Iraq Infrastructure Reconstruction Program

This report includes procurement sensitive information that shall not be disclosed outside the Government and shall only be used for planning, reporting and implementation of the program.

SUBMITTED TO:

USAID

SUBMITTED BY:

Bechtel National, Inc.
June 2003

Recommended Implementation Plan

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1.0 Introduction

On June 25, 2003, Bechtel issued the Iraq Reconstruction Project Assessment Report to the United States Agency for International Development (USAID). That report represents the culmination of 2 months of assessment work across Iraq in the six infrastructure segments covered by the contract: Umm Qasr port; airports; water, wastewater, and irrigation; power; surface transportation; and buildings. The Assessment Report, a contractual deliverable, presents Bechtel's evaluation of the existing condition of the infrastructure, requirements for restoring critical services, a needs assessment, and a recommended program for complete restoration. The recommendations section categorizes projects by projected duration. Spreadsheets with estimated costs for the recommended projects were provided under separate cover.

Project duration categories are described as follows:

- **Emergency.** Projects that should be completed immediately for humanitarian reasons. A majority of these projects are under way or completed.
- **ShortTerm.** Projects that could be completed within 6 months of receiving an approved Job Order from USAID.
- **Intermediate-Term.** Projects that would extend beyond 6 months but could be completed - prior to the contract completion date of December 2004.
- **Long-Term.** Projects that could not be completed prior to the December 2004 contract completion but that are still important to restoring Iraq's infrastructure.

The Assessment Report also included a fifth category called Unassessed Projects. This category included projects or potential scope from the contract that were not specifically assessed, but for which Bechtel could extrapolate requirements and estimates for restoration. The extrapolation was derived from our understanding of the integrated infrastructure system.

A cost estimate summary for the Assessment Report was separately submitted to USAID together with an Executive Summary of the Assessment Report text. All cost estimates are budgetary estimates, based on our management judgment of the scope of work as currently evaluated. These estimates will be converted into detailed Job Order proposals as priorities are established at the direction of the USAID contracting officer and cognizant technical officer. The Rough Order of Magnitude (ROM) cost estimates for recommended projects were developed using parametric information. The total cost estimate range for all project recommendations far exceeds the $680 million value of Bechtel's contract.

This Implementation Plan is a summary of the highest priority projects listed in the Assessment Report that Bechtel recommends be completed as part of its $680 million contract. The Implementation Plan is being submitted for review and approval by USAID in conjunction with the Coalition Provisional Authority.

This Implementation Plan includes:

- Recommended priority projects by infrastructure segment with supporting text. Although telecommunications infrastructure was not part of Bechtel's assessment program, priority telecommunications projects have been included in this Implementation Plan as instructed by USAID.
- Draft Level 1 schedules with proposed project start dates and durations.
- Estimate spreadsheets from the Assessment Report displaying the Implementation Plan Summary.

Despite the challenges discussed in the Assessment Report, a substantial amount of assessment work has been accomplished in all infrastructure segments. Bechtel has approached each segment as an integrated system and has a solid understanding of how to approach the restoration effort to ensure the greatest positive benefit. This Implementation Plan is based on that knowledge and the cost and schedule boundaries of our contract with USAID.

2.1 Port Of Umm Qasr

The Port of Umm Qasr was identified as a critical priority before the conflict concluded because of its importance to the distribution of humanitarian aid. After assessment and consultations with Stevedoring Services of America, the port operator, as well as USAID and other relevant parties, Bechtel determined the emergency work that would be necessary to facilitate humanitarian aid shipments. Emergency work, now in progress, includes initial dredging to open the new port and Berth 10, removal of wrecks and other sunken objects, emergency startup and cleaning of the port's grain facility, and improving port security. Temporary power is being implemented at the port and Iraqi personnel are completing repairs to equipment.

As additional short-term improvements, Bechtel recommends:

- Completing dredging of the new port. This is required to open up berths in the port to a depth of 12.5 meters, allowing Panamax-size ships to offload humanitarian aid shipments.
- Disposing of unexploded ordnance (UXO) on land and in water. Surveys and divers have found UXO on a wreck near Berth 21 at the new port. This ordnance needs to be cleared prior to wreck removal. The UXO will only be removed in the short-term if it can be done economically. If it becomes a major operation, Bechtel will establish a bypass alternative.
- Establishing an interim customs facility. Immigration and customs control must be reestablished to support commercial operations at the port. The original facilities are not usable. Bechtel's plan will restore four rooms in the passenger terminal supported by temporary power.
- Restoring fire water systems. An operational fire water system is required for safety reasons and to comply with IMO standards. The current systems are not operational and must be restarted. The pump stations are relatively intact, but the ring mains need a thorough leak check and identified leaks must be repaired. Hydrants and hoses will be refurbished.
- Restoring the new port administration building. Conflict and post-conflict events have left the building in a poor state of repair. The building needs to be restored to support port operations, the harbormaster, and administrative functions of the port's management. A detailed scope of repair, which would restore half the building at a time to facilitate early operations, has been submitted for review.
- Restoring and starting up new port container cranes. The cranes in the new port are in very good condition. If operational, the port could take delivery of containerized humanitarian aid that is currently being unloaded and trucked in from ports outside Iraq.
- Restoring area lighting. The lighting is not functional due to lack of power and is in poor condition requiring new fittings and bulbs. The port needs area lighting for security and 24-hour operation.

- Restoring new port wet utilities. These systems, currently inoperable, are required for sanitary purposes for the workforce operating the port. However, bottled water will continue being used for drinking.
- Restoring two Iraqi cutter suction dredges. The Port Authority has two small dredges that can be put back into service in a short period of time. They would perform the required maintenance to prevent the port from silting up again.

2.2 Airports

Bechtel's airport assessment work focused on the two primary international gateways of Baghdad and Basrah, and on the national air traffic management (ATM) infrastructure. Bechtel has completed detailed field inspections of both airports and, at the direction of USAID, shifted our mobilization emphasis from Basrah to Baghdad. Based on assessments performed at Baghdad and Basrah, Bechtel recommends prioritizing funding of the national ATM system, airport air traffic control (ATC) systems, general utility supply, and minimal passenger terminal reconstruction.

This approach allows facilities to open day and night to commercial and cargo traffic and facilitates collection of overflight and airport use fees and taxes to fund future system improvements. In addition, a number of the services to be provided at the airport, such as cargo handling, may be bid as concessions along with a requirement for private companies to invest in the facilities.

The first priority – safely managing aircraft over Iraq and at the international airport facilities – requires rebuilding the ATM system. As an emergency measure, communications with neighboring countries will be established using a VSAT-based ATM system and a VHF radio system added to the existing military ATM backbone. Installation of this system will allow Iraq to open its commercial route structure from all neighboring countries and Europe, permitting the collection of overflight fees. In the intermediate-term, a radar station will be added at Baghdad International Airport.

Replacements and repair of airport ATC systems will include control tower console replacements, instrument landing systems repair and replacement, DVOR replacement, repair of the Baghdad Air Control Center, telephone system improvements, and trunk radio systems. Airside lighting, signage, and markings will be reconstructed and repaired to meet minimum ICAO standards.

The second priority is the reconstruction and repair of general utilities and distribution and collection for the electrical, potable water, and sewage systems to supply the airport terminals and ancillary buildings. Emergency redundant electrical power systems will be restored to critical airport facilities, such as the control tower, communications, and airport ATC systems.

The third priority is to repair and reconstruct minimal passenger terminal facilities and other critical support facilities to handle expected passenger and aircraft throughput for the opening and anticipated first 2 years of operation. All repairs and new construction will comply with the security and operation guidelines provided by the U.S. Department of Transportation, Federal Aviation Administration, Transportation Security Administration, and customs and immigration specialists from the U.S. These activities include:

- Initially opening two gates in Terminal C at Baghdad airport then expanding to six gates. Administration building repairs will provide office space for the civil aviation, airport operator, and other airport support teams. A new security checkpoint will be installed on the airport access road and the emergency response station and perimeter security fence will be

repaired. Repairs to the central plant facility will provide chilled water to the terminal, control tower, and administration buildings.

- Initially opening one gate in the Basrah airport terminal, then expanding to three gates. Repairs will be made to terminal office space to support the airport emergency response station and control tower facilities.

2.3 Water, Waste, and Irrigation

Iraq's water and wastewater systems require immediate attention due to the poor condition of the majority of water treatment systems and the complete breakdown of its few wastewater treatment plants. The water system in the South Region and neighboring areas contains the accumulated wastes from sewerage and agricultural runoff, making it the most likely source of disease from water supplies. History has shown that the South Region has the highest incidence of disease.

