ENVIRONMENTAL IMPACT ASSESSMENT

of

BASRAH CHILDREN'S HOSPITAL PROJECT

JO-04-511

in Cooperation with the

MINISTRY OF HEALTH,

GOVERNMENT OF IRAQ

PREPARED BY:

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EXECUTIVE SUMMARY

The Basrah Children's Hospital Project is sponsored by US Government (USG) as a part of Iraq Infrastructure Rehabilitation Program (IIR) for supporting the Government of Iraq (GOI), Ministry of Health (MOH). The project was started in 2003 by USAID with a total funding of $50 million. USAID completed approximately 35% of the project scope of work, after which the project was transferred to the Gulf Region Division (GRD) for completion. This project seeks to improve essential health services delivery to the people of Iraq by constructing a 94-bed pediatric hospital facility in the City of Basrah, which is an area that greatly suffered from neglect during the previous regime.

The project falls into the category of Positive Determination for activities that have a potential to cause major adverse environmental impacts, as determined by the Iraq Infrastructure Reconstruction (IIR) program IEE, approved on February 2, 2004. The project requires an environmental impact assessment (EIA) study as specified by Regulation 22 CFR 216.2 (d)(1)(xi), for large-scale construction projects, so that potential adverse environmental impacts due to the project and their appropriate mitigation and monitoring measures can identified. In planning for this EIA study, a decision was made with USAID and the ANE BEO for preparation of a study Scoping Statement for ensuring that all the pertinent environmental issues due to the project were fully addressed, and for including the participation of all the project stakeholders in the study (Government of Iraq MOH, USAID Iraq Mission, USAID Washington ANE BEO, and the project implementing partner).

The EIA study methodology was based on the list of environmental issues of importance that were suggested by the study Scoping Statement. This was also used during the selection of the multi-disciplinary professional study team, and in the preparation of an "Environmental Checklist" that was used as a field study tool for ensuring that all the pertinent environmental issues due to the project activities were fully addressed. The study team included: Gib Owen, Team Leader, US Corps of Engineers; John Pennell, USAID Iraq MEO; Leslie Perry, USAID Iraq Mission Health Officer; Fadiya Fahim and Randy Kraciun, Biology Specialists, US Corps of Engineers; Trey Kish and Janene Van Deroef, Bechtel Environmental Specialists; Fadiya Fahim, US Corps of Engineers Biologist; Jim Nuttall, Basrah Program Manager; Mike Atwell, US Corps of Engineers Basrah Project Manager; Iman Naji Al-Dabbagh, Government of Iraq MOH Official; and, Steve Beuby, Bechtel Project Manager. The draft report was reviewed and finalized by Ephantus Wahome, USAID Iraq MEO.

For project alternatives analysis, the EIA study team explored a number of alternatives to the proposed project action to identify the most environmentally-sound alternative that would also achieve the desired project objectives. The study team and the project stakeholders identified the important potential adverse environmental impacts due to each alternative, and then compared them before selecting the preferred alternative. The comparison of the evaluated alternatives showed that the proposed project will not cause severe adverse environmental impacts if the recommended adverse impact mitigation and monitoring measures are fully implemented as required, and that it will also achieve the desired project objectives. The EIA study methodology relied on the following:

- Desk Study for detailed review of available Iraq reports for obtaining general country information environmental, reports on building construction and health projects, general EIA reports, discussions with key informants from the Government of Iraq MOH staff, other Iraq based organizations and individuals working on health services delivery projects in Iraq, and the EIA study team members' own professional knowledge and experience on health services delivery improvement projects and their associated environmental impacts.
- Environmental Checklist that was prepared during the desk study to be used as a study tool for ensuring that all the environmental issues of importance were properly addressed during the EIA study. The checklist contained a list of project activities that are likely to cause adverse environmental impacts in the project site..
- Field Study in the proposed project sites for detection of any present live UXO and historical and cultural resources, and identification and assessment of the environmental parameters likely to be impacted by the project activities. The potential environmental impacts were identified in terms of their associated project activities, project development stages in which they are likely to occur, whether they are short-term or long-term, and their appropriate mitigation and monitoring measures. The study concluded that with appropriate mitigation and monitoring measures the project is not expected to have severe adverse environmental impacts.

The identified project adverse environmental impacts were closely related to changes in project site topography, ground clearing, excavations and leveling for the construction of the hospital building structure, removal of any present live UXO, generation and handling of hazardous waste, alterations to surface and ground hydrological characteristics affecting surface and groundwater quality, traffic movement obstruction and generation of noise and dust during the operation of heavy project construction machinery. Most of the adverse impacts are short-term, occurring only during the project construction phase, and include the following:

- Soil erosion impact due to ground surface excavations and leveling for building structure construction. Mitigated by only clearing and grading the approved project site work limits, and stripping and stockpiling the top soil to be retrieved for ground surface restoration and replanting of original vegetation for landscaping around the hospital building after the project is completed.
- Site pollution impact due to accumulation of solid and hazardous waste during the construction stage, composed of construction debris, replaced defective equipment parts, plastics, lead-based paint residues, heavy metals, and accidental spillage of fuel and oil. Mitigated by using recommended procedures for handling hazardous waste including identification, labeling, knowing the exact location, proper storage and disposal, and safe work practices.
- Hydrological and water quality impacts due to increased surface runoff caused by extensive ground pavements around the building, ground surface alterations and possible transportation of pollutants from the hospital surroundings by surface runoff to surface and groundwater. Mitigated through construction of site drainage system that is connected to the existing storm water control structures, allowing for cross drainage diversion structures, and a site specific drainage plan.

- Biodiversity impact due to vegetation clearing, ground surface excavations and leveling that could interfere with the local flora and fauna. There are no threatened or endangered biodiversity species that are known to exist within the project site. Mitigated by using the removed soil in landscaping around the paved project areas and replanting the original vegetation for enhancement of environmental quality.
- Traffic obstruction impact due to transportation of heavy construction machinery, building construction materials and hospital equipment along the urban roads. Mitigated by informing the members of the public about the temporary obstruction of traffic movements along the affected routes, and the inconveniences caused by the project construction activities, through announcements in the local press (TV, radio, newspapers, etc.) so that they can use alternative routes.
- Human heath and safety impacts during the removal of live UXO, exposure to hazardous waste likely to contain petroleum hydrocarbons and lead-based paint residues from the project sites during the site preparation for construction of project structures, and generation of noise and dust during the operations of heavy construction machinery. Mitigated by issuing the project construction personnel with personal safety equipment against noise and dust, and through training on use of safety equipment and safe handling of hazardous waste, and live UXO.
- Air pollution impact due to dust generated during ground excavations and leveling, and movements of vehicles. Mitigated by using appropriate dust control measures, such as minimizing the amount of ground disturbance, safe construction material handling, and water use for dust suppression and providing the project construction personnel with dust protection equipment.
- Noise pollution impact due to operation of heavy project construction machinery and movement of heavy transport vehicles. Mitigated by monitoring changes in noise levels, providing the project construction personnel with personal hearing protection devices, and conducting weekly training on use of protective devices.
- Historical and cultural resources impacts due to ground excavations affecting any present historical and cultural resources. Mitigated by conducting field surveys at the project construction site to detect the presence of any historical and cultural resources of importance before commencement of the project construction activities.
- Socio-economic (positive) impact during the project operation stage, by improving children's access to improved pediatric health services, including referral health services for patients suffering from severe chronic illnesses. Currently children with urgent need for cancer treatment and patients suffering from severe chronic illnesses are refereed to local private hospitals, and other hospitals outside the country.
- Medical waste generation impact during the project operation stage, which is a hazardous type of waste due to possible presence of disease pathogens. The waste may contain large amounts of solid waste (used cotton and bandages, tested medical specimens, expired drugs, used syringes and needles, human waste and radio active materials). Mitigated by separating the waste from other solid waste (paper materials, food remains, used plastic bags and bottles, used metal containers, empty bottles, used laboratory chemicals, etc), and burning the medical waste with well tuned incinerators to ensure complete combustion.

The EIA study has shown that the adverse environmental impacts due to the project can be easily minimized or prevented through the implementation of recommended adverse impact mitigation

and monitoring measures. The Government of Iraq, MOH field staff, the hospital administration and the local authorities need to be actively involved in ensuring that the recommended adverse environmental impact mitigation and monitoring measures are fully implemented as required, that the environmental quality around the project sites is well maintained, and that the medical waste incinerators are regularly serviced to ensure complete combustion of the hazardous medical waste.

BASRAH CHILDREN'S HOSPITAL PROJECT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PROJECT INFORMATION

Country Code-SO:	266-001
SO Name:	Iraq Infrastructure Rehabilitation Program
Country or Region:	Iraq
Activity Name:	Basrah Children's Hospital Project
Funding Begin:	Funding Begin: August 3, 2004; Funding End: September 30, 2006
Funding Amount:	$ 50million

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ACRONYMS

IIR	**Iraq Infrastructure Rehabilitation**
22 CFR 216	**Title 22 of the Code of Federal Regulations Part 216**
ANE	**Asian & Near East Bureau**
BEO	**Bureau Environmental Officer**
MEO	**Mission Environmental Officer**
BMP	**Best Management Practice**
BOQ	**Bill of Quantities**
Iraq Reconstruction Management Office	**IRMO**
Iraq Relief and Reconstruction Funds II	**IRRF II**
CECP	**Construction Environmental Control Plan**
GRD	**Gulf Regional Division**
CEMVN	**U.S. Army Corps of Engineers, New Orleans District**
dbA	**Decibels**
PEA	**Programmatic Environmental Assessment**
EIA	**Environmental Impact Assessment**
EIS	**Environmental Impact Statement**
HTRW	**Hazardous, Toxic, and Radio Active Wastes**
NGO	**Non-Governmental Organization**
MOU	**Memorandum of Understanding**
MOH	**Ministry of Health**
HMMP	
IUCN	**International Union for the Conservation of Nature**
km	**kilometers**
km^2	**square kilometers**
MH	**Ministry of Health**
Mi	**miles**
mi^2	**square miles**
MoE	**Ministry of the Environment**
NEPA	**National Environmental Policy Act**
ROI	**Republic of Iraq**
T&E	**Threatened or Endangered species**
UNICEF	**United Nations Children's Fund**
UNEP	**United Nations Environment Program**
IUCN	**International Union for Conservation of Nature**
USAID	**United States Agency for International Development**
UXO	**unexploded ordnance**

1 INTRODUCTION

The Basrah Children's Hospital Project is sponsored by US Government (USG) as a part of Iraq Infrastructure Rehabilitation Program (IIR) for supporting the Government of Iraq (GOI), Ministry of Health (MOH). The project was started in 2003 by USAID, with a funding allocation of approximately $50 million, when the GOI identified a need for the construction of a pediatric hospital facility in the City of Basrah. The project seeks to improve essential pediatric health services delivery to the people of Iraq by constructing a 94-bed hospital facility. After completion of approximately 35% of the project scope of work by USAID the project was transferred to the Gulf Region Division (GRD) for completion.

The project site is located to the southeast of the City of Basrah, within an area that is near a residential estate, a sewer, power transmission lines, water supply lines, and is close to the main highway (Figures 1, 2 and 3). At the start of the project, consideration was given to the design and construction of a new pediatric hospital building, but it was later decided that the rehabilitation of an existing suitable building structure would be a better option, due to limitation of funding. The suitability of each of the 11 selected existing building structures (Table 1) was assessed by representatives from USAID Iraq Mission, US Army Corps of Engineers, Bechtel and Government of Iraq, MOH before the final selection of the building to be rehabilitated was completed.

