LOCAL DEVELOPMENT II
URBAN PROJECT

Submitted to

USAID / CAIRO

Submitted by

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in association with

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Budget Monitoring System Phase II

Executive Summary

EXECUTIVE SUMMARY

This report, entitled Budget Monitoring System Phase II, sets forth specifications for the automation of the central accounting functions in an Egyptian Governorate. The technical specifications contained in this document are commonly called a "Logical Design." They trace the logical creation, processing, and filing of data that accomplish a governorate's accounting. This logical information will be used to develop a physical system including hardware, software, trained personnel, and carefully defined procedures.

The Budget Monitoring System Phase II report also provides an implementation plan and procurement specifications that will help the governorate successfully acquire the computer software and equipment. The costs of procuring and maintaining this system will be substantial. We estimate that it will take twenty four months and USD $1,062,000 to complete the process of replacing the existing manual accounting system with a professionally developed computer system. The new system however, will provide the governorate with a high degree of financial control that will return this outlay many times over.

The development of a large computer system follows a recognized process that includes the following major activities:

1) Feasibility Study (Complete),
2) Systems Requirements Definition (Complete),
3) Logical Design (Complete),
4) Physical Design (To be completed by an Egyptian Vendor), and
5) Implementation (To be completed by an Egyptian Vendor).

We discuss the purpose of each step in the sections below. To date, the LDII BMS project team has progressed through the Logical Design stage. The technical documents resulting from the Logical Design process form a major section of the Budget Monitoring System, Phase II report. In addition, we included some elements of the Physical Design stage to facilitate later development by an Egyptian computer company. The necessary procurement specifications and a detailed implementation plan are in this report. These will assist the governorate to contract with a computer vendor who can implement the physical system. Again, the Budget Monitoring System, Phase II report does not accomplish the building of the actual system. It does however provide a clear blueprint for such a system, and an action plan for completion of the system development process.

FEASIBILITY STUDY (Complete)

We chose the Alexandria governorate as the site for this project because its' size and character represent other governorates (only Cairo is larger) and because it's financial managers support potential automation. The LDII Urban Project conducted a feasibility study (the first step of the system development process) to determine the possibility and desirability of automating a governorate's financial accounting functions. The

feasibility study showed that automation could:

- Help the governorate measure its' progress against program objectives.
- Control expenditures and maximize budget utility.
- Provide sophisticated economic analysis.
- Provide a rational framework for management of locally generated revenue.

All of these positive outcomes are possible through automation of the existing manual system. The remaining questions addressed in the feasibility study concern the constraints to implementing a computer system. The feasibility study analyzed what can be accomplished from an operational, economic, and technical perspective. In other words, it reviews the possible solutions from the following perspective:

- Can an automated system be operated within the governorate environment?
- Do the potential benefits derived from a new or improved system offset the costs of building and operating it?
- Can an adequate system be built using locally supported technology?

We examined these questions in detail and answered them positively in a previous report "Feasibility Study: Budget Monitoring System" prepared by the Local Development II Urban Project in October 21, 1991.

REQUIREMENTS DEFINITION (Complete)

Having confirmed feasibility, the LDII project team proceeded with the second step of system development, the definition of specific requirements for the automated system. The defined requirements contain a series of technical descriptions that form Chapter 2 of the Budget Monitoring System Phase II report. They state succinctly what the system must do to provide the benefits contemplated in the feasibility study. Moreover, they confirm procedures defined by the Ministry of Finance and are therefore applicable in any Egyptian governorate. In effect, these carefully defined requirements assure that the system will ultimately do the right things for the organization. The financial experts on the LDII project team added some additional requirements to enhance the effectiveness of the automated system with modern accounting capabilities.

LOGICAL DESIGN (Complete)

Following a clear definition of the system's requirements, the LDII project team completed step three of the system development process, the Logical Design. The Logical Design concerns itself

with exactly how the system will meet the requirements stated in the "Requirements Definition." It examines in extreme detail the inter-relationships of bits of data in the governorate. It records all of the forms used by each accounting clerk (data inputs), the procedures followed in each department (data processing), and the manual reports generated (data outputs). Extensive descriptions of each piece of data record their movement through the manual system including origin, size, content, and ultimate destinations. To this we added data that will upgrade existing capabilities after automation. The logical design process continues by developing a database structure that the computer software will be modeled around. This information is contained in a series of technical documents called a "Logical Model" that form Chapter 3 of the Budget Monitoring System Phase II report.