The recommended approach to mitigating these effects is to rehabilitate the water treatment systems in the South Region of Iraq. Bechtel also recommends repairing/rehabilitating the wastewater systems in the Central Region to greatly reduce the introduction of contaminants into the river system, which also provides potable and agricultural water to the general public.

The Assessment Report lists a broad range of projects that have been formally assessed. These assessments, and observations by others, have given us an understanding of the water and wastewater systems that should be incorporated in the long-range development of Iraq. Water projects have a potential cost of $6.5 billion over the next 10 to 20 years. The following represents Bechtel's recommended priority of these projects to be implemented as part of the USAID contract.

Water Projects. The first six projects on the list of recommendations will improve the potable water supplied to the public: four projects for the Al Basrah area water supply (Safwan pump station, area pump stations, filters, and area mains); the Saba Nissan water treatment plant extension to close the gap on water production on the east side of Baghdad; and repair of the water plant in An Najaf, where hospitalizations from waterborne diseases have been reported.

Wastewater Projects. Seven of the eight remaining projects on the list of recommendations are wastewater treatment plants; the other project is a group of pump stations in the Baghdad area. The wastewater plants constitute the majority of the waste that should currently be undergoing treatment in the established plants. All require significant rehabilitation due to neglect during the sanctions period. Some have suffered additional degradation due to looting.

Recommended projects include four in the Central Region (Kerballa, Al Najaf, Al Hillah, and Ad Diwaniyah); three in the Baghdad area (Kerkh and Rusramiyah wastewater plants and several Baghdad pump stations); and the Mosul wastewater plant in the North region.

2.4 Power

Electrical generation is the fundamental backbone of the Iraqi economy. It is also required to support other health and welfare activities within the country. Bechtel evaluated the three key areas of the electric power system – generating stations, transmission lines, and substations – to develop the recommendations detailed below. These recommendations focus on improving electrical supplies in the country, particularly Baghdad. As part of this effort, Bechtel is providing emergency supplies and materials to sustain current production.

Generating Stations. Iraq's generating stations sustained minimal damage during the conflict. However, their ability to provide electricity to the system is severely affected by a lack of maintenance. Consequently, Bechtel recommends rehabilitating selected generating stations that will produce the greatest increase in generation and improvement in reliability. Other recommendations focus on maintaining continued operation of water and wastewater treatment facilities, replacing generation not available through the use of small generating units, completing selected plants left inoperable because suppliers left the country prior to the conflict, and minor non-emergency repairs and restorations to improve total generation.

Generation implementation should include:

- Treating water and wastewater at all the thermal plants. Existing systems are in a state of disrepair and renovations are required to support continued generation levels and to maintain reliability.
- Installing generating units in the 1 to 5 MW range for specific needs, such as the Port of Umm Qasr and Baghdad International Airport, and units in the 10 to 50 MW range for support of electrical supply to Baghdad. This includes installing new units and rehabilitating old units at Taji Station.
- Rehabilitating steam turbines and control systems for Doura Units 5 and 6 to restore generating capability.
- Rehabilitating Bayji Unit 5 to return to full capability. This will provide a template for restoration of the other five units at Bayji over time.

Transmission Lines. Assessment of the 400 kV transmission system revealed major outages due to the recent conflict and subsequent looting. The Commission of Electricity is engaged in repairs to the system but does not have the materials, replacement towers, or insulators to complete them. Bechtel's recommendations center on providing required materials, support, and expertise to enable the Commission to complete system repairs. This will allow effective use of funds and return Iraqi personnel to work.

Based on the requirements for restoration of the 400 kV system, Bechtel recommends supporting immediate restoration of 400 kV lines on the western leg of the system that provide transmission to Baghdad.

Substations. Bechtel's recommendation focuses on repair of those substations required to provide critical service to selected areas of the country. This includes working with the Commission of Electricity to prioritize key substations and, within the funds available for this activity, refurbishing and repairing stations in priority order.

2.5 Rail, Roads, and Bridges

The surface transportation system in Iraq is vital to the movement of humanitarian aid and the free flow of commerce. Bechtel evaluated roads, bridges, and the national rail network and arrived at the following recommendations:

Rail. While the national rail system does need a significant amount of restoration, the most critical need required to ensure sustained operations, particularly for food shipments from the Port of Umm Qasr, is an upgrade of a 72 km stretch from Umm Qasr to Shuiaba Junction. The Ministry of Transportation supports this selection.

Roads. Assessments reveal that the road network in Iraq is significantly deteriorated. However, poor road conditions have not completely blocked the movement of goods and people within the country. Traffic continues to flow, albeit with greater difficulty than is generally acceptable. Consequently, the repair or upgrading of roads is not an immediate priority. Bechtel believes available funds should be directed to other areas with more pressing needs.

Bridges. Two bridges were identified as requiring emergency work to facilitate humanitarian and commercial traffic. They are the Al Mat bridge on Highway 10, near Ar Rutbah, between Baghdad and Jordan; and the Highway 10 bridge about 175 km east of Ar Rutbah. The Al Mat bridge requires a bypass to allow traffic flow and the Highway 10 bridge must be safely demolished to ensure Highway 10 stays open.

Bechtel conducted 36 detailed bridge assessments and recommends the following four bridges be repaired on a priority basis:

- **Al Mat Bridge.** Although Bechtel is building a bypass, the bridge itself is in imminent danger of collapse. In addition, the bypass permits only suboptimal traffic flow. We recommend demolishing the damaged bridge sections and rebuilding.
- **Khazir Bridge.** This bridge is critical to the flow of fuel and agricultural products in the North Region. Currently, both the southern and northern spans have failed and earthen fill is being used to replace one failed span, allowing only limited traffic; no bypass is feasible. We recommend phased demolition and reconstruction while maintaining traffic flow.
- **Al Fathah Highway Bridge.** This was both a road and pipeline bridge severely damaged by fire during the conflict. The Oil Ministry reports significant losses for each day the line is not restored. Bechtel recommends reconstruction to support the pipelines. It is not feasible to restore road traffic on this bridge. A new bridge would be needed, which is not a part of this recommendation.
- **Tikrit Bridge.** This is an important link for aid and commerce over the Tigris between Tikrit and Tuz Khurmatu. Traffic flows over temporary bridges and damaged spans. Collapsed spans may be further damaging the piers supporting the bridge. We recommend this bridge be reconstructed.

2.6 Buildings

Bechtel's potential scope for buildings projects under the terms of the contract is vast, ranging from educational and health facilities to different types of government buildings. To mobilize quickly and maximize impact, Bechtel set priorities in consultation with USAID. These priorities are identified below, together with the rationale for their inclusion for near-term action.

Primary and Secondary Schools. **The urgency is that grade-level schools are a critical element of** the social structure in Iraq. Children need not only an education, but a safe and secure place during times of turmoil. Also, the timing allows for considerable work to be accomplished in the summer months so that many schools will be available for the new term in September. An additional rationale for this priority is that most schools fall into a condition that can be remedied by emergency or "quick fix" rehabilitation, which allows undertaking specificschool repairs with minimal funds and with the maximum use of Iraqi contractors. A final consideration is that these small-scale projects can be undertaken in great numbers and across a broad geographic area. As such, the focus on schools reaches an unusually large percentage of the Iraqi population.

Health Clinics. The focus on clinics parallels many of the advantages noted for schools. In addition, clinic rehabilitation will decrease much of the current pressure at hospitals, since many people now seek even minor medical care at these overburdened facilities because primary care is not available at the clinics.

Selected Small-Scale Public Buildings (Police and Fire Stations in Baghdad). The rationale for including these now is that they are emergency facilities and are needed for public safety and welfare requirements. However, the program is limited in scope; there are only 45 facilities to be rehabilitated.

Not Included. The following facilities are not included at this time:

- **Universities.** University projects are large and would require a much greater investment. (Rehabilitation of the University of Basrah alone was estimated by local officials to be in excess of $40 million.) In addition, university work would not meet the immediate social objective of getting young children off the streets and into a safe and secure environment.
- **Hospitals.** The repair program of clinics should alleviate much of the pressure now being felt by the hospitals. Evaluation of hospital needs should be performed after the clinics are functioning, which will occur in the next 4 months.
- **Public Buildings.** Rehabilitated or new public buildings will ultimately be an important part of institutional strengthening in Iraq. However, the urgency is less than with educational and health facilities since it is easier to find temporary space for general-purpose government and public functions.

The focus described above has been confirmed in Job Order 03-014 and constitutes Bechtel's work program through October 2003. During this time, Bechtel will be evaluating the success of this program as well as exploring whether the scope should be modified in future phases.

