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PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN
IN THE AMOUNT OF US\$65 MILLION
TO THE
LEBANESE REPUBLIC
FOR THE
URBAN TRANSPORT DEVELOPMENT PROJECT
May 13, 2002

**Finance, Private Sector, and Infrastructure
Mashreq Department
Middle East and North Africa Region**

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 2001)

Currency Unit = Lebanese Pound (LL)

LL 1.00 = US\$0.000667

US\$1.00 = LL 1.500

FISCAL YEAR

January -- December

ABBREVIATIONS AND ACRONYMS

CAS	=	Country Assistance Strategy
CCTV	=	Closed Circuit Television
CDR	=	Council for Development and Reconstruction
DGA	=	Directorate General of Antiquities
DGLMT	=	Directorate General of Land and Maritime Transport
DOR	=	Directorate of Roads
EA	=	Environmental Assessment
EMP	=	Environmental Management Plan
EMP-CHC	=	Environmental Management Plan - Cultural Heritage Component
GDP	=	Gross Domestic Product
GBA	=	Greater Beirut Area
GBATP	=	Greater Beirut Area Transport Plan
ICB	=	International Competitive Bidding
IRR	=	Internal Economic Rate of Return
ITS	=	Intelligent Transport System
JBIC	=	Japan Bank for International Cooperation
LOS	=	Level of Service
MIRR	=	Modified Internal Economic Rate of Return
M&E	=	Monitoring and Evaluation
MOE	=	Ministry of Environment
MOIM	=	Ministry of Interior and Municipalities
MPT	=	Ministry of Posts and Telecommunications
MPWT	=	Ministry of Public Works and Transport
NPV	=	Net Present Value
O&M	=	Operation and Maintenance
OCFTC	=	Office des Chemins de Fer et des transports en Commun
PCU	=	Passenger Car Unit
PIP	=	Project Implementation Plan
PMR	=	Project Management Report
PMU	=	Project Management Unit
RAP	=	Resettlement Action Plan
ROW	=	Right of Way
SA	=	Social Assessment
TMC	=	Traffic Management Center
TMO	=	Traffic Management Organization
VOC	=	Vehicle Operating Cost
VOT	=	Value of Time

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**LEBANESE REPUBLIC
URBAN TRANSPORT DEVELOPMENT PROJECT**

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MAP(S)	
IBRD No. 30910: Lebanon	
IBRD No. 30911: Urban Transport Development Project - Traffic Signals System	
IBRD No. 30912: Urban Transport Development Project - Corridor Improvement Program	
IBRD No. 30913: Urban Transport Development Project - CCTV System	
IBRD No. 30914: Urban Transport Development Project - On-Street Paid Parking Zones	

Borrower: GOVERNMENT OF LEBANON

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Estimated Disbursements (Bank FY/US\$m):

FY	2003	2004	2005	2006	2007	2008	2009	
Annual	6.00	15.60	19.80	14.50	6.50	2.10	0.50	
Cumulative	6.00	21.60	41.40	55.90	62.40	64.50	65.00	

Project implementation period: 6

Expected effectiveness date: 10/31/2002 **Expected closing date:** 12/31/2008

OCB PAD Form: Rev. March, 2000

A. Project Development Objective

1. Project development objective: (see Annex 1)

The project's development objective is to provide the city of Beirut and the Greater Beirut Area (GBA) with the basic institutional framework, which it now lacks, and critical investments needed to maximize the efficiency of the existing urban transport infrastructure. These investments will provide the foundation for future development of an efficient transportation system for the city and its metropolitan area.

For Beirut to regain its position as a competitive regional center for finance, trade, services, and tourism, it needs to have an efficient transport system. To this end, the Government prepared in 1994 a comprehensive Greater Beirut Area Transportation Plan (GBATP) which addresses the most serious urban transport issues, analyzes needed investments through the year 2015, and recommends a large (phased) investment program. The prioritization and phasing of this program, which will be the largest single investment in Lebanon over the next ten years, will require a significant planning, consensus building, and resource mobilization effort.

The proposed Urban Transport Development Project, the first to be financed by the Bank in this sector in Lebanon, would help build the urban transport institutions needed to address the diverse transport issues the city faces, and would support selected high-priority investments recommended in the GBATP. The project is intended as the first of a series of projects to help Beirut meet the challenges of urban transport in a cost-effective, sustainable, and socially sensitive manner.

As a consequence of the long conflict that engulfed the city from the mid-1970s through the early 1990s, and the resulting destruction of both physical and institutional infrastructure for urban transport, Beirut presently lacks the most basic elements of an urban transport system. This project therefore focuses on establishing key institutions and providing the most necessary infrastructure investments. Specifically, the project would seek to:

- (a) *Improve traffic management* by supporting: (i) establishment of a Traffic Management Organization (TMO), with intelligent transport system (ITS) capabilities, as an autonomous metropolitan agency to monitor and control traffic operations within the GBA; (ii) capacity building for traffic operations; and (iii) installation of traffic signals and layout improvements for all significant intersections in the GBA (about 200 intersections).
- (b) *Regulate on-street parking in selected zones* through: (i) capacity building in the area of parking management; (ii) installation of pay-and-display parking meters, along with necessary parking signage to control about 6,500 on-street parking spaces; and (iii) development of appropriate regulations, pricing, and institutional arrangements for on-street parking control. Concession arrangements will be agreed between the Traffic Management Organization and the GBA municipalities for operating their on-street parking programs.
- (c) *Improve traffic flow along seven major corridors* (Beirut entrances) by financing the construction of grade separation facilities at 19 highly congested intersections.
- (d) *Improve transport planning and organize public transport services* through: (i) transport planning studies to formulate an integrated urban transport development strategy; and (ii) capacity building in the areas of regulation and organization of public transport services.

2. Key performance indicators: (see Annex 1)

The achievement of the project's objective will be evaluated against the following performance indicators (by the end of the project): (a) effective traffic control system throughout the GBA, and a well-functioning Traffic Management Organization; (b) reduced congestion on major corridors; (c) effective on-street parking management and significantly reduced parking violations in areas critical to efficient traffic operations; and (d)

approval of an integrated urban transport strategy and accompanying transportation plans by December 31, 2005.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)

Document number: R97-256 **Date of latest CAS discussion:** December 4, 1997

The project is fully consistent with the Bank's Country Assistance Strategy (CAS) for Lebanon. Specifically, the project addresses two of the key objectives of the CAS, namely: rehabilitation and expansion of infrastructure (focusing on transport), and institutional development.

2. Main sector issues and Government strategy:

Beirut is the core of Lebanon's service-based economy and accounts for one third of the country's population and more than two thirds of the total value added in the economy. The city and its metropolitan area, however, suffer severe traffic congestion, which results in high economic losses and deteriorating air quality. Since sustained growth of the service-oriented economy must be underpinned by efficient infrastructure, Beirut needs to improve the efficiency of its urban transport system.

In years past, Beirut had an extensive urban transport system including a well-developed bus system and even a trolley-bus system. Due to the prolonged period of conflict, this infrastructure deteriorated. Also, over the last two decades major changes have occurred in Lebanon's demography due to urbanization and displacement of residents from the south and relocation of businesses from Beirut to various locations along the coast. These have resulted in significant changes in traffic patterns throughout the GBA, which, in turn, have caused severe congestion in and around Beirut, and particularly at its entrances, including the connections with the coastal highway to the north and south. The problem of congestion is exacerbated by a heavy reliance on private cars, which amounts to approximately 300,000 cars for a population of some 1.2 million in the GBA (about 250 cars per 1000 inhabitants). More than 68 percent of total motorized person trips (about 1.75 million daily vehicular trips) are made by private car. Shared taxis account for nearly 15 percent of all trips, while just 17 percent of the population are served by private or public bus services. In addition, latent travel demand is high and would materialize if transport capacity were improved.

Main sector issues

Several key issues must be addressed to improve the operational and economic efficiency of the GBA urban transport system. These issues can be broadly grouped into six main categories: (a) transport planning and management; (b) traffic congestion; (c) parking management; (d) public transport; (e) transport emissions; and (f) integration of environmental and social issues into sector planning and management.

Ineffective transport planning and management. There is currently no institutional capacity for urban transport planning and traffic management in the GBA. At present, responsibility for urban transport planning and development is fragmented among various ministries, agencies within each ministry, autonomous municipal and national agencies, and GBA municipalities, with weak coordination mechanisms among them. Their duties are also not clearly delineated. Moreover, the institutions suffer from acute scarcity of financial and human resources. As a result, many critical transport policy, planning, and operational aspects are completely neglected under the existing institutional arrangements. The lack of institutional capacity has, among other things, resulted in deficient and poorly enforced traffic laws, and weak urban land-use planning. Deficiencies in traffic management also contribute to worsening auto-related externalities, such as air pollution, accidents, and chaotic traffic jams.

There is a need for a comprehensive multi-modal urban transport strategy. Until now, the emphasis has been on expressway development, with very little consideration given to public transport services. Also, travel demand management is an untapped instrument that could provide numerous benefits through road pricing options, parking supply controls, and various traffic restraint policies.

Severe traffic congestion. The limited capacity of the existing road network and the embryonic and unregulated public transport system are the primary reasons for the severe congestion. Construction of the overall GBA urban expressway and boulevard network (about 250 km) was planned in the early 1980s and only initiated in the mid-1990s. Consequently, traffic demand far exceeds the available capacity. During peak hours, which lasts for most of the work day, the traffic barely crawls through the network, with average speeds in many segments of the system reaching no more than 12 km/h. Other factors contributing to the high levels of congestion are: (a) road space obstructions created by chaotic and unregulated on-street parking; (b) poor intersection geometrics; (c) lack of signalization at most intersections; (d) closely spaced intersections; and (e) lack of proper traffic management. Along the major boulevards, roadway capacity is limited by the presence of closely spaced, multi-legged intersections with excessive traffic demands along all approaches.

Lack of parking management and shortage of parking spaces. The chaotic and unregulated on-street parking that has become commonplace in Beirut over the past 20 years not only makes traffic movements difficult, but also severely hampers the operation of bus services - which of course, makes the traffic situation worse, as the public must rely on private cars in the absence of an effective public transport system. Many busy streets are now reduced to single lanes due to parked vehicles on both sides of the road and near intersections, and these are in the very areas that could most benefit from the introduction of public transport. The present situation has emerged as a result of numerous factors, including: (a) lack of enforcement of the traffic code's provisions regarding improper parking; (b) deficiencies in the building code, which for a long time effectively did not require developers to incorporate sufficient private parking in new buildings; (c) lack of enforcement of the existing building code, resulting in much of the available parking being converted to other uses (shops, warehouses, etc.); and (d) restrictions on parking charges in vacant lots, which have been held at non-remunerative rates (flat rate equivalent to US\$1 per day). The effects of uncontrolled parking are experienced daily by commuters, visitors, delivery companies, tourists, and shoppers. Resolving on-street parking problems is essential for realizing the positive effects of other traffic and transit improvements, and for revitalizing the downtown commercial areas.

Unregulated public transport system. Bus transport services in Beirut have resumed only recently. Over the last 15 years, Beirut has relied on shared taxis for most of its public transport. These so-called "service-taxis," which operate on the hail and ride principle, represent about 80 percent of all public transport vehicles. In response to a growing need for public transport in the early 1990s, the Government decided to raise the number of vehicles licensed to provide public transport and to expand bus services in Beirut through the *Office des Chemins de Fer et Transports en Commun* (OCFTC the public sector agency that provides bus services and used to operate the new-defunct railway system). In 1996, the Government added 200 new standard city buses to the OCFTC fleet, and as compensation for the new competition from OCFTC, gave all 10,650 service-taxi drivers an additional license for free. A further 12,000 licenses were sold in the market. Besides these service-taxi licenses, new licenses were also issued for mini and standard buses, as well as for a new category of minivans. This surge in licenses increased the total number of public transport vehicles more than threefold in two years.

Beirut has very fragmented public transport markets, with the majority of small vehicles (taxis and minibuses) operated by single-vehicle owners. There are, in fact, only two urban bus companies in Beirut with more than 25 buses in operation. These are OCFTC, the state-owned bus company, with 225 standard city buses, and a private bus operator, the Lebanese Commuting Company (LCC), with 185 minibuses. Both of these companies

service the GBA and compete on many of the same routes, together with service-taxis. The Government's desire to see economic activity resume in the country led to an implicit policy of laissez-faire, allowing public transport providers to operate wherever and whenever they wished, subject to few, if any, safety or quality standards. Lebanon is one of the few middle-income countries where public transport vehicle licenses are issued without any specification regarding the area or manner in which the service is to be operated. This absence of regulation has created a situation of utter chaos, with all vehicles operating on the hail and ride principle, and no reliable bus schedules or published route networks. The sharp increase in licenses issued since 1996 has resulted in an excess supply of transport services, so that operators now forgo vehicle maintenance and insurance and aggressively solicit passengers to preserve increasingly thin margins. The existence of a large, subsidized public operator further exacerbates the need for private operators to cut their costs to unsustainable levels. (The intensity of the competition has pushed fares down to LL1,000 per ride for service-taxis and LL500 for buses/microbuses in Beirut.) Enhancing public transport must be an integral part of any plan to improve the urban transport system, since public transport not only provides the poor with access to job opportunities, but also reduces the reliance on private cars and the resulting congestion in city streets. However, there are several prerequisites for improving bus services in GBA, foremost of which is improving road network capacity, and effective organization and regulation of public transport services.

Integration of environmental and social issues. The large scale of proposed activities under the GBATP mandates integration of environmental and social issues, including involuntary resettlement and land acquisition, into the planning and management process for the transport sector. This requires the adoption of environmental assessment as a tool in planning and decisionmaking, which should be complemented by social assessments and resettlement action plans. Effectively addressing these concerns also requires the use of public consultation processes and public information programs. Although not substantiated by sufficient field data on transport-related air pollution in Beirut, emissions for transport are noticeably worsening the air quality in the Greater Beirut Area. Several estimates report high concentrations of serious pollutants. Often based on non-calibrated models, they report concentrations of certain pollutants significantly exceeding the pollutants criteria set in the National Ambient Air Quality Standards (NAAQS) of the United States Environmental Protection Agency. Yet, there are currently no specific policy or management measures in place to address this issue.

Government strategy

Road infrastructure. The Government started implementing its transportation plans in early 1994 as part of the GBA reconstruction program, which included the rehabilitation of all main urban boulevards (now completed) and several planned expressways to access the Beirut Central District (BCD). Most of the road network in the northern and southern suburbs of Beirut has been upgraded; the work ranged from drain cleaning to complete redevelopment involving major construction to provide storm water drainage and new road pavement. Many of the expressway projects have also been completed or are well underway, with the exception of the improvement of the existing main corridors entering Beirut (Beirut Entrances). The main aim of these projects has been to increase access to the BCD, and provide connections to two major planned facilities; namely, a bypass for the coastal highway, the *Beirut Peripherique*, and a new toll road along the Northern Entrances where traffic volumes in excess of 200,000 vehicles/day have been observed. A key component of the future network is the *Peripherique*, which will constitute an important north-south spine with several alternatives for entering Beirut. However, that project continues to seek private financing after a failed initial attempt at private sector participation in 1995. The project has had to be restructured and rescheduled due to prohibitive land expropriation costs and the severe budget reductions in 1999. Consequently, the Government is now giving priority to improving the capacity of the existing road infrastructure.

With respect to the *public transport services*, as noted earlier, the Government embarked on a program to re-start bus services in 1996 as part of an immediate action plan to improve public transport. The aim of the program was to have the public operator, OCFTC, run some 500 buses on 22 routes in the GBA. Since then, the development of public bus transport services in Beirut has reached a critical juncture. Entry of a very active private sector and a congested road infrastructure have rendered the future viability of public sector bus operations increasingly doubtful. Also, the public transport sector suffers from a lack of enforcement of rules aimed at ensuring a minimum level of service quality and safety.

Recognizing the critical importance of public transport, the Council of Ministers requested the Minister of Public Works and Transport (MPWT) to develop a reform plan (Cabinet Decision No. 22, dated February 24, 1999). A Transport Regulatory Unit (TRU) has been established in the MPWT, to regulate and organize public transport, civil aviation, and maritime transport subsectors. For public transport, the TRU will develop the regulatory and legal framework, along with a comprehensive plan, to organize the subsector and prepare for the privatization of OCTFC's bus operations in order to enhance performance and remove the expensive annual subsidy. In 1999, OCFTC's subsidy was expected to total LL13 billion (about US\$8.7 million), approximately the same as it was in 1998. The starting point for reform will be the establishment of a functioning regulatory framework. The Government envisages reform of the bus service markets in Beirut in three phases: (a) definition and implementation of target service levels, including safety standards; (b) definition and implementation of service areas for all vehicles; and (c) development and tendering of exclusive concession contracts for bus services. A fourth step involving reduction of the total number of licensed vehicles may also be required to decongest city center areas, but would only be taken up after the first three elements have been implemented, since the redeployment of vehicles implicit in the definition of service areas may be sufficient to decongest the city center areas. The corporatization/privatization of the OCFTC would also be pursued as an integral part of sector reform. To give the company a chance to compete equally with the private sector, its bus operations would be carved out of its current structure and corporatized as a fully commercial, non-subsidized operation. For the remaining OCFTC, a draft plan is being prepared to restructure it as an entity in charge of organizing and reforming the sector.

Regarding *parking management*, Beirut Municipality and the Governorate of Beirut are determined to bring order to on-street parking and to support other improvements in roadways, traffic, and transit. They regard on-street parking as one of the necessary first steps to create an overall transportation system that would serve Beirut residents and the people who work and visit Beirut regularly. To alleviate severe parking conditions, GBA municipalities implemented an urgent program to provide parking spaces on vacant plots of land and, for the medium term, are considering a few underground garages on municipal land, to be concessioned out to private developers.

Traffic management is the first priority in the Immediate Action Plan approved by the Government as part of the GBA Transportation Plan. However, implementation of traffic control and other traffic management measures has been delayed by the lack of institutional capacity and the more urgent reconstruction of the urban road network. Now that most of these projects have been completed, the Ministry of Public Works and Transport, the GBA Traffic Police, and CDR are focusing, on implementing a comprehensive traffic management program to effectively address the metropolitan area's traffic problems and reduce congestion. For such a traffic management program to succeed, the Government decided to establish a metropolitan Traffic Management Organization (TMO) as an autonomous agency to manage traffic and on-street parking within the GBA and keep parking revenues to cover part of the traffic and parking systems' operation and maintenance costs.

3. Sector issues to be addressed by the project and strategic choices:

The project will focus primarily on three of the main issues; namely, traffic management, parking management, and traffic congestion in main corridors.

Capacity building in traffic management. Traffic would be controlled throughout the GBA and monitored from a Traffic Management Center (TMC), which would be the core of new metropolitan Intelligent Transport Systems (ITS) including system for arterial management, freeway and main corridors management, incident management, parking management, and transit management. The TMC would be operated by the TMO, which would unify all GBA traffic management operations under its jurisdiction. The TMO would be established as an autonomous agency to monitor and control traffic, improve safety and respond to traffic incidents, and better coordinate the activities and programs of the various agencies involved in traffic management and on-street parking throughout the GBA. The project would also support the formulation of a comprehensive traffic management strategy covering demand restraint, public transport priority, one-way flows, pedestrian movements, and environmental management.

Parking management. Regulated on-street parking in selected zones would improve traffic conditions along main arteries and access to commercial areas, and encourage increased use of public transport services by commuters. The project would help in implementing much-needed reforms in parking policies and parking controls, which is a prerequisite for any transport improvement plan. Strict enforcement of on-street parking regulations would also encourage private investments in off-street parking facilities.

Corridor improvement schemes. Construction of grade-separated facilities at 19 congested and critical intersections in the GBA would help eliminate several major bottlenecks in the network. Traffic signals and minor layout improvements at about 200 intersections will further help facilitate the traffic flow in and around Beirut. These capacity improvements on non-expressways, along with ongoing or planned expressway developments, would provide a much-improved road network system for Beirut.

The traffic management and parking components described above are relatively high risk and would be implemented in phases/pilots. In order to limit the project's complexity, it was decided to not fully address the other sector issues. However, the project would help carry out preparatory studies for follow-up operations to improve transport planning processes and public transport services and to reduce transportation impacts on air quality. Technical assistance would also be provided to the Ministry of Public Works and Transport to strengthen its capacity in the area of land transport regulation. The results of these efforts would be utilized to design more comprehensive follow-up operations.

C. Project Description Summary

1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

The project would consist of the following five components: (a) traffic management program; (b) parking improvement program; (c) corridor improvement program; (d) technical assistance to the Ministry of Public Works and Transport for capacity building, transport planning, public transport regulation, air quality management and transport feasibility studies; and (e) project management.

- (a) The main objective of the *traffic management program* is to improve the effective capacity and performance of existing infrastructure through the use of ITS technologies to minimize traffic stops and delays, respond to traffic incidents, and provide information to road users. Efficient traffic management systems would reduce congestion, transport emissions and traffic accidents. This component would include (i) establishment of an autonomous metropolitan organization - the TMO, to manage traffic within the Greater Beirut Area; (ii) layout improvement works and installation of traffic signals for all significant intersections in the GBA (about 200 intersections); (iii) installation of a pilot video surveillance system using Closed Circuit Television (CCTV) at about 30 sites along four corridors to pilot the use of freeway management systems and prepare plans to cover other corridors in the future; (iv) establishment and equipping of a TMC to monitor and control traffic operations through ITS technologies; (v) technical assistance and training services to build capacity for traffic control operations and use of ITS technologies; and (vi) traffic enforcement equipment and training services for the traffic police.
- (b) The objectives of the second component, the *parking improvement program*, are to increase capacity, improve access to business, encourage the use of public transport services, and remove impediments to smooth traffic flow. It would consist of (a) installation of about 580 pay-and-display multi-space parking meters to control about 6,500 spaces under concession contracts with GBA municipalities; and (b) technical assistance and training services to build capacity for parking management operations and conduct public awareness campaigns.
- (c) The objectives of the third component, the *corridor improvement program*, are to increase capacity along seven main highly congested corridors entering Beirut through grade separation at about 19 intersections. These intersections are grouped into two lists according to their priority. The first list consists of 12 intersections, which have been appraised and are taken into account in the project's cost estimate. This component includes implementation and monitoring of environmental mitigation measures, adoption of special provisions for management of cultural property that may be uncovered during construction, implementation of a Resettlement Action Plan covering a limited number of households to be resettled, and land acquisition.
- (d) The fourth component consists of *technical assistance to strengthen the Ministry of Public Works and Transport's capacity* in transport planning and regulation of public transport services. It would (i) support engineering, transport economic, and environmental studies to assist in the formulation of an urban transport strategy for the GBA; (ii) assist in updating and refining urban transport plans and programs; (iii) support transport feasibility studies; (iv) help regulate and organize public transport services; (v) assist in developing an air quality management program for the GBA; and (vi) support training activities.

- (e) The fifth component provides resources for overall *project management*, including technical assistance services, and fees of local individual consultants to staff a Project Management Unit (PMU), which would have overall project implementation responsibility.