1.1 PURPOSE AND NEED OF THE PROJECT ACTION

1.1.1 Purpose

The project will provide support for improvement of health care facilities in the southern region of Iraq, where the challenges facing the delivery of improved health services are unique, due to a long period of neglect during the previous regime. This project is also meant to improve the delivery of health care services to urban residents in the City of Basrah, and also provide referral medical services to the entire southern region of Iraq and other parts of the country.

The hospital is also expected to include an outpatient clinic for general health care services, emergency attendance, referral medical services, primary care clinics, chemotherapy and radiation therapy, X-ray imaging, intensive care unit, surgery room (theatre), four in-patient wards, supporting services (cafeteria, laundry, laboratory analysis, morgue, physical therapy, pharmacies, etc.), administrative offices, and conference and training facilities.

1.1.2 Need

Children from the Governorates of Basrah, as well as the neighboring southern Governorates of Al-Muthana, Thi-qar and Missan do not have access to a pediatric services hospital. The total population of the four Iraq southern Governorates is 4.6 million, and 0.9 million are children below the age of 14. Despite being Iraq's third largest city with a population of over 1.3 million (2002 National Census), the Governorate of Basrah lacks the necessary health facilities for improved delivery of health services, due to many years of conflict and repression under the

former Government of Iraq. This project has been designed to benefit the people of Basrah and the surrounding Governorates by providing improved pediatric health care hospital facilities.

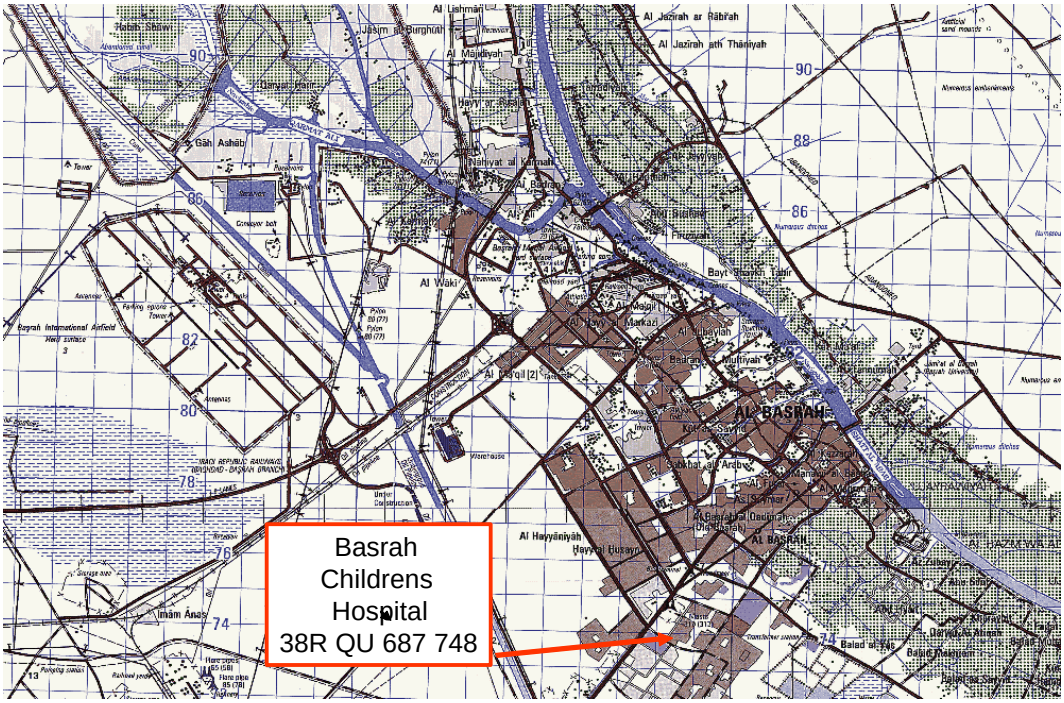

Figure 1: Site Location for Basrah Children's Hospital

Currently children with urgent need for cancer treatment, and those suffering from severe chronic illnesses have to be referred to expensive private hospitals in other parts of the country, or outside the country. After discussions with the MOH on the critical need for constructing the hospital facility, USG agreed to provide funding support for the design and construction of the new pediatric hospital, using basic minimum design standards that are consistent with internationally recognized best practices.

1.2 NEED FOR EIA

An EIA is a formal study process that is used in identifying likely adverse effects of development activities on the environment, and on human health and welfare. The study identifies potential adverse environmental impacts due to the project, and their appropriate mitigation and monitoring measures.

The Basrah Children's Hospital Project falls in the category of Positive Determination (high environmental risk) as determined by the IIR Program IEE, that was approved in February 2, 2004. This requires a full EIA study as specified by Regulation 22 CFR 216.2 (d)(1)(ix) for power development and management projects, since the project has a potential to cause significant adverse environmental impacts, which cannot be resolved by the IEE alone.

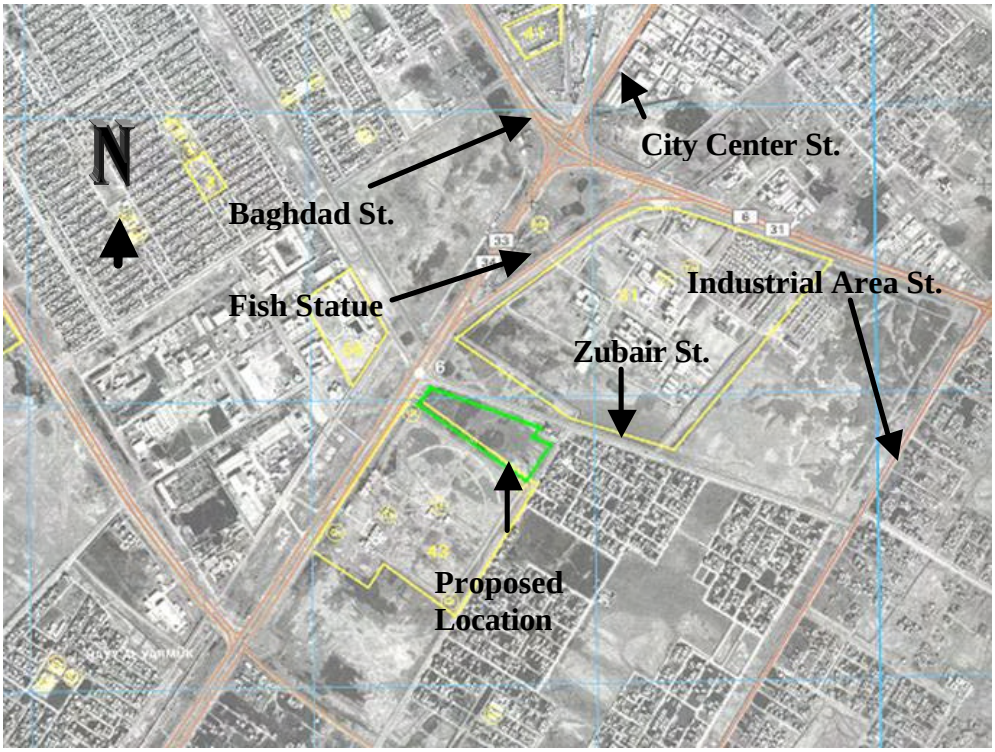

Figure 2: Proposed Basrah Children's Hospital Site Diagram

A Scoping Statement was prepared for the EIA study for ensuring that all the pertinent environmental issues due to the project were fully addressed. The preparation of the statement included the participation of all stakeholders in the project (Government of Iraq MOH, USAID Iraq Mission, USAID Washington ANE BEO, Local Authority and the project implementing partner).

2 EIA STUDY APPROACH AND METHODOLOGY

2.1 STUDY APPROACH AND METHODOLOGY

The EIA study for Basrah Children's Hospital Project was carried out in accordance with the requirements of the EIA study Scoping Statement (Appendix 1). The study process included three stages as follows:

Desk Study: This study was for review of available reports for obtaining country environmental information (Reports by UNEP 2003, UNDP 2004, IUCN 2002, etc.), reports on previous electric power development projects in Iraq and their associated environmental impacts, and individual study team members' contributions from their field experience and knowledge on Iraq environment. A general overview of the existing environmental threats in Iraq was also discussed during the periodic ad-hoc study team meetings that were held for study coordination. This also included holding discussions with other key informants involved in power development projects and environmental management activities in Iraq.

Environmental Checklist: The checklist was prepared as a field study tool with close reference to the proposed project activities and the study Scoping Statement requirements. This was to ensure that all the pertinent environmental issues were fully addressed during the environmental assessment study field study and the preparation of the EIA report.

Field Study: This was carried out to assess the existing environmental parameters in the proposed project site, through detailed field observations of existing environmental features and indicators. It was also during this stage that field assessments were carried out for detection of any present UXO and objects of historical or cultural importance. The identification of potential adverse environmental impacts was carried out using the proposed project activities as provided in the environmental checklist, and the existing site environmental parameters likely to be impacted by the project activities. The activities included project site clearing, ground excavations and leveling, operation of heavy construction machinery, transportation of project construction materials, etc. The field study was also used in updating the environmental information that was obtained during the desk study.

Figure 3: Proposed location for Basrah Children's Hospital.
(Looking Northwest from the East Property Boundary)

2.2 PROPOSED ACTION AND ALTERNATIVES

For project alternatives analysis, the EIA study team explored a number of alternatives to the proposed project action to identify the most environmentally-sound alternative that would also achieve the desired project objectives.

The EIA study team and the stakeholders identified the potential adverse environmental impacts of each alternative and then compared them to select the most appropriate alternative.

2.2.1 Proposed Project Alternative

The proposed project is meant to improve the delivery of health care services to urban residents in the City of Basrah, and also provide referral medical services to the entire southern region of Iraq and other parts of the country. The original plan was for the design and construction of a new pediatric hospital, but it was later decided that the rehabilitation of an existing building structure would be a better option, due to limitation of funding.

The suitability of each of the 11 selected existing building structures (Table 1) was assessed, using a "site criteria checklist". The checklist included access to water supply lines, capacity of sewer to accommodate increased sewage volume from the proposed hospital building, electric power lines, access to roads, requirement for remedial site work, clear land ownership title, proximity to other medical facilities, and presence of squatters and UXO on project site, which the team used to select the most suitable project site.

2.2.2 No Action Alternative

The no action alternative would mean that that the hospital facility would not be constructed if the potential adverse environmental are found to be severe. The final result would be that the children from the governorate of Basrah, as well as the adjacent southern governorates of Al-Muthana, Thi-qar and Missan would not have a readily available access to pediatric health services. The only hospital in Basrah which provides specialized pediatric services is the Maternal and Child Health Hospital, where the available services are not adequate to meet the needs of children under the age 14 years. If the proposed project is not implemented, the children with cancer problems and other chronically ill patients would have to continue being referred to expensive private specialized hospitals in other parts of the country, or even outside the country.

The no action alternative could have only been considered if the potential adverse environmental impacts due to the project were expected to be very severe, and not easy to mitigate and monitor. As noted earlier, the comparison of the various considered project alternatives showed that the proposed project will not cause severe adverse environmental impacts if appropriate mitigation and monitoring measures are identified and fully incorporated during the project design and implementation stages.

2.3 COMPARISON AND SELECTION OF ALTERNATIVE

After comparing the various considered alternatives it was determined that only the proposed project action satisfies the purpose and need to improve the health care facilities in the southern region of the country of Iraq. The proposed action will provide facilities for a pediatric oncology hospital with a 94-beds ward, outpatient treatment facilities and also serve as a referral hospital for patients from the City of Basrah and from other parts of Iraq. This will also include facilities for surgery, laboratory analysis, emergency attendance facilities, and training facilities for doctors and nurses.