2.7 Telecommunications

The Ministry of Communications has evaluated two reconstruction projects as top priority. After receiving authorization from Congress, USAID authorized Bechtel to begin preparation of job orders for the telecommunications system in Iraq. These projects are the fastest way to deliver a positive message to a substantial percentage of the Iraqi population, while providing the foundation for restoring an adequate level of communications capability to the rest of Iraq.

The two major projects are:

- Reconstitution of the country's fiber optic backbone from north of Mosul, through Baghdad, and down to An Nasiriyah and Umm Qasr. Total fiber cable reconstituted is 2,000 kilometers. This is a 3- to 4-month project in cooperation with the Iraqi Telephone and Postal Commission. This project will allow intercity calling in the country and facilitate operation of communications networks for major utilities, such as electricity.
- The second project will partially reconstitute the public switched network in Baghdad, which was severely damaged in the conflict. According to the Ministry, 10 of 33 switches were damaged and only one-third of the lines in Baghdad are operating. There are 280,000 inoperable lines, mostly in the city center where government buildings were targeted. Bechtel will install four switches for local access and one satellite gateway for international calling. This will allow the Ministry to return 120,000 lines to operation at a cost of $36 million.

Completion of these two projects will have positive results in themselves and are the basis for further improvements.

- The 2,000-kilometer fiber optic backbone is the core of the network. Future additions will be backbones crossing the country, all connected by the North-South backbone.
- The International Satellite Gateway will provide capability for half the country to make international calls. A second gateway will be required for full coverage.
- The four switching units are the first phase of recovery of the required 12 major exchanges. They will provide connectivity to about 120,000 homes in the greater Baghdad area that do not currently have service.

2.8 Institutional Strengthening

USAID and Bechtel established institutional strengthening as an integral part of the Bechtel contract. The two main components are institutional capacity building for operation and maintenance and developing a roadmap describing how these facilities might be sustainably managed over the long-term. Bechtel will address this in the detailed infrastructure implementation plans and a USAID policy on this topic is under development. It will give guidance on issues such as the extent of institutional strengthening efforts in the various sectors and the relationship between Bechtel and other players, thereby including USAID in a what is seen as a highly collaborative effort.

The broad outlines of Bechtel's approach to institutional strengthening in the power sector give an example of how we might address this aspect of our contract in the priority sectors:

Initial Assessments. These indicate that the Iraqis responsible for operations and maintenance of electric power generation and distribution systems are highly competent and have been doing a heroic job of keeping exhausted installations working during the last decade or more.

Initial Challenges. In the short-term, the main operations and maintenance challenge is replacing worn-out or destroyed equipment and supporting the people operating and maintaining the system.

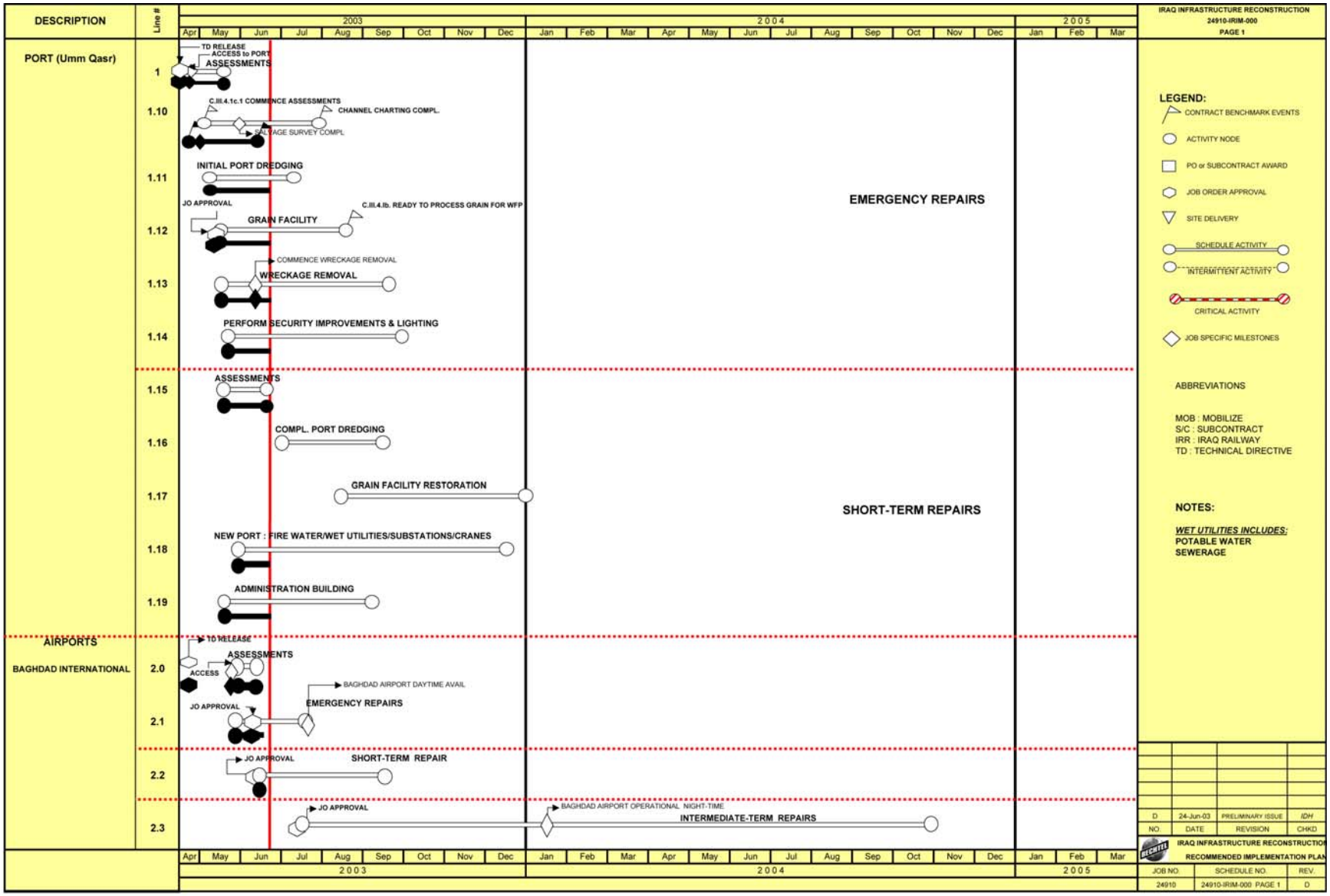
Longer-term Challenges. In the medium- to long-term, a comprehensive ongoing training program is needed to support a new strategy and decision-making culture for the infrastructure sector, the people, and the technology to implement it. This training program could include:

- A shadowing program to help power sector managers elevated to senior positions assume their new responsibilities
- A broad training program to meet the operations and maintenance needs of the sector
- Rehabilitation of the Commission of Electricity's training center to create the institutional capacity to provide this training
- Assistance to the Commission of Electricity to revise and update its strategic plan for the Iraqi power sector, which in the process will strengthen its strategic capacity

Other Infrastructure Sectors. This sort of program is also applicable to other highly organized sectors, such as water, wastewater, and irrigation and the Iraqi Republic Railway, where similar approaches are also proposed in Bechtel's Assessment Report.