Cost estimates for the above components are provided in the table below.

Component	Sector	Indicative Costs (US\$M)	% of Total	Bank-financing (US\$M)	% of Bank-financing
1. Traffic Management Program	Urban Transport	27.71	24.1	23.43	36.0
2. Parking Improvement Program	Urban Transport	6.70	5.8	5.79	8.9
3. Corridor Improvement Program	Urban Transport	75.38	65.5	30.45	46.8
4. Technical Assistance to the Ministry of Public Works and Transport	Urban Transport	3.50	3.0	3.49	5.4
5. Project Management	Urban Transport	1.23	1.1	1.19	1.8
Total Project Costs		114.52	99.4	64.35	99.0
Front-end fee		0.65	0.6	0.65	1.0
Total Financing Required		115.17	100.0	65.00	100.0

2. Key policy and institutional reforms supported by the project:

The project supports one important institutional reform; namely, the establishment of the Traffic Management Organization, which would manage and control traffic and on-street parking within GBA, improve safety and respond to traffic incidents, and better coordinate the activities and programs of the various agencies involved in traffic operation. The TMO was established in October 14, 2000 (Decree No. 4082) as a public agency with financial and managerial autonomy under the tutelage of the Minister of Interior.

The TMO would be the focal point of traffic management activities for the whole GBA, covering all traffic control and engineering, traffic enforcement, and parking management functions. It would report to a governing Board, whose members would represent all stakeholder agencies: Ministry of Interior and Municipalities, Ministry of Public Works and Transport, Ministry of Environment, the Governorate of Beirut, the Municipality of Beirut, and selected GBA municipalities. It would operate several systems and perform several functions: traffic control and surveillance, traffic enforcement, traffic operations planning and engineering, on-street parking management, and travel information. Revenues generated from parking management would be the primary revenue source to finance the operation of the TMO, which would enter into concession agreements with the GBA municipalities to operate their on-street paid parking programs. The TMO would be the sole operator of on-street parking within the GBA.

The project would also assist Ministry of Public Works and Transport develop the capacity to better regulate and organize public transport services, and to prepare an air quality management program.

3. Benefits and target population:

The 1.2 million GBA's inhabitants, constituting about a third of Lebanon's population, are the project's target population. The project would help provide much-needed roadway capacity improvements for the GBA. Specifically, the project would help reduce the ever-worsening traffic congestion in the GBA and increase the mobility of its inhabitants. Significant savings in travel time and costs are expected as the direct outputs of the proposed investments. An enhanced urban transport system and better-organized bus services will increase efficiency of urban functions affecting the well-being of the GBA population and businesses, and improve the mobility of urban poor and women workers.

4. Institutional and implementation arrangements:

Project oversight. A Steering Committee was established in April 7, 2001 (Prime Minister Decision No.42/2001) to ensure effective coordination among all concerned agencies, monitor project progress, and assist in timely implementation. It includes the Minister of Finance, the Minister of Interior and Municipalities, the Minister of Public Works and Transport, and the President of the Council for Development and Reconstruction. The Ministry of Environment and Directorate General of Antiquities of the Ministry of Culture would be invited to participate in sessions concerning environmental and cultural heritage issues.

The CDR would be the main executing agency and have overall project implementation responsibility. It would work closely with the other responsible agencies: the Ministry of Interior and Municipalities; GBA Traffic Police reporting the Directorate General of Internal Security; the Ministry of Public Works and Transport, Directorate General of Land and Maritime Transport (DGLMT); the Governorate of Beirut; the Governorate of Mount Lebanon; and the GBA municipalities. Concerning issues related to environment and cultural heritage, it would work with the Ministry of Environment and the Directorate General of Antiquities of the Ministry of Culture.

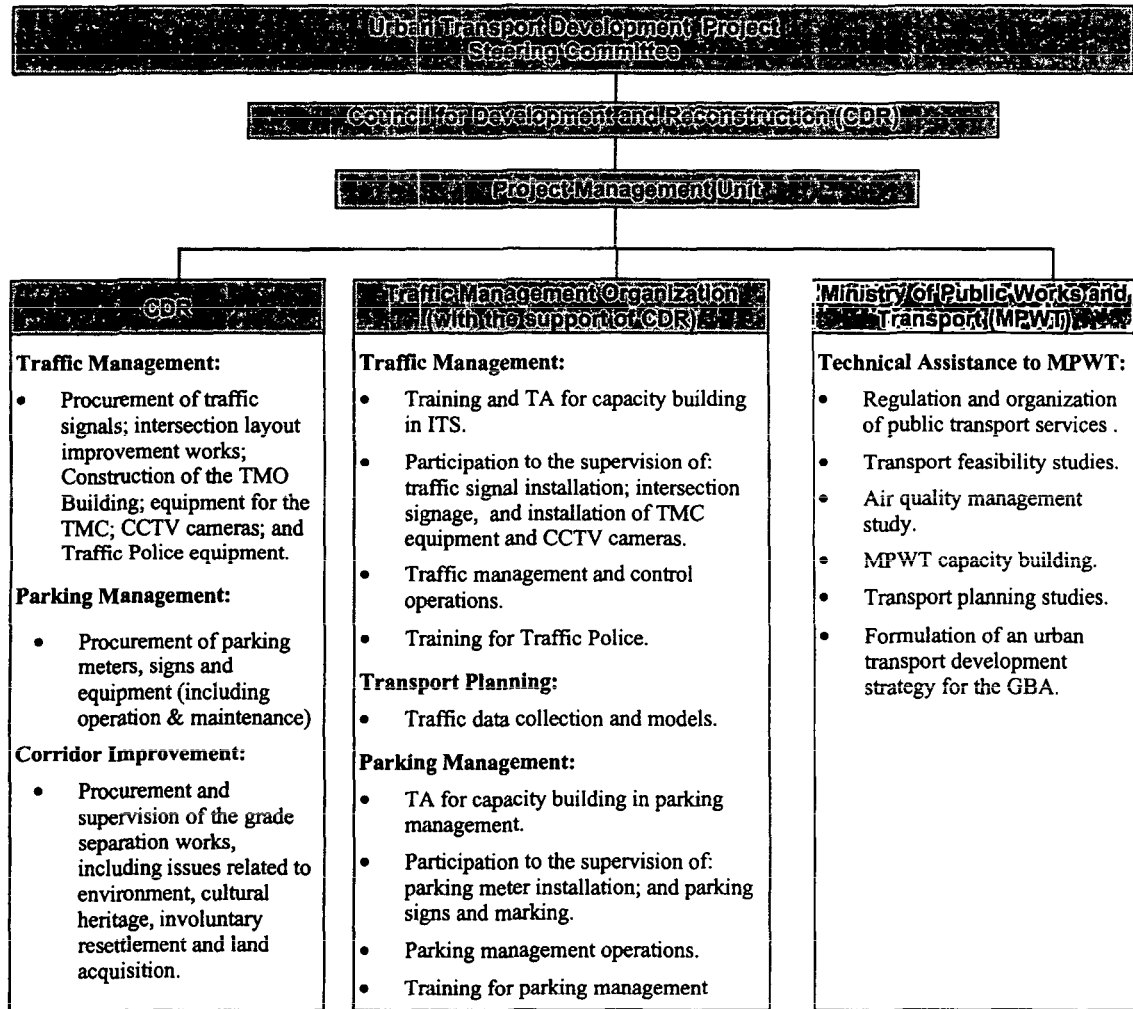
CDR would also be responsible for all procurement activities, in accordance with Bank's procurement guidelines, with the exception of those related to Component 4, Technical Assistance to the Ministry of Public Works and Transport, which would be the responsibility of the DGLMT.

A Project Management Unit has been established at CDR, with a mandate for overall project management/monitoring and to serve as focal point for all communication with the Bank. To ensure effective project management, the project would include procurement of equipment and necessary operating costs of the PMU. In addition to a full time Project Manager from CDR, the PMU would be staffed with the following professionals, to be hired with performance-based contracts: (a) a traffic engineer, (b) a highway engineer; (c) a parking specialist; (d) a procurement/construction management specialist; and (e) an accountant/financial manager. The terms of reference of the PMU staff have been discussed and are included in the Project Implementation Plan (PIP). As a condition of effectiveness, CDR would complete the PMU staffing.

For the implementation of the Traffic Management and Parking components, the PMU would work closely with the TMO. The number, qualification, and terms of reference of the TMO core technical staff are included in the PIP. Since a well-functioning TMO is necessary for effective implementation as well as for the success of the early phases of the traffic management and parking operations, the project would support on a declining basis, their initial operating costs and the salaries of their core technical staff, all of whom would be hired with performance-based contracts.

Chart 1 below summarizes the project implementation arrangements.

Chart 1 – Implementation Arrangements



Accounting, financial reporting, and auditing arrangements. The CDR would be responsible for financial management of the project, using systems and procedures acceptable to the Bank. The CDR Financial Department, in coordination with the PMU, would be responsible for maintaining all accounting records for project-related expenditures and financing, following generally accepted accounting principles. CDR's financial management system are considered satisfactory to the Bank, based on previous Bank assessments, and has been reviewed during appraisal. For Component 4, Technical Assistance to MPWT, the project would benefit from the financial management software developed and currently used by the same ministry for the ongoing National Roads Project.

Responsibility for project accounting and financial management would be assigned to a qualified financial accountant/financial management specialist, to be recruited as a PMU member and supervised by CDR's Chief Finance Officer.

Special Account(s). To facilitate the management of funds, the Government would establish two Special Accounts (SAs) in the Central Bank of Lebanon, to be operated respectively, by CDR and MPWT, under terms and conditions satisfactory to the Bank. When the project is considered LACI compliant and ready for PMR disbursements, the Special Accounts would be replenished based on the PMRs submitted by the PMU. To facilitate disbursements against eligible expenditures, before the project is declared ready for Project Management Report (PMR) disbursements, the Bank would, upon request, make authorized allocation of US\$5 million to the CDR Special Account and US\$0.35 million to the MPWT Special Account.

Audits of the project accounts and Special Accounts, following international auditing standards, would be undertaken by independent auditors and submitted in English to the Bank for review and approval within six months of the end of each fiscal year.

During negotiations, it was agreed that the TMO would: (a) establish and maintain financial accounts and statements in formats acceptable to the Bank; (b) have its accounts audited each fiscal year in accordance with Bank guidelines and by independent auditors acceptable to the Bank; and (c) the Bank would be furnished with the auditor's management letter or other reports which the auditors may provide to TMO management.

Monitoring and evaluation arrangements. The Project Management Unit would be responsible for monitoring progress against agreed-upon performance monitoring indicators, as specified in Annex 1. The Project Implementation Plan consolidates the implementation and monitoring and evaluation (M&E) arrangements. The TMO and the DGMLT of the MPWT would furnish the PMU with detailed quarterly reports, to be completed and consolidated by the PMU and submitted to the Bank. A standard format for the reports prepared during appraisal would be validated during the Project Launch Workshop, which would be organized following Loan effectiveness. The reports would cover implementation status; deviations, if any, from the implementation schedule and procurement plan; problems and constraints and corrective actions being taken; and updated disbursement and commitment tables. The PMU would prepare a detailed mid-term report to serve as the basis for a mid-term project review, scheduled for the first quarter of 2006. The PMU would also prepare and submit an Implementation Completion Report to the Bank within six months of the closing date of the Bank loan, which report would also include the completion reports of both the TMO and the DGMLT.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

Focused project vs. multiple-component project. Because of limited institutional capacity, a multiple-component project addressing a broad range of major sector issues was considered not feasible at this time. It was considered more realistic to strategically focus on institution building, traffic management, network capacity deficiencies, and parking improvements in this particular operation. The project is intended to provide the fundamental urban transport apparatus needed to address the city's diverse and complex transport issues. Addressing GBA's other transport issues, related to transport planning, public transport, and transport emissions, would require several projects for which the proposed operation would help build the foundation.

An investment operation vs. a Learning and Innovation Loan (LIL). Given the risks associated with the implementation of traffic management and parking control programs, and the weak and fragmented institutional capacity in urban transport management, a LIL was first considered to provide technical assistance for preparation of a comprehensive traffic management strategy (covering demand restraint, public transport priority, one-way flows, pedestrian movements, environmental management), and support to traffic

management and parking pilot operations. However, the Government clearly indicated its commitment to address the issue of weak and fragmented institutional capacity in traffic management within an investment operation that would include GBA's high-priority urban transport projects.

Choice of the lead implementing and coordinating agency. In addition to CDR, the principal contenders for the role of lead agency were the Ministry of Public Works and Transport, Beirut Municipality, the *Conseil Executif des Grands Projets de la Ville de Beyrouth* (CEGPVB) (in April 2000 the Government decided to merge the CEGPVB with the CDR Projects Division), and the Governorate of Beirut. Within the urban transport sector, the Directorate of Land Transport of the MPWT is primarily responsible for vehicles and freight regulations as well as public transport services, including oversight of OCFTC, but has little or no capacity in traffic management and implementation of urban transport infrastructure. The Directorate of Roads of the MPWT, which has an established capacity in implementing road projects, has limited experience in the execution of urban transport facilities. Beirut Municipality covers only a limited portion of the project area, while more than 50 municipalities have jurisdiction over the surrounding areas. The CEGPVB is a semi-autonomous agency created in the 1960 with special procurement powers to enable implementation of large municipal projects within Beirut Municipality. However CEGPVB's work in the area of urban transport has been gradually taken over by CDR. The Governorate of Beirut, which oversees the Beirut Municipality, does not have experience managing major investments involving a high degree of inter-agency coordination. Based on the prevailing institutional arrangements and implementation capabilities, it was concluded that CDR would be the most suitable lead agency; it has an established project implementation capacity, and routinely performs the public investment planning function in Lebanon.

Establish a metropolitan Traffic Management Organization (TMO) to implement the traffic management program in an effective and coordinated manner across jurisdictions vs. allocate its implementation in separate elements to the various concerned agencies. After several inconclusive evaluations of possible distribution of tasks among concerned agencies, the Ministry of Interior and Municipalities, Ministry of Public Works and Transport, and CDR recognized the benefits of assigning all traffic management functions to an autonomous metropolitan organization that can effectively work across jurisdictions.

Procurement of traffic control and on-street parking systems. The lessons learned in this area suggest that it may well be more cost-effective to procure both systems through, respectively, turnkey contracts based on functional specifications, and international competition opened to pre-qualified suppliers.

Off-street parking vs. on-street parking. Among the areas of urban transport addressed under this project, off-street parking provision is the one that provides opportunities for private sector involvement. Numerous factors have deterred private investment in parking, among which are the total breakdown of parking enforcement and the excessively high cost of land. The idea of jump-starting private sector involvement was considered with the Government constructing about four parking facilities on municipal land and concessioning their operation to private operators. Such a program of municipal garages was thought to be critical for successful introduction of on-street parking controls, in view of the overall deficit in parking facilities. Feasibility studies carried out as part of project preparation concluded that the location of available municipal land did not correspond to the areas where parking problems were the most severe. Furthermore, some investors, including international parking operators, were interested in investing in parking garages. Also, *SOLIDERE*, a private land development company in charge of the reconstruction of the Beirut downtown area, has tendered out the construction of two major underground parking garages.

Based on these findings, it was decided to define a comprehensive on-street parking improvement program to be implemented gradually in selected zones, and to build capacity in parking management at the municipality level to create the enabling environment for private investment in parking. Private sector operators would be

retained through a competitive process to provide services that require expertise, personnel, or equipment not easily available in the public sector for two major functions: (a) parking meter installation, maintenance, and collections; and (b) parking ticket processing, violation database management, and support for the adjudication of parking tickets.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed Road maintenance and rehabilitation backlog, inefficient funding arrangements, and limited road administration capacity. Support to a Transport Regulatory Unit at the Ministry of Transport. Municipal infrastructure (and capacity building in municipal management).	National Roads Project	S	S
	Administration Reform Project	S	S
	First Municipal Infrastructure Project	S	S
Other development agencies Rehabilitation of expansion of port facilities. Insufficient urban road capacity in Beirut. Completion of the Coastal Highway. Public transport (mass transit). Airport facilities rehabilitation and expansion. Technical assistance to CDR and main infrastructure ministries to rehabilitate, expand, and modernize Lebanon's public infrastructure facilities.	Beirut Port Rehabilitation and Terminal Container Project (European Investment Bank financed) Major urban roads project (Saudi Fund financed) Several north and south projects (Saudi Fund financed) Feasibility of a light rail system for the GBA (US TDA financed) Beirut International Airport Project (European Investment Bank financed) European Union (EU-financed) Investment Planning Project (under preparation)		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

The Bank has financed no urban transport projects in Lebanon. However, the design of the proposed project draws upon the experience of other Bank-financed urban transport projects. The main lessons reflected in the project design are as follows:

A pragmatic approach was needed in designing the institutional components. As experience shows that it takes more than one project to achieve a sustainable institutional structure. Presently, institutional arrangements for urban transport in Beirut are extremely weak or non-existent. In preparing the project, an institutional analysis was carried out to assess the institutional arrangements agreed by the key stakeholders, including the establishment of the TMO, which will constitute the core institutional capacity for traffic management and data processing for transport planning.

To reinforce *project ownership* and build strong understanding of key sector issues, project preparation has been carried out by CDR in close coordination with representatives of the Ministry of Public Works and Transport, Ministry of Interior and Municipalities, the Mayor of Beirut, the Governor of Beirut, and area municipal governments.

It is essential that the political commitment be secured for implementation of traffic and parking management schemes and policies, to minimize risks of cancelation of components. There is no easy way to plan for changing political priorities. However, the lessons learned are (a) implementation duration should not be too long, even if this means a project of reduced scale; shorter periods would safeguard, to some extent, against changing priorities; (b) consultations with decisionmakers and key stakeholders are critical; and (c) the agency(ies) responsible for the project should have the capacity to play an effective leadership role in the pursuit of policy and institutional reforms.

The fundamental requirement for successful implementation of any traffic management program is the *existence of a strong core of technical professionals*. Unless such a group of professionals exists (or is created) with adequate powers and financing, successful implementation of traffic management systems will be at risk. Drawing on this lesson, the project would support the operating costs and salaries of professionals (to be recruited on a performance-based contracts) for the two first years, to build the capacity of TMO's traffic engineering division.

A critical factor causing delays in implementation has often been weak institutional implementation arrangements and delays in procurement by Government agencies. To ensure timely implementation of this project, detailed engineering design of civil works and technical specifications of equipment for the project's first year sub-components have been completed. Also, prior to Board presentation, (a) core staff of the PMU would be hired; and (b) TMO Board members would be designated and the TMO Director General appointed. Advance preparation of bidding documents and independent design reviews would foster smooth implementation and help reduce variations during the implementation period. The recruitment of a Procurement/Construction Management Specialist would be critical for timely preparation of all contracts.

Operation and maintenance expenditures. Necessary budgets for effective operation and maintenance (O&M) of both the traffic management and parking systems during the two first years of operation are included in the project costs. After that initial period, the O&M costs would be funded by the TMO from its on-street paid-parking revenues.

Quality control for the traffic management program is important to a successful outcome. The project would support inspection and quality control services to be performed by a qualified ITS independent supervisor.

Integration of environmental and social dimensions into the planning and implementation process prevents or reduces potential adverse impacts. The project would demonstrate the integrated use of environmental assessments, resettlement action plans, and social assessments in the planning and implementation of a project. The project would also include specific provisions to address the management of cultural property that may be encountered during the course of construction of the corridor improvements.

Use of a participatory process, which provides for transparency in project planning and implementation increases public commitment and reduces conflict during implementation. The project would provide for the use of a participatory process in the planning and implementation process, including national and site-specific consultations, public information, and outreach activities.

4. Indications of borrower commitment and ownership:

Government's recognition of the seriousness of the urban transport issues in Beirut is evidenced by its initiation of the comprehensive Greater Beirut Area Transportation Plan, on which this project is based. The project fits in the Government's plan to develop the GBA urban transport system and supports its immediate and high-return investments. Furthermore, during the CAS preparation, the Government strongly supported a Bank operation in the urban transport sector.

CDR funded most of the preparatory studies, including environmental and social studies, identified in the preparation plan, and effectively coordinated with all concerned agencies to develop the proposed project. The high priority of the projects is confirmed in CDR's five-year development plan, prepared in April 2000. CDR has organized and participated in an unprecedented public consultation process at the national and local level, to support project preparation.

The Ministry of Public Works and Transport, Ministry of Interior and Municipalities, and Governorate and Municipality of Beirut have effectively collaborated in project preparation and agreed to their respective roles in the project implementation. The establishment of the TMO and the setting of a Steering Committee underline the high priority of the project.

5. Value added of Bank support in this project:

Value added of the Bank's participation in the proposed project will come from several contributions to its design and implementation, of which the most important are:

- (a) The Bank has built initial experience in the transport sector in Lebanon through support of national road networks rehabilitation, as part of the ongoing National Roads Project (NRP), and through its 1999 public expenditure review (PER) of the transport sector. The design of this project ensures overall coordination with the policies supported by the NRP and aims to achieve synergies wherever possible, such as by adding traffic engineering to the capacity building activities of the Directorate of Roads. It also supports the PER's recommendations.
- (b) The Bank will assist in the formulation of an appropriate urban transport strategy for Beirut, which would support public transport, travel demand management, and environmental management, including measures for reduced transport emissions.

- (c) The Bank was instrumental in helping all concerned agencies focus on the implementation of high-priority projects based on comprehensive preparatory studies, which included use of a broad-based participatory process for review of environmental, cultural property, resettlement, and land acquisition issues.
- (d) The Bank has worldwide experience implementing urban transport projects in metropolitan areas with multiple jurisdictions. The Bank is accustomed to working across geographical, legislative, and regulatory boundaries under a single project framework. In performing this catalytic role for this project, the Bank has helped to bring together all concerned agencies to decide on adequate arrangements to develop an ITS architecture, consider a comprehensive traffic management program, approach the parking issue in a resolute manner and prepare for effective regulation of the public transport services.
- (e) The Bank's experience in cost-benefit analyses of transport investment options in a variety of different environments would be useful for the review of the different options considered in the GBA transportation plan. The project transport planning sub-component would help in revising and refining existing transportation plans based on sound economic analysis.
- (f) The Bank has supported CDR, Beirut Municipality, and local municipalities in introducing the use of national and local level public participation processes as an element of the design and implementation of large-scale infrastructure projects.
- (g) Bank involvement in the project would increase donor interest in this critical sector.
- (h) Bank involvement would help introduce the use of environmental management plans and resettlement action plans as an element of investments in the transport sector. The Bank would also support actions to evaluate potential impacts to cultural property during project preparation, and adoption of measures to address these issues during implementation.

E. Summary Project Analysis (Detailed assessments are in the project file, see Annex 8)

1. Economic (see Annex 4):

Cost benefit NPV=US\$ million; ERR = % (see Annex 4)

Cost effectiveness

Other (specify)

	NPV (US\$million)	IRR (%)	MIRR (%)*
Traffic management program	45.62	33.9%	20.1%
Parking improvement program	164.78		32.5%
Corridor Improvement Program (including Traffic Management and Parking Program)	123.26	33.8%	19.2%

* A reinvestment interest rate of 12 percent was assumed in the calculation of the modified internal rate of return (MIRR).