It was also noted that with appropriate mitigation and monitoring measures the project would not cause severe adverse environmental impacts. The comparison of the various considered project alternatives showed that the proposed project will not cause severe adverse environmental impacts if appropriate adverse impact mitigation and monitoring measures are identified and incorporated in the project design and implementation. Therefore the proposed project alternative was selected for more detailed environmental analysis and construction.

2.4 REPORT PREPARATION

The EIA report was prepared using the available country environmental information obtained during the desk study, reports from the Government of Iraq MOH, review of available professional journals on PEA/EIA studies and reports from environmental and health services delivery organizations operating in Iraq, and the field information collected during the field survey of existing environmental parameters in the proposed project site. The information obtained from the desk study and the field study was used during the identification of potential adverse environmental impacts due to the project and their appropriate mitigation measures

Public consultation and review was invited during the preparation of the EIA study Scoping Statement, and after the completion of the first draft EIA report. The draft report was also reviewed by the ANE BEO and the USAID Iraq MEO, who compiled all the submitted public consultation observations and comments and gave them to the EIA study team to be incorporated during the preparation of the final report.

	Working Names:	Also Known As (AKA):	Category:	Classification:	~ Bed Capacity:	GPS Coordinates:
1	Al Fayha Hospital	Czech, Al-Basrah Military	Public	General	400	67021 N 81260 E
2	Al-Mawani Hospital	Al Tahrir General Teaching, Port Administration, Republican, 2nd General Hosp.	Public	General	400	66981 N 83225 E
3	MCH Hospital	Maternity and Children's, Maternity and Pediatric	Public	Specialized	400	72019 N 78258 E
4	Basrah General Hospital	N/A	Public	General	682	66900 N 83200 E
5	Al Sadr Teaching Hospital	Saddam General Teaching, Al Talimi	Public	Specialized	449	73400 N 78400 E
6	Al Shefah Hospital	Ibn Majeed Naval	Public	General	200	69572 N 81718 E
7	Al Rahmah Private Hospital	Al-Saadoon Private	Private	General	50	73008 N 77671 E
8	Al Noor Private Hospital	N/A	Private	General	15	72340 N 79279 E
9	Ibn Al-Bitar Private Hospital	N/A	Private	General	15	68247 N 76835 E
10	Sheraton Hotel	N/A	Hotel	-	-	N / A
11	Second Palace	UN Building, CPA Business Center	Government	-	-	N / A

Table 1: Evaluated Hospitals and Facilities
(Note: Sites 1 through 3 were recommended sites for further assessment)

3 DESCRIPTION OF THE COUNTRY ENVIRONMENT

3.1 COUNTRY LOCATION

The Republic of Iraq is located in the Middle East, and is surrounded by six neighboring states (Iran to the east, Turkey to the north, Jordan and Syria to the west, Saudi Arabia to the south, and Kuwait to the south-east. The country is located between 29 and 38-degree latitude and between 39 and 49-degree longitude, and covers a land area of 438,320 square kilometers, with a coastline of 58 km in length (Figure 4).

3.2 CLIMATE

The country is mostly hot and dry, although the mountainous north and north-east, where the highlands rise to over 12,000 feet have cooler temperatures and more rainfall. The extremely hot, dry summer months last from May through October and produce maximum daytime temperatures that reach 40 degrees centigrade, usually varying between 31 – 34 degrees Centigrade. Summer months also feature strong winds and sandstorms. During the winter season,

the mean daily maximum temperature is 17 degrees centigrade; but the temperatures are colder in the highlands.

Figure 4: Country Location

The main rainfall period is November to April, with most of the rainfall falling between December and March. The remaining period of six months, particularly June to August is dry. Precipitation is highest in the north and north-eastern highlands, which receive 760 – 1,000 mm. of rainfall annually, and snow up to three months per year. The mean annual rainfall ranges between 100 – 170 mm in other parts of the country, and the summer months feature two types of wind. The southerly wind occurring from April to June is a dry dusty wind, and the wind occurring from June to September is dry and hot. The country is hot and humid at the coast and dry in the interior, with a desert covering over 40% of the land area.

3.3 AGRO-ECOLOGICAL ZONES

Iraq has four agro-ecological zones which include desert plateau, northeastern highlands, uplands region and the alluvial plain:

Desert Plateau: Approximately 40% 0f Iraqi territory consists of a broad, stony plain with scattered stretches of sand, lying west and southwest of the Euphrates River and sparsely inhabited by pastoral nomads. A network of seasonal water courses or wadis runs from the country's western borders towards the Euphrates River. The area west of the Euphrates River is part of the Syrian Desert, which is shared by Syria, Jordan, and Saudi Arabia. This area is uninhabited, except for a few pastoral nomads. The landscape is mainly shaped by wind and water erosion (wadis or dry river and stream beds are present). Desert and steppe cover parts of the alluvial plain, but they are locally interrupted by depressions with drainage channels

North-Eastern Highlands: This region covers approximately 20% of the country, and extends south of a line between Mosul to Kirkuk towards the boarders with Turkey and Iran, where mountain ranges reach up to 3,600 m in latitude. This area is mountainous with valleys that are suitable for cultivation, and are mostly wooded and mainly used for livestock grazing. The Mesopotamian syncline is a deep alluvial valley trough, which is filled with sediments from the mountains deposited by the Tigris and Euphrates Rivers. The City of Baghdad is located within this syncline and occupies both banks of the Tigris River.

Uplands Region: About 20% of Iraq comprises a transitional area between the highlands and the desert plateau, located between the Tigris north of Samarra and Euphrates north of Hit, and forming part of a large natural area that extends into Syria and Turkey. Much of this zone may be classified as desert because watercourses flow in deeply cut valleys, making irrigation far more difficult than in the alluvial plain. The upper Mesopotamia portion of this region, the up-tilting part, is represented by what is called in Arabic "Jirah" (the island) and falls between the middle courses of the Euphrates and Tigris Rivers

Alluvial Plain: Approximately 30% 0f Iraq is composed of the alluvial plain formed by the combined deltas of the Tigris and Euphrates Rivers. This region begins north of Baghdad and extends south to the Gulf Coast bordering Iran. The once extensive wetlands of the region have been decimated by damming and diversions of the Euphrates River in Turkey and Syria, and by large-scale drainage works carried out by the previous Baathist Iraq regime. The plain begins near Samarra and Ramadi, ending near the Gulf Coast after covering a distance of approximately 600 km long and 200 km wide. From Baghdad the basin tilts to the southeast to the City of Hilla, which is situated on the eastern bank of the Euphrates River, in an area that is also a part of the alluvial plain. Southeastern Iraq also has remnants of Mesopotamian marsh low-lying plains and complex interconnected shallow freshwater lakes and canals. The Tigris and Euphrates Rivers flood this area seasonally during month of March through May. The City of Basrah is located in this area.

3.4 TOPOGRAPHY

The terrain of the country includes large flat expanses deeply cut by Euphrates and Tigris Rivers that originate from Syria and Turkey, and wadis (dry river beds) that are dry during most of the year. The delta lowland region of the Tigris and Euphrates Rivers basin extends southerly from the north of Baghdad to Arabian Gulf. The area is flat and encompasses 7,500 square km. of marshland, with scattered lakes in the south-eastern area. The south-western desert region is an

extension of the Arabian Peninsula that comprises half of Iraq's total area, but is home to only 1% of the population. The desert region extends into Syria, Jordan, and Saudi Arabia, and is sparsely inhabited by nomads, mainly consisting a wide stony plain that is interspersed with a few sandy stretches. Some wadis are more than 400 kilometers long, and they flood during the winter rainy season.

The north-eastern region borders with Turkey to the north, and the terrain elevation increases towards Iran. This changes from rolling plateau nearest to Turkey to irregular hills, and then to high mountains ridges (the Zagros Mountains), where summits average 2,440 meters above sea level. Except for a few valleys, the mountain area is mainly used for livestock grazing in the foothills and steppes, and the fertile soil in the valleys and high rainfall, however, make cultivation possible. The uplands region between the Tigris and the Euphrates Rivers extends westwards into Syria and Turkey, with water flowing into deep valleys, making irrigated agriculture more difficult than in the lower plain.

3.5 DRAINAGE

The main sources of water in Iraq are the twin Euphrates and Tigris Rivers that originate in Turkey, which are vital to supporting livelihoods in Iraq. The problem of water scarcity is a continuing source of conflict in the region because of the mostly dry and hot climate. Iraq exercises the greatest control over the Tigris, since more than 1,500 km of the river's total length of 1,900 km. (80%) run through Iraq. Also, nearly 60% of the fresh water inflow enters the Tigris through tributaries originating from the Zagros Mountain range that collect most of the runoff within Iraq. After crossing the Turkish border, the Tigris River maintains a fairly constant slope for 36 km, and a stable course through soft bedrock for approximately 500 km. The average flow rate of the Tigris is approximately 1,500 cubic meters.

The Euphrates extends 2,700 km from its headwaters in Turkey, and only 1,000 km of the river lie within Iraqi borders. There is no fresh water inflow into the Euphrates from within Iraq, and approximately 85% of the inflow occurs within Turkey, with the remaining 15% in Syria. The construction of dams within Turkey has greatly reduced the threat of flooding along the Euphrates within Iraq, but this has also reduced the water supply required for supporting irrigated agriculture in Iraq. Although these dams are necessary in ensuring human health and safety through flood control, they also need to be managed in a way that they ensure sufficient downstream water availability for irrigated agriculture development in Iraq to prevent future resource use conflicts (US Department of Defense, 2003).

3.6 GEOLOGY AND SOILS

The desert plateau which covers approximately 40% of Iraq territory consists of a broad, stony plain with scattered stretches of sand, lying west and south-west of the Euphrates River. The Mesopotamian syncline, on which Baghdad sits, is a deep trough, filled with sediments derived from the mountains and transported by the rivers. The lower plains between the Euphrates and Tigris Rivers have been formed by the sedimentation of fluvial material resulting from historic floods.

Most of the soils are arid-alluvium soils that are some of the most important soils in Iraq because they support irrigated agriculture, which is a major land use type in the area. These soils are highly susceptible to salinization (accumulation of harmful salts in the crop root zone, due to poor drainage), and soil erosion by water and wind. The soils need to be managed in a way that the occurrence of salinization and accelerated soil erosion caused by wind and water are effectively controlled. Approximately 30% of Iraq is composed of the alluvial plain, formed by the combined deltas of the Tigris and Euphrates Rivers. This region extends from north of Baghdad to the south, and includes the Gulf coast bordering Iran (UNEP, 2003).

3.7 POPULATION AND HEALTH

The 1997 national population census recorded a population of 22.3 million people, with an average population density of 51 persons per square kilometer. The current population growth rate is about 3% per year, with a possibility of the national population doubling in about 25 years. Today, roughly about 40% of the population is under the age of 15 years. There is no reliable estimate for the resident population in the country, and demographic statistics indicate that the population is comparatively worse off than that of its neighbors in terms of life expectancy, nutrition and infant mortality (UNEP, 2003).

Many religions are practiced, but Islam (both Sunni and Shiite sects), account for 97% of the population, with the country including some of the holiest shrines of Islam. There are 23 spoken languages with various dialects of Arabic dominating. Kurdish dialects are spoken by about 20% of the population, highlighting the difference between much of Iraq and “Kurdistan” in the north. The country is currently in a serious political crisis.