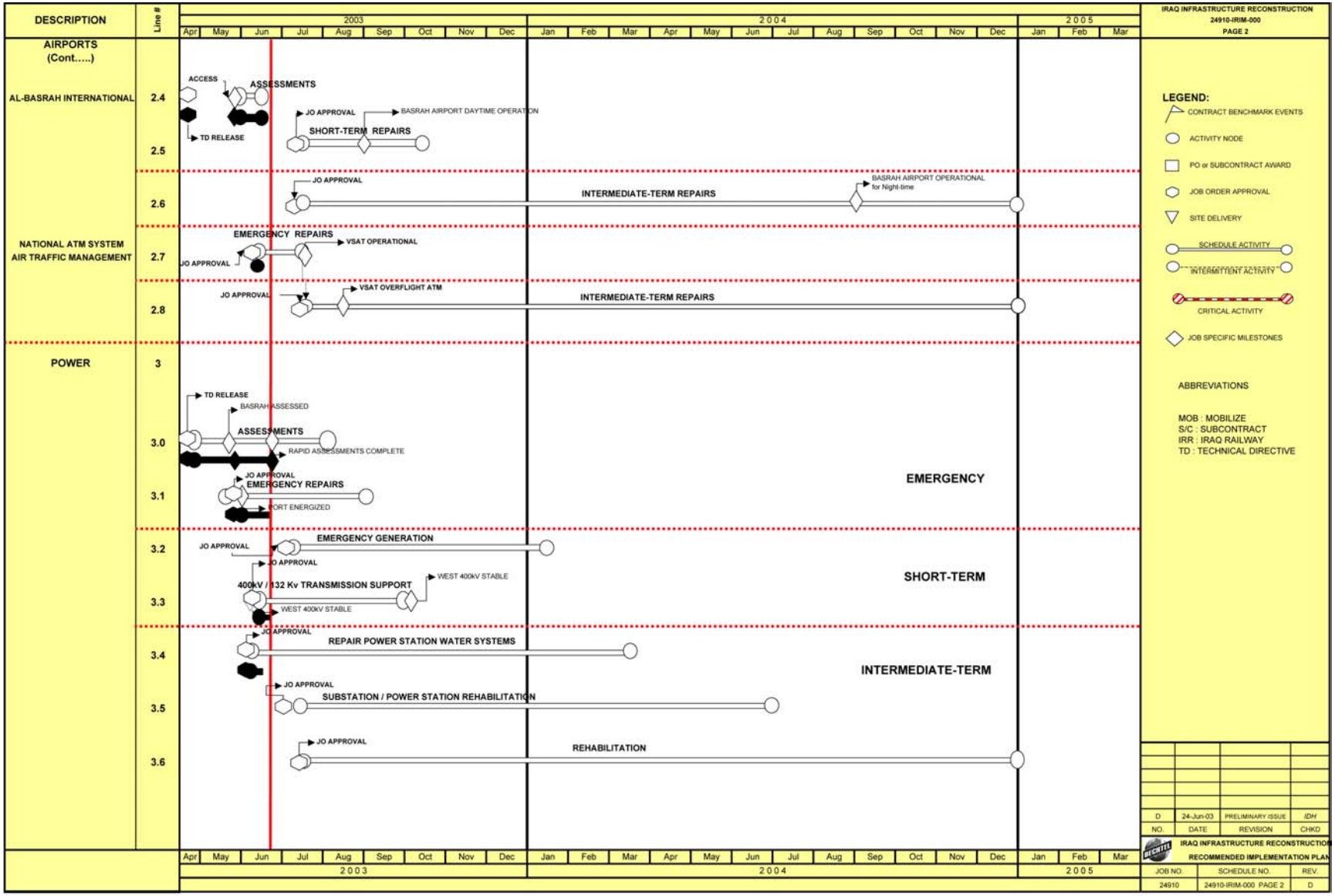
3.0 Recommended Implementation Plan Schedules

The following Level 1 schedules present the timeline for emergency, short-term, and intermediate-term repairs in the six sectors, including job-specific milestones. In addition, we have included a schedule for the telecommunications sector.



Recommended Implementation Plan Schedule.

1



Recommended Implementation Plan Schedule (continued).

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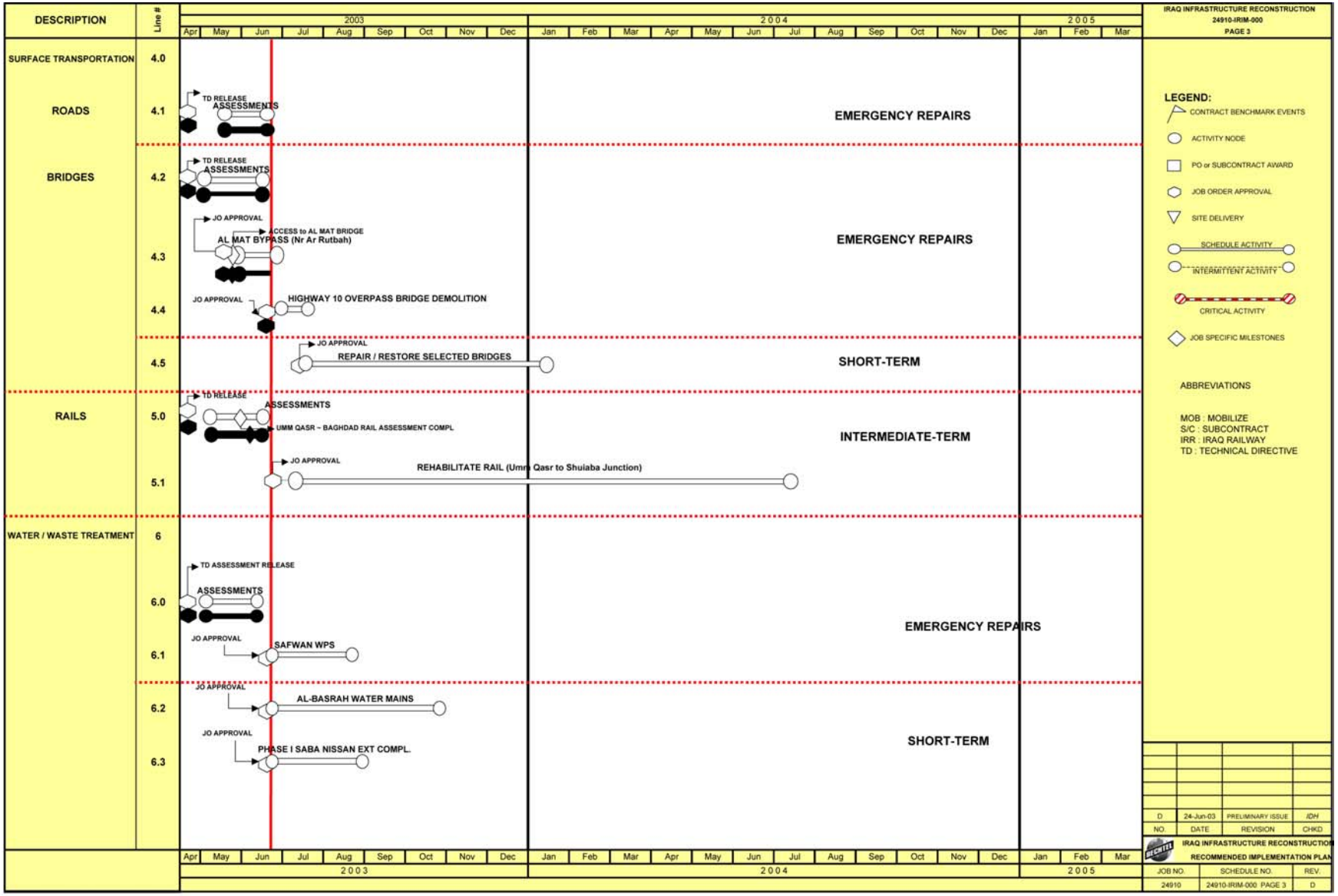

Recommended Implementation Plan Schedule (continued).

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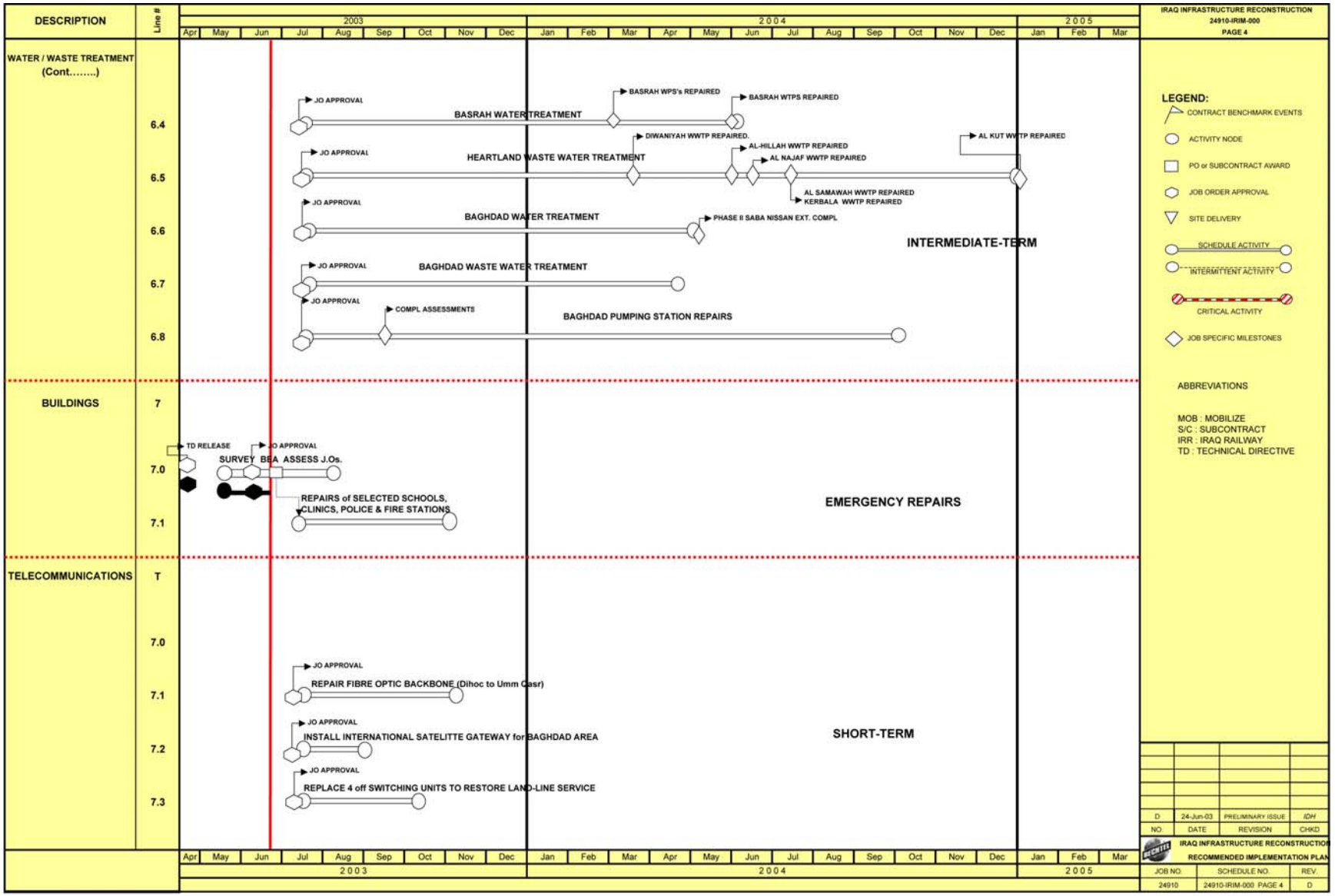