PHYSICAL DESIGN

Following completion of a Logical Design, system developers begin the 4'th stage of development, The Physical Design. In the Budget Monitoring System Phase II report, is not charged with this task. However, we have included technical information in the report that is normally considered a part of the Physical Design. This has been done to facilitate the development of this system by a local vendor. Specifically, we have included 1) extensive report layouts and 2) a detailed data dictionary. These technical documents will provide the vendor with a clear understanding of how each process creates, retrieves, updates, or deletes data. For the technicians who develop the software this information will be invaluable.

At the request of USAID, we address two issues that normally occur in the physical design stage. We offer a hardware solution and system development time frame to provide rough estimates of the physical system cost:

- **What hardware will the system to use?**
- **What time period is required for implementation?**

The hardware/software configuration we recommend is a micro-computer based Local Area Network. This includes two large file servers and up to 25 workstations. Most of the equipment will be implemented in the department of financial affairs. The file servers will reside in the MIS center. This system configuration takes advantage of the rapidly decreasing costs of microcomputer technology. It also uses software that has worked well in the governorates and can be developed in Arabic. Many of the staff in the Urban governorates have experience with similar systems. This configuration is therefore less likely to intimidate the existing staff.

From a purely technical standpoint, a network topology has several advantages. It will allow the successful vendor flexibility to meet the needs of individual governorates. It provides reliability by distributing the processing across a series of computers instead of relying on a single large machine. There are many Egyptian contractors who can successfully develop

and maintain such a system. Finally, this configuration is much less costly to develop software for than a minicomputer or mainframe based system.

IMPLEMENTATION PLAN

In this report, we have set forth an implementation plan that contains the tasks remaining to complete a Budget Monitoring System. The remaining process will take about two years.

In brief, the steps in the implementation plan are as follows:

1) Technical Advisor

At the outset, the governorate should retain a qualified consultant to act as a Technical Advisor to the Procurement Committee at key points through the development and implementation of the system. This will be the first time that a governorate has undertaken the development of a major automated system. They will need help and lots of it. The Technical Advisor should have a background in systems development and finance and they should have experience implementing major accounting systems. In our budget estimates we assume this advisor will be an expatriate. There are knowledgeable Egyptian consultants who can provide this advisory function but their technical ability must be evaluated and proven extremely sound.

2) Procurement Committee

A procurement committee should be formed that complies with governorate procurement regulations and contains adequate representation from the departments that will be affected by the system. Senior representatives from the Accounting and Budget Control department must be on the committee since they will be the primary users. Likewise, the Management Information Systems center manager and his most qualified technical staff should be represented. The committee will meet throughout the implementation of the system to accept deliverables required from the vendor and generally review the vendor's progress. This process will take at least one year during which the committee can expect to meet perhaps twenty times.

3) Public Tender Procurement

We have included in this report detailed procurement specifications which can be used by a governorate as the technical basis for a public tender bidding process. Chapters Two, Three, Four, and Five of the Budget Monitoring System, Phase II report with little or no modification report may be used as the basis of a public tender document for purposes of procuring a Budget Monitoring System. These specifications must be amended with the procurement language required by law Nine, the legal statute for local governorate public tender. Members of the procurement committee from the governorate will be responsible for the final document, however we suggest that

the Procurement Sections of the Budget Monitoring System, Phase II report (Chapter 4) be used with little or no modification unless a system consultant is retained for that purpose.

The procurement committee should consider that there are laws governing computer procurement that require the approval of the Central Agency for Popular Mobilization and Statistics or the Minister of Local Administration. These laws should be examined and adhered to by the committee. This document, along with the Feasibility Study that preceded it, may be used as evidence that this procurement has been properly studied and is technically sound.

4) Software Development

Following contract award, the vendor should be granted an adequate period to develop the application software for the Budget Monitoring System. Early estimates show that this process will take a three person programming team approximately nine months. During this process, the vendor should be allowed unlimited access to the governorate offices for further analysis and verification of Chapters Three and Four of the Budget Monitoring System, Phase II report. This access should be formally granted and should continue throughout the vendor's contract. The Governorate procurement committee should resist the temptation to change the requirements set out in Chapter Three and Four of the Budget Monitoring System, Phase II report. These requirements were carefully developed and conform specifically to Ministry of Finance regulation. These requirements are a contractual obligation that the vendor must adhere to and should not be confused at this time.

At the outset of the software development period, governorate staff must prepare test data to be submitted to the vendor. This data should include at least 500 unique examples of each input document listed in Chapter Four, Subsection 1.1 of the Budget Monitoring System, Phase II report. These should be submitted to the vendor as soon as possible following the award of the contract. The vendor may ask for additional data that should be promptly supplied by the governorate.