The human health situation is a major concern, not only for Iraqi people but also for foreign soldiers and aid workers operating in the country. There is a variety of diseases and human health hazards that pose a serious health risk, (e.g. malaria, typhoid, tuberculosis, cholera, etc.) that are endemic in the country (UNEP, 2003).

3.8 ELECTRIC POWER DISTRIBUTION INFRASTRUCTURE

About 20 power generation stations, and up to 90% of Iraq’s electricity distribution grid system was damaged or destroyed during the 1991 Gulf War. By 1998, the Iraqi Government authorities estimated that about 45% of the maximum pre-war generation capacity had been restored, with a report in November 1999 indicating that this figure may have increased to around 65%. But all the same, power continued to be rationed everyday throughout the country.

Before 2003, electricity was available for less than 12 hours per day in parts of the country, resulting in the degradation of public services, ranging from water supply and sanitation systems, to educational and health facilities, as well as a substantial drop in overall living standards. Iraq has for a long time provided services to its citizens for electric power supply, potable water supply, wastewater treatment, health care and education for “free”, mainly using the national revenue generated from sales of oil and gas to support these services.

3.9 AGRICULTURE, AGRIBUSINESS, LIVESTOCK, AND FISHERIES

Agricultural production in Iraq includes barley, wheat, and rice. Iraqi fruits products include pears, apples, oranges, grapes, dates, figs and pomegranates. The City of Baghdad is known for date palms that are mainly found along residential streets. The date palms trees bear fruit in September and October if there is ample rainfall and a mild summer. There are more than 300 different varieties of dates, which form an intricate part of Iraqi culture, with many traditional uses, such as furniture, baskets (or large containers), and mats made from leaves that can also be used as flotation devices. The fruit is eaten during religious ceremonies, and has historically been a major export. The populations of date palm trees have been decimated by conflicts (wars), salt-water intrusion, and lack of electricity for irrigation, from approximately 30 to around 13 million trees.

Before the United Nations imposed sanctions after the Gulf War in 1991, Iraq's export of dates accounted for a major share in the world market for this product. Livestock production, such as poultry, sheep, buffalo, camels, goats, and cattle are also raised in the upland regions and on farms within the Mesopotamian syncline. There is limited information on commercial fishing in Iraq, but there is some evidence of a small fishing industry that relies mainly on the common carp fish and other freshwater fish. As Iraq rebuilds itself and its economy stabilizes, opportunities for the expansion of agricultural production and agribusiness activities, and increased livestock and fisheries production will become available.

3.10 BIODIVERSITY RESOURCES

3.10.1 Vegetation (Herbaceous Cover)

Natural herbaceous vegetation (ground surface cover) in Iraq is extremely sparse, except in the northern mountains and the marshlands (wetlands) areas in the south. The once extensive wetlands of the region have been decimated by damming and diversion of the Euphrates in Turkey and Syria, and by large-scale drainage works carried out by the previous Iraq Baathist regime. The desert ecosystems that are found in a large part of the country are particularly vulnerable to physical damage from vehicle movements, which result in loss of vegetation ground surface cover and desegregations of soil particles. Iraq's deserts have therefore been at risk of widespread degradation during the military conflicts of recent decades (UNEP, 2003). The desert crust is a layer of algae, mosses, lichens, fungi, bacteria and cyanobacteria that occupy the top one millimeter of the desert soil. These organisms are dormant when dry, but they become active when wet. The crust has major ecological value in the desert ecosystem as a protector of the thin desert soil organisms against wind erosion, and as a suitable bed for seed germination. The crust is known to be highly fragile, and is easily damaged by vehicles, and takes a long time to repair itself. Extensive desert crust damage caused by vehicle movements was detected by Birdlife International in Iraq and Kuwait following the 1991 Gulf War (UNEP, 2003).

3.10.2 Forest Cover

Forest cover in Iraq (including both natural forests and plantations) has been estimated to be 799,400 hectares (FAO - Global Forest Resources Assessment, 2000). An earlier FAO study from 1970 included a figure of 1.8 million hectares, which shows a clear suggestion of extensive deforestation during the 1980s and 1990s. A UNEP, 2001 study for assessment of the world's closed forests (where tree cover is greater than 40% of the land surface) gives a figure of 1,100 hectares for Iraq, showing that most of the country's forest cover consists of scattered trees. The only major areas of natural forest cover occur on the slopes of the north east mountain ranges, with a few remnant patches of riverbank scrub along the Euphrates and Tigris Rivers, and their main tributaries. In its undisturbed state, this forest forms dense stands of poplar (mainly *Populus euphratica*) and tamarisk (*Tamarix* spp.), with an under-story of species such as the Barbary Boxthorn. The remainder of the country is treeless, except for areas where tree plantations have been established, including tree crops such as date palms. Most of the original riverine forests that existed along the Tigris and Euphrates River courses have been cleared and converted to agricultural lands (UNEP, 2003).

3.10.3 Wildlife

There is scant information on the numbers and distribution of wildlife in Iraq. The endangered mammals such as the gray wolf, the smooth-coated otter, and the honey badger are believed to range in the south of Iraq in the marshlands. The database listed 33 threatened species that could be found in Iraq: Cheetah (*Acinonyx jubatus*), Euphrates jerboa (*Allactaga euphratica*), Wild goat (*Capra aegagrus*), Grey Dwarf Hamster (*Cricetulus migratorius*), Forest Dormouse (*Dryomys nitedula*), Asian Garden Dormouse (*Eliomys melanurus*), Cinereous Bunting (*Emberiza cineracea*), European Pond Turtle (*Emys Orbicularis*), Sind Bat (*Eptesicus nasutus*), Sand Cat (*Felis margarita*), Saudi Gazelle (*Gazella saudiya*), Goitered Gazelle (*Gazella subgutturosa*), Striped Hyaena (*Hyaena hyaena*), European Common Tree Frog (*Hyla arborea*), Common Otter (*Lutra lutra*), Indian Smooth-coated Otter (*Lutrogale perspicillata*), Eurasian Lynx (*Lynx lynx*), Common Bentwing Bat (*Miniopterus schreibersi*), Long-fingered Bat (*Myotis capaccinii*), and Bunn's Short-tailed Bandicoot Rat (*Nesokia bunnii*).
The International Union for Conservation of Nature (IUCN) wildlife species list for Iraq includes reptiles and amphibians, such as toads (*Bufo viridis*), tree frogs (*Hyla arborea*), the marsh frogs (*Rana ridibunda)* and the edible frogs, *R. esculenta* (may be a hybrid of marsh frog and pool frog, *R. lessonae).* The common reptiles found in the marshes include the Caspian terrapin (*Clemmys caspia*), a soft-shell turtle (*Trionyx euphraticus*), geckos of the genus *Hemidactylus*, two species of skinks (*Mabuya aurata* and *M. vittata*), and a variety of snakes including the spotted sand boa (*Eryx jaculus*), tessellated water snake (*Natrix tessellata*) and gray's desert racer (*Coluber ventromaculatus*). The desert monitor (*Varanus griseus*) can sometimes be found in the areas adjacent to the rivers and marshes.

The IUCN database lists 404 species of birds that are believed to exist in Iraq, of which 14 are included in the global list of threatened species. For Iraq, the global list of threatened bird species includes: White-headed duck (*Oxyura leucocephala*), Lesser White-fronted Goose (*Anser erythropus*), Red-breasted Goose (*Branta ruficollis*), Marbled Teal (*Marmaronetta*

angustirostris), Ferruginous Pochard (*Aythya nyroca*), Corn Crake (*Crex crex*), Slender-Billed Curlew (*Numenius tenuirostris*), Sociable Lapwing (*Vanellus gregarious*), Pallas's Sea-Eagle (*Haliaeetus leucoryphus*), Greater Spotted Eagle (*Aquila clanga*), Lesser Kestrel (*Falco naumanni*), Waldrapp (*Geronticus eremite*), and Dalmatian Pelican (*Pelecanus crispus*) while the Great Bustard (*Otis tarda*) is considered to be Extirpated globally. Bird species considered to be endangered in Iraq include: Imperial Eagle (*Aquila heliaca*), Houbara Bustard (*Chlamydotis undulate*), Pale Harrier (*Circus macrourus*), Lesser Kestrel (*Falco Naumanni*), Black-winged Pratincole (*Galreola nordmanni*), Grey Sea Eagle (*Haliaeetus albicilla*), Basra reed warbler (*Acrocephalus griseldis*), Long-billed Curlew (*Numenius tenuirostris*), and the Band-Tailed Fish-Eagle (*Haliaeetus leucoryphus*). The Long-Billed Curlew is considered critically endangered because all the remaining individuals are believed to live in a single sub-population of less than 50 mature individuals. The three endemic birds of Iraq - the Basra reed warbler, the Iraq babbler (*Turdoides altirostris*), and the Grey hypocolius – are marshland birds and are found primarily in the marshlands of the south. Two of these species, the Iraq Babbler and Basra Reed Warbler, are known to breed only in the marshes.

The Iraq region is especially important as part of the intercontinental flyways used by large populations of birds migrating between Africa and Eurasia. The majority of sites that are important for biodiversity conservation have no protected area status; although many have been recommended for designation (e.g. BirdLife International recognized a total of 42 sites in Iraq as important bird conservation areas, which cover about 35,000 square km, or 8% of the country surface area.). None of these areas have legal protection for biodiversity conservation, and many of the wetlands are critically threatened by flood control, irrigation, and drainage projects being carried out in the country and neighboring countries.

3.11 BIODIVERSITY AND ENVIRONMENTAL THREATS IN IRAQ

The main biodiversity and environmental threats that are contributing to ecosystem and biodiversity degradation in Iraq are: (1) Destruction of the Mesopotamian marshes and degradation of the Shatt Al-Arab region; (2) Destruction of forest cover; (3) Desertification and drought; (4) Pollution and contamination; (5) Military Operations and Insurgency Conflicts; and, (6) Irrigation and Soil Salinization.

3.11.1 Destruction of Mesopotamian Marshes

The Iraq Mesopotamia marshlands (wetlands) are in a generally arid and semi-arid region and are of great importance for the conservation of biodiversity and support of community livelihoods. The destruction of the marshlands, which were of global conservation value, has been well documented (UNEP Reports: The Mesopotamia Marshlands: Demise of an Ecosystem, 2001; and, Desk Study on the Environment in Iraq, 2003). These studies have revealed that wetlands in the middle and lower parts of the Tigris and Euphrates Rivers were, until recently, the most extensive wetland ecosystems in the Middle East. The marshes covered an area of 20,000 square km, comprised of tall reeds, seasonal marshes dominated by desert shrub and grasses, shallow and deep-water lakes, slightly brackish seasonal lagoons, and regularly inundated mudflats. The wetlands extended from Basra in the south to within 150 km of

Baghdad, but the core of the wetland system was located around the confluence of the Tigris and Euphrates Rivers (UNEP, 2003).

Previous government water control projects have drained most of the inhabited marsh areas east of An Nasiriyah by drying up or diverting the feeder streams and rivers. A once sizable population of Marsh Arabs, who inhabited these areas for thousands of years, has been displaced and furthermore, the destruction of the natural habitat poses serious threats to the area's wildlife populations, and inadequate supplies of potable water. The development of the Tigris and Euphrates rivers system contingent upon agreements with upstream riparian Turkey, air and water pollution; soil degradation (salinization) and erosion, and desertification. Massive drainage works in southern Iraq in the late 1980s and early 1990s, together with the effects of major upstream damming along the Tigris and Euphrates Rivers devastated the wetlands through desiccation. This has caused a total loss of 90% of the area originally covered by wetlands, such that only minor and fragmented parcels remain today. As a result this has put an end to the water filtering role of the marshlands for water purification, causing the remaining drainage canals to transport polluted irrigation waste water directly to the waters of the Persian Gulf, with potentially harmful impacts on local fish resources. The entire Marsh Arab community has suffered huge socio-economic upheaval as a result of the marshlands destruction, with about 40,000 people being forced to flee to the southwest of neighboring Iran, and hundreds of thousands of IDPs within Iraq (AMAR/ICF, 2001). Also, most of the natural freshwater lakes and marshes in central and northern Iraq have been drained for agricultural purposes, although significant remnants of the marshes still remain.