Recommended Implementation Plan Schedule (continued).

4

4.0 Rough Order of Magnitude Estimates

The Rough Order of Magnitude (ROM) estimates contained in this report have been produced using one or more of the following methods:

- Comparison with similar work performed by Bechtel, with material and labor adjustments based on observed or perceived site conditions and/or on information provided by local engineers or operators of the facilities that have been surveyed
- Facility cost/capacity ratios, with adjustments for site conditions
- Ratio methods, using known material/equipment costs as guides

The purpose of these estimates is to assist in establishing priorities for decision-making and to aid in evaluating the potential cost of performing the identified tasks. These estimates cannot be relied upon to establish definitive funding levels for individual tasks, as neither preliminary nor detailed design engineering have been performed in sufficient detail to provide quantities from which to estimate. Survey and as-built information has been, in general, nonexistent and soils reports and other environmental information has not been available.

In many instances, the methodology for performing the work has not been determined, and this will have a great impact on the ultimate cost of the effort. For example, local sourcing of material and labor will yield significantly different cost results from international or regional sourcing. In addition, the security environment may greatly impact the cost of doing business and this factor cannot be quantified at this time.

Detailed cost estimates can only be developed utilizing normal engineering methodologies by performing sufficient engineering to definitize the scope for discrete projects. Once detailed designs are performed, detailed engineer's estimates can be prepared so that packages can be issued for competitive bidding.

Caution should be used in utilizing these ROM numbers for anything other than preliminary prioritization purposes. Once the priorities have been established by USAID, the traditional engineering, procurement, and construction process of design, bid, and build can be followed.

Iraq Infrastructure Reconstruction Program

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
Summary Table
(US$ MM)

No.	Sector	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total
1	2.1 Port of Umm Qasr	34	19	30	140	103	325
2	2.2 Airports	10	8	54	164	1,540	1,776
3	2.3 Water, Waste and Irrigation		38	358	2,688	3,459	6,543
4	2.4 Power	20	28	152	425	5,420	6,045
5	2.5 Rail, Road, and Bridges	6	57	39	156	52	310
6	2.6 Buildings	53	80	150	2	618	903
	Total	**123**	**231**	**782**	**3,574**	**11,191**	**15,902**

Rough Order of Magnitude (ROM) Estimates for Work Identified in Recommended Implementation Plan
Summary Table
(US$ MM)

No.	Sector	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total
1	2.1 Port of Umm Qasr	34	19				53
2	2.2 Airports	10	8	54			72
3	2.3 Water, Waste and Irrigation		23	115			139
4	2.4 Power	20	28	152			200
5	2.5 Rail, Road, and Bridges	1	27	4			32
6	2.6 Buildings	53					53
7	2.7 Telecommunications		45				45
	Total	**118**	**151**	**325**			**594**

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.1 Port of Umm Qasr
(US$ MM)

No.	Priority E	S	I	L	U	Description	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
						Emergency Projects								
1	P					Initial dredging to open up new port and berth 10	12.0					12.0	03-001	12.0
2	P					Removal of wrecks and other sunken objects	12.2					12.2	03-010	12.2
3	P					Emergency startup & cleaning of grain facility	8.2					8.2	03-004	8.2
4	P					Port security improvements	1.7					1.7	03-009	1.7
						Short-Term Projects								
5		P				Complete dredging of new port		8.8				8.8		
6		P				Construction of interim customs facility		0.1				0.1		
7		P				Restoration of fire water systems		0.3				0.3		
8		P				Restoration of new port administration building		2.8				2.8	BCL 03-0078	2.8
9		P				Restoration and startup of new port container cranes		0.3				0.3		
10		P				Restoration of area lighting		0.8				0.8		
11		P				Restoration of new port wet utilities		2.5				2.5		
12		P				Repair of 2 each Iraqi cutter suction dredges		3.1				3.1	BCL 03-0083	3.1
13		P				Disposal of UXO in land and water		0.2				0.2		
						Intermediate-Term Projects								
14						Spot dredging of main channel from Umm Qasr to Arabian Gulf			20.0			20.0		
15						Restoration of quay fender system			2.0			2.0		
16						Restoration of gantry cranes			5.0			5.0		
17						Restoration of customs area and passenger terminal			2.5			2.5		
						Long-Term Projects								
18						Dredging main channel from Umm Qasr to Arabian Gulf to 12.5 meters depth				100.0		100.0		
19						Structural repairs to grain facility wharf				6.0		6.0		
20						Restoration of warehouses and miscellaneous buildings				4.0		4.0		
21						Repair of 3 each Iraqi suction hopper dredges				30.0		30.0		
						Unassessed Projects								
22						Dredging main channel from Umm Qasr to Al Zubayer					25.0	25.0		
23						Replacement of old container cranes at old port					15.0	15.0		
24						Replacment of obsolete gantry cranes to enhance port capacity					40.0	40.0		
25						Modernization of all wet and dry utilities at old and new port					15.0	15.0		
26						Upgrade all cathodic protection systems					7.5	7.5		
						Total All Projects	**34.1**	**18.7**	**29.5**	**140.0**	**102.5**	**324.7**		**39.9**
						Total Recommended Priority Projects	**34.1**	**18.7**				**52.7**		
						Related Work in Other Sectors								
27						Procurement, installation, and startup of new standby generators for grain facility	4.7					4.7	03-003	4.7
28						Procurement, installation, and startup of new standby generators for port	4.4					4.4	03-003	4.4
29						Restoration of 132 kV electrical supply								
30						Training of port operators				1.8		1.8		
						Total Related Projects	**9.2**			**1.8**		**11.0**		**9.2**

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report

2.2 Airports

(US$ MM)