5) **Live Test and Demonstration**

Upon completion of system development, the vendor should conduct a "Live Test and Demonstration" for the procurement committee. This test should occur at the vendor's premises. A thorough review of the system functions, data, and reports should be conducted by the committee. Acceptance of the system should not be granted until it has passed all the evaluation criteria. If the system fails to meet one or more criteria, the vendor should be given reasonable time to rectify the deficiency and an additional "Live Test and Demonstration" should be conducted.

6) Hardware and Software Implementation

A reasonable period must be granted for the vendor to procure and implement the system hardware and software. We estimate this process may take up to three months. During this period, adequate site preparations must be undertaken by the governorate. Space for the systems must be identified in each office where a user terminal will be situated. Likewise, proper electrical outlets must be installed and all circuitry must be grounded. The Management Information Systems center must prepare a site for the two file servers and high speed printers that will form the operating core of the system. Adequate ventilation and lighting must be provided in each office. The vendor may be consulted to assure adequacy of site preparation.

A dedicated data line (telephone line) must be arranged between the Inventory Control Department and the General Dewan. This line will be used for remote access to the Budget Monitoring System from the inventory department. Governorate authorities must arrange for this line at the outset of the system procurement as it will take time for its clearance by the central government. Likewise, the Inventory control department must make a site available in the accounting section for two terminals that will communicate across this data link with the Budget Monitoring System in the central Dewan.

7) Live Test and Demonstration

Upon completion of the physical system implementation, a second "Live Test and Demonstration" will be conducted in the governorate site. The procedures will be similar to those in discussed in the prior "Live Test and Demonstration," however the test should include some additional criteria related to the success of the hardware.

8) Training

Governorate staff must be appointed to attend training sessions organized by the vendor under the terms of procurement (See Chapter 4, Section 4.4 of the Budget Monitoring System, Phase II report). Five Individuals from the governorate Management Information Systems Center should be appointed to attend system administration training for the Budget Monitoring System. These persons will be responsible for the ongoing technical functioning of Budget Monitoring System. They must have strong microcomputer programming skills before assuming these responsibilities and should be carefully chosen. Ideally persons should be selected who are dedicated to their work in the governorate and can be expected to remain employed for the long term. These persons will attend the vendor training detailed in the procurement specifications for Group 1.

System Users must be identified for all department of the governorate who will receive work-stations. These

departments will include:

Budget Control
Accounting
Inventory

The General Directors and Department managers of the Dewan should be appointed to attend training outlined in Chapter 5 of the Budget Monitoring System, Phase II report for Group 3. These persons will be affected by the improved reporting and accountability resulting from the Budget Monitoring System and must be familiar with the information that will now be available. Likewise, they will be given solid grounding in basic computer literacy and the reporting features of the Budget Monitoring System application software so they can use and understand the technology.

9) Parallel Processing

An eight month period of parallel processing should be undertaken during which time full implementation of the system will occur. Historical data must be entered in the system at this time. This data should be assembled by each department well in advance of the commencement of this task. The accuracy of this data should be checked manually in preparation for its entry. The timeliness and quality of the data entered in the system at this stage will largely determine the success of the overall implementation and the computer's ultimate ability to supplant the manual system.

Procedures set forth in the user manuals supplied by the vendor must be strictly enforced by governorate management. The system will not be successful with anything less than full compliance. An important task from the governorate standpoint will be to generate consensus among the governorate management regarding the long term desirability and commitment to the Budget Monitoring System. This is critical to the systems success and cannot be established by the vendor.

10) EDP Audit

We recommend in Chapter Two, Section 4.4 of the Budget Monitoring System, Phase II report, a "friendly" Electronic Data Processing audit of the system to follow successful paralell processing. The outcome of this audit would be twofold:

- It will document the weaknesses, if any, of the system and

- It will outline the necessary changes to policy, procedure, and systems that would be necessary for the governorate to achieve full autonomy. The word system here denotes the paper process and internal controls rather than a computer system.

The following pages set forth the suggested work plan schedule and the cost associated with each task of the work plan.