3.11.2 Destruction of Forest Cover

There does not appear to be any readily available data on Iraq's natural forest cover and risks due to threats caused by resource utilization, but the combination of conflict and sanctions have caused increased pressure on the utilization and mismanagement of forests and their resources. During the 1980s and 1990s, about 80% of the approximately 17 to 18 million date palms tree crops lining the Shatt Al-Arab estuary, which was once the largest stand of date palms in the world, yielding an economically important crop of dates, were destroyed. This was mainly due to the consequence of the Iraq and Iran war, increased water salinity in the estuary, and large-scale upstream development of dams and irrigation schemes. There is a need for an up to date assessment of the forest resources in Iraq (UNEP, 2003).

The remaining, weakened palms have been highly susceptible to pest infestations and disease that have further degraded the quality of the environment (Partow - UNEP, 2003). Most of the riverine forests which once lined the banks of Tigris and Euphrates have been replaced by orchards and other cultivated land, but significant stands of natural forest still exist, especially on small islands (UNEP, 2003). The surviving natural forest cover provides important breeding habitat for a wide variety of birds, such as grey *Hypocolius ampelinus*, Iraq babbler, *Turdoides altirostris* , and Dead Sea sparrow *Passer moabiliticus.* These forests are also used as staging areas by large populations of migrating birds, between Africa and Asia.

3.11.3 Desertification and Drought

Desertification is the process of land degradation that is mainly caused by poorly regulated land use practices and climatic factors in arid, semi–arid and dry sub-humid areas. This occurs because dry ecosystems are highly fragile and extremely vulnerable to over-exploitation and inappropriate land use practices, causing the loss of life support capacity of the land. In Iraq the combination of impacts of military conflicts, internal policies and external sanctions have contributed to a high risk of desertification occurrence. This has been exacerbated by drought, and the destruction of the Mesopotamian Marshes (UNEP, 2003). Also, the degradation of grazing areas in the arid and semi-arid areas (rangelands) will have particularly adverse effects on the nomadic pastoralists. Desert ecosystems are particularly highly vulnerable to physical damage from vehicle movements, which result in loss of vegetation cover and desegregation of soil particles. During the military conflict of recent decades, Iraq nomadic grazing areas and deserts have been highly susceptible to the risk of widespread land degradation. The extensive desert crust damage from increased vehicle movements was detected by Birdlife International in Iraq and Kuwait, following the 1991 Gulf War (Greenpeace, 1999).

The problems of uncontrolled resource use due to internal conflicts and poorly regulated irrigated agriculture practices that cause soil salinization, including soil erosion due to overgrazing, vehicle movements causing loss of vegetation cover and desegregation of soil particles, will have major implications on Iraq's ability to sustain agricultural production and to conserve the natural resource base (UNEP, 2003). In addition to unsustainable land management practices, there are also a number of institutional constraints which are reducing the effectiveness of biodiversity and forestry protection in Iraq. For example, there is poor coordination among various organizations (e.g. NGOs and international organizations) that are involved in natural resources management, due to the present conflict and political instability.

3.12 Environmental Pollution and Contamination

There are specific environmental pollution concerns in Iraq, caused by conflict damaged water and sanitation facilities in urban and industrial areas, oil wells, pipelines, refineries and petroleum storage sites. This stresses the need for identification, assessment and clean up of possible environmental pollution "hot spots" that pose immediate risks to human health, and damage to biodiversity resources and the environment, that require immediate attention. Some of the worst pollution "hot spots" include damaged industrial and military sites, sewage treatment facilities and places where municipal or medical (clinical waste) has accumulated in the urban areas.

Potential health risks due to air pollution caused by burning oil wells and pipelines, and fires at targeted industrial and military sites, also need to be assessed and remedial measures affected accordingly. To address these environmental concerns effectively, the environment should be fully integrated into all Iraq reconstruction and development plans and management operations (UNEP, 2003).

3.13 MILITARY OPERATIONS AND INSURGENCY CONFLICTS

Iraqis' industrial infrastructure was heavily damaged during the 1991 Gulf War, and during the insurgency conflicts. The damaged industrial and military sites included armaments and oil production installations, and petrochemical industries that make up the most important sector, with products including agricultural chemicals, pharmaceuticals and fibers. The other damaged manufacturing industries include textiles and paper mills, furniture factories, electronic plants, and iron and steel production. All these industries use raw materials and also generate waste that has a potential to cause high risks to the environment, where oil is the major sources of hazardous polluting waste.

Past experience has shown that every conflict generates risk to human health and the environment (UNEP, 2003). The human health and safety (H&S) and environmental threats due to most recent military and insurgency activities in Iraq include air pollution, abandoned live UXO, drinking water contamination and the presence of hazardous substances including heavy metals and depleted uranium. The post-conflict situation in Iraq compounds a range of chronic environmental issues, and presents immediate challenges in the fields of humanitarian assistance, reconstruction and administration. There is a need, after the end of the major military operations and insurgency conflicts to address the post-conflict risk to the environment and to human health, and to promote long-term environmental management. Lessons learnt from earlier conflicts show that the immediate environmental consequences must be addressed as soon as possible to avoid further deterioration of human health and safety, and environmental conditions. This requires that environmental considerations be integrated across all sectoral development activities in all post-conflict situations.

3.14 IRRIGATION AND SOIL SALINIZATION

Irrigated agriculture has been practiced in Iraq for over 7,500 years, dating back to the time when the Sumerians built canals to irrigate wheat and barley on the land between the Tigris and Euphrates Rivers. It was estimated in 1990 that over 5.5 million hectares of Iraqi territory are potentially suitable for irrigation, with 63% of this land occurring in the Tigris basin, 35% in the Euphrates basin and 2% in the Shatt al-Arab basin (UNEP, 2003).

The risk of increased soil salinity and water logging as a result of poor irrigation and drainage practices has long been a priority concern in the country, and was already recorded as a serious cause of reduction of crop yields some 3,800 years ago. In 1970 it was estimated that half the irrigated areas in central and southern Iraq were degraded due to increased soil salinity (UNEP, 2003). A land rehabilitation program was initiated in 1978, comprising concrete lining for irrigation canals and the installation of field drains and water collector drains. By 1970, a total of 700,000 hectares had been rehabilitated. But the continuing use of unsustainable management practices, damage to irrigation and drainage infrastructure during the 1991 Gulf War, and poor irrigation system maintenance practices exacerbated by sanctions, have caused a further soil deterioration due to salinity.

3.15 AIR POLLUTION

Although the Ministry of Environment does not possess the apparatus to effectively monitor the level of pollutants in the air, the air quality in Baghdad and other major cities is generally considered to be not very good.

This has mainly been due to gaseous emissions from burning oil installations (wells, pipelines, refineries, storage tanks, etc.), power plants, brick factories, natural dust storms, and open burning of trash in urban areas and villages. The gaseous emission control methods for air quality standards have also not been consistently enforced in the country.

3.16 NOISE POLLUTION

Ambient sound levels in Iraq are consistent with similar areas elsewhere in the Middle East. Areas in the mountains and areas outside the cities generally have lower ambient sound levels.

But frequent military operations and insurgent activities have contributed greatly to noise pollution in recent years.

4 ENVIRONMENTAL CONSEQUENCES OF BAGHDAD POWER DISTRIBUTION SUBSTATION PROJECT

4.1 ENVIRONMENTAL IMPACT ANALYSIS

The Scoping Statement indicated the main areas of focus for the EIA study for identification of potential adverse environmental impacts due to the proposed project. During the field work, the EIA study team identified the potential adverse impacts and their appropriate mitigation and monitoring measures, using the existing environmental parameters likely to be impacted by the project activities. The following are the most pertinent references that were used by the EIA study team during the Desk Study:

1. Bechtel. 2003. Construction Environmental Control Plan for the Iraq Infrastructure Reconstruction Project. Contract Number EEE-C-00-01-00018-00, Document Number 249-2HP-H01-00003.

2. EMF RAPID Program. 1996. EMF Basics from the U.S. Department of Energy, the National Institute for Occupational Safety and Health, the National Institute of Environmental Health Sciences, and Oak Ridge National Laboratory. DOE/GO-10095-218, DE95013123

3. http://www.bsc-eoc.org/avibase/avibase.jsp; World Bird Database

4. Salvato, J.A., N.L. Nemerow, and F.J. Agardy (eds.). 2003. Environmental Engineering, Fifth Edition. John Wiley & Sons, Inc., Hoboken, NJ.

5. Arab.net, part of the Saudi Research and Marketing Group, (http://www.arab.net/iraq/iq_agriculture.htm; http://www.arab.net/iraq/iq_florafauna.htm, and http://www.arab.net/iraq/iq_road.htm).

6. Bird Checklists of the World, (http://www.bsc-eoc.org/links/links.jsp?page=l_mid_iq#spcount)

7. Bird Life International, (http://www.birdlife.org/datazone/ebas/index.html)

8. Evans, M.I. 1994, Important Bird Areas of the Middle East. Cambridge, UK: Birdlife International.

9. Federal Research Division of the Library of Congress as part of the Country Studies/Area Handbook Series sponsored by the U.S. Department of the Army between 1986 and 1998, (http://countrystudies.us/iraq/58.htm)

10. First Scientific Conference on the Rehabilitation of the Southern Iraq Marshes Basrah, Iraq 11 - 12 April 2005, (http://www.public.iastate.edu/~mariposa/MarinaMesopotamica/abstracts1.htm)

11. Fish base (http://www.fishbase.org/TrophicEco/FishEcoList)

12. Green, A.J. (1993). The status and conservation of the Marbled Teal Marmaronetta angustirostris. International Waterfowl and Wetlands Research Bureau Special Publication No. 23. IWRB, Slimbridge, UK. 107pp.

13. International Union for the Conservation of Nature (http://www.redlist.org)

14. United Nations Development Program, "Iraq Living Conditions Survey 2004" Tabulation Report (http://www.iq.undp.org)

15. USAID (http://www.usaid.gov/iraq/accomplishments/telecom.html)

16. USAToday:(http://www.usatoday.com/printedition/news/20050401/a_iraqweektext01.art.htm)

17. Groombridge, B., Ed. 1992. Global Diversity - Status of the Earth's Living Resources. Compiled by the World Conservation Monitoring Centre. Chapman & Hall, London, UK.

18. National Preservation Institute 2005, http://www.npi.org/nepa/whatis.htm

19. USAID 2004, National Children's Hospital of Iraq, Preliminary Hospital Assessment Report Feb 26, 2004.

The following are the identified potential adverse environmental impacts due to the proposed project as they relate to the project development stages, including their recommended mitigation measures:

4.2 POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS

Most of the environmental consequences resulting from the proposed action were found to be mainly due to ground excavations and leveling, transportation of project construction materials and equipment, and generation of medical waste. The impacts are short-term, occurring only during the project construction phase, but the impacts due to generation of solid hazardous medical waste and increase in volume of sewage discharge during the project operation stage are long-term impacts.