No.	Priority E	S	I	L	U	Description	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
						Baghdad International Airport (BIAP)								
1	P					Parking and checkpoint facility	0.82					0.82	03-016	0.82
2	P	P				On call repair services for Terminal C	3.53	3.53				7.06	03-019	7.06
3	P					Preparation of airfield for commercial operations	0.97					0.97	BLC 03-0087	0.97
4			P			Air traffic control (ATC) and airfield			4.70	13.55		18.25		
5			P			Architectural			5.39	29.75		35.14		
6			P			Mechanical systems			4.79	4.25		9.04		
7			P			Electrical systems			6.36	8.50		14.86		
8			P			Special systems[2]			4.64	14.61		19.25		
9						To bring BIAP to normal standard					500.00	500.00		
						BIAP subtotal	**5.32**	**3.53**	**25.88**	**70.66**	**500.00**	**605.39**		**8.86**
						Basrah International Airport (BIA)								
10	P					Restoration of Basrah airport sewage treatment plant	0.73					0.73	BLC 03-0084	0.73
11		P	P			Air traffic control (ATC) and airfield		0.75	4.25	6.54		11.54		
12		P	P			Architectural		1.00	3.50	0.22		4.72		
13		P	P			Mechanical systems		0.50	3.00	0.53		4.03		
14		P	P			Electrical systems		0.50	4.00	4.78		9.28		
15		P	P			Special systems[2]		0.50	1.50	5.70		7.70		
16						To bring BIA to normal standard					300.00	300.00		
						BIA subtotal	**0.73**	**3.25**	**16.25**	**17.77**	**300.00**	**337.99**		**0.73**
						National Air Traffic Management (ATM) Infrastructure								
17		P				PABX and hardwire telecom systems		1.64				1.64	03-012	1.64
18	P					Satellite and wireless telecom systems	1.45					1.45	03-013	1.45
19	P					VSAT and VHF system for air traffic management network	2.11					2.11	03-017	2.11
20	P					BIAP ATC Inspector	0.04					0.04		
21			P			Air traffic control (ATC) and airfield			9.89	15.28		25.18		
22						To bring ATC systems to normal standard					500.00	500.00		
						ATM subtotal	**3.60**	**1.64**	**9.89**	**15.28**	**500.00**	**530.41**		**5.20**
						Other Identified Work								
23			P			Institutional strengthening program			1.82			1.82		
24						Reconstruction of 3 domestic airports				60.00	240.00	300.00		
						Other identified work subtotal			**1.82**	**60.00**	**240.00**	**301.82**		
						Total All Projects	**9.65**	**8.42**	**53.85**	**163.70**	**1,540.00**	**1,775.61**		**14.78**
						Total Recommended Priority Projects	**9.65**	**8.42**	**53.85**			**71.91**		

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.3 Water, Waste and Irrigation
(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
						Emergency Projects									
1	P					Safwan pump station	New pump station and rehabilitated elevated storage tank for potable water supply to approximately 40,000 people near Al Basrah.	0.2					0.2	03-015	0.2
						Short-Term Projects									
2		P				Saba Nissan Extension No. 1	Construct 200 million liter/day water plant extension for east side of Baghdad serving about 2.5 million		16.6				16.6	BLC 03-0079	16.6
3		P				Repair water mains in Basrah region	Replace 1 - 15 km supply pipeline and repair damage incurred by illegal connections on approximately 40 km of two potable water main pipelines.		6.8				6.8	BLC 03-0085	6.8
4						Ba'aqubah water treatment plant	Rehabilitate or replace mechanical and electrical (including ICA) equipment.		4.0				4.0		
5						Diwaniyah water treatment plant	Rehabilitate through replacement or repair dosing (Alum, Chlorine), flocculation, clarification and filtration equipment at the treatment plant. Update QC		1.0				1.0		
6						Al kut water treatment	Rehabilitate or replace mechanical and electrical (including ICA) equipment. Update QC laboratory.		2.0				2.0		
7						Al Samawah water treatment plant.	Rehabilitate and replace mechanical and electrical (including ICA) equipment. Update QC laboratory.		4.0				4.0		
8						Canal salinity and general water quality survey	Determine flows and salinity for canals, rivers tributary to Tigris and Euphrates.		4.0				4.0		
						Intermediate-Term Projects									
9						Al Hillah water treatment plant.	Complete the works for the two waste water plants serving Al Basrah. Increase the network to serve about 50%.			35.0			35.0		
10						Saba Nissan Extension No. 2	Add new 50MGD (200 million liter/day) water plant expansion.			35.0			35.0		
11			P			Basrah water distribution pumps and generators	Rehabilitate or replace approximately 90 water pumps and 20 generators (and all ICA equipment) that supply water to 13 areas in and around the Basrah region.			13.0			13.0		
12			P			Basrah water treatment plants	Rehabilitate through replacement or repair 13 water treatment plants within the Basrah region, including dosing equipment (Alum, Chlorine), coagulation, filtration and disinfection.			14.3			14.3		
13			P			Diwaniyah wastewater treatment plant	Rehabilitate or replace mechanical and electrical (including ICA) equipment. Plant is currently disposing raw wastewater into river network.			6.9			6.9	BLC 03-0086	6.9
14			P			Kerballa wastewater treatment plant	Rehabilitate or replace mechanical and electrical (including ICA) equipment. Plant is currently disposing raw wastewater into river network.			13.0			13.0		
15			P			Al Najaf water treatment plant	Rehabilitate through replacement or repair of dosing (Alum, Chlorine), flocculation, clarification and filtration equipment at the treatment plant.			8.0			8.0		
16			P			Al Najaf wastewater treatment plant	Rehabilitate and replace mechanical and electrical (including ICA) equipment. Plant is currently disposing raw wastewater into river network.			10.7			10.7		
17			P			Al Hillah wastewater treatment plant.	Rehabilitate or replace mechanical and electrical (including ICA) equipment. Plant is currently disposing raw wastewater into river network .			4.0			4.0		

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.3 Water, Waste and Irrigation
(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
18			P			Baghdad sewage lift stations.	Pump failure is causing sewerage to back up into city streets. Install bar screens to protect lift station pumps and replace or rehabilitate existing pumps.			20.0			20.0		
19			P			Kerkh wastewater treatment plant	Rehabilitate and replace mechanical and electrical (including ICA) equipment within the influent screenings. Grit removal and primary tanks currently passing raw wastewater into the river network. Plant is currently disposing raw wastewater into river network.			5.0			5.0		
20			P			Rusramiyah wastewater treatment plants	Replace or rehabilitate the mechanical and electrical systems from the influent screens to the chlorination system. Plant is currently discharging raw wastewater to the river.			10.0			10.0		
21						Kirkuk water treatment plant	Rehabilitate or replace mechanical and electrical (including ICA) equipment.			5.0			5.0		
22						Arbil water treatment plant	Rehabilitate or replace mechanical and electrical (including ICA) equipment.			4.0			4.0		
23						Rehabilitate existing flooding sewerage stations	Repair or replace pumps and provide bar screens for pump protection where recommended.			10.0			10.0		
24			P			Mosul waste water treatment plant.	Rehabilitate or replace mechanical and electrical (including ICA) equipment.			10.0			10.0		
25						Mosul water treatment plant.	Rehabilitate or replace mechanical and electrical (including ICA) equipment. Update QC laboratory.			8.0			8.0		
26						Refurbish Sweet water canal pumps, gates and canal walls	Remove debris, clean accumulated sand, repair canal banks, (both erosion damage and serious structural concrete collapse) line canal where appropriate (only 60% canal walls are lined, bottom is unlined). Repair/replace pumps and controls,valves and penstocks.			45.0			45.0		
27						Refurbish Baghdad existing water plants (Kerkh and Saba Nissan)	General plant maintenance of mechanical and electrical equipment.			20.0			20.0		
28						Complete refurbishment of Kerkh wastewater treatment plant	Upgrade, rehabilitate or replace mechanical and electrical (including ICA) equipment. (Note: both plants), as required.			26.0			26.0		
29						Upgrade institutional capacity for sustainable plant O&M	Assist in implementing new management systems for O&M and in training operating staff.			1.8			1.8		
30						Complete refurbishment of Rusramiyah wastewater treatment plant	Upgrade, rehabilitate or replace mechanical and electrical (including ICA) equipment, as required.			53.0			53.0		
						Long-Term Projects									
31						Refurbish Al Faris wastewater treatment plant	Rehabilitate or replace mechanical and electrical (including ICA) equipment. Update QC laboratory.				10.0		10.0		
32						Baghdad water treatment plant expansion	Design and install a new conventional coagulation and filtration plant for the east side of Baghdad.				2,400.0		2,400.0		
33						Canal dredging	Dredge canals on a continuing basis to remove silt and lower adjacent water tables.				5.0		5.0		
34						Heartlands area interceptor sewer	Add a sewer line along river to intercept existing flows of untreated sewerage is dumped in storm sewers and transport of sewerage away from river to aeration				20.0		20.0		
35						Upgrade Baghdad wastewater plants to handle existing flows.	Existing plants do not have the design capacity to handle the current sewerage flows.				90.0		90.0		
36						Install septage treatment systems in Arbil and Kirkuk	Septic tank wastes are currently not treated and most likely are discharged to the canals and rivers.				30.0		30.0		
37						Install sewerage systems in Arbil and Kirkuk	These cities currently do not have any sewers; they rely on septic tanks and latrines.				75.0		75.0		