The proposed improvements were mainly evaluated for their direct contributions to the users in terms of travel time and vehicle operating costs. Other direct benefits to users include increased safety due to better incidence management and reduced congestion. The benefits to both users and non-users include reductions in carbon and hydrocarbon emissions. The short-term impact of the proposed improvements to local businesses in the vicinity of the construction may be negative. However, reduction in sales in one area would result in increased sales in another. In the longterm, the decreased congestion would improve the metropolitan image as well as the business climate. The results of the economic analysis show that the three proposed improvement programs are economically viable and would produce good economic indicators in terms of Net Present Value (NPV) and Internal Rate of Return (IRR). A risk analysis of the various factors that influence the benefits also show that

the proposed improvements are economically viable both separately and in combination.

2. Financial (see Annex 4 and Annex 5):

NPV=US\$ million; FRR = % (see Annex 4)

The investment program proposed under the project would contribute to the development of an efficient transportation network and support selected high priority investments that are part of the Greater Beirut Area Transportation Plan, which addresses the most critical urban transport issues through the year 2015. It is by design a national program, which would require significant resources that go well beyond the financial, technical, and institutional capacity of the municipal governments that are beneficiaries of the project. More broadly, the sector focus of the project in terms of capacity building in the areas of traffic management, traffic congestion on main corridors all of which are part of the national road network, and parking management does not allow a fragmentation of project responsibilities among the various participating municipalities, given their narrow technical base and lack of institutional apparatus for effective coordination.

To assess the financial capacity of the concerned municipalities to sustain such investments – regardless of the conventional expenditure assignment among government tiers in Lebanon – the associated outlays were compared to the financial resources of the municipalities. In terms of financing requirements, the project's investments represent a financing envelope that by far exceeds the funding capabilities of individual municipalities and would thus fall outside the scope of local government responsibility. In the case of Beirut, where current expenditures account for some 85 percent of the city's overall budget, the planned expenditures under the project are clearly not within the city's funding capability, as the city's US\$11.7 million budgetary envelope for annual capital expenditures (including maintenance and expropriation costs) represents less than 30 percent of the US\$35.9 million estimated project outlays.

Fiscal Impact:

The government counterpart funds – totaling about US\$32.26 million (including US\$15 million for land acquisition) would come from the national budget allocated to the priority investment programs implemented by CDR. Over the implementation period, the required counterpart funds would range from US\$1 million/year to US\$9.25 million/year, including the funds for land acquisition (about US\$6 million the first year, US\$4.5 million the second year, US\$3 million the third year, and US\$1.5 million for the fourth year). Government confirmation was obtained that the required counterpart funds would be available when needed and that funds were available for the first acquisitions of land.

The project operation and maintenance costs would be funded from the parking revenues, with the exception of (a) the maintenance of the grade separation facilities, totaling about US\$1 million/year, which would be funded from the national roads budget (about 1 percent of the road sector budget); and (b) a contribution from the budget of the Ministry of Interior for the first year of operation of the Traffic Management Organization, for a total amount of about US\$3.11 million (US\$0.5 million for the first year, US\$1.0 million for the second year, and US\$1.1 million for the third year).

3. Technical:

Three technical issues were addressed during project preparation: (a) design of the traffic control system and the technical specifications of its key components; (b) justification for the proposed grade separations; and (c) the meter technology for the on-street parking program.

Traffic control system. Various traffic control systems and types of signal controllers have been reviewed to assess their relevance for Beirut conditions. Some systems are proprietary in both software and hardware, while others are more open. Rather than selecting specific traffic control systems, it is more important to

determine the most appropriate traffic control functions for Beirut. There are several competing systems that will provide the functions of time-of-day, central manual selection, and traffic responsive operations to satisfy the requirements of International Competitive Bidding (ICB). Other than the functional requirements, the system's modularity, expandability, and inter-operability would be key criteria for selection.

The *justification methodology for grade separation* is based on analysis of road junction capacity, with proposed geometrics and traffic control measures evaluated as to their traffic carrying capacity, and level of service measured by the average stopped delay per vehicle. For complex configurations, or where several junctions are to be studied simultaneously, such as a corridor or a whole network, simulation techniques were used and measures of effectiveness calculated.

The proposed grade separation schemes have been selected to (a) provide an acceptable level of service (LOS) in the year 2012 (measured in terms of peak hour average delay per vehicle); (b) minimize the requirement of additional right-of-way and minimize displacement of businesses and residents; and (c) wherever possible, select the most environment-friendly alternative. In built-up areas, underpasses are preferred to overpasses, and special attention has been given to the relocation requirements of existing major utilities. Site characteristics related to topography and drainage were also important considerations. Short underpasses were preferred to tunnels, which require mechanical ventilation and significant operation and maintenance expenditures. The preservation of access to side properties and businesses has been an important consideration, to find the right balance between the interests of through traffic and local traffic. Special attention was also given to maintaining traffic on busy major thoroughfares during construction. Aesthetics and landscape preservation were also taken into consideration, and value engineering techniques used for cost-effective design.

With regard to *parking metering technology*, pay-and-display multi-space parking meters have been selected to govern the on-street spaces. Using this technology, one meter can govern 10-15 parking spaces, depending upon the particular block face in question. The parking patron drives into a legal parking space, walks to the pay station, decides how long a parking period is desired and pays for the period, retrieves a receipt that indicates when the parking is expired, and places the receipt in a specified place on the dashboard so that it may be viewed by enforcement officers. The meter calculates the parking time period based upon the starting time and the funds deposited. Payment may be made with a wide variety of media: coins, bills, tokens, credit cards, or value cards. Validation and frequent shopper programs may be accommodated as well. An enforcement officer checking a vehicle needs to view only the date and the ending time printed on the receipt.

The pay-and-display multi-space parking meters have been chosen over individual electronic meters, though the latter one most widely used control in the world. In many cities, the electronic meters have replaced earlier mechanized meters, since drivers are used to single space meters but municipalities have wanted to update the technology. Beirut, however, has decided to use multi-space meters to eliminate multiple poles on every metered block (especially with Beirut's highly variable sidewalk widths), the labor required to maintain a large inventory of meters, and the labor required to collect from single space meters.

4. Institutional:

4.1 Executing agencies:

The CDR, which has an established project implementation capacity, will be the main executing agency. It will work closely with:

The Traffic Management Organization.

The Traffic Police Department of the MOIM, which will be involved in the operation of the Traffic Management Center, and in the enforcement of traffic and parking control.

The Governorate of Beirut and the GBA municipalities will play a key role in assisting the Traffic Management Organization in implementing the on-street parking program.

The Ministry of Public Works and Transport through the Directorate General of Land and Maritime Transport (DGLMT).

The Ministry of Environment and Directorate General of Antiquities of the Ministry of Culture will assist CDR in addressing issues related to environmental management and cultural property.

4.2 Project management:

A Project Management Unit (PMU) has been established at CDR with the mandate for overall project management/monitoring and to serve as focal point for all communication with the Bank. To ensure effective project management, the project would include procurement of equipment and necessary operating costs of the PMU.

4.3 Procurement issues:

The CDR would be responsible for all project-related procurement and disbursement activities except those pertaining to the fourth component, Technical Assistance to the Ministry of Public Works and Transport, which would be the responsibility of the DGLMT. Under this project, a procurement/construction manager specialist would be recruited at the PMU to be responsible for all procurement activities and contract monitoring.

DGLMT would be responsible for implementing the fourth component of the project, including all associated procurement, financial management, and reporting functions. It would benefit from the procurement procedures developed for the Bank-financed National Roads Project.

4.4 Financial management issues:

CDR, which is the implementing agency for most Bank-financed projects in Lebanon, has a satisfactory record of project implementation. It is currently upgrading its information systems to integrate all project information and produce comprehensive Project Management Reports, as per Bank (LACI) requirements. Planning, coordination, and monitoring of procurement activities and their linkages with the disbursement function would be the responsibility of the PMU. The PMU would also be responsible for consolidating procurement reports included in PMRs, and for preparing quarterly progress reports.

5. Environmental:

Environmental Category: A (Full Assessment)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

The project uses an integrated approach to environmental assessment, mitigation, and monitoring in the preparation and implementation phases. It supports improvements in environmental quality in the urban environment, including management of cultural property, and provides for special studies and institutional strengthening. It has also introduced public participation as an element of the environmental assessment process for investments in the transport sector. Annex 12 presents the Environmental Management Plan (EMP), which would be monitored during supervision and evaluated at mid term and on completion.

Environmental assessment. A detailed environmental assessment was prepared for the project in compliance with the provisions of OD 4.01 for screening Category A projects. It includes an analysis of planning and design alternatives, development of an EMP that includes environmental mitigation and monitoring measures, and an extensive public consultation process. During preparation, proposed construction of underground parking garages that would have required major changes in established urban public parks was dropped from the project. The environmental assessment is available at the Info Shop, Resident Mission, and at a number of locations in Beirut. Its Executive Summary has been distributed to the Executive Directors of the World Bank.

Environmental impacts. The environmental assessment found that the Project will result in overall improvement in urban environmental quality in greater Beirut from reduced traffic congestion in the vicinity of major intersections and their access routes and from complementary improvements in on-street parking, which will also improve overall traffic flow. The primary benefits will come from reduced noise from vehicles, especially horns, lower emissions from quicker moving vehicles and reduced light at street level in the evenings. Over the medium-term, the phasing out of leaded gasoline and reduced use of diesel-fueled trucks will also contribute to improvements in air quality. The primary adverse environmental impacts are associated with the construction period for grade separation improvements, which will include temporary increases in noise, dust, sedimentation, light and vehicle emissions due to demolition and construction activities. In some cases temporary changes will also be made in storm water drainage patterns. In addition, there will be temporary impacts associated with the rerouting of traffic around the construction areas. These impacts can be mitigated by thorough planning of the staging used for construction and rerouting of traffic, careful supervision of construction activities and use of environmental monitoring to support management decisions by the CDR and other parties.

Cultural heritage. The Beirut urban area has a long history of human settlement and includes a wide range of archaeological and historical sites. Such sites may exist buried under the intersections at which grade separation improvements are planned. To address this concern, the environmental assessment, consistent with the provisions of Operational Policy Note 11.03, "Cultural Property," included site-specific evaluations of potential risks to cultural heritage, provisions for archaeological investigations and monitoring during the construction phase, and use of "archaeological chance find" procedures in case significant materials are encountered. To address these issues, which have been linked to the environmental assessment process, the EMP includes a special Cultural Heritage Component (EMP-CHC), described in Annex 12.

5.2 What are the main features of the EMP and are they adequate?

An EMP, including mitigation and monitoring measures, has been prepared as an element of the Project. Mitigation actions would focus on environmental supervision of the construction contractors and actions to reduce traffic flow problems during the construction phase. The monitoring plan provides for quality-controlled air, noise, and dust measurements to be used as baseline and trend data to support management decisions. In

addition, the project includes a policy study for urban air quality that reviews fuel improvements, vehicle emissions testing, and emission-related taxes and registration fees. It also supports a training program in environmental monitoring, which targets the needs of national and local government officials, consulting firms, construction contractors, and local NGOs.

5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: May 2000

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

A project of this kind is naturally driven mainly by technical considerations, and then attempts to take into account, as far as possible through consultations, the interests of beneficiaries, project-affected persons, and other stakeholders. The country's nature and history have encouraged political traditions that stress mutual accommodation among interest groups through power-sharing arrangements rather than open public consultations. The public hearings conducted for the environmental and social aspects of the project broke new ground in terms of consultation. Once a solution to the traffic problem and public support for it is obtained through public awareness and information campaigns, follow-on projects will be able to strengthen and broaden this pioneering consultative process.

a. Primary beneficiaries and other affected groups:

Beneficiaries. With one car for every four persons, and 83 percent of trips being by private car or taxi, the inhabitants of Greater Beirut are direct and indirect beneficiaries (mainly time saved) of improved traffic flow and improved parking availability and management. Indirect public consultations were held through the environmental assessment, by means of two higher-level national consultations and direct public consultations through smaller local consultations in selected affected areas. A series of 17 local consultation meetings were held to discuss proposed grade separation improvements. In addition to the environmental consultant team, a social scientist was present at many of these meetings, and the views of this expert were incorporated to the extent possible into the technical designs.

Other affected persons. Residents approved the overall intentions and designs, with the exception of one area where there is some local minority opposition to the changes induced by increased traffic flows. Many special interest groups may potentially be affected by the project, such as taxi drivers, pedestrians, schoolchildren, business operators, and employees, whose particular interests will be taken into account as the traffic management capability develops. A focused social assessment in one area surveyed the attitudes of the residential and transitory population (owners, managers, residents, and employees) to parking problems and reforms. A regular public information campaign will ensure that the reasons for innovations are appreciated by the public and, consistent with the project, enable their views and representations to be taken into account, particularly through systematic incorporation into a follow-up project.

b. Other key stakeholders:

Key institutional stakeholders include the Ministry of Public Works and Transport, Ministry of Interior and Municipalities, Ministry of Environment, Directorate General of Antiquities of the Ministry of Culture, Governorate of Greater Beirut, Beirut Municipality, and 15 individual GBA municipalities. The institutional environment is complex, with different and overlapping jurisdictions, and consultations with key stakeholders led to their agreement to establish a Traffic Management Organization. Preparation of the environmental assessment included consultations with the Ministry of Environment, Ministry of Health, Directorate General of

Antiquities of the Ministry of Culture, National Scientific Research Council, municipal governments, Lebanese universities (American University Beirut, Arab University, Lebanese University), *SOLIDERE*, merchants associations and other private sector parties, community organizations and non-governmental organizations (Beirut Issues, Development and Environment Media Association, Green Forum, Lebanese Environment Forum, Order of Engineers, Rotary Club, etc).

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

The EMP includes an environmental monitoring plan that provides for continuous monitoring of environmental and cultural heritage issues by two specialists who will be members of the project supervision team. The plan includes routine monitoring, during the construction phase, of health and safety conditions, restoration of landscaped areas, proper disposal of waste materials, and application of archaeological chance-find procedures. This would be complemented by quarterly monitoring of key environmental parameters by qualified independent consultants, including traffic patterns, air quality, noise, and water quality. The indicators adopted for this work reflect the objectives of the EMP and provide a basis for improved project results. Provisions have been made for the participation of Bank environmental and cultural heritage specialists as part of the supervision missions, and environmental aspects of the project would be covered in the Mid-Term Review and the ICR.

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

Three social development issues arise in this project, namely: (a) involuntary resettlement; (b) social impact of parking reforms; and (c) pedestrian and driver behavior. While the project concentrates on solving pressing physical, technical and institutional constraints, it will also lay the groundwork for a longer-term social development outcome; namely, the systematic future incorporation into transport planning of public participation, stakeholder consultation, and attention to the needs of the poor and other social groups.

a. Involuntary resettlement and land acquisition. The project is implemented in a densely developed and inhabited urban environment not originally designed for modern traffic conditions, and subject to some destruction and unplanned development and reconstruction during the war. The grade separation component of this project requires a modest amount of land acquisition, demolition of structures, and relocation of residents and economic activities. The project involves the resettlement of some 200 persons, owners or renters and their families, through either loss of residence or loss of small business locations (33), or both; and the expropriation of a total of about 3.1 ha of land from more than 200 lots in the form of strips and edges for alignment, affecting 1,437 landowners (because of multiple ownerships). Annex 11 summarizes these impacts and the compensatory and mitigatory measures proposed in the Resettlement Action Plan (RAP). The RAP was prepared following a social assessment of the expected impacts and of the operation of existing mechanisms for expropriation and compensation. It provides a mechanism that, without encroaching on the independence of the long-established judicial expropriation commissions and their procedures for public disclosure and consultation, encourages them to comply with OD 4.30 by using the full range of compensation options open to them, in the knowledge that their decisions will be supported and financed. The RAP provides also a mechanism for the detailed site-by-site monitoring and clearance by a Bank social scientist.

b. Social impact of parking reforms. A focused social assessment in one area surveyed the behaviors, attitudes, needs, hopes, and concerns of the different categories of the residential and transitory population (owners, managers, residents, customers, employees) to parking problems and reforms. The project's new parking provisions would take into account the actual behaviors and needs of these different categories of users. The economic and other impacts of parking reforms on different of users, particularly local parking for residents, would be monitored, and modifications introduced where necessary.

c. Modifying pedestrian and driver behavior. The limitations on on-street parking and resulting increased motor vehicle flows and speeds, will require a change in driver and pedestrian awareness and behavior. In many parts of the city, pedestrians are accustomed to the protection of one and sometimes two rows of curb-parked cars, and to negotiating their way across streets between rows of slow-moving or stopped vehicles. The need for increased driver and pedestrian awareness of and courtesy toward different types of traffic will be made clear to a wide range of agencies, particularly schools, through driver education programs and the media.

6.2 Participatory Approach: How are key stakeholders participating in the project?

Public consultation on the urban transport strategy. Solving the city's motor vehicle congestion problem is the first part of a complex and multi-stage program that includes public transport needs and will address more general questions such as what kind of city people want, the desired balance between vehicles and people, and the location and planning of pedestrian-friendly zones. The formulation of the urban transport development strategy under the project would involve broad consultation with all stakeholders, including transport professionals. This would provide an opportunity to continue the participatory approaches begun during project preparation. The particular interests of different groups will be taken into account as the traffic management capability develops. The basis for incorporation of public and stakeholder views in this longer-term planning perspective has already been laid in the public consultations undertaken for the environmental assessment, and in the social assessment for the Resettlement Action Plan. During project implementation, capacity in the TMO would be developed to include an understanding of alternative solutions to urban traffic planning, and how to have more systematic participation and consultation on alternatives.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

See 5.4 and 6.2 above.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

Poverty focus and disaggregation of impacts in the urban transport strategy. There is little absolute poverty in Beirut, but the poorer segments of the population rely primarily on public transport and service taxis. The logical sequencing of investments requires that before public transport improvement can be addressed, the infrastructure, traffic management, and on-street parking issues must be solved. During this project, a study would be designed and commissioned by the Ministry of Public Works and Transport to identify the mobility problems of the poor in terms of public transport and service taxi needs, define needs by gender and other socioeconomic differences, and quantify actual transport costs in terms of time and fares in relation to monthly household budgets. This information would be used in the preparation of a follow-on project dealing public transport, so that service routes, schedules, and fares can better respond to the needs of the poor, women, and other users.

6.5 How will the project monitor performance in terms of social development outcomes?

Implementation of the RAP will be followed up during field visits, carefully reviewed at project mid-term, and reported in the ICR. The evolution of the transport strategy study (terms of reference, team selection, conduct, and output) would be monitored by a Bank social scientist.

7. Safeguard Policies:

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Forestry (OP 4.36, GP 4.36)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Pest Management (OP 4.09)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Cultural Property (OPN 11.03)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Indigenous Peoples (OD 4.20)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Safety of Dams (OP 4.37, BP 4.37)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	<input type="radio"/> Yes <input checked="" type="radio"/> No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

Project preparation included preparation of an environmental assessment and a Resettlement Action Plan. The environmental assessment contains an Environmental Management Plan with a special a cultural heritage component to address issues related to cultural property. Implementation of the environmental management plan and resettlement action plan would be an integral part of the project supervision process, and environmental and social specialists from the Bank would participate in supervision missions to monitor these implementation activities. Environmental and social aspects of the project, including cultural heritage issues, would be examined at the Mid-Term Review and ICR. The environmental assessment and Resettlement Action Plan were subject to an extensive public consultation process and have been disclosed at the InfoShop, Resident Mission, and a variety of locations in Beirut.

F. Sustainability and Risks

1. Sustainability:

The sustainability of the GBA urban transport system would be enhanced under the project through: (a) building of institutional capacity in traffic management; (b) increasing the road network capacity by implementing the priority elements of the GBA transportation plan; and (c) enabling parking control enforcement.

Project sustainability would depend on the quality of project implementation, the success of institutional reforms, and the adequacy of available finance to support ongoing project operation and maintenance costs. With regard to the institutional reforms, the lead implementing agency, CDR, has succeeded in involving all concerned agencies, which have agreed to work in a coordinated manner to achieve effective traffic management and parking controls. The maintenance costs for the three first years of operation for both the on-street parking meters and traffic control signals and equipment would be included in their procurement to allow for stable budgets for operation and maintenance. Public awareness campaigns would be conducted during project implementation to ensure project sustainability on traffic and parking controls.

2. **Critical Risks** (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
<p>From Outputs to Objective</p> <p>Institutional barriers might impede implementation of effective traffic management.</p> <p>Insufficient resources to operate and maintain the GBA traffic management system.</p> <p>Insufficient support for parking policy reform.</p>	<p>S</p> <p>M</p> <p>S</p>	<p>A Steering Committee, consisting of the Minister of Finance, the Minister of Transport, the Minister of Interior and Municipalities, and the President of CDR, would ensure effective coordination among all concerned agencies.</p> <p>Necessary budgets for initial operation and maintenance of the traffic management system are included in the project costs. The O&M costs would be funded by the Traffic Management Organization from its on-street paid parking revenues.</p> <p>A Memorandum of Understanding on the implementation of the on-street parking program and the on-street paid parking concession agreement with the Municipality of Beirut has been signed prior to negotiations.</p>
<p>From Components to Outputs</p> <p>Implementation delays.</p> <p>Non compliance with traffic signals and parking controls.</p> <p>Inappropriate parking regulations.</p> <p>Risk of too-long traffic disruption during construction and diversions, creating new traffic patterns.</p> <p>The computerized and updated vehicle registration system, which is essential to parking management, might not materialize.</p>	<p>M</p> <p>M</p> <p>M</p> <p>S</p> <p>M</p>	<p>A Project Management Unit (PMU) would be maintained within CDR to have overall project implementation responsibility. Bidding documents for two grade separations, and traffic signals and equipment for the Traffic Management Center have been completed prior to negotiations.</p> <p>Regular public awareness campaigns would be conducted during project implementation. Traffic police would be trained to ensure effective enforcement.</p> <p>The TMO would regularly consult with all stakeholders (including business associations and real estate developers).</p> <p>The PMU, in coordination with the TMO would ensure implementation of appropriate circulation plans according to adequate sequencing of intersections to be grade separated, and include stringent penalties for delays.</p> <p>The TMO would develop and maintain a license tag database, based upon the license tags noted on parking tickets.</p>
<p>Overall Risk Rating</p>	<p>S</p>	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

3. Possible Controversial Aspects:

Local communities may complain to municipal authorities concerning disruption associated with construction activities and temporary redirection of traffic patterns. Construction impacts, including dust, noise, and light would be minimized by effective supervision of the contractors and routine field monitoring. In addition, public awareness activities should assist residents in understanding the objectives of the project and that these problems are temporary. In addition, the PMU would establish a mechanism for citizens to make complaints concerning construction-related problems.