The following are the identified potential adverse environmental impacts due to the proposed project activities, including their recommended mitigation measures:

4.2.1 Soil Erosion Impact

Ground surface alterations during the project site preparation and the transportation of construction materials and equipment, using heavy trucks will disturb the soil surface, making it highly susceptible to soil erosion occurrence. The disturbed soil could easily be transported by surface runoff, causing clogging of nearby drains and sewer pipes. This is likely to be temporary impacts, ceasing after the project construction stage is completed. It is anticipated that the proposed project will not have a significant soil erosion impact if preventive measures are undertaken during the project design and construction stages.

Mitigation Measures: The soil erosion problem will be addressed during the project design and construction stages when the necessary control measures would be considered and incorporated in the project design and implementation. The soil on site will be investigated prior to site preparation for building construction and appropriate safety procedures developed to reduce the occurrence of increased soil erosion. Measures taken to control erosion will include clearing and grading the ground surface within approved work limits, stripping the top soil layer from the subsoil, stockpiling the removed soil in approved areas to be retrieved during landscaping and site restoration, clearing the nearby drainage systems and replanting the original vegetation after construction is completed. This will be done in accordance with the CECP 5.2.4 guidelines for sediment and erosion control and restoration of the original environmental condition to prevent further soil erosion occurrence.

4.2.2 Site Pollution Impact

Site pollution is likely to occur due to accumulation of solid waste during the project construction stage that will mainly be composed of debris containing bits of wood, bricks, stone and metal pieces, replaced machinery parts; plastics, broken glass, and ceramics. The waste could also contain hazardous lead-based paint residues, paints and solvents, cement, diesel fuel and oil, heavy metals, and other products that could be considered as hazardous waste material from the site backup generator containing spillages of fuel and oil.

Site pollution could also occur during the project operation stage, due to the generation and accumulation of hazardous medical waste containing used bandages, tested medical specimens

expired drugs, used syringes and needles and human waste. Also, the operation and management of a large hospital with the types of medical procedures envisioned for this project such as; surgeries, chemotherapy, x-rays, etc. could generate a variety of hazardous, toxic and radioactive waste.

Mitigation Measures: The management of hazardous waste materials will be done in accordance with CECP Section 5.2.8 safety guidelines. This includes identifying, labeling, keeping data sheets, knowing the exact location, proper storage, and using recommended safe work practices to handle hazardous waste. Also, fuel storage systems will be placed within concrete containment areas so that any oil spills would be contained according to safe environmental BMP. A lined containment basin will be constructed for the generator to sit in, so that the released oil does not leak into the ground to cause pollution of underground water resources. In addition, any hazardous waste material will be safely stored until proper disposal can be done. The hospital will have proper incineration facilities for the safe disposal of hazardous medical waste.

4.2.3 Hydrology and Water Resources Impact

Site construction activities will cause increased surface run-off, since the area surrounding the hospital building structure will be paved, causing changes in local drainage characteristics and possible flooding in nearby areas. This is likely to increase the transportation of pollutants from the hospital surroundings to surface and underground water resources. The City of Basrah is located near a historically and ecologically rich wetland (marshland), where the groundwater is relatively shallow during a large part of the year, which will require the building design to provide a stable foundation. This would include stability piles driven into the ground as a part of the structure foundation.

During the project operation stage, there will be considerable increase in local volume of sewage discharge because of the additional quantity of sewage effluent that will be placed into the existing City of Basrah sewage system. The increase in volume of sewage is estimated to be equivalent to approximately 60 percent of the water that will be supplied to the hospital.

Mitigation Measures: Storm water will be managed according to CECP 5.2.3 guidelines for surface runoff controls that include having construction site draining system connected to the existing storm water control structures, allowing for cross drainage diversion structures and a site-specific drainage plan for the new project construction. The potential increase in local volume of sewage discharge will be investigated thoroughly during the project planning and design phase so that necessary changes in the existing sewage system design could be incorporated during the project construction stage to prevent any leakage of sewage when the project becomes operational.

4.2.4 Biodiversity (Flora and Fauna) Impact

The proposed project site has a very limited value as wildlife habitat because of lack of vegetation cover. The area around the proposed site has been developed for some time and is frequently disturbed by human activity. There are no threatened or endangered biodiversity

(flora and fauna) species that are known to exist within the affected urban areas, and there are no protected areas within the project sites. For these reasons it is expected that any activities for vegetation removal, ground excavations and leveling are likely to cause minimal or no biodiversity impacts in the proposed project site.

Mitigation Measures: Measures taken to control loss of biodiversity will include clearing and grading the ground surface within approved work limits, stripping the top soil layer from the subsoil, stockpiling the removed soil in approved areas to be retrievable for landscaping and site restoration around the building structure, clearing the nearby drainage systems and replanting the original vegetation after construction is completed. The soil removed from the building site will be used in landscaping around the paved areas for enhancement of environmental quality. The surrounding areas will be replanted with grass and flowers, and other suitable plants, and the MOH and the hospital administration staff will be asked to monitor the recovery of the planted natural vegetation.

4.2.5 Traffic Obstruction Impact

The transportation of building construction materials and equipment along the urban roads and feeder roads will temporarily impede traffic movements and also require the use of one lane in two-lane streets during the movement of heavy building equipment, causing traffic to be directed to alternate lanes or routes. Any traffic obstructions caused by construction activities would be temporary and conditions would return to normal once the proposed project action is completed.

Mitigation Measures: The Ministry of Transportation will be requested to inform the members of the public about the temporary traffic movement inconveniences likely to be caused by project construction activities involving road closure and detour signs. This could be achieved through announcements on radio, television, and notices in the local newspapers, so as to enable the commuters to utilize alternate routes to avoid delays likely to be caused by the project construction activities. If commuters are well informed of construction delays and utilize alternate routes, impacts to local business and residents would be expected to be minimal.

The alternate traffic routes arrangements will be done in accordance with CECP Section 5.2.11 guidelines which state that, “At construction site entry, or exit points, public roads will be maintained, such that the roads are clear of debris, that street markings are visible, and that any damage to public roads, markings, or signs caused by project construction activities will be restored to pre-existing conditions or better” after the completion of the project construction stage.

4.2.6 Air Pollution Impact

Project construction activities involving ground excavations and leveling are likely to generate dust and gaseous emissions due to the operation of heavy construction machinery that could cause breathing problems to the project personnel and nearby residents. Also, occasional odors resulting from construction activities (welding, hot roofing, paving, etc.) and odors caused by possible accumulation of medical waste during project operation could contribute to air

pollution. These impacts would cease after the project construction activities are completed, and after the incineration of generated medical waste.

Mitigation Measures: A part of the contractors plan will be to provide protective equipment, such as gas masks, to the project personnel. The CECP 5.2.2 guidelines will be used in construction material handling to minimize the occurrence of fugitive dust to the extent possible. The population density around the project area ranges from heavy to moderate, and most residential premises are located far away from the project construction site. Appropriate dust control measures, such as minimizing the amount of ground disturbance, material handling, and water use for dust suppression will be used to reduce the amount of dust and particulate matter produced during the construction activities. Also, incineration of solid medical waste will be encouraged.

4.2.7 Noise Pollution Impact

The project construction activities involving operation of heavy equipment for ground preparation, construction of building structure and movement of heavy machinery during the transportation of construction materials and medical equipment will cause temporary increase of noise levels in the project site. The noise levels outside the project site boundary will not exceed 70 dBAs as provided in the CECP Section 5.2.1 guidelines. During the project construction stage the noise levels at the project site and adjacent areas would be expected to be higher than those normally occurring in the project area. The noise levels in the area should return to the normal level after completion of project construction activities.

Mitigation Measures: Noise levels will be monitored on weekly basis during the project construction stage, so as to ensure that the levels do not to exceed 55 dBA. This will include regular project personnel health checks, keeping records of employee health status, occurrence of safety events (accidents) and weekly safety meetings. Where local equipment noise exceeds 85 decibels (dBA) on the A scale, project personnel working in the vicinity of the noise will be provided with protective equipment. Also, the heavy machinery operators will be provided with hearing protection devises, and weekly training will be provided on use of protective devises.

4.2.8 Human Health and Safety Impact

The probability of discovering live UXO at the proposed project site is likely to be high, since adjacent to the project site there are remains of a communications and tower building that was destroyed in 2003 through aerial bombing. The presence of live UXOs during the project construction stage could cause serious risk to project construction personnel and project construction equipment if not detected and safely removed before the commencement of project construction activities. The construction activities could also contribute to the project personnel exposure to chemical hazardous waste, noise and dust pollution that could be injurious to health.

Mitigation Measures: The contractor will perform a site survey and assessment for detection of any present live UXO before project construction is started, in accordance with CECP 5.2.6 guidelines. The project construction personnel will be issued with personal safety equipment including steel toed boots, impermeable coveralls and gloves, safety hats, dust and gas masks,

and special indicators such as methane detection devices and radiation exposure badges, if possible radiation exposure becomes an issue. Safety harnesses will be used while working in any trenches where methane might accumulate, and first aid kits will be included in every project office and vehicle. The MOH will be requested to assist in the storage of hazardous waste until it can be safely disposed of in an environmentally sound manner. This will be done in accordance with the CECP 5.2.8 and 5.2.10 guidelines for handling and disposal of hazardous waste.

4.2.9 Historical and Cultural Resources Impact

Iraq is a country that is rich in historical and cultural resources, and is considered to be one of the cradles of civilization. These resources could include culturally valued aspects of the environment, such as artifacts, historic properties, culturally valued pieces of property, cultural use of the biophysical environment, and such "intangible" socio-cultural attributes as social cohesion, social institutions, religious practices, and other cultural institutions (National Preservation Institute, 2005). The proposed project site is located in an urban area and buried cultural artifacts could possibly be present.

Mitigation Measures: Field surveys will be performed at the project site to identify the presence of any historical and cultural resources of importance before commencement of project site measurements and construction activities. This will be done during the period of site field surveys for any presence of live UXOs. At the moment no cultural resources are known to exist at the project site. If any buried material of historical or cultural importance is discovered during the project construction phase, work will immediately cease and the proper authorities (USAID Iraq Mission, GOI Department of Antiquities, Iraq Bureau for Tourism and the MOH) will be notified. Work will not resume at the project site until authority is given to continue with the construction activities.

4.2.10 Solid Medical Waste Generation Impact

During the project operation stage the hospital is likely to generate large amounts of hazardous solid medical waste (used cotton and bandages, tested medical specimens, expired drugs, used syringes and needles, human waste, etc.) and soil contamination due to accidental chemical and oil spills. This could also include radioactive waste, since operation and management of a large hospital with medical procedures involving radiotherapy, chemotherapy, x-rays, etc. could also generate this type of waste.

Mitigation Measures: The proper procedures for handling hazardous medical waste will include identifying, labeling, keeping data sheets, knowing the exact location, proper storage, and using recommended safe work practices for handling hazardous medical waste material. The waste material should be stored safely before it is disposed of in a safe manner to prevent potential harm to the urban residents. The hospital administration will have the facility for safe management and disposal of hazardous medical waste, since there are plans for installation of a new medical waste incinerator that is designed to emit low or no gasses during operation for ensuring complete solid waste combustion.

4.2.11 Socio-Economic (Positive) Impact

The project will have a significant positive impact on the children of the Governorates of Basrah, and the neighboring Governorates of Al-Muthana, Thi-qar and Missan, who do not have access to pediatric services hospital.