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.3 Water, Waste and Irrigation
(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
38						Upgrade Basrah wastewater plant	Complete the construction and startup of the wastewater plant.				35.0		35.0		
39						Al Hillah water treatment plant.	New screens, rehabilitate and replace mechanical and electrical (including ICA) equipment. Update QC laboratory.				3.0		3.0		
40						Upgrade Al Kut wastewater	New wastewater treatment plant				8.5		8.5		
41						Al Samawah wastewater treatment plant.	Complete the design and commence construction on a new wastewater treatment plant. Design is partially complete. Work stopped at the onset of the conflict.				11.0		11.0		
						Unassessed Projects									
42						Marshlands rehabilitation	Rerouting of river flows has resulted in a significant reduction in supply of water to the marshlands. This program will look to identifying and implementing solutions to the problem.					100.0	100.0		
43						The expansion of Baghdad wastewater plants and collection systems serving the entire city.	At present 80% of Baghdad has a sewer system. This project will provide sewage for the entire city.					400.0	400.0		
44						Expand existing wastewater collection systems to serve 100% of municipalities that currently have sewage treatment.	Municipalities with sewer systems generally only have service for 10-20 percent of the city. This program would provide full coverage to the entire city.					110.0	110.0		
45						Expand existing wastewater treatment in GCWS municipalities to cover 100%.	The above municipalities have wastewater treatment for only 10-20 percent of the community. This will expand the treatment capacity to conform to the					240.0	240.0		
46						Install regional conventional water plant to serve Basrah users	The Basrah area is currently served by about 15 water treatment plants distributed over a wide area. This would centralize treatment in a regional conventional plant, distributing treated water to the surrounding area.					900.0	900.0		
47						Install regional conventional water plants to replace compact units in areas other than Basrah	Compact uinits were meant as an interim measure during the embargo. Conventional plants more reliably serve the community over a longer period of time.					1,100.0	1,100.0		
48						Convert Arbil and Kirkuk septage treatment to conventional	Once the sewer systems are in place the treatment works can be modified to permit more complete removal of wastes and possible recycling of the					80.0	80.0		
49						Upgrade 45 municipal solid waste disposal systems	Sanitary disposal of municipal wastes is limited. This task will develop a standard landfill design and use it where applicable.					140.0	140.0		
50						Rehabilitation of irrigation systems	Irrigation and brackish water canals need maintenance and upgrading to minimize contamination of agricultural lands and to minimize transfer of salts to canals and rivers.					19.0	19.0		
51						Treat agricultural brines	Brackish wastes from farms should be collected and treated where agriculture is dense to limit the salt load on the rivers and downstream users.					90.0	90.0		
52						Repair and restoration of additional 7 urban wastewater collection and treatment systems	Smaller communitiea either have minimal or no systems. This project will install the sewers and the treatment plant to handle the local wastes.					280.0	280.0		
							Total All Projects	**0.2**	**38.4**	**357.7**	**2,687.5**	**3,459.0**	**6,542.8**		**30.5**
							Total Recommended Priority Projects	**0.2**	**23.4**	**114.9**			**138.5**		

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.4 Power
(US$ MM)

No.	Priority E	S	I	L	U	Area of Work	Required Actions	Emergency	Short-Term	Intermediate Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
1	P					Emergency work. This includes chemicals, gases, consumables, replacement parts, vendor technical support, tools and other emergency repair items.	■ Repairs and restoration required to keep power stations operating or immediately come back on line. ■ Immediate repair of transmission lines and substations to allow transfer of electricity to Baghdad and other areas with shortage of electricity.	20					20		
2		P	P			Water and wastewater systems for power plants. Heat exchangers and mechanical equipment are also included. All thermal power plants need some upgrades in their water treatment systems.	■ Restoration and upgrading of power plant water and wastewater treatment systems to improve output and reduce water pollution. ■ Repair and replacement of heat exchangers and other mechanical equipment to increase production and reliability.		10	15	35		60		
3		P				Small generating units from 1 to 10 MW in size	■ Provision of immediate generation needs to support specific activities of short-term benefit such as opening of Baghdad airport and Port of Umm Qasr. ■ In the longer term, these small units may be needed to get industrial plants operating until improvements in the power system can be made.		10		40		50		
4			P			Medium size generating units from 10 to 50 MW in size	■ Generation to improve supply of electricity to specific locations such as Baghdad. This scope is for the Taji power station and includes 2 new 25MW units, 2 new 15MW units, and 2 refurbished 25MW units. ■ In the long term, an additional 200MW unit could possibly be added.			50	100		150		
5		P	P			Substation restoration and repairs	■ Repair and restoration of substations for distribution of electricity to the population and resumption of critical industry or petroleum production. ■ Over 20 major substations have been destroyed by looters primarily in the South. The Commission of Energy (COE) is developing a prioritized list of those to be addressed in the short and intermediate time frame. ■ In the long run, additional substations must be constructed to distribute power from the new plants to be constructed.		8	12	100	200	320		
6			P			Rehabilitation of generating units	■ Rehabilitation of existing generating units to return them to design capability and reliability. This includes a new control system and rehabilitated steam turbines for Doura units 5 and 6 (cost is $40MM). It also includes a standard rehabilitation package for Baiji Thermal #5 ($30MM to be paid by USAID; total cost is $80MM) to be used as a template for later rehabilitation of the other 5 units at Baiji. ■ Most other major thermal plants will require rehabilitation over the next few years.			70	100	1,000	1,170		
7						New transmission and distribution	■ Redundant and increased capacity to transmission lines to allow flexibility in distribution. ■ New transmission will be required to handle new generation expected in the long run.					200	200		
8			P			UNDP plants completion	■ Completion of plants started under the UNDP program(s) which require additional equipment and commissioning support. ■ Based on inspection of the Doura and Baiji plants, most new UNDP plants will require additional equipment and			5	50		55		
9						New generation using standard plant designs, 6,000 MW	■ New units required for 24 hour service to the population, industry and petroleum production. ■ To meet the expected demand and replace aging units, an additional 6000MW will be needed over the next 5 years. The standard plant design will incorporate design and construction standards, quality standards, and codes which will form the basis of all future work in Iraq.					4,000	4,000		
10						Standardized operations and maintenance training program	■ Establish standard methods of operating and maintaining plants and system equipment.					20	20		
							Total All Projects	**20**	**28**	**152**	**425**	**5,420**	**6,045**		
							Total Recommended Priority Projects	**20**	**28**	**152**			**200**		

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.5 Rail, Road, and Bridges
(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
						Roads and Bridges - Emergency Projects									
1	P					Highway 10 Bridge	This bridge must be completely removed to avoid additional obstruction to traffic flow on Route 10 between Baghdad and Jordan	0.7					0.7	BLC 03-0071	0.7
2	P					Al Mat Bypass	Construction of 3 km bypass road	0.3					0.3	03-007	0.3
						Roads and Bridges - Short-Term Projects									
3		P				Al Fathah Highway Bridge	This bridge is critical for the movement of oil, gas and LNG in the Northern region		4.3				4.3		
4		P				Khazir River Bridge	This bridge is on the main Erbil to Kirkuk and Mosul Highway, which supports movement of fuel, food and farm products from the northern region		3.8				3.8	BLC 03-0070	3.8
5						14 July Suspension Bridge	This bridge will require the repairs by the original suspension cable suppliers		8.3				8.3		
6						Al Muthana Bridge	Located in Baghdad this bridge has damage only to one span and associated decking. Iraqi's can repair if		3.8				3.8		
7						Az Zubaydiyah Bridge	Pontoon bridge that serves as crossing of River Tigris. Power plant and gas plant on south side of river near bridge		3.5				3.5		
8						Old Diyala Bridge	The old bridge is worn out and should be destroyed. The MBJ in place for the temporary span should be replaced with a 2 lane bridge		2.8				2.8		
9						Wadi Hawran Bridge	This bridge is on the local path to the area north of Route 10 and the current bypass will probably washout during the rainy season		2.4				2.4	BLC 03-0072	2.4
10						Al Taji Highway Bridge	This bridge is steel support beams set on concrete piles in the river. The only damage is to the span; abutments and the pier head are unaffected		3.1				3.1		
11						Al Kut Bridge	This bridge sustained no war damage, but requires major maintenance work to sustain reliable traffic flow		0.9				0.9		
12						Aziziyah Bridge	This is a pontoon bridge that serves the local community for a crossing point		4.0				4.0		
13						MC – 70 Emulsion Application	Resurfacing of roads in 3 urban areas		1.2				1.2		
						Roads and Bridges - Intermediate-Term Projects									
14						Al Mat Bridge Reconstruction	This bridge is critical for the normal flow of traffic from Baghdad to Jordan			5.1			5.1	BLC 03-0073	5.1
15						New Diyala Bridge	The damage to the bridge creates large traffic bottleneck with long lines waiting to cross the bridge. Average crossing time is 30+ mins			6.9			6.9		
16			P			Tikrit Bridge	On major route out of city to the North. The dropped spans may be causing scouring to the adjacent pile foundations			4.3			4.3		
17						Al Musayyib Bridge	This bridge is damaged on the east end. Abutment destroyed and one span dropped. May be damaged on 1st pier head from the east end			4.0			4.0		
18						Al Fathah Rail Bridge	This bridge is the main link between Baghdad and Kirkuk. Bridge and rail repairs are required			3.3			3.3		
19						Chabbab Bridge	There is a small dirt road and river crossing 3 miles upstream, that is only usable during the dry season			5.8			5.8		