G. Main Loan Conditions

1. Effectiveness Condition

- Signing of the TMO application decrees related to its organization, operations, and staffing.
- Appointment of: (a) the Directors of the key TMO departments (Traffic Engineering and Parking Management); and (b) the coordinating officer in charge of traffic surveillance and enforcement.
- Signing of the concession agreement to operate the Municipality of Beirut's on-street paid parking programs.
- Traffic diversion plans prepared by CDR for the construction of the two first-grade separation facilities.
- CDR to complete the staffing of the PMU.

2. Other [classify according to covenant types used in the Legal Agreements.]

- Accounts/audit
 - Annual audit reports of project accounts and SOEs would be prepared and submitted in English by independent auditors acceptable to the Bank within six months of the end of each fiscal year.
 - Documentation to support expenditures financed under SOEs or otherwise would be maintained in English by CDR and made available for review by Bank supervision missions.
- Project management
 - CDR would maintain the Project Management Unit established for the project with staffing, terms of reference, and qualifications satisfactory to the Bank.
- Reporting
 - The TMO and the DGMLT would furnish the PMU with detailed quarterly reports to be completed and consolidated by the PMU and submitted to the Bank.
 - The TMO would: (a) establish and maintain financial accounts and statements in formats acceptable to the Bank; and (b) have its accounts audited each fiscal year in accordance with Bank guidelines and by independent auditors acceptable to the Bank. In addition, the Bank would be furnished with the auditor's management letter or other reports, which the auditors may also provide to TMO management.
 - By December 31, 2005, CDR would submit to the Bank a detailed mid-term report to serve as the basis for a mid-term review of project implementation. CDR would also submit quarterly progress reports.

- The PMU (CDR) would also prepare and submit an Implementation Completion Report to the Bank within six months of the closing date of the Bank loan. The PMU report would include the completion reports of both the TMO and the DGMLT.

- Project implementation

- Ministry of Interior and Municipalities would designate a traffic police team by July 31, 2003, to carry out the traffic surveillance activities of the TMO.
- MPWT would update the GBA transportation plan by June 30, 2005.
- A Greater Beirut Area urban transport strategy would be formulated by June 30, 2005, and approved by the Cabinet by December 31, 2005.
- MPWT would complete the Air Quality Management study by June 30, 2005.

H. Readiness for Implementation

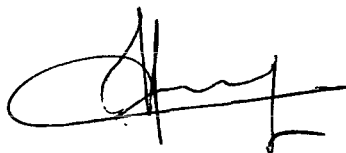
- 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- 1. b) Not applicable.
- 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- 4. The following items are lacking and are discussed under loan conditions (Section G):

I. Compliance with Bank Policies

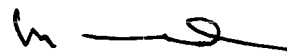
- 1. This project complies with all applicable Bank policies.
- 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.



Mohammed D. E. Feghoul
Team Leader



Hedi Larbi
Sector Manager



Joseph P. Saba
Country Manager/Director

Annex 1: Project Design Summary

LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
Sector-related CAS Goal: Rehabilitation and expansion of infrastructure and institutional development.	Sector Indicators:	Sector/ country reports:	(from Goal to Bank Mission)
Project Development Objective: <ul style="list-style-type: none"> ● Provide the city of Beirut and the Greater Beirut Area (GBA) with the basic institutional framework, which it now lacks, and critical investments needed to maximize the efficiency of the existing urban transport infrastructure. 	Outcome / Impact Indicators: <ul style="list-style-type: none"> ● Effective traffic control system throughout the GBA. ● Well-functioning Traffic Management Organization capable of operating all implemented traffic management systems, and focusing on traffic engineering, control, and management for the entire GBA. ● Reduced congestion (average traffic speed) on major corridors; and level of service improved for critical intersections (from 37% of key intersections - about 250 - in Year 1 to 70% by the end of the project at LOS A, B or C and no LOS below D). ● Effective parking management by the TMO; significantly reduced parking violations in areas critical to efficient traffic operations; and average occupancy of metered parking space from 30% in Year 1 to 50% by the end of the project. 	Project reports: <ul style="list-style-type: none"> ● regular traffic and parking surveys ● project monitoring reports 	(from Objective to Goal) <ul style="list-style-type: none"> ● Government support for an integrated GBA urban transport policy.

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
<p>Output from each Component:</p> <p>1. Reduced congestion.</p> <p>2. Improved on-street parking controls and unauthorized parking significantly reduced in specific zones.</p> <p>3. Formulation of an integrated urban transport strategy and accompanying transportation plans.</p>	<p>Output Indicators:</p> <p>1.1 Traffic monitored and controlled throughout the GBA.</p> <p>1.2 Traffic signals and layout improvements implemented at 200 intersections, and integration of 64 signalized intersections.</p> <p>1.3 Circulation plans developed and implemented.</p> <p>1.4 Improved traffic conditions 7 main corridors through 16 grade separation facilities. The monitoring indicators selected are: for the corridors' volume/capacity ratio, traffic speed and traffic volumes to be monitored at peak hours; and for the intersections' level of service, peak hour average per vehicle.</p> <p>2.1 Paid on-street parking enforced in about 14 select zones, for a total of about 6,500 metered parking spaces.</p> <p>2.2 Revised parking regulations approved and enforced.</p> <p>3.1 Approval of an integrated urban transport strategy and accompanying transportation plans by the end of December 2005.</p>	<p>Project reports:</p> <ul style="list-style-type: none"> • traffic surveys • project monitoring reports <ul style="list-style-type: none"> • parking surveys • project monitoring reports <ul style="list-style-type: none"> • project monitoring reports 	<p>(from Outputs to Objective)</p> <ul style="list-style-type: none"> • Institutional barriers might impede implementation of effective traffic management. • Sufficient resources are secured to operate and maintain the GBA urban transport system. <ul style="list-style-type: none"> • Lasting Central Government and GBA municipalities' support to the parking improvement program. <ul style="list-style-type: none"> • MPWT's continued commitment to improve public transport services.

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
<p>Project Components / Sub-components:</p> <p>1. Traffic management: (a) Establishment of an autonomous metropolitan organization for traffic and parking management (the TMO); (b) Layout improvement works and installation of traffic signals for all GBA's significant intersections (about 200); (c) installation of a video surveillance system using Closed Circuit Television (CCTV) at about 30 sites along 4 corridors to pilot the use of freeway management systems; (d) establishment and equipment of a Traffic Management Center (TMC) to monitor and control traffic operations through ITS technologies; (e) technical assistance and training services to build capacity for traffic control operations and ITS technologies; and (f) traffic enforcement equipment and training services for the traffic police.</p> <p>2. On-street parking improvement program: (a) Installation of about 580 pay-and-display multi-space parking meters to control about 6,500 spaces under concession contracts with GBA municipalities; and (b) technical assistance and training services to build capacity for parking management operations and conduct public awareness campaigns.</p> <p>3. Corridor improvement program: Construction of grade separation facilities at highly congested intersections along seven main corridors (Beirut main entrances).</p> <p>Land acquisition.</p>	<p>Inputs: (budget for each component)</p> <p>US\$27.71 million</p> <p>US\$6.70 million</p> <p>US\$60.38 million</p> <p>US\$15 million</p>	<p>Project reports:</p> <ul style="list-style-type: none"> ● project monitoring reports ● project monitoring reports ● project monitoring reports 	<p>(from Components to Outputs)</p> <ul style="list-style-type: none"> ● Adequate implementation capacity will be maintained by CDR. ● Qualified professionals will be recruited at the project onset to constitute the core staff of the Traffic Management Center. ● Public awareness campaigns will be conducted regularly during project implementation. ● Qualified professionals will be recruited at project onset to constitute the core staff of the TMO Parking Department. ● Public awareness campaigns will be conducted regularly during project implementation. ● Consultations for developing parking regulations will be conducted, and will include business associations and real estate developers ● Risks of traffic disruption during construction will be managed through adequate circulation plans to divert traffic during construction; penalties for delays built into the works contracts; and regular public information campaigns.

<p>4. Technical assistance to the Ministry of Public Works and Transport: (a) Support engineering, transport, economic, and environmental studies to assist in the formulation of an urban transport strategy for the GBA; (b) Assist in updating and refining urban transport plans and programs; (c) Support transport feasibility studies; (d) Help regulate and organize public transport services; (e) Assist in developing an air quality management program for the GBA; and (f) Support training activities.</p>	<p>US\$3.50 million</p>	<ul style="list-style-type: none"> ● project monitoring reports 	<ul style="list-style-type: none"> ● MPWT's continued commitment to comprehensive multi-modal urban transport development strategy.
<p>5. Project management: Technical assistance services, and fees of local individual consultants to staff a Project Management Unit, including equipment and operating costs on a declining basis.</p>	<p>US\$1.23 million</p>	<ul style="list-style-type: none"> ● project monitoring reports 	<ul style="list-style-type: none"> ● CDR will maintain an adequately staffed PMU.

Annex 2: Detailed Project Description
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

By Component:

Project Component 1 - US\$27.71 million
Traffic Management Program

1.1 The overall objectives of the traffic management component of the project are to improve the efficiency of the road network, reduce delays, improve travel speed, and enhance traffic safety through the establishment of a comprehensive and integrated traffic management program in the Greater Beirut Area.

1.2 The traffic management program includes the following seven major elements:

- (a) Traffic Management Organization (TMO): A unified and autonomous organization will be established to monitor and control traffic, improve safety and respond to traffic incidents, and better coordinate the activities and programs of the various agencies involved in traffic management throughout the metropolitan Beirut area. This organization will perform the functions of traffic control and surveillance, traffic enforcement, parking management and regulation, traffic operations planning, traffic engineering, and traveler information. The TMO will report to a governing Board, whose members are appointed by the Minister of Interior and Municipalities. The Board will establish traffic and parking management polices in accordance with the existing traffic laws, and set the framework for TMO operations. A Memorandum of Understanding (MOU) regarding the TMO's functions and division of responsibilities among all participating Ministries has been discussed and approved by all stakeholders (see Appendix 1 to this Annex).

A capacity building and professional development program is included to assist engineering staff, traffic police, and parking personnel, in better managing traffic flows.

- (b) Traffic Signal System: A computerized traffic signal control system of about 200 new signals, integrated with 64 existing (mostly minimally operational) signalized intersections. This element includes the installation of advanced traffic signal controllers, loop detectors, signal heads, pedestrian heads and buttons, mast arms, and communications, with hardware and software.
- (c) Intersection Layout Improvement: Covering both intersections receiving signalization and selected links between these intersections, including conversion to one-way street, traffic channelization, median island improvements, curb and gutter improvements, street resurfacing and paving, signing, striping, and marking.
- (d) Traffic Management Center (TMC): A new TMC housing traffic operations planning and engineering, signal operations, parking, traffic enforcement, support services, and traffic video surveillance functions. All the traffic signals in the GBA will be directly monitored and controlled from the TMC. This element contains a new building for all TMO departments, communications equipment, control hardware and software, and video display system. Operations support of the TMC and maintenance of all central and field equipment for three years after the completion of the program will be provided.
- (e) Video Surveillance System: A video surveillance system of about 40 color cameras along major routes, integrated with 20 existing cameras viewing the Beirut Central District (BCD) tunnel, and 20 cameras viewing the airport tunnel. This element includes video cameras with housings, pan/tilt units, lenses, camera controllers, video switches, pan/tilt/zoom controllers, and video display units.

- (f) Telecommunication System: The video communications between field cameras and the center will be provided through the existing fiber-optics backbone owned by the Ministry of Post and Telecommunications (MPT). Data communications among the traffic signal controllers will be mostly handled by the leased twisted-pair telephone line, with an option of grouping adjacent intersections with the wireless Spread Spectrum Radio communications system. This system contains multiplexers, channel banks, codecs, modems, cabinets, patch panels, vaults, junction boxes and possibly Spread Spectrum radio equipment.
- (g) Traffic Police Equipment: Towing trucks (10 small and 2 midsize), motorcycles (125 units), radio communication sets (125 units), and cars (50 units) will be purchased for effective traffic enforcement.

Traffic Management Organization (TMO)

1.3 Throughout the GBA, traffic will be controlled, monitored and managed from the centralized TMO, which will be at the core of the comprehensive traffic management program utilizing the Intelligent Transportation Systems (ITS). The centralized single TMO will consist of traffic signal control systems, main corridors management systems, video surveillance system, incident management systems, parking management systems, and traveler information systems. These systems will be used by engineering staff, traffic police enforcement officers, and parking management personnel under a unified TMO organization to perform various traffic management functions in an integrated manner throughout the GBA. An alternative to the centralized TMO would have been two centers with separate functions in each. Worldwide experience has demonstrated superior results from a centralized single TMO when it performs multiple traffic management functions.

1.4 The TMO will be the focal point of traffic management activities for the whole Beirut metropolitan area, covering all the traffic control and engineering, traffic enforcement, and parking management functions. It will perform the following core functions:

Traffic Control and Surveillance: TMO will manage, operate, and maintain the computerized traffic signal control system. It will be responsible for the development and maintenance of optimal signal timing plans, the calibration of detector data, and the preparation of signal database. A video surveillance system will be used to monitor traffic conditions, detect and confirm incidents, evaluate the impacts of response plans, and identify the release of incidents.

Traffic Enforcement: Traffic police officers in the TMO will have the authority to command and direct field traffic officers through the district offices to manage traffic flows when necessary. Traffic enforcement will be the responsibility of the traffic police and will be coordinated through the TMO.

Parking Management: Parking management staff in the TMO will develop on-street parking policies, establish parking regulations, manage parking meter programs, conduct parking analysis, and coordinate with municipal police to enforce parking regulations.

Traffic Operations Planning: Engineering and traffic enforcement staff will jointly develop traffic management strategies and circulation plans, analyze operational requirements for special events and construction lane-closure activities, and prepare response plans for incidents.

Traffic Engineering Studies: Engineering staff will conduct studies and evaluation of current traffic control devices including signing, striping and signal operations, and implement changes as necessary. Traffic data collection will be performed by TMO to assist in traffic studies and transport planning.

Public Information: TMO will provide the public with current traffic and road conditions. Traveler information system will also be made available through advanced technologies. It will conduct public

campaigns to educate drivers and pedestrians about the new traffic management system.

1.5 Law enforcement personnel in the TMO will interact with field traffic officers via five existing regional police districts. These districts are geographically located in the GBA (three within the municipality of Beirut and two outside of Beirut). Traffic police at the intersection level are under direct supervision of each commander in their respective district offices. The TMO will have direct chain of command over the five police districts for traffic management matters.

1.6 The TMO will interface with the Ministry of Public Works and Transport in the areas of road improvements and transport planning. The TMO will be responsible for traffic operational improvements, but not the design and implementation of roadway infrastructure. It will serve as a source of data collection on traffic flows and conditions for use by others performing studies, and it will provide recommendations regarding approval of proposed for traffic control changes by other agencies.

1.7 The public information function is very crucial to the TMO. Once fully operational, the TMO will become the nerve center of all traffic management activities in the GBA. Real-time traffic information and road conditions will be disseminated from this center. The news media will provide such information, particularly video images, to the general public, which will generate attention of the public and high-ranking officers about the traffic management system. If the impact of the system is positive, public support will grow, and more financial resources will become available to help sustain the traffic management program and continue to expand the system.

Traffic Signal System

1.8 Currently, most of the intersections in Beirut are not signalized. The limited number of existing signals are mostly dark or on flash. At major intersections, uniformed traffic police officers direct traffic manually. Some intersections are sufficiently complex as to require multiple officers, each directing one or more approaches in coordination with one another. Traffic flow is chaotic and little traffic discipline exists. Enforcement is seemingly secondary to attempting to achieve some semblance of control for the officers at most intersections. The roads covered by the project can be viewed as a fairly dense downtown network (including some closely spaced intersections), a series of corridors, and some isolated intersections.

1.9 Implementation of an effective traffic signal system should result in significant improvements in safety and efficiency, and concurrent decreases in delays. Further, travel times should become considerably more consistent than under current conditions. Emissions will be positively impacted as well.

1.10 *Installation of New Signals.* New signals need to be installed and operated in Beirut to direct traffic flow in a more efficient and orderly manner. This project will include the installation of a total of 180 signals. The criteria used for selecting the proposed signals were based on the 1994 Greater Beirut Urban Transport Study and other major corridor analyses. The intersection level of service was calculated using the projected traffic volume generated by the EMME2 model. A simplified critical movement analysis and traffic signal warrant study based on the U.S. Manual of Uniform Traffic Control Devices (MUTCD) were later conducted during the appraisal mission. The result showed that 178 intersections meet the minimum critical movement volumes and at least one of the two traffic signal warrants: Minimum Vehicle Volume and Interruption of Continuous Traffic Flows. Two other intersections were close to meeting the warrant criteria and will be included in the project. All 180 new signals will be interconnected with the TMC.

1.11 *Existing Signal System.* The existing 64 signalized intersections include 24 in the Beirut Central District area and 40 in the municipality of Beirut and outlying areas. Most of these signals are not operational

because of poor traffic engineering design and lack of maintenance. This project will re-activate these signals and incorporate the existing and proposed traffic signals into a fully integrated control system so that the signal operations can be optimized.

1.12 This project will bring the existing signals up to the current standard in terms of signal controllers, signal head placement, signal phasing design, and signal timing plans. All field equipment that does not meet the current design standard will be replaced and upgraded.

1.13 Traffic Control Functions. A computerized traffic signal control system can have the following different traffic control functions:

Local Operations/Central Monitoring: Local controllers run basic signal timing plans (consisting of cycle length, amount of green/red time for each direction, and synchronization timing) without central control and coordination. When communications between the central and the local signals are down, all signals will be on local operations.

Time-of-Day Operations: The TMC controls and monitors traffic signals using pre-determined signal timing plans by time-of-day. These timing plans are generally developed through off-line signal optimization software.

Central Manual Selection: Traffic engineers in the TMC can manually implement any pre-determined timing plans remotely from the center through the communications system. This is an important function to enable the TMC to respond to incidents and special events.

Traffic Responsive Operations (or regular adaptive traffic control): A central computer adjusts the signal timing plans automatically based on traffic demands, using either pattern matching method or off-line calculation in intervals of 15 minutes or longer. A detection system needs to be placed at strategic locations to detect traffic pattern changes.

Real-time Adaptive Traffic Control Operations: Signal timing parameters are adjusted with high frequency (in seconds) to meet traffic demand using on-line calculation algorithms. This mode of operations is the most sophisticated control of any traffic signal system. An extensive detection system detecting traffic volume and speed for every lane of every approach to all signalized intersection would be needed to operate the system properly. A sophisticated software algorithm would take the traffic data as inputs to compute the timing parameters within seconds and implement them immediately. Each operating adaptive control system has its own algorithm. Some systems also lock in the proprietary signal controllers that their algorithm can work with.

1.14 Most benefits of a central signal control system are realized through the reliability of the system running well-maintained and predictable time-of-day timing plans. Central manual selection is critical during incident management and any unexpected traffic congestion. Traffic-responsive operations allow the system to adjust signal timing automatically when there is a significant traffic pattern change. The cumulative effects of these modes of operations would be significant. Currently in Beirut, traffic fluctuation with time is limited. Peak periods are generally predictable, and many intersections show a high level of traffic volumes consistently throughout the day. The need for a real-time adaptive control system to respond to traffic demands is not high. Also, the correlation of traffic volumes between upstream and downstream locations is low because of traffic coming in and out of minor cross streets in between detectors, and traffic frictions such as illegal double-parking and taxis picking up and dropping off passengers. This low correlation makes it difficult to predict traffic flow for the downstream intersections, which is a central theme of most adaptive traffic control systems. However, since traffic continues to grow over time in the Beirut area, there is a rationale for traffic-responsive control to adjust signal timing in response to changing traffic patterns. Therefore,

appropriate traffic-responsive functions will be included in the system.

1.15 *Traffic Control System.* Various traffic control systems and types of signal controllers have been reviewed to assess their relevance for Beirut conditions. Some systems are proprietary in both software and hardware, while others are more open. Rather than selecting specific traffic control systems, it is more important to determine the most appropriate traffic control functions for Beirut. Other than the functional requirements, the system's modularity, expandability, and inter-operability would be key criteria for selection.

1.16 One of the important elements of the traffic control system is the development and implementation of good signal timing plans. Traffic engineers need to have a useful tool to conduct such a task. An off-line signal timing simulation and optimization software package will be included in the procurement so that the operating agency will be able to develop optimal signal timing plans and evaluate traffic control strategies.

1.17 *Type of Signal Controller.* Many types of controllers could provide the control functions specified for the Beirut system. However, in order to maximize the investments already made at the existing signals, the contractor will be required to make every effort to reuse the existing controllers for these signals.

1.18 *Signal Design Standard.* Current design practice in Beirut is to install signal heads at the near side of the intersection. While this would clearly indicate the stop line to drivers approaching the intersection, the visibility to those already stopping is poor. This project would add two additional signal heads 300 mm in diameter at the far-side of the intersection to improve signal visibility to both drivers and pedestrians. If the approaching direction has three or more lanes, an overhead signal head mounted on the far-side mast-arm pole will be installed.

Intersectional Layout Improvements

1.19 Intersection layout improvements are required in order to implement and achieve full value from the traffic signal control and video surveillance systems. Such works are of a minor nature in comparison to construction or rehabilitation of a roadway, but are necessary to provide proper facilities for and proper user response to the systems. About 24 corridors in Greater Beirut Area will be receiving surface improvement to increase safety, improve efficiency, and enhance driveability. The work for this item includes traffic channelization improvements, one-way street conversion, traffic signing and striping, pavement resurfacing, median island relocations, curb and gutter repairs, sidewalk paving, pavement markings, and minor landscaping. The specific improvements were selected following evaluation of each intersection by the consultant, seeking the most cost-effective manner in which to improve traffic operations. The improvements are considered necessary in order to achieve the full potential of a comprehensive traffic management system. Intersection layout improvements will be performed consistent with existing local standards and practice. Existing standard specifications and project-specific design details are adequate for procurement and execution of this portion of the project.

Traffic Management Center and TMO Building

1.20 The premises of the TMO will be situated in a multi-story facility of about 3000m², to be built on available Government-owned land at the northern edge of Beirut. In addition to the traffic operations room, offices for planning, engineering, support services, parking, training/public relations, and administration are planned. Areas for training, meetings, tours, media interaction, a library, and testing/maintenance/repair of moderately sized equipment are included. Computer and communications rooms will provide safe and secure environments for their respective sets of critical equipment, and will provide locations in which the internal

systems interface with external equipment. Facility parking will be included for several organizational elements.

1.21 Multi-level facility security will be maintained, with video surveillance of the building exterior and parking areas, a guard providing building entrance control and video monitoring, and computer/communications/control rooms protected by keypad-type security. Appropriate security will also be required for the parking fee collections area.

1.22 The control room will feature a 6-cube video wall displaying both video images from the CCTV cameras and computer-generated images. The primary image will be a geographic representation of the status of the traffic signal network and traffic conditions on the detectorized roadways. Operations consoles will house the workstations through which operators interface with and control the traffic signals and individual video monitors.