BMS PHASE 2 WORKPLAN

#. TASK #.# SUB-TASK	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Advisor																								
1.1 Review Physical Design					********																			
1.2 Evaluate 1st Live Test and Demo												****												
1.3 Review Modifications													********											
1.4 Evaluate 2nd Live Test and Demo														****										
1.5 Review System Testing															********									
1.6 Evaluate Initial Parallel Processing																	**********							
1.7 Exit Report																				****				
2. Procurement Committee																								
2.1 Public Tender	********																							
2.2 Award Contract		****																						
2.3 Evaluate 1st Live Test and Demo												****												
2.4 Review Modifications													********											
2.5 Evaluate 2nd Live Test and Demo														****										
2.6 Review System Testing															********									
2.7 Monitor Parallel Processing																	**********							
2.8 Accept Aplication																							****	
3. Develop Application																								
3.1 Physical Design				********																				
3.2 Programming						**********																		
3.3 1st Live Test and Demo												****												
3.4 Modify Application													********											
3.5 2nd Live Test and Demo														****										
3.6 System Testing															********									
3.7 Deliver Draft Application Documentation																****								
3.8 Deliver Final Application Documentation																							****	
3.9 Parallel Processing																	**********							

BMS PHASE 2 WORKPLAN

#. TASK #.# SUB-TASK	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Advisor																								
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3.8 Deliver Final Application Documentation																							****	
3.9 Parallel Processing																	**********							

BUDGET SUMMARY

TASK	COST USD$
1. Advisor (Expatriate)	299,748
2. Procurement Committee	0
3. Application Development (Local Contractor)	416,441
4. Purchase Hardware/Software	171,490
5. Training	66,000
6. EDP Audit	108,108
TOTAL COST OF PHASE 2 (All in USD)	1,061,787

TASK 1. ADVISOR (Costs assume the advisor is an Expatriate)

Cost Category	Months	Rate	Amount	
Advisor				
Systems/Finance Specialist	11	5125	56,375	USD
Fringe/Overhead		1.5	84,563	USD
International Air Travel			6,400	USD
Misc. Travel Cost			350	USD
Local Travel			748	USD
Per Diem		97	32,010	USD
Post-differential		.20	11,275	USD
Communications			3,300	USD
Defense Base Insurance		.035	2,368	USD
Medical Evacuation Insurance		125	1,375	USD
Personal Computer			10,000	USD
Base Fee		.06	12,526	USD
Award Fee		.04	8,351	USD
Sub-total			217,115	USD
Local Advisor Assistant				
Systems/Finance Specialist	18	3,500	63,000	LE
Fringe/Overhead		.75	47,250	LE
Local Travel			8,100	LE
Per Diem		180	97,200	LE
Computer			33,100	LE
Base Fee		.06	14,919	LE
Award Fee		.04	9,946	LE
Sub-total in LE			273,515	LE
Exchange Rate			3.31	LE/ USD
Sub-total in USD			82,633	USD
Total Cost of Task 1.			299,748	USD

TASK 3., 4., and 5. SYSTEMS DEVELOPMENT, PURCHASE, AND TRAINING

Cost Category	Months	Rate	Amount	
Local Contractor				
Senior Programmer/Systems Analyst	21	4,250	89,250	LE
Programmer/Systems Analyst	35	3,500	122,500	LE
Overhead/Fringe		0.75	158,813	LE
Local Travel			25,200	LE
Per Diem		180	302,400	LE
Hardware/Software Cost[1]			567,632	LE
Training Cost			218,460	LE
Communications			5,600	LE
Base Fee		.06	89,391	LE
Award Fee		.04	59,594	LE
Sub-total in LE			1,638,840	LE
Exchange Rate			3.31	LE/ USD
Sub-total in USD			495,118	USD
Total Cost of Task 3., 4., & 5.			653,931	USD

[1] See following page title "BMS Equipment" for the detail of the actual equipment to be purchased and prices.

TASK 6. EDP AUDIT

Cost Category	Months	Rate	Amount	
EDP Auditor Team				
Systems/Finance Auditor (2)	4	5125	20,500	USD
Fringe/Overhead		1.5	30,750	USD
International Air Travel			6,400	USD
Misc. Travel Cost			350	USD
Local Travel			272	USD
Per Diem		97	11,640	USD
Post-differential		.20	4,100	USD
Communications			1,200	USD
Defense Base Insurance		.035	861	USD
Medical Evacuation Insurance		125	500	USD
Base Fee		.06	4,594	USD
Award Fee		.04	3,063	USD
Sub-total			84,230	USD
Local EDP Auditor Team				
Systems/Finance Auditor (2)	6	3,500	21,000	LE
Fringe/Overhead		.75	15,750	LE
Local Travel			2,700	LE
Per Diem		180	32,400	LE
Base Fee		.06	4,311	LE
Award Fee		.04	2,874	LE
Sub-total in LE			79,035	LE
Exchange Rate			3.31	LE/ USD
Sub-total in USD			23,878	USD
Total Cost of Task 6. EDP Audit			108,108	USD