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.5 Rail, Road, and Bridges
(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
						Roads and Bridges - Long -Term Projects									
20						Suwaira Br (Sarabadi over Tigris River) Bridge	Traffic is using this bridge with MBJ across dropped span. South span is dropped also and the support columns are deteriorating				3.8		3.8		
21						Kiffel Br (An Najaf N Hwy Br Over Euphrates R) Bridge	Damaged piling at south end of bridge. Continued deterioration may make this bridge impassable				3.8		3.8		
22						Ar Rumaylah Hwy Br N Over Hawr Al Hammar Bridge	Access to oil fields West of Basra				3.8		3.8		
23						Ash Shamiyah Hwy Br Over Qanat Safiyah Bridge	Bridge is passable with temporary repairs in place at this time				3.8		3.8		
24						Gap @ N of An Nasiriyah	Bridge is unfinished. Not damaged. Serves oil field to the west. MBJ in place 600 yds upstream				3.8		3.8		
25						HWY 10 BR to Jordan Over Wadi Ashwah Bridge	Dropped span is blocking the east bound lane of Rte 10				3.8		3.8		
26						Wadi Hawran Highway North Bridge	Demolition and reconstruction required				2.4		2.4		
27						Al Muwaffaqiyah (Hwy Br over Nahral Gharraf) Bridge	Minor damage; temporary fix is in place				3.8		3.8		
28						Highway 1 Paving Project	Need to complete the unfinished lane to expedite traffic flow from Baghdad to Basra				73.0		73.0		
29						Tuz Kurmatu Bridge	This bridge requires normal maintenance repairs to expansion joints, handrails, sidewalks and lighting				0.9		0.9		
						Roads and Bridges - Unassessed Projects									
30						Shab Al Hiri Bridge	Presumed reconstruction					3.8	3.8		
31						Ar Rutbah Hwy Br Over Musad Ar Rutba (Hwy 10 to Jordan) Bridge	Presumed reconstruction					3.8	3.8		
32						Balad Highway Bridge Northwest Bound Over Canal Bridge	Presumed reconstruction					3.8	3.8		
33						Al Furat Br (Shaykh Biyjti Highway Brg Over Nahr Al Furat aka Saddam) Bridge	Presumed reconstruction					3.8	3.8		
34						Al Basrah Pontoon Bridge Over Shatt Al Arab (300m gap) Bridge	Presumed reconstruction					3.8	3.8		
35						Al Habbariyah N Hwy Br Over Wadi - RT 21 Bridge	Presumed reconstruction					3.8	3.8		
36						Gap at SW of Baghdad near Sadr al Yusufiyah	Presumed reconstruction					3.8	3.8		
37						Gap at NW of Baghdad	Presumed reconstruction					3.8	3.8		
38						Gap Near Shaykh Hamid E. Br Over Dara Xpwy	Presumed reconstruction					3.8	3.8		
39						Gap at N of Baghdad	Presumed reconstruction					3.8	3.8		
40						Gap at Shuzayf	Presumed reconstruction					3.8	3.8		
							Roads and Bridges Projects Subtotal	**0.9**	**38.0**	**29.4**	**102.8**	**41.8**	**213.0**		**12.2**
							Roads and Bridges Recommended Priority Projects Subtotal	**0.9**	**8.1**	**4.3**					
						Rail - Emergency Projects									
41						Umm Qasr port	Emergent work authorization (bucket order) for spare parts for grain hopper cars	0.2					0.2		
42						Port of Umm Qasr and on mainline to Baghdad	VHF radio train movement control system in Port of Umm Qasr and on mainline to Baghdad	5.0					5.0		
						Rail - Short-Term Projects									
43		P				Mainline track for a distance of 56 km north of the Port of Umm Qasr	Complete construction of Iraqi Republic Railway (IRR) new mainline track and sidings for a distance of 56 km north and rebuild essentials tracks in the port area		19.0				19.0	BLC 03-0095	19.0

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.5 Rail, Road, and Bridges
(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
						Rail - Intermediate-Term Projects									
44						Along mainline track	Maintenance of way equipment and Abu Ghiab shop rehabilitation and/or reconstruction			10.0			10.0		
						Rail - Long-term Projects									
45						Along mainline track	Shuiaba Junction, north 85 km, track rehabilitation and/or reconstruction				20.0		20.0		
46						Along mainline track	Maintenance of way equipment and Abu Ghiab shop rehabilitation and/or reconstruction				10.0		10.0		
47						Baghdad	Managerial advisors for Iraqi Republic Railways				3.0		3.0		
48						Mosul	Mosul track rehabilitation and/or reconstruction				10.0		10.0		
49						Baiji Bridge	Baiji Bridge track rehabilitation and/or reconstruction				10.0		10.0		
						Rail - Unassessed Projects									
50						Ramadi - Al Qaim - Akishot	Ramadi - Al Qaim - Akishot track rehabilitation and/or reconstruction					10.0	10.0		
							Rail Projects Subtotal	**5.2**	**19.0**	**10.0**	**53.0**	**10.0**	**97.2**		**19.0**
							Rail Recommended Priority Projects Subtotal		**19.0**						
							Total All Projects	**6.1**	**57.0**	**39.4**	**155.8**	**51.8**	**310.1**		**31.2**
							Total Recommended Priority Projects	**0.9**	**27.1**	**4.3**			**32.3**		

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report

2.6 Buildings

(US$ MM)

No.	Priority E	S	I	L	U	Location	Required Actions	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
1	P					At approximately 6000 facilities in cities across all regions of the country	■ Assessments of schools and clinics, and selected police stations and fire stations, to identify those most amenable to immediate repairs. ■ Repair and/or reconstruction of facilities to pre-conflict conditions. ■ Approximately 6000 facilities will be covered by this program in three phases: 1350 in 12 cities in the emergency phase, 1600 in other cities the short-term, and an addtional 3050 in remaining cities by the end of 2004.	53	80	150			283	03-014	53
2						In 12 cities: Baghdad, Al Basrah, Al Nasiryah, Al Qurnah, Al Hillah, Al Najef, Al Diwaniyah, Al Kut, Karbala, Mosul, Arbil, Kirkuk	■ Repair, rehabilitate, or upgrade 1 referral hospital in each city (12 total). Non-structural rehabilitation work will be carried out, and may include painting and repairs and/or upgrades to windows, lighting, electrical wiring, and plumbing and HVAC systems.				2		2		
3						At population centers across the country	■ Repair or upgrade up to 100 general hospitals. Cost assumes approximately 120 beds at each hospital at $1,500 per bed.					18	18		
4						In 6 cities: Baghdad, Al Basrah, Al Nasiryah, Al Hillah, Al Najef, and Mosul	■ Repair, upgrade, or reconstruct Ministry of Education buildings. Cost is estimated parametrically by assuming 20,000 m2 per building in Baghdad, Al Basrah, and Mosul and 15,000 m2 per building in the other cities.					300	300		
5						In 6 cities: Baghdad, Al Basrah, Al Nasiryah, Al Hillah, Al Najef, and Mosul	■ Repair, upgrade, or reconstruct Ministry of Health buildings. Cost is estimated parametrically by assuming 20,000 m2 per building in Baghdad, Al Basrah, and Mosul and 15,000 m2 per building in the other cities.					300	300		
							Total All Projects	**53**	**80**	**150**	**2**	**618**	**903**		**53**
							Total Recommended Priority Projects	**53**					**53**		

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.

Rough Order of Magnitude (ROM) Estimates for Work Identified in Assessment Report
2.7 Telecommunications
(US$ MM)

No.	Priority E	S	I	L	U	Description	Emergency	Short-Term	Intermediate-Term	Long-Term	Unassessed	Total	Job Order Reference No.	Amount
1		P				Telecommunications terrestrial network restoration		9						
2		P				Telecommunications subscriber service restoration		36						
						Total All Projects		**45**						
						Total Recommended Priority Projects		**45**				**45**		

Note:
Items denoted with "P" under the Priority column are included in Bechtel's Recommended Implementation Plan.