1.23 The TMC will house the following equipment: (a) cable racks and communication electronics and software; (b) video displays, video wall, video wall controller, camera controller, video cassette recorders, camera control distribution unit, video switches, and associated software; (c) several computer systems for the proposed traffic applications, including traffic signal control, modeling/simulation, database management, geographic information systems, and associated software; (d) local area network (LAN) hub, wide area network interface, cabling, equipment, and software connecting all computer devices; (e) uninterruptible power supply (UPS) with redundant diesel or turbine backup generators; (f) heating, ventilating, and air conditioning system; (g) furnishings and office equipment, including workstation units.

1.24 Video is displayed in the TMC control room, which has a video wall of 2mx3m composed of up to six rear projection video cubes. This video matrix can also display computer images. Larger single-projector units equivalent in size require more maintenance and a larger dark space behind the screens. The control room also has four 32-inch monitors. Video routing is provided by a video switch with 100 inputs by 20 outputs, with expansion capability. In the future, there may be reason to consider routing video from this area to the five district offices of the Ministry of Interior.

Video Surveillance System

1.25 The proposed CCTV system for the GBA will be used for surveillance and monitoring of traffic conditions on the road network. The CCTV system of 40 cameras will cover four key corridors in the GBA; i.e., Northern, Southern, and Eastern Entrances, and Corniche El Mazraa. Each field site will include a high-resolution color camera, camera control system, and cabling. It is expected that the CCTV system will expand geographically to cover larger parts of the GBA.

1.26 The second part of the video surveillance system is the integration of the existing CCTV cameras in the Business Central District (BCD) and airport tunnels. Most of the existing cameras are fixed and black/white. This project will establish video connection between these cameras and the TMC.

1.27 *New CCTV.* The proposed 40 new cameras will be mounted either atop 15-meter poles at approximately 1 km distances along major corridors, or on the top of high-rise public buildings. Even though the plan to mount cameras on high buildings may have to endure lengthy negotiations with building owners and may involve higher risk to camera cabling and support electronics, coverage of some complex and extended intersections will be improved by such a mounting method using high magnification cameras. The selected contractor will have to field-verify all camera sites using a bucket truck survey prior to installation. Images from all sources will be transmitted over a fiber optic telecommunication network to the TMC. The combination of spacing and camera magnification will provide essentially full coverage of the chosen routes,

which is useful for current applications.

1.28 The new CCTV system is crucial to the traffic surveillance and monitoring functions of the TMC. Video cameras are the most direct and effective tools to monitor traffic conditions, identify and confirm incidents, and verify the impacts of control strategies, and are therefore far superior to other detection systems. Most detection systems can only detect accurate traffic volume and speed data when traffic is moving. If traffic is blocked due to a major incident or street/lane closure, these detection systems would not show meaningful traffic data to which the operator could respond. CCTV, on the other hand, provides clear pictures of road conditions with pan/tilt/zoom capabilities and is able to identify the source of the incidents and to assist the operator in developing the most appropriate response plans. At the end of the incident, video cameras are also extremely useful to help the operator decide when to change the traffic control plans back to normal conditions. Without the CCTV system, the operators will not be able to manage the TMC effectively. In addition, the video cameras will also provide great assistance in carrying out traffic studies.

1.29 Existing Tunnel Cameras. Each of the BCD and airport tunnels has approximately 20 cameras. All are black/white, and all but those at the ends of the tunnels are fixed view (no pan/tilt/zoom). Output from airport tunnel cameras is digital, while that from the BCD tunnel is analog. These cameras provide both the ability to investigate all problems in the tunnels, whether related to traffic, pedestrian intrusion, or other alarms received by the respective tunnel control centers. Full video coverage is provided to the mini monitoring center of each tunnel. Each tunnel monitoring center receives its own video, but has no access to any other video. Staffing at these two monitoring centers will be eliminated once adequate surveillance and monitoring can be provided centrally from the TMC. Since the tunnels also represent critical traffic bottlenecks on the transportation network, these cameras will augment the surveillance functions of the TMC.

Telecommunication System

1.30 The communication system for the GBA will be designed to accommodate the immediate need to control and monitor traffic signals, data collection stations, and CCTV systems. In addition, it will accommodate future communication needs for advanced ITS applications, such as traveler information systems, public transportation, commercial vehicle operation, incident management detection and verification, and emissions management. The communication systems and subsystems will be based on an open architecture using non-proprietary communication hardware and software. The system will be operated and maintained using industry standard communications protocols and off-the-shelf devices.

1.31 Multiple alternatives for the telecommunications solution supporting the traffic management center have been posed as the project has evolved, culminating in a potentially cost-effective solution using the Ministry of Posts and Telecommunications' (MPT) fiber optic network. The MPT has already installed a highly underutilized high bandwidth (622 Mbps) fiber optic network along all routes of interest for video surveillance. MPT will connect the video cameras, existing video systems, and TMC directly to this network, offering highly reliable, easily expandable service of outstanding quality for video transmission and control.

1.32 For control and monitoring of the traffic signal system, MPT has offered direction connection to each intersection through its existing telephone network. Due to the potentially high operating cost of such service, TMO will retain this service only to specified nodes, each of which would control up to 8 intersections via frequency-hopping Spread Spectrum radio.

Implementation Arrangements, Schedule, and Contract Packaging

1.33 Staff assigned to the CDR Project Management Unit (PMU) will supervise and monitor the implementation of the traffic management component, and provide smooth transition to the operations and

maintenance of the overall system once completed. Active involvement of the TMO in the implementation of the system is critical for sustainable improvements. Through the system development and implementation process, staff from the TMO will be trained to have necessary knowledge and take ownership of the traffic management system. A general supervision firm will be hired by CDR to provide inspection and supervision of the traffic management component.

1.34 Effectively procuring an integrated solution containing a mix of goods and services, representing both conventional intersection layout improvements and high technology, requires a procurement methodology that is flexible, minimizes administrative effort, and tightly integrates the multiple components of the program. A direct turn-key technique was chosen for the procurement and installation of the traffic signal system, telecommunications, video surveillance, traffic signals, and intersection layout improvements; the integration of the central control system and all TMC equipment; and the TMO operations support and maintenance of all software and hardware for three years after the completion of the program. The turn-key contractor will carry functional specifications to full design, and will submit for approval (before acquisition) details for all products/systems and work. Materials, software, and equipment will then be procured, installed, tested, integrated, and acceptance tested. As-built drawings will be submitted following completion of the work and acceptance of the completed operational system. The contractor will also provide operations training to operations personnel.

1.35 The advantages of the turn-key contract are manifold. The line of responsibility is clear and unambiguous. The contractor is solely responsible for the delivery of the system. The administration work for the CDR will be greatly reduced as compared to managing multiple construction contracts. The fact that the contractor can better coordinate all of its subcontractors under one management will likely to result in more efficient and cost-effective implementation of the project. The turn-key contractor will be supervised and monitored by a general supervision firm. Furthermore, in order to augment the technical capabilities of the PMU, an Expert Advisor will be hired to provide high-level technical assistance to CDR and review and approve the final design plans prepared by the turn-key contractor. The terms of reference for the Expert Advisor are included in the Project Implementation Plan (PIP).

1.36 An effective communications and outreach program targeted at drivers and pedestrians will be necessary in order to gain full value from the infrastructure investment. A consultant firm will be hired to perform this task. In addition, several professional training and development contracts will be awarded to conduct specialized training for traffic police, engineers, and parking personnel.

1.37 The implementation of the traffic management program will take about three years. The new signal system will be divided into three stages of approximately 60 intersections each. The construction period is six months for each stage. The retrofit of the existing signals will take another half year. The intersection layout improvements will be divided in the same manner, but with a 2-month lag after the signal construction.

1.38 Construction of the TMO building is a critical part of implementation. Detailed design of the building will immediately start from the beginning, followed by the construction permit application/approval process. During this stage, both CDR (with the assistance of the Expert Advisor) and the turn-key contractor will have to work cohesively to meet the task schedule. The construction of the building will take an estimated 18 months. Equipment for the TMC will be procured before the construction of the TMO building is completed. The installation of all system hardware, software, and display systems will start three months prior to the completion of TMO building and will take six months to finish. The final eight months in the three-year implementation cycle will be dedicated to system integration and acceptance testing.

1.39 The field CCTV units will be installed in four stages grouped by corridor. The contractor will validate

and determine the exact site and number of cameras that need to be installed prior to procurement and installation. The installation will have to be completed before the TMO building is ready. The contractor will then complete the telecommunication link into the TMC. The communication system design plans needs to be finalized by the turn-key contractor in consultation with the MPT. The communications equipment will be procured by the contractor and delivered to MPT for installation, which will take place 6 months before the completion of the TMO building. The contractor will then connect to the central system and verify that telecommunication links are working properly.

Operations and Maintenance

1.40 Requirements for operations support and maintenance for two/three years following system acceptance and startup will be incorporated into the turn-key contract. Operational support from the turn-key contractor will be on a declining basis. Over time, the TMO staff will gradually assume responsibility for system operations. The important aspect will be the transition from the turn-key contractor to TMO staff, for which training to repair hardware failure will be is critical. At the end of the turn-key contract, the TMO can choose to conduct maintenance in-house or continue to contract out the maintenance function.

TMO Staffing Plan and Capacity Building

1.41 Detailed TMO staffing plan has been prepared for the first six years of implementation and operations and is included in the PIP. The TMO Director and heads of three major departments within the TMO (Traffic Engineering, Traffic Enforcement, and Parking Management) will be appointed at the project start. For the first year, when construction begins, the PMU staff will supervise various contracts to ensure quality work. Starting the second year, when the first phase of new signal installation is completed, signal operations work will start. Traffic engineering and system engineering staff will need to be hired. Also, administrative staff will need to prepare for hiring additional staff, and for conducting administrative and support functions for the TMO. In the third year, when testing and integration work is well under way, most traffic engineering and operation staff will have to participate in the system acceptance process. Traffic police liaison will start their function of directing traffic officers to manage traffic in the field. Year four will be the first year of full operations after the start of the project.

1.42 The project supports capacity building in such areas as traffic and transport engineering, traffic planning, traffic operations, traffic law enforcement, parking management, and intelligent transportation system (ITS) technologies. The training program will include, but not be limited to: traffic laws and codes, accident investigation and reporting, handling of special events, dealing with the public, traffic flow characteristics, use of traffic enforcement equipment and testing devices, understanding of ITS technologies and communication links, and traffic management and signal operation. As ITS increases in importance in the GBA, more general expertise in systems engineering, systems integration, and electronics will also be needed.

Monitoring and Evaluation

1.43 Three performance indicators will be used to measure the effectiveness of the traffic management program. The first is the total stopped delays at signalized intersections. The second is the average travel time and speed along major arterials. The third is traffic safety in terms of total accidents reduced at major intersections. The performance of traffic enforcement will also be measured.

1.44 Baseline surveys were carried out prior to the implementation of the traffic management program. Traffic delay studies were also conducted at approximately 50 major and minor signalized intersections, representing 20 percent of the total number of intersections (new and existing signals) included in the traffic management program. These intersections were geographically distributed across the GBA. The selection avoided intersections where major construction activities would take place in the near vicinity within the next

four years. These studies were performed for two typical days with one hour in each of the three time periods (AM peak, midday, and PM peak). The standard approach is to manually count the number of vehicles stopped at the intersections every 10 seconds. Multiplying the interval duration of 10 seconds by the total number of vehicles stopped at the intersections within one hour. When the intersections are large and complex, more than one person is needed to cover all approaches.

1.45 The travel time and speed data were calculated by driving on selected major arterials within the project area, recording the travel time along the routes and delays at the intersections. Average speed for the arterials can be derived from the speed survey. A minimum of 10 arterials were chosen covering various geographic areas. Two separate weekdays and three time periods were surveyed for at least five runs in each direction for every arterial. Each run consists of traveling both directions if the arterial is a two-way street.

1.46 The third indicator is the traffic accident data collected over a two-year period before and after the completion of the traffic management program. The total number of accidents is tallied to compare the before and after conditions. If the accident data are not readily available, an alternate approach is to conduct traffic conflict studies, which measure any potential conflicts (near misses) between moving vehicles, and between vehicles and passengers. A sample of 50 intersections, different than the traffic delay study locations, would be surveyed for the busiest two hours of the day for two days. Training will also be provided to better define potential conflicts.

1.47 The data collection of all three performance indicators will be repeated for the "after" condition, which is after the traffic management system is completed and stabilized. Statistical analyses will then be conducted to compare the before and after data and determine whether the improvements are statistically significant. In terms of interim comparison, the traffic delay and traffic conflict studies will be appropriate for those intersections where the traffic signal system is completed and fully operational. However, the improvement measured in the interim period will not represent the full benefits of the traffic management system because the central control system within the TMO will not have been completed at that time.

1.48 The description and the cost estimate of Component 1 are summarized in the Table 1. below.

Table 1 Component 1 - Traffic Management Program

Description	Total costs Including contingencies
	US\$ million
1.1. Intersection layout improvement, signing, and marking works for about 250 intersections	5.59
1.2. Traffic signals for about 200 intersections (including installation, 2 years of operation and maintenance, and modification of existing 64 signalized intersections)	9.87
1.3. Traffic Management Center (TMC)	
1.3.1. Technical assistance, training, and supervision services	1.68
1.3.2. Operating costs (for initial operation on a declining basis)	0.11
1.3.3. Construction of the TMO building	2.80
1.3.4. TMO cars and office equipment	0.35
1.3.5. Equipment for the Traffic Management Center (TMC) (excluding cars and office equipment for the TMO)	1.25
1.3.6. Communication infrastructure (60km)	1.69
1.3.7. Closed Circuit Television cameras (CCTV)	0.83
	8.70
1.4. Traffic police	
1.4.1. Equipment for traffic police	3.38
1.4.2. Training for traffic police	0.17
	3.55
Total Component 1 costs	27.71

Project Component 2 - US\$6.70 million
On-Street Parking Improvement Program

A. Elements of the Program

2.1 The main objective of this component is to regulate and control on-street parking in selected zones of the Greater Beirut Area to free roadways for traffic and, as a demand management measure, promote the use of public transport. The program aims at positive changes that are both observable and measurable in the target zones (about 14 zones).

2.2 The municipalities in the GBA, which have substantial on-street parking problems, need both the organizational structure and the professional capacity to address these problems. Neither a suitable organizational structure nor professionals in the field of parking management exist in GBA municipalities, and both must be created to deal effectively with parking management as a component of an overall urban transport development strategy.

2.3 On-street parking will be controlled in order to eliminate double parking that blocks traffic, parking on the sidewalks that endangers pedestrians, parking at intersections that hinders traffic movement, all-day parking in areas that should have short-term use, and other driving and parking behavior that degrades both the economic efficiency and the quality of life in Beirut's commercial areas. The controls will include appropriate parking regulations to preserve the land use adjacent to on-street spaces, fair and consistent parking enforcement, a rational system of fees for parking spaces in high demand, a fine structure that deters drivers from parking incorrectly and receiving parking tickets, and equipment and technology to implement the controls.

2.4 Controlling on-street parking is necessary to improve transit and traffic conditions, as well as to support the commercial areas of Beirut by providing convenient parking for shoppers, tourists, and visitors to the areas. Better on-street parking also improves safety and convenience for pedestrians, as it will decrease parking on the sidewalks.

2.5 The parking program will be progressive in its selection and use of new technology to solve the on-street parking problem. Since Beirut is essentially starting its on-street parking program with a clean slate, it has the opportunity to benefit from other cities' experiences (positive and negative) and to use the most modern technology to support the parking program.

2.6 The fundamental elements proposed for the on-street parking management program are as follows:

- (a) The parking program will be consolidated into one parking management department that will be a key part of the independent public traffic management agency, the Traffic Management Organization (TMO). The municipalities that participate in the On-Street Parking Improvement Program will concession out to the TMO Parking Department the design, implementation, management, regulation, and operation of their on-street parking program.
- (b) The Traffic Code will be complemented by administrative decisions to provide an updated parking fine schedule and extend the life of parking tickets.
- (c) As part of their concession agreements, the municipalities will authorize the TMO Parking Enforcement Officers to enforce parking surcharges (for parking improperly with regard to the multi-meters), illegal parking (such as double parking, parking on the sidewalk), and vehicle

immobilization (“booting”) for unpaid parking surcharges. These officers will also call the Traffic Police to tow illegally parked vehicles.

- (d) The TMO Parking Department will pay concession fees as direct revenues to the municipalities in which the parking meters are located.
- (e) Paid on-street parking will be implemented in commercial areas where parking demand significantly exceeds supply.
- (f) On-street parking spaces will be provided and signed for short-term parking, loading/unloading of goods, passenger loading/unloading zones, bus stops, and taxi zones. Few of these necessary on-street spaces exist today.
- (g) The program will be tailored on a block-by-block basis. For instance, a block containing a hotel will need more passenger loading area than a block with primarily office buildings. Parking time periods, rates, and regulations will take into consideration land use, patrons, and hours of peak demand, particularly as the program matures.
- (h) Implementation will include several pilot program areas in which new regulatory signs and meters will be installed. The results and use by the public will be monitored and analyzed so that any improvements can be made before larger areas are covered. The pilot areas will be in the municipality of Beirut, so that additional complexity is not added to the initial phase of the program.

2.7 The program will result in positive changes that are both observable and measurable. Primary objectives include the following:

- (a) Illegal parking (double and triple parking, parking on sidewalks, parking in intersections, etc.) should decrease to the point where it is atypical rather than normal in Beirut.
- (b) Levels of service (in traffic engineering terms) should improve at intersections, streets, and arterials as traffic ceases to be blocked by illegal parking.
- (c) On-street parking spaces should experience more turnover – a larger number of individuals should be able to park in each space each day, thus serving commercial establishments and those who frequent them. Commercial establishments should experience, over time, greater patronage as those who drive to downtown Beirut have an easier time finding parking.
- (d) Sparsely used off-street parking lots should fill as all-day parkers are prevented from using short-term spaces in commercial areas, thus causing the entire parking supply to be used more effectively.
- (e) Trucks and other commercial vehicles should cease to double-park for loading and unloading as loading zones are established specifically for their use.
- (f) Pedestrian movement and safety should improve as parking on the sidewalk and at intersections is prohibited and these regulations enforced.
- (g) In the future, a well planned and enforced on-street parking program will encourage increased use of public transit by employees and other who come downtown all day, since the on-street parking in commercial areas will favor those who want to park for short periods of time.

B. Establishment of On-Street Parking Management Capacity

2.8 The most fundamental aspect of the organizational structure is that all parking functions will be consolidated into one responsibility center where the staff, performance, analysis, and planning may benefit from the thorough management and understanding of all aspects of the parking program. Many parking

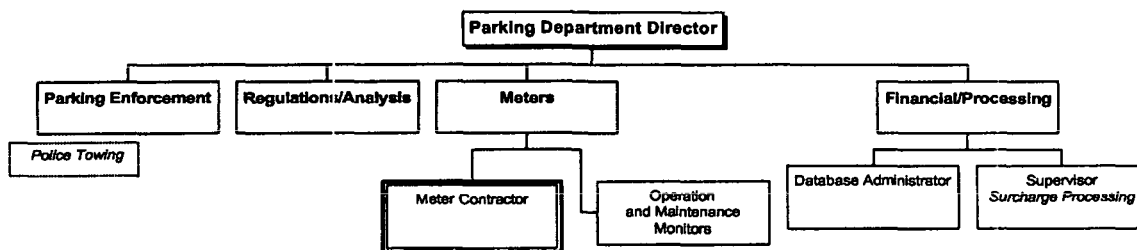
functions are interdependent and rely upon close coordination for successful operation. The consolidation of all program elements into one organization allows greater efficiency, exchange of information, and cost effectiveness.

2.9 The Parking Department will be one of the major functions of the TMO, which includes traffic planning and engineering, traffic signal operation, traffic enforcement, traffic video surveillance, and support functions for both traffic and parking management (communications, computer systems, human resources, accounting, general services, and public information). The purpose of combining these functions into one organization is that they all will benefit from having consolidated operations designed to manage and deliver specified services to the municipalities of the GBA. The municipalities, on the other hand, will receive professional services from an organization particularly suited to perform the functions with trained and experienced staff, state-of-the-art equipment, and a focus on quality of service balanced with sensitivity to cost. The TMO must also deal effectively and fairly with the public, as this will be evaluated in its performance.

2.10 The Parking Department will have the following major sections: parking enforcement, regulations and analysis, parking meters operations, and financial and ticket processing (see Chart 1 below). Each of these sections will have specific staff members and responsibilities, and one of the sections (meters) will have ongoing responsibility to monitor the performance of a private contractor performing services for the Department (see below). Individuals recruited for the Parking Department will have significant training in the objectives and operations of their units, plus ongoing professional development activities to build a competent parking management staff.

2.11 The management, operations, analysis, and technology associated with parking management is sophisticated and specialized. It is a field that has grown over time but is not yet served by formal education. International organizations have created certification programs that combine formal education courses, operating experience, and evaluation of skills. Necessary technical assistance and training will be provided to the Parking Department and its staff members. Technical assistance will cover the structuring of the program, the preparation of standard operating procedures and policies, and the integration of parking management functions.

Chart 1
Traffic Management Organization
Parking Department
Organization Chart



Operating Relationships

2.12 The Parking Department is being established as a single responsibility center for on-street parking management and the paid parking program. However, it will have operating relationships with various other

departments and entities that have related responsibilities.

2.13 Parking Enforcement Officers will enforce parking surcharges and fines for violations, and will immobilize (boot) vehicles with unpaid tickets. When a tow is required, such as when a parked vehicle is blocking a moving lane of traffic, the officer will radio the Traffic Police, who will authorize and perform the tow with their tow trucks. Parking Enforcement Officers will also assist Traffic Police as necessary when special events, emergencies, or other activities require changes in parking enforcement for a defined period of time.

2.14 The parking program will have a defined relationship with the courts responsible for collecting parking fines (for Traffic Code violations and parking illegally). The Parking Department must convey to the Courts information about tickets that have been written for parking violations other than parking surcharges (charge for parking improperly at a parking meter, written on a computerized ticket). This information may be transferred by paper or electronic methods, within the details to be worked out between the Parking Department and the Courts.

Codes and Ordinances

2.15. The Traffic Code contains adequate definitions of illegal parking and remedies related to enforcement. Therefore, no changes to the Code are necessary to implement the on-street parking improvement program. However, administrative decisions must be issued to change the amounts of parking surcharges and fines for parking tickets, along with the addition of fees for the booting, and possibly towing. Administrative decisions would also extend the life of the parking surcharge and parking tickets from one to three years. The longer life of the ticket/surcharge is particularly needed when starting a new program in a city that has not had consistent parking enforcement; violators should not be able to thwart the new system simply by waiting for the ticket or surcharge to expire.