The total population of the four Iraq southern provinces is 4.6 million, and 0.9 million are children below the age of 14. Despite being Iraq's third largest city with a population of over 1.3 million (2002 National Census), the Governorate of Basrah has been lacking the necessary health facilities to provide adequate health care services to children, which the proposed project will provide.

5 RECOMMENDED ADVERSE ENVIRONMENTAL IMPACT MITIGATION AND MONITORING MEASURES

The purpose of this EIA study is to identify potential adverse environmental impacts due to Basrah Childrens' Hospital Project, and their appropriate mitigation and monitoring measures (table 4), so as to make the project environmentally-sound. This would make it possible to achieve a reliable and sustainable delivery of pediatric health services to the residents of the City of Basrah and surrounding areas by integrating project design and implementation with sound environmental management practices. The incorporation of recommended adverse environmental impact mitigation and monitoring measures (Table 4) during the project design and implementation (construction, operation and management) stages will be expected to assist in achieving an environmentally-sound project design. This requirement also needs to be included as a part of the contracting process for the implementation of Basrah Childrens' Hospital Project.

The implementation of recommended adverse environmental impact mitigation and monitoring measures should not be an exclusive responsibility of the Baghdad Power Distribution Substation Project implementing partner and the MOH staff. The local government authority (which is one of the project stakeholders) could also play an important role in ensuring that the recommended adverse impact mitigation and monitoring measures are fully implemented and performing as required. These measures are required to be addressed during the project planning and design, construction and operation stages. The following Table 4 shows the occurrence of the identified potential adverse environmental impacts due to the project and their recommended mitigation and monitoring measures, including their associated project development stages, as outlined in Section 6.

Table 4: Mitigation and Monitoring Measures Associated with Basrah Children's Hospital Project Construction and Operation

Activity	Impact	Mitigation Measures	Monitoring Requirements
1. Project Planning and Design Phase			
Assessment of existing hospital building structures and design of new building structure with structure engineering design consultants.	Environmental sensitivities may not be considered at this stage, but it is important to ensure that potential adverse impact **mitigation and monitoring measures** are considered and budgeted for**.**	Ensure good collaboration with the MOH staff so that project activities can be coordinated. Encourage understanding of potential adverse impacts due to increase in local volume of sewage discharge. Building construction may require having an "Environmental Checklist" for use in the assessment of building structure construction activities environmental potential impacts. . Costs of environmental protection and management become an explicit part of the BOQ.	USAID MEO and Government of Iraq MOH staff review completed checklist and verify that it has been adequately completed. Possible field site visit by MEO to assess the existing environmental parameters and mitigation and monitoring plans.
	Human health and safety impacts during the field survey for detection and removal of any live UXO before project construction starts. .	Ensure that the personnel doing the field survey for detection and removal of any UXO are well trained and fully equipped for safe detection, removal, safe handling and storage of UXO.	Carry out regular field checks to ensure that workers are provided with appropriate protective field equipment for removal of live UXO, and that the removed live UXO is safely stored.

2. Project Construction Phase			
Soil surface disturbance from present ground cover removal, ground excavations and leveling for building structure construction, requiring transportation using heavy trucks, and operation of heavy construction machinery.	**Soil erosion impact** leading to soil displacement and sedimentation, causing clogging of near by drains and watercourses or surface water bodies.	Plant grass or other ground cover using local plants and flowers around the hospital building structure. Cost of spreading and, or compaction of disturbed soil incorporated into BOQ. Ensure adequate maintenance of affected water drainage ways to prevent possible blockages and failure.	Monitor the buildup of transported soil sediment and debris in nearby drains, ditches or culverts. Measure drainage flow, or local hydrology to increase the understanding of local conditions for improvement of drainage conditions.
	Air pollution impact due to generation of dust during ground surface excavations and leveling.	Ensure that the field crew has breathing equipment to prevent health hazards due inhalation of dust.	Check breathing equipment to ensure that it is working well.
	Noise pollution impact during the operation of heavy machinery.	Ensure that machinery operators have personal hearing protection equipment to prevent possible hearing injury.	Ensure that the personal hearing protection equipment is working well.
	Historical and cultural resources impact, causing possible damage to present resources.	Ensure that field surveys are carried out in the project site before the start of construction activities for detection of presence of any historical and cultural resources of importance.	Ensure that the necessary field surveys are carried out in the project site before project construction activities are started.

Increased surface runoff due to roof catchments and construction of ground pavements in the hospital building compound.	**Hydrology and water resources pollution impact** due to increased building structure pavements, causing changes in local drainage characteristics and possible flooding in nearby areas, and transportation of pollutants to surface and underground water resources. **Human health and safety impacts** due to removal of any live UXO during the building structure construction.	Ensure that construction site draining system is connected to existing storm water control structures, allowing for cross drainage diversion structures and site-specific drainage plan for new project construction. Ensure that project personnel involved in project construction are well trained and fully equipped for safe detection, removal, storage and disposal of hazardous waste and live UXO.	Carry out regular inspection of the hospital building construction site to ensure that any present live UXO is removed and safely stored and disposed off. Carry out regular checks to ensure that field equipment for removal of live UXO is working well.
Ground excavations and leveling for construction of power distribution structures.	**Biodiversity impacts** due to removal of plant material and other living organisms from the site, leading to possible loss of local flora and fauna species	Ensure that removed soil is well kept and used for environmental restoration and landscaping around the power distribution substations after the construction is completed.	Verify that environmental restoration and landscaping activities meet the mitigation standards. Verify natural plant regeneration on restored areas and if necessary, replant.

Generation of hazardous solid and liquid waste during the building structure construction stage.	**Site pollution impact** due to accumulation of hazardous waste from garbage, fuel leaks or waste oil and other lubricants from motorized equipment.	Ensure project personnel training on specified site pollution safeguards. Provide equipment for storage of waste oil and other lubricants. Incorporate full field cleanup costs into BOQ. Ensure that the field crew is well trained in safe handling and disposal of hazardous waste.	Ensure that the hazardous waste is properly removed stored and regularly disposed off in a safe manner. Ensure that training on safe handling of hazardous waste is regularly provided, including equipment for safe handling of waste.
Transportation of building construction materials and equipment, using heavy vehicles along the urban roads, and general traffic movements along the affected roads.	**Traffic obstruction impact** due to possible creation of heavy traffic jams along the affected urban roads, during the movement of heavy transportation vehicle tracks.	Transmit messages on affected roads through radio, TV and newspapers to warn members of the public to avoid affected roads during project construction periods. Arrange for regulation of traffic movement during project construction along affected roads. Install road signs to enforce speed limits and slow down traffic along affected roads during project construction periods. Arrange for road signals for alerting drivers to the dangers of passing on affected roads during project construction.	Ensure that traffic laws are enforced during the project construction period. Ensure that roads liaison officer maintains continuous log of community enquiries and complaints on road use inconveniences during project construction periods.

3. Project Operations Phase			
Delivery of improved health services to the communities Basrah Governorate and the surrounding Governorates in Southern Iraq.	**Human health and safety impacts** due to the generation of hazardous solid medical waste and increased volume of sewage discharge.	Separate medical waste from other waste and manage the two components separately. Ensure that **incinerators** are installed and regularly tuned for safe handling and disposal of hazardous medical waste generated in the hospital. Ensure that the **sewage system** has the necessary capacity to contain the increased volume of sewage discharge from the hospital without causing any possible leakages that could cause human health and safety issues.	Monitor the process of separation, handling and storage of different types of waste, especially the hazardous medical waste. Monitor the maintenance and performance of incinerators to ensure complete combustion of medical waste.
		Ensure that the MOH staff involved in the management and disposal of solid medical waste using incinerators are well trained in tuning the incinerator and fully equipped for safe handling and disposal of hazardous medical waste.	Ensure that training and equipment for tuning the incinerator and safe handling and disposal of medical waste are provided as required.

6 CONCLUSION

The purpose of Basrah Children's Hospital Project is to develop a referral level pediatric hospital with an emphasis on pediatric oncology in the City of Basrah to provide improved health services to the entire southern region of Iraq. The 94-bed inpatient hospital will include a large

outpatient health clinic as well as facilities for surgery, laboratory and minor emergencies. The hospital will also serve a medical training facility for doctors and nurses from all parts of Iraq.

The project construction and operation activities have been shown to have a potential to cause adverse environmental impacts, most of which are temporary impacts. The prevention or minization of the occurrence of these impacts will be considered early in the project design and construction stages, so that the recommended adverse impact mitigation and monitoring measures can be fully incorporated in the project design, including the award and contracting process for the project construction company. Also, the project personnel will be trained and provided with the necessary equipment for preventing any impacts that have a potential to cause human health and safety problems during the project construction and operation stages.

The contraction company will be required to ensure that all the recommended adverse environmental impact mitigation and monitoring measures are fully implemented as required. The MOH staff, the hospital administration and the urban local government authority in the City of Basrah will be requested to play an active role in the implementation of the adverse impact mitigation and monitoring measures so as to ensure that the recommended measures for medical waste incineration and for environmental restoration and landscaping around the hospital building structure are properly implemented as required.

7 LIST OF EIA REPORT PREPARERS

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Representative of the Ministry of Health, Basrah
Representative of the Ministry of Municipalities and Public Works, Basrah

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10 APPENDIX 1: SCOPING STATEMENT

SCOPING STATEMENT

for

ENVIRONMENTAL IMPACT ASSESSMENT

of

BASRAH CHILDREN'S PEDIATRIC HOSPITAL PROJECT

in Cooperation with

MINISTRY OF HEALTH,

GOVERNMENT OF IRAQ

INTRODUCTION

In order to support the people and the Government of Iraq, and to improve the quality of health care in an environmentally acceptable and sustainable manner, the United States Agency for International Development (USAID) has proposed to finance the design and construction of a 50 bed children's pediatric hospital, and appurtenant facilities located in Basrah. The project would benefit thousands of children in the Basrah area and possibly hundreds more countrywide. The environmental review requirements of USAID (22 CFR 216) require the preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) for new construction, specifically, the construction of new facilities – the category under which this hospital project falls. An EA is a detailed study of the reasonably foreseeable significant effects, both beneficial and adverse, of a proposed action on the environment of a foreign country. The first step in this process is the preparation of a Scoping Statement which is a document used to anticipate significant issues, issues that are not significant, and to determine how and by whom the study will be conducted. The purpose of this Scoping Statement is to set forth clear understandings between USAID and the Ministry of Health with respect to these issues for this project.

BACKGROUND

The Bureau Environmental Officer (BEO) for USAID's Asian Near East (ANE) bureau concurred with the recommendations contained in a Programmatic Initial Environmental Examination (PIEE) of the Iraq Infrastructure Reconstruction (IIR) Program in February 2004. This PIEE anticipated a finding of a positive determination for activities that involve new construction, and suggested the need for an EA for such projects. The development of a children's hospital facility on an undeveloped site is a type of new construction that would require the preparation of an EA based on the PIEE and section 216(2)(d)(1)(x) of REG 16 since it would fall under the provisions for an industrial plant.

The Basrah Children's Hospital Project (BCH) is intended to provide modern pediatric healthcare services to the children of Basrah (figure 1). A 50-bed facility is planned along with a large outpatient treatment area. Additionally the hospital would be used as a teaching environment for doctors and nurses from across the country of Iraq. Cost of this project is US fifty (50) million dollars. In addition to the physical building, USAID is working with a private group (Project HOPE) to obtain the donation of the specialized medical equipment necessary to run a hospital of this size. The Ministry of Health has acquired title to a parcel of land 52,897 square meters in size in southeast Basrah for the facility (photo 1). The Ministry of Health has requested that the hospital be design so that the facility could be expanded to a 200-bed hospital in the future. Bechtel has been chosen as the prime contractor and will engage the services of a qualified design/build contractor. The contractor would provide the design, operational plan and construct the BCH. It is expected that up to 300 local workers would be employed daily at the hospital once it is commissioned in December 2005. The BCH design shall meet design standards that are consistent with internationally recognized best appropriate practices applied to modern hospitals in the Middle East. Management training would include hospital management and operation as well as training on the operation and maintenance of the hospitals facilities. I.e. Standby power, HVAC, fire suppression, medical incinerator, etc.