C. Paid Parking Areas

2.16 Sixteen areas were studied, out of which fourteen have been retained, because they have commercial/retail concentrations that could benefit from the on-street parking program and parking demand in excess of supply. The following areas are the most likely recipients of the parking program due to a combination of factors, including need for parking, commercial/retail activity, and potential acceptance of the program:

- within the Beirut municipality: Hamra, Rachid Karami – Rachidine, Sassine;
- in the Greater Beirut Area: Borj Hammoud, Jal El Dib, Antelias.

2.17 Other areas, which may be candidates for future program expansion, include Ain Mreisseh; Saint Georges, Raouche, Basta; Mazraa – Barbour, Mar Elias; Independence, Arab University – Afif El Tibi, Furn El Chebbak – Sami Solh, Nahr, Mdawar, and Fouad Chehab – Akkawi. Some of these areas do not contain large numbers of potential on-street parking spaces and are unlikely candidates for some time, since they would need to have sufficient activity to justify the need for the program. However, as redevelopment and economic activity increase in the Greater Beirut Area, these latter locations bear watching to determine when they will need and could benefit from the on-street parking improvement program.

2.18 Under the project, approximately 6,500 parking spaces will be governed with multi-space parking meters. Once the on-street parking improvement program is running and producing revenue to support itself and to pay concession fees to the municipalities, additional spaces can be added to other commercial/retail areas

as desired and appropriate. Analysis of potential blocks will be carried out by the TMO Parking Department, or blocks and areas may be proposed by the municipalities and subsequently analyzed by the Department.

2.19 Approximately 10 block faces of Hamra and 10 block faces of Sassine (resulting in the use of 20 multi-space meters) have been selected as pilot program areas. Beginning the pilot program in just one municipality (Beirut) will simplify program start-up, and will ensure that the program is well established prior to extending into the Greater Beirut Area.

D. Implementation of the On-Street Parking Improvement Program

Concession Agreement with Municipalities

2.20 The TMO will enter into concession agreements with GBA municipalities to operate their on-street paid parking programs, which will run for several years and stipulate the following key terms:

- The municipalities will authorize the TMO Parking Department to design, implement, manage, regulate, and operate their on-street parking programs.
- The municipalities will agree with the Parking Department that they will not run any other paid on-street parking programs, since the TMO Parking Department is a public agency established for that purpose.
- The Parking Department will agree with the Municipalities on the specific areas for paid parking and multi-space parking meters. The initial program areas were studied and determined under the project.
- The municipalities will empower the Parking Department to have dedicated staff to enforce improper parking and collect fees related to parking meter surcharges. Parking Department staff will serve as Parking Enforcement Officers to write surcharges for meters, and parking tickets for illegal parking, and to immobilize (boot) vehicles when surcharges are not paid.
- The TMO Parking Department will be responsible for all program operating costs, including the amortization of capital purchases associated with the program.
- The TMO Parking Department will be held accountable for its performance and will report on its activities, accomplishments, and level of service to the public. As part of the reporting requirements, the Parking Department will meet regularly with municipal representatives to report on its activities and solve problems raised by the municipalities.
- The TMO Parking Department will pay concession fees to the respective municipalities in which the parking meters are located. The formula for the fees takes into consideration the operating cost of the TMO, incentives for effective operation of the parking system, and a fair remuneration to the municipalities for granting the concessions. The fees will be paid to each municipalities as direct revenues.

Parking Meters and Services

2.21 For the on-street parking improvement program, the most significant contract will be for the provision, installation, maintenance, and operation of the multi-space meters. The parking meter collection will be done internally by parking department staff, since this will not be a labor-intensive function, at least in the early years.

2.22 The Project Management Unit will pre-qualify turn-key contractors for supply, installation, and operation and maintenance of about 6,500 metered spaces with their associated signage and marking. The

turn-key contractor will be responsible for the operation and maintenance of the parking meters for a two or three-year period, allowing the Parking Department to build its own capacity in these areas.

2.23 The paid parking program will be implemented through the use of solar-powered pay-and-display multi-space parking meters. These meters allow the use of coins as well as credit and debit cards, and are state-of-the-art technology that will serve Beirut well for a decade. Using this technology, one meter can govern 10-15 parking spaces, depending upon the particular block face in question. The parking patron drives into a legal parking space, walks to the pay station, decides how long a parking period is desired and pays for the period, retrieves a receipt that indicates when the parking is expired, and places the receipt in a specified place on the dashboard of the vehicle so that it can be viewed by enforcement officers. The meter calculates the parking time period based upon the starting time and the funds deposited. An enforcement officer checking a vehicle needs to view only the date and the ending time printed on the receipt.

2.24 There are numerous brands of multi-space meters available on the world market. It is recommended that Beirut acquire meters that meet the following basic requirements:

- solar powered (due to Beirut's power distribution network and varying location conditions);
- ability to accept credit cards, debit cards, re-chargeable "smart" cards, and coins (Lebanese paperbills are typically so worn that they will not be accepted in cash machines);
- multi-lingual electronic display;
- electronic locks and armored cash boxes;
- capability for radio links or later hard-wired networked links;
- electronic auditing for revenue; and
- software supporting sound management analysis.

2.25 Value cards will be used for the parking meters. The process for distributing value cards, either at the meters or through other means, will be part of the bidding documentation.

2.26 The decision to use solar-powered multi-space pay-and-display meters has been discussed and confirmed during the preparation of the program. There are other mechanized or electronic methods of paid parking, but they all bring fewer benefits than the pay-and-display technology. Individual electronic meters are the most widely used control in the world. In many cities, they have replaced earlier mechanized meters, since drivers are used to single-space meters but municipalities have wanted to update the technology used. GBA could use single space electronic meters, but it has been decided to use a method designed for the future rather than one that upgrades the past. The elimination of multiple poles on every metered block face (especially with Beirut's highly variable sidewalks), labor required to maintain a large inventory of meters, and labor required to collect from single-space meters all led to the conclusion that multi-space meters are the progressive decision for the GBA.

Enforcement Equipment

2.27 Several types of equipment will be necessary to carry out effective enforcement. The equipment will include the following:

- hand-held ticket writing computers to be used by Parking Enforcement Officers to write surcharges and parking violations, plus the accompanying equipment to download/upload enforcement information, software to process the surcharges, and software to build a license tag database of violators and communicate with the Courts on parking violations other than surcharges;
- two-way radios for enforcement personnel to communicate with the dispatch center, the office,

those managing the enforcement database, and police (to call for tows);

- immobilization units (boots) to immobilize vehicles for which parking surcharges have not been paid on time; and
- vehicles for the delivery of Parking Enforcement Officers to their walking beats (the area each of them will patrol), to carry boots and Booting Officers, for analysts collecting monitoring and program data, and for management staff.

2.28 All necessary office equipment, furnishings, computers and software, telephones, and other communications devices for the Parking Department will be included in the TMO's respective bidding packages.

Signs and Street Markings Regulations, and Curbs

2.29 Initial work has been performed on parking signs and pole design. Additional specifications will be developed for the signs and coordinated with the traffic engineers in the TMO so that consistency is achieved. The signs and markings will follow the guidelines below:

- Signs will use international symbols;
- Pavement markings will be used sparingly to avoid the need for constant re-painting done to keep them current;
- Messages for new parking functions (loading/unloading, taxi stands, etc.) will be developed;
- Signs governing on-street parking will be of the same size and format throughout the Greater Beirut Area, appropriate signs are particularly important in Beirut because the public has not been obeying any parking instructions for many years. Therefore, the signs and regular public information campaigns will be key to drivers understanding what parking is allowed and what is prohibited.

2.30 When areas were explored for the on-street parking program, none of the blocks in the *Centre ville* were considered. This area is under the jurisdiction of *SOLIDERE* (a private land development company in charge of the reconstruction of downtown Beirut), which has established its own guidelines for on-street and off-street parking. During parking program implementation, consideration will be given to coordinating the signs, regulations, and parking meters in the *Centre ville* with the rest of the GBA, where the on-street paid parking program will operate. It will be confusing to the public if different signs, parking rates, and meters are used on-street in the *Centre ville*.

2.31 Some of the curb design in Beirut encourages illegal parking at the corners. In many commercial areas, the curbs at the street corners are not rounded, but are placed at angles. These angled corners will be painted to indicate "no parking". Over time, as areas are reconstructed or streets upgraded, these angled corners will need to be replaced so that parking in the intersections is uniformly prohibited.

2.32 Curbs vary widely in Beirut, ranging from several feet high in some locations to no curb at all on other blocks. Overly high curbs have been installed in part because merchants did not want drivers parking on the sidewalks in front of their stores. These high curbs make pedestrian movement very difficult, as do the formal or informal bollards (flower planters and concrete boxes) also placed to prevent sidewalk parking. As appropriate parking is enforced in Beirut, a program will be promoted to standardize curbs and sidewalks for better parking and pedestrian movement. Many of these design issues are examples of the coordination work that will be performed between the Parking Department and the traffic engineers who will be planning traffic

movement in the TMO.

2.33 In addition to the spaces that will be established on block faces for paid parking, several types of special parking areas must also be established. They include the following:

- Loading zones – goods. These spaces are designated for use by trucks of various sizes, which deliver to commercial enterprises. If loading must be accommodated on-street, then the location of the loading zone should be done with consideration for the type of loading that will occur, the potential location of the parking meter (since spaces closest to the meter should be designated for paid parking), and the distribution of businesses along the block face.
- Loading zones – passengers. Businesses that rely on individuals being delivered to the front door (such as hotels and restaurants) may need passenger loading zones.
- Bus stops. Previous studies in Beirut established bus stop areas for most if not all bus routes. However, many bus shelters were built using revenues from advertising, and thus the locations for the shelters were based upon maximum advertising exposure, not the most suitable configuration for the convenience of passengers and smooth operation by bus drivers. On block faces where the on-street program is implemented, the location of any bus stop will be re-examined and the stop and/or shelter located based upon the needs of the bus and its passengers and the location of the parking meter. For instance, a bus stop and shelter in the middle of the block never allows a bus to stop in sequence with a traffic light, although this could minimize traffic delay. Further, under the new parking program, a bus shelter in the middle of the block will make the parking meter location more difficult to observe by parking patrons. Another consideration is the actual physical layout of the bus stops, which must be carefully done to minimize traffic delays and the number of parking spaces lost to the approach and exit areas of the bus stop. Serious consideration should be given to the design of extended sidewalks to provide a safe board and alight area for buses while minimizing traffic blockage and maximizing pedestrian safety.
- Taxi stands. It is highly desirable to adopt formal areas for taxi waiting and pick-up, particularly in a city such as Beirut where taxis are so ubiquitous. Their practice of stopping anywhere to pick up a fare is injurious to traffic movement and management, but it will be a difficult tradition to break. During the pilot project, care will be taken to identify any blocks where taxi stands would be particularly effective. It may turn out that modifying taxi behavior will not be effective until there is more extensive competition from public transportation.

2.34 Beginning with the pilot program areas, each block face will be examined for the need for special parking areas, the most desirable locations for them, and the effects on adjacent land use and the parking program. Understanding the need for special parking areas, the concentration still should be on maximizing the space available for public parking on each block. The determination of special parking areas cannot be done any other way than to observe the activity on the block face in question and to analyze the most suitable regulations and locations available.

E. Public Information

2.35 A public awareness campaign will be carried out to inform drivers, pedestrians, merchants, visitors, and residents of the program and all of its components. Drivers have not had to conform to parking regulations, for the most part, for many years. There is a generation of drivers that does not remember any parking regulations. Likely methods to be used include focus groups to help determine critical issues, print media (articles in newspapers, advertisements, interviews in newspapers), electronic media (public service announcements on television and radio, interviews), printed materials (brochures, posters, flyers), and

cooperative ventures.

2.36 Ongoing public information campaigns are necessary for several reasons:

- The purposes of the on-street parking improvement program must be explained to the public, particularly the necessity to improve traffic and pedestrian movement, increase parking opportunities, and contribute to the overall economic vitality of Beirut's commercial and retail areas.
- The concept and operations of the multi-space meters must be explained as clearly as possible prior to individuals using the meters.
- Parking violations have not been enforced uniformly, and many current drivers have never experienced parking enforcement. Ways of illegally parking must be listed, explained, and the results outlined.
- The public must be encouraged to view the parking program as part of the overall urban transport system, helping to increase the speed and performance of the bus system and reduce traffic time and frustration. The primary purpose of the meters is not to gain revenue, but other functions must be emphasized for the public to believe this.
- The public information campaign must be ongoing, for good parking behavior must be reinforced in areas that have been part of the program, and new areas will be added during the first three or four years of implementation. Although the public relations firm that will be retained for much of the public information process will accomplish a great deal, many of the ongoing public information functions will eventually be carried out by staff using brochures, public information meetings, and assistance rendered to the public by Parking Enforcement Officers on blocks where the parking meters are located.

F. Enforcement and Revenue Control Security

2.37 Municipalities have the authority and responsibility to govern parking and parking enforcement. Under the concession agreements with the TMO, the municipalities who participate in the on-street parking improvement program in the Greater Beirut Area will authorize the TMO Parking Enforcement Officers to enforce on-street parking regulations on their behalf. The Officers will perform the following:

- write parking surcharges for those drivers who do not pay at the meters, park overtime at the meters, or otherwise violate the instructions for the meters;
- immobilize (boot) vehicles when two parking surcharges are outstanding, overdue, and have not been paid;
- write tickets for illegal parking (on the sidewalk, double-parking, in corner clearance areas, etc.); and
- radio the Traffic Police for tow trucks when illegally parked vehicles must be moved so that they do not interfere with traffic or pedestrian movement.

2.38 Parking surcharges will apply only to the paid parking areas where on-street spaces are governed by multi-space parking meters. Other parking tickets may be written wherever illegal parking is affecting traffic and pedestrian movement, and they may be written by Parking Enforcement Officers or other police. It will be necessary to extend the enforcement of illegal parking beyond the metered areas in order to facilitate the movement of traffic, particularly in the peak periods when roadway capacity is the most necessary.

2.39 Parking surcharges will be written on hand-held computerized ticket writers be carried by the Parking Enforcement Officers. These computers will generate a ticket similar to the existing tickets but focusing on the surcharges and providing instructions for the motorist who has received the ticket. Additional research must be undertaken to determine whether (a) the typical illegal parking ticket now used by the Traffic police may also be produced by the computers, or (b) the Parking Enforcement Officers will need to carry a book of tickets like those now used by the Police. If possible, it would be preferable for the hand-held ticket writing computers to generate one ticket that could be used for both types of violations, with a clear design indicating to the driver which type of violation has been committed.

2.40 In addition to the enforcement functions listed above, the Parking Enforcement Officers will patrol the locations where meters are installed during the evening and through the night, to ensure that the meters are not vandalized or destroyed. Although the meters are constructed in a very secure and strong manner, they are capable of having components destroyed by those who may be in disagreement with paying for parking or are trying to obtain cash from the meters.

G. Parking Rates, Parking Surcharges, and Ticket Processing

Parking Rates

2.41 Pricing for parking meters is typically based upon the following items (a financial model has been developed and is available in the project files): (a) nature of the land use (e.g., dense commercial/retail land use with high parking demand versus less demand in areas with less density); (b) nature of the commercial/retail area (e.g., high-priced, high-fashion stores versus neighborhood stores and markets); (c) level of cost estimated to reduce demand for all-day parking on the street, and to discourage motorists from staying longer than necessary; and (d) comparison with off-street parking prices with private parking prices.

2.42 The pilot program and the first meters to be installed will be in Hamra and Sassine, both dense land use areas with high parking demand. To make the program simple and understandable in the beginning, the parking rate will be about USD\$0.60 or LL1,000 per hour (to be confirmed in the concession agreements to be signed with the GBA municipalities). The off-street parking rates on private land turned into off-street parking by the Governorate of Beirut will be reviewed prior to the meters beginning operation, for parking in many of these lots will be less expensive than that on-street meters. The off-street lots may be located in good areas for commuters to use for parking all-day, since on-street spaces will be limited to two-hour parking.

Parking Surcharges and Ticket Processing

2.43 If a person parks on a block with a parking meter and does not pay the fee stays longer than the fee paid allows, or otherwise violates the directions on the parking meter, the penalty will be a ticket for a parking surcharge. This surcharge will be in addition to the meter fee, and must be paid in a prescribed manner. In addition to parking surcharges, tickets will still be written for parking violations. The payment process will remain the same as it is now for parking tickets.

2.44 The Parking Department will process the parking surcharges. The office will contain a public area where individuals may come to pay the surcharges and booting fees and inquire about parking matters. Overall, the payment process will work as follows:

- A motorist who has received a parking surcharge may pay at the Parking Department office or mail in the payment. (There are indications that the improvements in the Lebanese mail system will encourage people to mail their payments.)
- Research will be conducted to establish whether surcharges could be immediately paid at the

multi-space meter or in a secure box directly adjacent to the meter. It is highly desirable for a violator to be able to conveniently pay the surcharge, for it is more likely that they will be paid if the process is easy. The process now used for some violations, in which the violator purchases a stamp and returns the stamped portion of the ticket to authorities, is not desired for surcharges, since the revenue from the surcharges needs to be returned to the Parking Department to help defray operating costs.

- Parking violations for illegal parking will continue to be processed by the Courts, and the Parking Department will take no role in this process other than to communicate to the Courts the violations written by Parking Enforcement Officers. This communication may be by electronic or paper means, based on the need of the Courts.
- Violators who have not paid their surcharges and are booted must come to the Parking Department office to pay a booting fee for the removal of the boot, as well as their unpaid parking surcharges. The boot will not be removed unless and until all parking surcharges have been satisfied.
- If a vehicle is parked so as to require a tow, the violator must pay any outstanding parking surcharges at the Parking Department office prior to being able to remove the vehicle from the impound yard.

2.45 If an individual comes to the Parking Office to pay a ticket, staff must require the individual's legal address at that time and verify the ownership of the vehicle in question. The violator will be asked to provide a mailing address when sending ticket payment by mail as well. However, it is recognized that it may take several years to develop any sizable database of license tags. The parking organization cannot, at this time, effectively query the Lebanese vehicle registration database for consistent and accurate information about vehicle registration and ownership because the database is faulty. Thus the parking program cannot rely on sending notices to individuals who do not pay their parking tickets. Instead, the booting program will be used to require the payment of multiple parking tickets. It is recommended that once a vehicle receives two parking tickets and has not paid them within the prescribed time on the ticket, the vehicle becomes eligible to be booted. This information will be available from the hand-held ticket writing computers, which have data downloaded every evening when the officers return from their enforcement beats.

H. Implementation Strategy

2.46 The Project Management Unit will begin activities on behalf of the Parking Department as it arranges for contracts, begins hiring staff, and monitors the progress of contractors of various types – meters, public information, procurement of equipment and office necessities, and arrangements for technical assistance and training. It is estimated that these start-up activities will take approximately six months, after which the pilot program will begin. The pilot program cannot begin until signs and meters are installed, the hand-held ticket writing machines and their software are operable, the collection process specified, the first complement of staff are trained and prepared for their duties, and the process to capture public comments and problems is in place. Relationships with the Courts over parking tickets must be clear and agreed upon, and the process for calling and dispatching tow trucks from the Traffic Police must be formalized before any enforcement can begin.

Pilot Program

2.47 Approximately ten block faces in Hamra and another ten block faces in Sassine have been selected in coordination with Beirut Municipality for the pilot program. The public information campaign about on-street parking will have provided general information about the coming program, and will provide more specific information about the implementation of the program in Hamra and Sassine. Included in the information will

be the date on which the parking meters will be operable.

2.48 Parking regulation signs will be specified and installed for the block faces selected. Any special parking areas (loading zones, bus zones, etc.) will be established, and any necessary curb painting for regulation of the curb space will be accomplished. Twenty to ninety parking meters will be installed.

2.49 Once the pilot program begins and the meters and regulations are in force, the Parking Enforcement Officers will begin enforcing. For the first several weeks, they will not ticket surcharges, but they will give warning notices to any vehicles where the pay-and-display receipt from the parking meter is not visible. They will also spend a great deal of time working with the public to explain paid parking, the operation of the meters, and the overall program. They will be, in effect, ambassadors for the on-street program, not just enforcement agents.

2.50 It is anticipated that the pilot program will be in effect three to six months. Focus groups in the Hamra and Sassine areas will be asked to provide feedback on the program after the first month and then on a regular basis until the end of the pilot program. Any refinement of the program that can be effectively done during the pilot period will be done. This could include such activities as changing the instructions on the meters if they are not clear, adding information on the pay-and-display receipt if it would be helpful, adding additional signs leading to the pay-and-display meter, and similar activities. The purpose of the pilot program is to put elements in place as anticipated, judge the public reactions and abilities to use the parking program, fine-tune the program to the characteristics of Beirut as necessary to achieve the objectives stated for on-street parking, and confirm the meters' technical specifications.

Implementation of Parking in Commercial/Retail Areas

2.51 Before the pilot program is over, the process will start to install additional meters in the other selected areas. It is anticipated that the first full year of the program will see placement of approximately 125 parking meters covering 1,500 parking spaces, while the second year of the program will add another 2,000 spaces. Pilot program experiences will indicate whether this expectation is too high or too low.

2.52 Much the same process will occur to prepare the additional block faces in the urban areas for parking meters, enforcement, and the on-street parking program. Since the areas will be larger, additional public information activities will be necessary, and some fine tuning of these activities will undoubtedly come from the pilot program.

2.53 Each block face will be examined in person by staff to determine where special parking areas should go, where the curb spaces for paid parking should be specified, and where regulation signs should be installed. Criteria for the installation of the meters will have been given previously to the installation crews but confirmation may be necessary since changing land use may affect previous decisions.

2.54 On-street parking areas should be completely metered and signed before proceeding to the next area. The meters that are installed will need to be tested and their performance ensured before the rest of the program may begin. This process should continue throughout all areas until the approximately 6,500 spaces are prepared and all meters installed.

I. Monitoring and Performance Indicators

2.55 Performance must be monitored during the implementation and operation phases of the program. Early monitoring and determination of performance will be determined by Project Management Unit. Later monitoring will be performed by Parking Department staff. The following performance indicators have been selected:

- parking turnover at metered spaces
- percentage of paid parking (occupancy rate)
- illegal on-street parking
- levels of service for traffic
- use of off-street parking lots (occupancy rate)
- illegal double parking of trucks and delivery vehicles
- enhanced pedestrian movement
- enhanced commercial activity due to available parking spaces for customers.

2.56 Data on existing conditions (e.g., double parking, parking on sidewalk, occupancy rates, etc.) will be gathered by a parking analyst on the pilot program blocks as soon as the block faces are identified, and the analyst will begin comparisons on a regular basis as soon as meters are installed and the program is under way.

J. Related Issues To Be Addressed in the Future

Off-Street Surface Parking

2.57 Off-street surface parking exists in Beirut, but it is predominately on vacant lots that have been minimally improved to serve as parking lots for a fixed price. Since parking at the curb has been free and basically unenforced, there has been little demand for off-street parking for a price. Thus many lots are under-utilized, except for those in very dense areas where parking demand is high.