The scope of work (SOW) includes the clearance of UXO, geotechnical evaluation, design, assess site security, site preparation work, access road, site security fence and trailers, construction rubble storage site, construction of the facility and appurtenant facilities required to operate a modern hospital facility. Project activities that have the potential to have direct, indirect or cumulative significant effect include the following issues.

DIRECT, INDIRECT AND CUMULATIVE POTENTIALLY SIGNIFICANT EFFECTS

1) **Biological wastes (Red Bag Wastes)**

   Scope – Biological waste is created by hospitals, clinics and biological and medical laboratories. It can include bacteria, viruses, and other highly infectious and very dangerous materials that do not belong in a landfill.

   Significance – Controlled high temperature incinerator in a proper facility is the proper means to dispose of such materials and a failsafe means of providing for this must be of the highest importance.

2) **Hazardous chemicals/materials**

   Scope – The BCHCHP would generate a variety of hazardous chemicals and materials. Project managers must have the capability to safely identify, characterize, and handle this wide variety of wastes. The staff must have the ability and means to redirect, handle, store and properly dispose of chemicals that will be generated during construction of the facility and later during operation of the hospital.

   Significance – From the standpoint of worker health and safety, this is a critically important issue. This is most important from a perspective of the long-term protection of the natural environment. Appropriate systems, procedures and facilities on site are needed to effectively deal with this highly important issue.

3) **Ground or surface water contamination by leachate**

   Scope – The leachate that drains from the facility during construction could potentially contain many unidentified pollutants that should not be allowed to enter the groundwater or the surface runoff watercourses. An effective, environmentally sound and fail-safe means must be provided in the design to accommodate the leachate and provide for the handling and disposal of the pollutants.

   Significance – This leachate has the potential to migrate into the ground water and contaminate or make the groundwater unfit for consumption and agricultural purposes. Leachate contamination can have direct and cumulative effects, this is a highly significant issue, and while prevention is relative easy, remediation is both difficult and expensive. The water table in the Basrah area is quite high at times, making groundwater more vulnerable to contamination.

4) Construction site debris

Scope – Construction site debris is primarily rubble, brick, stone and asphalt; but it also includes many diverse types of metal, wood, plastics, glass, ceramics, and other non-noxious materials. Construction debris could also contain paints, asbestos, heavy metals, and other products that would be included in item 2 above. A site-specific permit must be issued allowing for the disposal of materials after inspection by staff knowledgeable in material recognition and hazard identification.

Significance – This is significant only in so far as any hazardous chemicals or products are present during the construction phase.

5) Air pollution control, dust and air quality control

Scope - This means the control of particulates (particularly elemental carbon), silicon dust, and other carcinogens, asbestos, hydrocarbons, sulfur dioxide, nitrogen oxides, carbon monoxide, smoke and other noxious fumes and gases.

Significance – This is the highest priority of site management with respect to worker health and safety and impacts on neighbors and the general public.

6) Vermin

Scope – Vermin that would find stored construction debris an attractive nuisance include rats, crows, seagulls, bats, feral dogs, feral cats, and foxes.

Significance – Vermin are carriers of disease. Vermin could spread disease from the waste site to humans, other animals, sources of water and food crops or food animals. Appropriate physical barriers would prevent access by vermin and tidy procedures could prevent the site from becoming a nuisance, allowing vermin to contact disease organisms or allowing the transfer of disease offsite.

7) Vectors

Scope – Vectors include flies, mosquitoes, fleas and sand flies. Habitat management is the key to prevention of disease through control of such vectors.

Significance – Vectors are carriers of diseases such as malaria, leishmaniasis, and gastrointestinal diseases. Waste sites could provide habitat for vectors if not properly controlled and managed.

8) Traffic

Scope – The site will receive many truckloads of fill material, construction materials daily for over a year. There will also be traffic created by many of the workers who will drive to the site each day to work. The road way and entrance/exit design, driver safety, and road worthiness of the trucks are all important issues, as is the need to contain all garbage, trash and fluids in the load.

Additionally once the hospital has been commission it is expected that workers, patients and visitors would create an increase in traffic in the area of the facility.

Significance – This is a management issue that must be well controlled to prevent these issues from becoming unsafe and an unacceptable nuisance. This is an issue of medium significance.

9) Worker health and safety

Scope – Workers must be protected with knowledge of the materials they are handling, an active safety program, and appropriate safety equipment including appropriate gloves, steel toed boots, non-permeable coveralls, safety helmets, and protective masks (including gas masks) and hearing protective devices. Detection equipment, such as radiation badges if warranted, must be used and an institutionalized monitored program set-up and monitored regularly. Smoking on the site must not be allowed

Significance – This is extremely significant and must be the first priority of site management.

10) Fire suppression and spontaneous combustion

Scope – Fire suppression equipment must be provided. Fire suppression training must be part of the knowledge base of the site staff. The techniques, means and methods of preventing spontaneous combustion must be utilized.

Significance – A major nuisance and chief among the occupational hazards faced by operators of construction sites in Iraq is the smoke from burning garbage. Site fires must be prevented by effective site management. Cigarette smoking on site must not be allowed for both fire safety and health safety reasons.

11) Noise

Scope – Machinery noise would be a major source of noise during the construction phase. Air horn use must be restricted to emergency warnings only. Strict silencer standards are needed and silencers must be well maintained.

Significance – Personal hearing protection devices must be worn by machinery operators when required. This is a minor issue.

12) Archeological

Scope – Care must be exercised during site development to identify and effectively deal with any archeological discoveries.

Significance – This is a major issue with regard to the site only during the preparation of the site. Archeological relics could be delivered to the site at any time during the life of the site, but the occurrence will be seldom and random. This is high priority only initially.

ISSUES THAT ARE POTENTIALLY NOT SIGNIFICANT

1) **Threatened and Endangered Species**

Scope – The site is a finite site that does not provide habitat for any species that are critically threatened, threatened, or vulnerable.

Significance – This issue is not significant for this site. The IUCN database was searched for T&E species in Iraq without a result that leads one to believe that this issue is significant.

2) **Seismic, geology, soils and slope stability**

Scope – Iraq is not a seismically active area – USGS records show there have been no recorded earthquakes in Iraq since before 1998. The geology of the site will be investigated prior to site construction. The soil type could be significant if it contains silicon sand or soil that is susceptible to settling.

Significance – This issue is believed to be not significant.

3) **Floods and runoff**

Scope – The possibility of a flood event occurring is not expected to be an issue since the rivers of Iraq originate from Turkey and are controlled by a series of upstream dams. Localized flooding from a local storm event must be reflected in the design and construction plans to shield the site from flooding and erosion. Runoff would be collected in a leachate collection system designed to be sufficiently large to accommodate the maximum anticipated storm event.

Significance - This is a design issue and is not expected to be a significant issue as long as plans are in place to deal with localized storm water runoff events during the initial civil works phase of this project.

4) **Unexploded Ordnance**

Scope – The whole site would be cleared of UXO before any other work can begin.

Significance – This item is not significant once the UXO is cleared at the beginning of the project.

TIMING OF PREPARATION OF ENVIRONMENTAL ANALYSIS

It is anticipated that the Scoping Statement document will be completed in Baghdad by September 10, 2004 and forwarded to the ANE BEO for circulation. The Scoping Statement document will be circulated by the Mission Environmental Officer (MEO) to the Ministry of Health, Ministry of the Environment, Ministry of Transportation, Governorate of Basrah, and interested in-country NGOs concurrently with circulation to other federal agencies by the ANE BEO. The comment period provided by REG 16 is thirty (30) days. EA preparation can commence and the work progress prior to BEO formal approval of the final Scoping Statement

document. Comments received following circulation can be incorporated in the final Scoping Statement document. Following the receipt in September of comments on the Scoping Statement, the EA team can perform any additional studies necessary and prepare the final project design and the design of the monitoring and mitigation plan. The EA can be submitted before the end of October to the BEO and final approval can be obtained before the end of November 2004.

VARIATIONS IN THE FORMAT OF EA

No variations in the format of this Environmental Assessment are needed at this time nor is it anticipated that any variations will be needed at a later time.

SCHEDULE OF PLANNING AND DECISION MAKING

September 10 – Scoping Statement sent to BEO and circulated in country
September 13 – BEO sets up Washington based EA review team
September 10 – October 15 – draft EA prepared
October 16 – Final Scoping Statement prepared
October 16 - Final EA prepared
October 20 – Final EA sent to BEO in Washington
October 21 – November 5 – EA circulated for comment
November 8 – Final EA approved by BEO and Washington Team

DESCRIPTION OF HOW ANALYSIS WILL BE CONDUCTED

The analysis will be conducted in Baghdad through individual contributions of the team members with periodic ad-hoc meetings to coordinate the study of significant issues and track the progress of the work.

DISCIPLINES THAT WILL PARTICIPATE IN THE ANALYSIS

CORE TEAM

1) Team Leader – Gib Owen, Corps of Engineers
2) Mission Environmental Officer – Robert Macleod, USAID
3) Mission Health Officer – Leslie Perry, USAID
4) Biologist – Fadiya Fahim, Corps of Engineers
5) Basrah Regional Coordinator – Tom Rhodes, USAID
6) Basrah Program Manager – Jim Nuttall, USAID
7) Basrah Project Manager – Mike Atwell, Corps of Engineers

SUBJECT AREA SPECIALIST

1) Ministry of Health – Iman Naji Al-Dabbagh
2) Environmental Specialist – Trey Kish, Bechtel

3) Project Manager, Steve Beuby, Bechtel

REVIEWERS

1) Ministry of Environment
2) Ministry of Health
3) Ministry of Transportation
4) Ministry of Municipalities and Public Works
5) Governate of Basrah

11 APPENDIX 2: PUBLIC REVIEW COMMENT

Republic Of Iraq
Ministry Of Environment
Office Of The Senior Deputy For
Technical Affairs
NO: 2312
DATE : 18/Sep/ 200

جمهورية العراق
وزارة البيئة
مكتب الوكيل الفني
العدد : ٢٣١٢
التاريخ: ١٨/٩/٢٠٠٥

Dear Mr. Owen,

With reference to your letter dated 22nd August, 2005 , requesting the Ministry's comments regarding the Draft Environmental Assessment Basrah Children's Hospital Project, would you kindly provide us with the following information:

1- Nature of the sector and the location with respect to the Initial design of sector as well as the number and code of the land and the district which the hospital will be erected upon.
2- Means of solid waste disposal (municipal and medical).
3- Details and schematics relating to the incinerators needed for the hospital and their location with respect to the direction of the prevailing wind .
4- Type of fuel used for the incinerators.
5- Are there any other sources of air pollution in the direction of the prevailing wind with respect to the hospital.

Please accept the assurances of my highest consideration.

Yours sincerely,

Dr. Muthanna Al-Omar
Deputy Minister
September, , 2005

Mr. Gib Owen
Environmental Compliance Manager
U.S. Army Corps of Engineers
USAID Project Office, Baghdad

العنوان البريدي ــ بريد الكرادة ــ صندوق بريد (١٠٠٦٢)