2.58 As the on-street program is established, the dynamic of parking demand will alter dramatically. The control of on-street spaces by the use of rates and timing will force commuters to try to find off-street parking, and the first source will be the under-utilized surface lots. They will need some improvement, and those governed by public law as well as those that are private should be required to follow the guidelines listed in the following paragraph.

2.59 While there are some attractive off-street parking lots that are well maintained and well marked, most are informal, unattractive, and undesirable places to park. These lots are an important part of the parking supply, and as the parking program moves forward:

- Beirut should consider requiring uniform posting of information on parking rates, the owner or operator of the parking lot/garage, and to contact for information or in case of emergency. This information will help patrons understand that the parking facilities are legitimate enterprises and open for parking.
- The lots should be organized to provide the maximum number of parking spaces. While having the lots paved is the most desirable, it is likely that many owners will not want to incur this expense given the likely revenue. However, other mechanisms can be used to designate spaces on gravel or even unimproved ground, such as parking cones and tire stops.
- There should be a well-constructed booth where a parking attendant, takes the fees and provides the motorist a ticket indicating how much time has been paid. At present, some lots have shacks on them which are not inviting and do not instill confidence in the motorists that they should leave

their vehicles in these lots.

- As the on-street program proceeds, it may be desirable for the Parking Department to offer some technical assistance to the Government in creating and regulating off-street parking lots.

Off-Street Structured Parking

2.60 Off-street garages, whether above or underground, will likely be part of the Beirut parking scheme in the near future. Large underground garages, built by concessionaires, are already in effect in *Centre ville*, and there is interest in other locations.

2.61 Controlled on-street parking will benefit off-street garages. Thus municipalities or others who want to invest in garages should not fear the on-street program.

2.62 The Parking Department will be the source of the greatest expertise on parking in the Greater Beirut Area. In the future, the Parking Department may offer some technical assistance to the municipalities as they contemplate either constructing their own public garages or contracting to have this done. Anyone establishing an off-street garage must be very careful in crafting the terms of reference for its development, pricing, and return of revenue. Individuals experienced in the financial feasibility of such facilities should provide assistance to the municipalities so that they avoid long-term agreements that might be detrimental to the public.

2.63 Creating garages in Beirut is difficult due to the water table, the presence of substrata rock, and the shortage of land. As typical concrete ramped garages are considered, new totally automated garages should be considered as well. They are roughly comparable in price to ramped garages, but they are more land efficient, have lower operating cost, and are more secure for both vehicles and passengers. These garages are in significant use in Europe, Asia, and Australia. They are just coming into use in the United States. Their technology is sound, and they should definitely be considered in a city such as Beirut where land is at a premium in commercial and retail areas.

Zoning Codes

2.64 Other codes important for overall parking conditions include zoning and/or development codes (parking requirements for certain uses). Zoning codes may prescribe the number of parking spaces required based upon space and land use, or provide conditions under which the required number of spaces may be waived or altered (e.g., if a transit amenity is provided, or if payment-in-lieu may be made for spaces not built).

2.65 Updating the zoning code to deal effectively with parking may give Beirut the opportunity to incorporate some of the best practices of other municipalities. For example, Calgary (Alberta, Canada) has perhaps the most effective payment-in-lieu program in North America. It has enabled the local parking authority to construct many needed garages over the years. Other cities have attempted to incorporate shared parking concepts for mixed-use developments. While these concepts are difficult to implement in dense urban areas, they are much more workable for mixed-use developments that are more self-contained and not so integrally woven into the urban fabric. With all of Beirut's new development, there may be a place for mixed use for certain types of developments. Updated provisions for parking in the zoning code will be important to consider as the parking program comes into operation.

K. Cost Estimate

2.66 The costs associated with the elements above are shown in Table 2.

Table 2 - Component 2 - Parking Improvement Program Cost Estimate

Description	Total costs Including contingencies
	US\$ million
2.1 Technical assistance (including public awareness campaigns, training and supervision services)	0.45
2.2 Operating costs of the TMO Parking Department to implement the first pilots	0.22
2.3 Procurement of about 580 pay-and-display multi-space parking meters	5.19
2.4 Cars and enforcement equipment (booting equipment)	0.50
2.5 Computers and office equipment	0.34
Total Component 2 Costs	6.70

2.67 The initial activities to begin the program will be coordinated with similar activities taking place for the Traffic Management Organization and its other traffic systems. The CDR Project Management Unit will implement the on-street parking program and will retain a parking management specialist to serve in the unit.

2.68. The operating costs for the parking program will exceed its revenues for perhaps as long as three years. It is anticipated that by or before Year 4, the parking program will produce sufficient revenues to pay and exceed its operating costs.

Project Component 3 - US\$ 60.38 million
(plus US\$15.0 million for land acquisition)

Corridor Improvement Program

3.1 The Transportation Plan, prepared in 1994-95, has shown that about two dozen of road junctions are highly congested in the GBA, and that their level of service cannot be improved only by traffic control measures. At these major intersections, where two or more multi-lane roadways intersect, traffic volumes reach high levels and signalized traffic control will result in excessive stopping delays and long queues on all approaches. For such situations, at-grade geometric corrections and traffic control measures cannot reduce congestion and improve levels of service. The workable alternative consists of separating conflicting movements in space by permitting the heaviest traffic movement to flow uninterrupted while other movements are handled at grade using traffic signal and appropriate geometric layouts.

3.2 The corridor improvement program for Beirut Entrances consists of grade separation at 19 of the highly congested junctions along 7 main corridors entering Beirut (Beirut Entrances). It was decided to consider only the intersections for which grade separation will improve traffic along an entire corridor, in order not to transfer the congestion to a downstream intersection or to another node of the network. In addition to economic and environmental analyses, design alternatives have been compared to validate the proposed schemes, and traffic analyses performed to justify the need for grade separation. These analyses included traffic management measures vs. grade separation; overpass vs. underpass; and directions to remain at-grade. The analyses took also into account the potential impacts of other planned short and medium-term transport infrastructure investments on the improvement schemes at the selected junctions.

3.3 Nineteen junctions are included in this component (subject to satisfactory expropriation outcomes). They are shown along with the seven corridors to which they belong in Map IBRD 30912, Urban Transport Development Project – Corridor Improvement Program. The 7 corridors and the 19 intersections are:

- (a) Corridor No.1. Corniche El-Mazraa. This is an important boulevard that circles most of Beirut City. It is a multi-lane divided facility (3 lanes each direction) at most of its alignment. Many of its intersections with radial routes are congested. Two grade separations are included in the program, the intersection with Damascus Road near the Museum, and the Adlieh Junction. The length of the corridor is 11.5 km, the distance between the two proposed grade separations is 700m, and the traffic volume is 52,000 vpd.
- (b) Corridor No. 4. Chatila - Tayounneh - Sami El-Solh – Adlieh. This is an east-west corridor running at the southern limits of Municipal Beirut. It is a multi-lane divided boulevard with 3 traffic lanes each direction. At Chatila, this corridor intersects Airport Road, and at Tayounneh it intersects Old Saida Road. Further east, it intersects Damascus Road and ends at Adlieh Junction, where it meets Corniche El-Mazraa (Corridor No. 1). The first section, between Chatila and Tayounneh, is bounded at one side by a pine forest and by residences on the other side. The second section, Sami El-Solh Avenue, is a mix of business at the ground level and residences at the upper floors. The last section, between Damascus Road and Adlieh, does not have a lot of business activities at the ground level. This corridor will attract more traffic from two new links (Kafaat - Chatila Road and the Northern Urban Bypass Tahwita - Tayounneh). The length of the corridor is 2 km, the distance between the two proposed grade separations is 900m, and the traffic volume is 64,000 vpd.

- (c) Corridor No. 6. Airport Road - Bechara El-Khoury Boulevard. This major south-north corridor starts south at the airport and ends in the Beirut Central District (BCD). It is a divided boulevard with three lanes in each direction along most of its alignment. It runs through the middle of Municipal Beirut. The section of this corridor selected for improvement starts at its intersection with Chiyah Boulevard (Corridor No. 20). The first intersection to be treated is where Airport Road goes over a steel bridge overpassing Chiyah Boulevard. The at-grade intersection below does not allow left turns from Chiyah Boulevard to Airport Road, and the steel overpass needs to be replaced with a permanent bridge. The following major intersection is Chatila, under construction where Airport Road meets Corridor No. 4. Further north, Airport Road meets Omar Beyhum Boulevard (an extension of Old Saida Road) near Corniche El-Mazraa (Corridor No. 1). At that point, two 6-lane roads meet, forcing south-north traffic through a 4-lane underpass. The last major junction further north is the intersection of Bechara El-Khoury Boulevard with Independence Avenue just at the southern limit of the BCD. The length of the corridor is 6.5 km, the distances between the proposed grade separations are 2.1 km and 1 km respectively, and the traffic volume 86,000 vpd.
- (d) Corridor No. 18. Old Saida Road. This road is a long corridor starting in the south of GBA at Khaldeh and ending north at the City of Beirut. It intersects with Chiyah Boulevard (Corridor 20) at Mar Mekhael. At its origin near Khaldeh, two roads T-intersect with it (Bchamoun and Aramoun roads). Traffic at this junction experiences significant delays. The intersection is the only access to expanding residential areas, several schools, and an industrial zone. The alignment of this corridor runs to the west of the southern section of the proposed *Périphérique* (ring road). The length of the corridor is 11.5 km and the traffic volume is 49,000 vpd.
- (e) Corridor No. 19. Northern Entrance. The Northern Coastal Highway runs into Greater Beirut from its northern boundary at Nahr El-Kalb through Dbayeh, Antélias, Jal El-Dib, and Nahr El-Mott, and continues west in the direction of the Port of Beirut. It is in the most heavily traveled road in Lebanon with about 210,000 vpd. At Antélias, it intersects with the road leading to Bikfaya, and at Jal El-Dib there is another T-intersection. At both locations, the northbound traffic is grade separated over a temporary steel bridge to allow turning under it. The road junction at Nahr El-Mott is not included in this project. Further West at Dora, an existing 2-lane steel bridge carries northbound traffic and it is highly congested for an extended period of the day. The length of the corridor is 8.5 km, the distance between the proposed grade separations are 1km and 3km respectively, and the traffic volume 210,000 vpd.
- (f) Corridor No. 20. Chiyah Boulevard. This is a major west-east corridor adjacent to the southern border of Municipal Beirut. It links the coastal road (east) at Sultan Ibrahim to the Sayyad Junction on the Damascus Road (West) in Hazmieh. This corridor is a divided urban boulevard about 5 km long with a right-of-way varying between 20 and 25m, allowing 2 lanes of traffic each direction plus parking at sections where there is intensive retail activity. It crosses several main arteries through six major intersections, three of which need to be grade-separated Mucharrafiéh, Mar-Mekhael and Galerie Semaan junctions. The length of the corridor is 5 km, the distances between the proposed grade separations are 700m and 900m respectively, and the traffic volume 58,000 vpd.
- (g) Corridor No. 22. Mkalles - Hayek – Saloume. The corridor runs south-north in an alignment parallel to the northern section of the proposed *Périphérique*. It lies at the edge of the plain just before the hills to the east of the GBA. It is a divided urban boulevard providing at least two lanes in each direction plus parking, along its entire length. There are two highly congested junctions along this corridor at the complex of the Saloume and Hayek intersections, which function as one facility, and Mkalles. At Saloume the junction with Sin El-Fil Boulevard and the roads to Dekwaneh and Nabaa-Borj Hammoud

is currently a roundabout. At Hayek, several multi-lane boulevards from Mkalles, Qalaa, Jisr El-Wati, and the road to Dekwaneh meet to form a 5-leg intersection. The corridor goes from Hayek toward Mkalles roundabout, where it forms a 5-leg roundabout when it meets multi-lane divided roads from Qalaa, Jisr El-Bacha, Mansourieh, and Tel El-Zaatar. The delays experienced at this roundabout are excessive. The areas bordering the roundabout are mostly business (commercial and offices). The length of the corridor is 2 km, the distance between Mkalles and Hayek is 1.2 km, and the traffic volume amounts to 58,000 vpd.

3.4 Project funds will be provided for: (a) detailed engineering studies for grade separation facilities and construction supervision services; and (b) implementation of a satisfactory Resettlement Action Plan to address involuntary resettlement and land acquisition, and to undertake a site-specific archaeological mitigation program. In addition, an environmental monitoring plan (EMP) will be implemented to address construction issues related to air, noise, and water pollution as well as worker health and safety issues.

3.5 The project will support a program of environmental training that includes a series of sessions targeting the needs of national and local Government officials, consulting firms and construction contractors, and local NGOs. The objective of the training program is to ensure environmental awareness, develop knowledge of environmental issues, and provide skills for implementation of the EMP. One-day training sessions will be conducted quarterly during the construction phase and twice a year during the initial operational phase. The training will cover environmental legislation, pollution prevention measures, health impacts from pollution, environmental monitoring methods, conservation of cultural heritage, traffic and pedestrian safety issues, etc.

3.6 Table 3 below lists the intersections to be grade-separated under this component.

Table 3 - Component 3 - Corridor Improvement Program - Cost Estimate

Description	Total Costs (including contingencies) US\$ million		
	Appraised and included in the project's cost	Appraised not included in the project's cost	Selected but not appraised
3.1 Corridor 1. Corniche El-Mazraa			
- Intersection No. 8: Adlieh	5.57		
- Intersection No. 9: Muscum (Abdallah Yafi)	-	2.67	
	5.57		
3.2 Corridor 4. Chatila - Tayounneh - Sami El-Solh - Adlieh			
- Intersection No. 5: Tayounneh	4.23		
- Intersection No. 10: Sami El-Solh and Damascus Road	-	1.79	
	4.23		
3.3 Corridor 6. Airport Road - Bechara El-Khoury Boulevard			
- Intersection No. 1: Airport Road and Chiyah Boulevard	5.93		
- Intersection No. 6: Bechara El-Khoury / Omar Beyhum at Beit El Atfal	5.84		
- Intersection No. 7: Bechara El-Khoury and Independence	3.91		
	15.68		
3.4 Corridor 18. Old Saida Road			
- Intersection No. 16: Bchamoun Aramoun	2.01		
	2.01		
3.5 Corridor 19. Northern Entrance			
- Intersection No. 17: Quarantina (P. Gemayel)	-		t.b.d
- Intersection No. 13: Dora	5.70		
- Intersection No. 18: Zalqa	-		t.b.d
- Intersection No. 14: Jal El Dib	4.44		
- Intersection No. 15: Antelias	5.59		
	15.74		
3.6 Corridor 20. Chiyah Boulevard			
- Intersection No. 2: Mucharrafiéh	3.06		
- Intersection No. 3: Mar Mekhael	-	3.41	
- Intersection No. 4: Galerie Semaan	-	3.71	
	3.06		
3.7 Corridor 22. Saloume - Hayek - Mkalles			
- Intersection No. 11: Hayek and Saloume	4.92		
- Intersection No. 12: Mkalles	5.93		
- Intersection No. 19: Dekwaneh	-		t.b.d
	10.85		
3.8. Design studies and supervision services	2.40	0.48	
3.9. Resettlement costs and provision for archeological works	0.84		
Total Component 3 Costs (excluding land acquisition costs)	60.38	12.06	
Land acquisition costs	15.00		
Total Component 3 Costs (including land acquisition costs)	75.38		

Project Component 4 - US\$3.50 million

Technical Assistance to the Ministry of Public Works and Transport

4.1 This component will consist of technical assistance services to strengthen the Ministry of Transport's capacity to: (a) regulate and organize public transport services; (b) carry out studies to develop an air quality management program for the GBA; and (c) prepare transport feasibility studies. It will support engineering, transport, economic, and environmental studies to assist in the formulation of an urban transport strategy for the GBA, and update and refine urban transport plans and programs.

Public Transport

4.2 A strategy is being developed to ensure that the public transport sector, provides greater reliability, safety, and availability of services, while reducing the cost of maintaining the socially desirable (but unprofitable) services currently run by the public operator, the OCFTC. The starting point for reform will be the establishment of a functioning regulatory framework to upgrade and expand service quality. The existence of this framework will be key to generating value for the corporatization and subsequent privatization of the OCFTC. The Government envisages reforming of the bus service markets in Beirut in three phases: (a) definition and implementation of target service levels (including safety standards); (b) definition and implementation of service areas for all vehicles; and (c) development and tendering of exclusive concession contracts for bus services. A fourth step involving a reduction in the total number of licensed vehicles may also be required, but would be addressed once the first three elements have been implemented, as the redeployment of vehicles implicit in the definition of service areas may be sufficiently effective in decongesting the city centers. The existence of many private sector bus companies in Lebanon ensures that there will be a sufficient number of bidders for such route concessions to preserve the necessary competitive pressures.

4.3 The corporatization/privatization of the OCFTC will be pursued as an integral part of sector reform. To give the company a chance to compete equally with the private sector, its bus operations will be carved out of its current structure and corporatized as a fully commercial, non-subsidized operation. A draft plan is being prepared to restructure the OCFTC as an entity in charge of organizing and reforming the sector; and the TRU is organizing the service-taxi (shared-taxi) operators in the GBA defining service routes, stations, frequency of service, and capacities on such routes.

Air Quality Management

4.4 The air quality management program is intended to prevent the deterioration of air quality from increased motorization and urban traffic congestion. The project component will support studies to:

- (a) Set up an air quality monitoring program to lead to several important decisions: which pollutants should be monitored; where in the Beirut region should monitoring stations be established; and which technical mechanisms for ambient air tests should be used.
- (b) Develop appropriate emissions standards for Lebanon. Emissions standards are controversial, and a number of questions need to be resolved during preparatory studies, including: (i) should Lebanon adopt some kind of motor vehicle emissions target or standards for different pollutants, and how should that target be established; (ii) should Lebanon adopt standards used elsewhere; (iii) should the standards be enforced through regulation or fiscal measures; (iv) should standards be set for all vehicles, or only new vehicles in the fleet; (v) must there be corresponding changes to the quality of

fuels available in Lebanon in order to meet the new emissions standards; and (vi) should more stringent fuel quality standards be adopted?

- (c) Structure and implement Inspection and Maintenance (I&M) programs, which have proven to be highly cost-effective mechanisms to bring about cleaner air. The early phases of the studies will focus as much on demonstrating the quantitative benefits of the program as on helping to define it. The studies will help decide on the I&M model. The two principal models are *centralized* and *decentralized* testing facilities. A centralized structure involves a process of letting contracts to one or several private firms to set up and run a few large-scale testing centers in metropolitan regions. A decentralized structure involves the licensing of independent establishments to carry out such tests. The studies will also address the issue of how to target vehicles; should they be required to undergo periodic tests (say, every two years) or should they be targeted through on-road visual inspections only. In addition, interim testing stations set up by roadsides will be considered. Vehicle buyback –or scrappage – programs have been utilized in various countries with mixed results; their potential effectiveness in Lebanon will also be studied.

4.5 The development of the air quality program will include public awareness and education campaigns. They will focus in particular on publicizing two aspects: (a) the costs of poor air quality to Lebanese citizens; and (b) how the vehicle emission standards and inspection and maintenance programs work, and why they are important.

4.6 The description and the cost estimate of Component 4 are summarized in Table 4.

Table 4 - Component 4 - Technical Assistance to the Ministry of Transport

Description	Total costs (including contingencies)
	US\$ million
4.1. Regulation and organization of public transport services	0.49
4.2. Transport planning studies	0.78
4.3. Urban transport development strategy study	0.34
4.4. Transport programs feasibility studies	0.34
4.5. Air quality management study	0.38
4.6. Technical assistance and training services to strengthen DGMLT capacity	1.12
Total Component 4 Costs	3.45

Project Component 5 - US\$1.23 million

Project Management

5.1. This component will provide resources for overall project management: technical assistance services, fees for local individual consultants to staff the Project Management Unit being established within CDR, and a small amount for operating costs to ensure effective project management.

5.2. The description and the cost estimate of the Component 5 are summarized in Table 5.

Table 5 - Component 5 - Project Management

Description	Total costs (including contingencies)
	US\$ million
5.1. Technical assistance for project management	1.01
5.2. Project management operating costs	0.11
5.3. Equipment for project management	0.11
Total Component 5 Costs	1.23

Annex 2: Detailed Project Description

Appendix 1- Traffic Management Organization - Memorandum of Understanding Approved by Concerned Agencies

1. The Greater Beirut Area (GBA) suffers severe traffic congestion due to limited capacity of the road network, high traffic demands, chaotic and unregulated on-street parking, and inefficient traffic operations. In order to address such a severe traffic problem, a comprehensive and fully integrated traffic management program across all jurisdictions needs to be developed.
2. The traffic management program will have to incorporate sound traffic engineering, effective traffic enforcement, strong parking regulation and management, and a modern traffic management system.
3. Throughout the GBA, traffic will be controlled, monitored, and managed by a Traffic Management Organization (TMO), which will be at the core of the comprehensive traffic management program utilizing Intelligent Transportation Systems (ITS). The TMO will cover traffic signal control systems, main corridors management systems, video surveillance system, incident management systems, parking management systems and traveler information systems.
4. The TMO will be the focal point of traffic management activities for the whole Beirut metropolitan area, covering all the traffic control and engineering, traffic enforcement, and parking management functions.
5. The TMO has been established as an autonomous metropolitan government agency to work across jurisdictions. This organization will report to a governing Board, whose members will be appointed by the Minister of Interior and Municipalities. The Board will establish traffic and parking management polices in accordance with the existing traffic and parking laws and regulations.
6. The TMO will perform the following core functions:
 - Traffic Control and Surveillance.* TMO will manage, operate, and maintain the computerized traffic signal control system. Staff will be responsible for the development and maintenance of optimal signal timing plans, calibration of detector data, preparation of signal database, and management of maintenance contractors to conduct routine and emergency maintenance. The video surveillance system will be used to monitor traffic conditions, detect and confirm incidents, and evaluate the impacts of response plans.
 - Traffic Enforcement.* Traffic police officers in the TMO will have the authority to command and direct field traffic officers in the district offices to manage traffic flows when necessary. The enforcement of traffic laws and decrees related to traffic control devices is the major responsibility of the traffic police and will be coordinated through the TMO.
 - Parking Management.* The TMO will operate parking management system through a dedicated Parking Department. This department will develop on-street parking policies, establish parking regulations and signs, manage the on-street paid parking program and the multi-space parking meters, enforce parking surcharges and violations, immobilize (boot) vehicles with unpaid parking surcharges, collect parking fees and surcharges, and conduct parking analyses to meet performance standards and expand the program in new areas as desired.
 - Traffic Operations Planning:* Engineering and traffic enforcement staff will jointly develop traffic management strategies and circulation plans, analyze operations requirements for special events and

construction lane-closure activities, and prepare response plans for incidents.

Traffic Engineering Studies: Engineering staff will conduct studies and evaluations of current traffic control devices including signing, striping, and signal operations, and implement changes as necessary. Detector data collection will be made by TMO to assist traffic studies and transport planning conducted by other agencies.

Public Information: TMO will provide the public, news media and decision makers with current traffic and road conditions. Traveler information system will also be made available through advanced technologies. TMO will conduct public awareness campaigns to educate drivers and passengers about the new traffic management system.

7. Traffic enforcement personnel in the Traffic Management Center (TMC) will interact with field traffic officers via the five regional police districts. These districts are geographically located in the GBA (three within the municipality of Beirut and two outside of Beirut). Traffic police at the intersection level are under direct supervision of commanders in their respective district office. The TMO will have direct chain of command over the five police districts in terms of traffic management matters.

8. The TMO will interface with ministries of Public Works and Transport in the areas of road improvements and transport planning. It will be responsible for traffic operational improvements, but not the design and implementation of roadway infrastructure. It will serve as a source of data collection on traffic flows and conditions for use by others performing studies, and it will provide recommendations regarding approval of proposals for traffic control changes by other agencies.

9. As per decree 4082 dated October 14, 2000, the revenues of the TMO consist of allocations in the general budget, its own revenues, treasury advances, grants and other revenues mentioned elsewhere. The revenues generated from the parking management program (own revenues) will be the primary revenue source for financing TMO's operations.

10. The TMO will enter into long-term concession agreements with the GBA municipalities with an exclusive right to operate their on-street paid parking programs. The terms of the concessions, in particular the concession duration, should be adequate to ensure the long-term viability of the TMO in carrying out its functions, primarily in relation to the operation and maintenance of the traffic management and on-street parking systems. This will be reflected in the Loan Agreement, to be ratified by the Lebanese Parliament.

11. The key elements of the concession agreement relative to Beirut Municipality were approved by its council as per decision No. 446 dated June 27, 2000.

12. The concession agreement will stipulate the following key terms:

- The municipalities and the TMO will agree in the concession agreement that the TMO will design, implement, manage, regulate, and operate the on-street parking program in areas under their jurisdictions.
- The municipalities will agree with the TMO that they will not run any other paid parking programs during the above agreement duration (the TMO Parking Department is a public agency established for that purpose).
- The TMO will agree with the municipalities on the areas for paid parking and multi-space parking meters. The initial program areas have been studied and determined under the preparation study of the project, and they are illustrated on maps included in the project implementation plan.

- The Municipalities will empower the TMO to have dedicated staff to control improper parking and collect fees related to parking meters. Parking Department staff of the TMO will serve as Parking Enforcement staff in relation to the on-street parking program, such as writing and enforcing fees resulting from unpaid parking fees, and immobilizing vehicles when these fees are not paid. The TMO will coordinate with the traffic police on enforcement of illegal parking (i.e., double parking, over the sidewalk, in no parking zones).
- The TMO will be held accountable for its performance and will report on its activities, accomplishments, and level of service to the public. As part of its reporting requirements, the Parking Department will meet regularly with municipal representatives to report on its activities and address problems raised by the municipalities.
- The TMO will pay a concession fee to the respective municipalities in which the parking meters are located, as per the concession agreement. The formula for the fee is now being prepared, and will take into consideration the operating cost of the TMO, incentives for effective operation of the parking system, and a fair remuneration of the municipalities for granting the concessions. The fees will be paid to each Municipality as direct revenues.

13. A major task of the TMO will be a public information campaign to explain the benefits of proper on-street parking, the new parking regulations that will be established, how the multi-space parking meters work, and the increased parking enforcement that will be in effect. The public awareness campaign will take into consideration that changing the behavior of the public with regard to parking will require several methods (television, radio, brochures, etc.) and a multi-year effort.

14. CDR will continue coordination with the Ministry of Interior and Municipalities, and the Ministry of Public Works and Transport during the design and the execution of the Urban Transport Development Project. CDR will also coordinate with the concerned GBA municipalities.

Annex 3: Estimated Project Costs
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

Project Cost By Component	Local	Foreign	Total
	US\$ million	US\$ million	US\$ million
1. Traffic Management Program			
1.1 Intersection layout improvement, signing and marking works	2.500	2.500	5.000
1.2 Traffic signals for about 200 intersection and modification of traffic signals at 64 equipped intersections (including installation works and maintenance for the three first years of operation)	1.323	7.497	8.820
1.3 Traffic Management Center (TMC)			
1.3.1 Technical assistance, training services, and supervision services	0.990	0.510	1.500
1.3.2 Individual consultants for initial operation	0.100	0.000	0.100
1.3.3 Construction of the Traffic Management Organization building	1.250	1.250	2.500
1.3.4 Cars and office equipment for TMO's operations	0.047	0.264	0.310
1.3.5 Equipment for the TMC (excluding cars or office equipment)	0.168	0.952	1.120
1.3.6 Communication infrastructure and equipment	0.227	1.284	1.510
1.3.7 Closed circuit television (CCTV) cameras	0.111	0.629	0.740
	2.892	4.888	7.780
1.4 Traffic Police			
1.4.1 Equipment for traffic police (cars, motorcycles, and towing trucks)	0.454	2.571	3.025
1.4.2 Training for traffic police	0.075	0.075	0.150
	0.529	2.646	3.175
	7.244	17.531	24.775
2. Parking Management			
2.1 Technical assistance and training for parking management	0.320	0.080	0.400
2.2 Individual consultants for initial operation	0.200	0.000	0.200
2.3 Procurement of parking meters (about 580)	0.696	3.944	4.640
2.4 Cars and booting equipment	0.068	0.383	0.450
2.5 Computers, software, and office equipment	0.045	0.255	0.300
	1.329	4.662	5.990

3. Corridor Improvement Program	Appraised and included in the project's cost			Appraised not included in the project's cost		
	US\$ million			US\$ million		
	Local	Foreign	Total	Local	Foreign	Total
3.1 Corridor 1. Corniche El-Mazraa						
(#8) - Adlieh	2.491	2.491	4.981			
(#9) - Museum (Abdallah Yafi)	-	-	-	1.192	1.192	2.384
	2.491	2.491	4.981			
3.2 Corridor 4. Chatila - Tayounneh - Sami el-Solh - Adlieh						
(#5) - Tayounneh	1.890	1.890	3.781			
(#10) - Sami El-Solh and Damascus Road	-	-	-	0.801	0.801	1.601
	1.890	1.890	3.781			
3.3 Corridor 6. Airport Road - Bechara El-Khoury Boulevard						
(#1) - Airport Road and Chiyah Boulevard	2.651	2.651	5.302			
(#6) - Bechara El-Khoury and Omar Beyhum at Beit El Atfal	2.610	2.610	5.220			
(#7) - Bechara El-Khoury and Independence	1.749	1.749	3.498			
	7.010	7.010	14.020			
3.4 Corridor 18. Old Saida Road						
(#16) - Bchamoun Aramoun	0.900	0.900	1.799			
	0.900	0.900	1.799			
3.5 Corridor 19. Northern Entrance						
(#17) - Quarantina (P. Gemayel)						t.b.d
(#13) - Dora	2.550	2.550	5.100			
(#18) - Zalqa						t.b.d
(#14) - Jal El Dib	1.987	1.987	3.973			
(#15) - Antelias	2.500	2.500	5.000			
	7.037	7.037	14.073			
3.6 Corridor 20. Chiyah Boulevard						
(#2) - Mucharrafiéh	1.368	1.368	2.736			
(#3) - Mar Mekhael	-	-	-	1.525	1.525	3.049
(#4) - Galerie Semaan	-	-	-	1.658	1.658	3.317
	1.368	1.368	2.736			
3.7 Corridor 22 . Saloume - Hayek - Mkalles						
(#11) - Hayek and Saloume	2.198	2.198	4.396			
(#12) - Mkalles	2.650	2.650	5.300			
(#19) - Dekwaneh	-	-	-			t.b.d
	4.848	4.848	9.696			
3.8 Design studies and supervision services	1.824	0.322	2.146	0.369	0.065	0.434
3.9 Archeological surveys + EMP-CH	0.563	0.188	0.750			
	27.929	26.052	53.982			
Land acquisition	15.000	0.000	15.000			

Project Cost By Component	Local	Foreign	Total
	US\$ million	US\$ million	US\$ million
4. Technical Assistance to the Ministry of Transport	US\$ million	US\$ million	US\$ million
4.1 Regulation and organization of public transport services	0.264	0.176	0.440
4.2 Transport Planning	0.280	0.420	0.700
4.3 Urban Transport Development Strategy Study	0.120	0.180	0.300
4.4 Transport Programs Feasibility Studies	0.120	0.180	0.300
4.5 Air Quality Management Study	0.204	0.136	0.340
4.6 TA to strengthen DGMLT capacity	0.600	0.400	1.000
4.7 Cars (2) for the DGMLT	0.008	0.043	0.050
	1.596	1.535	3.130
5. Project management			
5.1 Technical assistance for project management	0.900	0.000	0.900
5.2 Project management operating costs	0.090	0.010	0.100
5.2 Equipment for project management	0.015	0.085	0.100
	1.005	0.095	1.100
Total Baseline Cost	54.102	49.875	103.977
Physical contingencies	2.679	3.417	6.096
Price contingencies	1.955	2.494	4.449
	58.736	55.785	114.521
Front-end fee	-	0.650	0.650
Total Project Costs	58.736	56.435	115.171

Project Cost By Category	Total
	US\$ million
Works	60.775
Goods	29.154
Services and training	9.433
Project management operating expenditures	0.159
Land acquisition	15.000
Total Project Cost	114.521
Front-end fee	0.650
Total Financing Required	115.171

Annex 4: Cost Benefit Analysis Summary
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

Summary of Benefits and Costs:

1. The Economic Analysis covers the project's three main components, representing 96 percent of the project total cost: (a) the Traffic Management Program; (b) the Parking Management Program; and (c) the Corridor Improvement Program. A detailed economic analysis is in the project file.

2. For the Traffic Management and Parking Management components, the monetized benefits that accrue to road users are calculated from savings of both vehicle operating cost (VOC) and value of time (VOT). Motor vehicle operating costs are calculated as the sum of fuel and non-fuel costs, by applying unit fuel consumption rates (as a function of speed) and costs from zone-to-zone distances. The dollar value of travel time for each zone pair is computed by applying the corresponding unit travel time values for passengers and drivers. Table 1 shows that these benefits are substantial for the (a) Traffic Management Program, and (b) Parking Management Program.

Table 1: Summary of Benefits and Costs

	Present Value of Flows -US\$ million 2001 Base Year	
Benefits:		
Traffic Management Program	79.44	
On-Street Parking Improvement Program	204.49	
Corridor Improvement Program (Grade Separation)	340.43	
Costs:		
Traffic Management Program	33.82	
On-Street Parking Improvement Program	39.70	
Corridor Improvement Program (Grade Separation)	49.21	
Net Benefits:		
Traffic Management Program	45.62	
On-Street Parking Program	164.78	
Corridor Improvement Program (Grade Separation)	123.26	
IRR/MIRR:	IRR	MIRR
Traffic management program	33.9%	20.1%
On-Street Parking Improvement Program		32.5%
Corridor Improvement Program (grade separation)	33.8%	19.2%

3. For the Corridor Improvement Program, the monetized benefit accruing to road users includes value-of-time savings only; reductions in vehicle operating costs have not been taken into account, and would have resulted in even higher rates of return than those reported had they been factored into the analysis. For this component, the value of time is assessed by time-of-day: AM peak period (7 am to 10 am); Midday period (10 am to 2 pm); PM peak period (2 pm to 8 pm); and night period (8 pm to 07 am). This partitioning by time-of-day provides a more realistic approach than using a single value for the whole day, since time savings for trips done during AM and PM peak (usually work trips) generally carry a higher economic value than leisure trips done during the Night period.

4. Since the Traffic Management Program and the Parking Improvement Program yielded substantial benefits in the analysis, both programs were considered to be in place for the purpose of analyzing the economic benefits of the Corridor Improvement Program. Consequently, the combined benefits of the three

components should not be construed to be additive, as those attributable to the Corridor Improvement Program are compared to a base case that already includes the first two components.

5. Costs were estimated based on unit prices for similar urban road works recently implemented in Lebanon, and on detailed studies for the traffic control and parking equipment and software. The costs for land acquisition, which is required for twelve of the sixteen appraised grade separation facilities, were estimated based on the current use of the properties to be acquired and their proximity to commercial and business areas. Operation costs for the traffic management center and parking meters include manpower and consumables, and maintenance costs for the different components including equipment and infrastructure. Indirect costs such as reduction in business/economic activity along existing routes due to improvement programs have not been considered in this analysis, nor have external costs to transportation users and non-users during construction (such as travel delay, noise, dust, etc.). Similarly, impacts from potentially induced travel as a result of the corridor improvements have not been taken into account in the analysis. However, to subject the project's components to stringent scrutiny, salvage values are assumed to be \$0 for all the investments at the horizon of the analysis, year 2020.

6. For the Corridor Improvement Program, not only do the combined investment in the 16 grade separations realize an economic rate of return of the program greater than 12 percent, but also the marginal investments in each grade separation, over that in the other 15 grade separations, realize an economic rate of return greater than 12 percent.

Main Assumptions:

7. In order to develop a conservative estimate of benefits of the proposed improvements, the benefits are held constant after the year 2015 when the volume-to-capacity ratio on almost all road network links exceeds one. The following table lists the major assumptions made in performing the economic analysis.

Table 2: Economic Analysis Assumptions

Assumption Description	Values	Assumption Description	Values
Project benefit period	20 years	Reduction in emission rates	Years (2001 through 2004) constant
Project benefit held constant beyond	2015		Year 2005 - by 10%
Discount rate	12%		Year 2010 - by 25%
Currency	2001 USD		Year 2015 - by 50%
Working hours per year	2000	Reduction in fuel consumption rates	Years (2001 through 2004) constant
Annual income escalation rate	5%		Year 2005 - by 10%
Standard cost conversion factor	0.94		Year 2015 - by 30%
Transit vehicle occupancy (percentage)	Year 2001 - 24 Year 2002 - 26 Year 2003 - 28 Year 2005 - 30 Year 2010 - 40 Year 2015 - 50	Maintenance cost (% of value)	1 to 2% Structures 5% Communications networks 10% Electrical & mechanical equip. 14% Signing works 25% Marking works
Car occupancy	1.7	Passenger car equivalent for transit	2
Truck occupancy	1	Yearly expansion factor	332 days
Annual average trip growth rate	3.30%	Salvage values	None

Sensitivity analysis / Switching values of critical items:

8. Changes in the project's economic indicators as a result of changes in key parameters (variables) for the Traffic Management and On-Street Parking Improvement components were investigated. Input variables chosen for this analysis were: (a) value of time for car, truck, and transit vehicle; (b) discount rate; (c) fuel consumption rate; (d) fuel prices; (e) capital costs; (f) salvage value; and (g) operating cost. Mean values of these input parameters were decreased by as much as 30 percent and increased by as much as 50 percent and their impact on the economic indicators IRR and NPV were evaluated. A Monte Carlo simulation based on an assumed log-normal probability distribution for each variable was performed, providing a forecast and likelihood for each result (IRR and NPV).

9. Risk analysis for the Traffic Management and On-Street Parking Improvement Programs was performed for a representative year – 2010 – because all the improvements were to be completed before 2010 and this year represents the mid-point in the demand level between 2000 and 2020. Two scenarios were constructed for this risk analysis:

The *worst-case scenario* represents the case for which there is 80 percent probability that the estimated value of total annual costs will be exceeded, and there is 80 percent probability that the estimated value of total annual benefits will not be exceeded.

The *likely scenario* represents the case for which there is 50 percent probability that the estimated value of total annual costs will be exceeded, and 50 percent probability the estimated value of total annual benefits will not be exceeded

10. This analysis showed that the Traffic Management and On-Street Parking Improvement components are economically viable under assumptions of varying levels of risks, and that their benefits are sizable and warrant implementation.

11. Benefits of the Traffic Management and On-Street Parking improvement Components vary directly with the increase in traffic volume. In order to estimate a conservative set of values for benefits, therefore, they were computed under a no-traffic-volume-growth scenario. If no growth in traffic volumes occurs beyond 2005, the IRR of the investment in the Traffic Management Program would be 21.4 percent, and the MIRR of the investment in the Parking Control Program would be 39.3 percent.

12. For the Corridor Improvement Program, sensitivity tests included cases in which the unit value-of-time saved is less than that adopted, the costs estimates are higher than adopted, and there is no growth in traffic. For the first three of these analyses, the methodology involved determining how much the unit value of time may drop, and/or the cost estimates may increase, before the IRR of the investment under consideration drops below 12 percent. For the no-traffic-growth sensitivity test, the methodology involved determining the earliest year in which traffic would stop growing and still keep the total IRR of the investment above 12 percent.

13. Taking the combined investment in all 16 grade separations the sensitivity of the IRR to the changes described above is as follows:

- The unit value of time saved would need to be less than one-third of what was adopted in order to bring the IRR below 12 percent.
- The cost estimates (first and recurring) would need to be more than 3 times what was estimated in order for the IRR to drop below 12 percent.

- A unit value of time only half as much as adopted (50 percent reduction) combined with an increase in the cost estimate of 50 percent (1.5 the base cost estimate) would still result in an IRR exceeding 12 percent.
- Even if traffic were to experience no growth beyond the year 2002, the investment in the 16 grade separations combined would still realize an IRR exceeding 12 percent, all other factors unchanged.

14. Similar checks were made on the sensitivity of the IRR of the marginal investment in each grade separation, separately, and the results demonstrated the robustness of the IRR of these marginal investments in each grade separation.

15. Tables 3.1, 3.2, and 3.3 summarize the cost benefits analysis.

Table 3.1: Summary of Cost Benefits Analysis - Traffic Management Program

Year	Costs (US\$ Million)			Benefits (US\$ Million)			Net Benefits (US\$ Million)	
	Investment Costs	Operation and Maintenance Costs	Total Costs	Total VOC Benefits	Total VOT Benefits	Total Benefits	Total Net Benefits	Discounted @ 12%
2002			0.00			0.00	0.00	0.00
2003	4.48	0.19	4.67			0.00	-4.67	-3.72
2004	10.95	0.68	11.63			0.00	-11.63	-8.28
2005	7.97	0.99	8.96	-3.03	9.35	6.32	-2.65	-1.68
2006	1.98	1.11	3.09	-0.28	7.74	7.46	4.37	2.48
2007	0.68	1.30	1.98	2.47	6.13	8.60	6.62	3.36
2008	0.68	1.83	2.52	1.17	9.16	10.34	7.82	3.54
2009	0.12	1.89	2.01	-0.12	12.20	12.07	10.06	4.06
2010	0.83	1.95	2.78	-1.42	15.23	13.81	11.03	3.98
2011	1.59	2.00	3.60	-2.71	18.26	15.54	11.95	3.85
2012	2.14	2.07	4.21	-4.01	21.29	17.28	13.07	3.76
2013	2.28	2.13	4.41	-3.38	22.72	19.34	14.93	3.83
2014	2.08	2.19	4.27	-2.74	24.14	21.40	17.13	3.92
2015	2.14	2.26	4.40	-2.11	25.57	23.46	19.06	3.90
2016	2.21	2.32	4.53	-1.48	27.00	25.52	20.99	3.83
2017	2.27	2.39	4.67	-0.85	28.43	27.58	22.91	3.74
2018	2.34	2.47	4.81	-0.85	28.43	27.58	22.77	3.32
2019	2.41	2.54	4.95	-0.85	28.43	27.58	22.63	2.94
2020	2.49	2.62	5.10	-0.85	28.43	27.58	22.48	2.61
2021	2.56	2.69	5.25	-0.85	28.43	27.58	22.32	2.31
2022	2.64	2.78	5.41	-0.85	28.43	27.58	22.17	2.05
2023	2.72	2.86	5.57	-0.85	28.43	27.58	22.00	1.82
		Present values	33.82			79.44	45.62	45.62
							NPV =	45.62
							IRR =	33.9%
							MIRR	20.1%

Table 3.2: Summary of cost Benefit Analysis - On-Street Parking Program

Year	Costs (US\$ Million)			Benefits (US\$ Million)			Net Benefits (US\$ Million)	
	Investment Costs	Operation and Maintenance Costs	Total Costs	Total VOC Benefits	Total VOT Benefits	Total Benefits	Total Net Benefits	Discounted @ 12%
2002			0.00			0.00	0.00	0.00
2003	1.56	0.40	1.96			0.00	-1.96	-1.56
2004	3.14	1.70	4.84			0.00	-4.84	-3.44
2005	2.28	2.60	4.88	0.70	35.78	36.48	31.61	20.09
2006	0.31	3.43	3.75	1.43	28.15	29.58	25.83	14.66
2007	0.19	4.57	4.76	2.17	20.51	22.68	17.91	9.07
2008	1.75	5.08	6.83	0.98	23.12	24.11	17.27	7.81
2009	1.16	5.65	6.81	-0.20	25.74	25.54	18.72	7.56
2010	1.69	5.73	7.42	-1.39	28.36	26.97	19.54	7.05
2011	1.76	5.82	7.57	-2.57	30.97	28.40	20.83	6.71
2012	1.18	5.90	7.08	-3.76	33.59	29.83	22.75	6.54
2013	1.65	5.99	7.64	-2.89	41.30	38.41	30.77	7.90
2014	1.25	6.09	7.34	-2.02	49.02	46.99	39.65	9.09
2015	1.77	6.27	8.04	-1.16	56.73	55.58	47.54	9.73
2016	1.81	6.46	8.27	-0.29	64.45	64.16	55.89	10.21
2017	1.21	6.65	7.86	0.58	72.16	72.74	64.88	10.58
2018	1.70	6.85	8.55	0.58	72.16	72.74	64.19	9.35
2019	1.29	7.06	8.35	0.58	72.16	72.74	64.40	8.37
2020	1.82	7.27	9.09	0.58	72.16	72.74	63.65	7.39
2021	1.86	7.49	9.35	0.58	72.16	72.74	63.39	6.57
2022	1.25	7.71	8.96	0.58	72.16	72.74	63.78	5.90
2023	1.75	7.94	9.69	0.58	72.16	72.74	63.05	5.21
		Present values	39.70			204.49	164.78	164.78
							NPV =	167.78
							IRR =	250.3%
							MIRR	32.5%

Table 3.3: Summary of Cost Benefit Analysis - Corridor Improvement Program

Year	Costs (US\$ Million)			Benefits (US\$ Million)	Net Benefits (US\$ Million)	
	Investment Costs	Operation and Maintenance Costs	Total Costs	Total VOT benefits	Total Net Benefits	Discounted @ 12%
2002			0		0.00	0.00
2003	12.66		12.66		-12.66	-10.09
2004	14.03		14.03		-14.03	-9.99
2005	16.10		16.10		-16.10	-10.23
2006	13.12		13.12		-13.12	-7.45
2007	15.05	0.28	15.32		-15.32	-7.76
2008	4.41	0.41	4.82	54.40	49.58	22.43
2009		0.42	0.42	50.32	49.90	20.15
2010		0.43	0.43	46.25	45.82	16.52
2011		0.45	0.45	42.18	41.73	13.44
2012		0.46	0.46	38.11	37.65	10.82
2013		0.47	0.47	34.03	33.56	8.61
2014		0.49	0.49	39.47	38.98	8.93
2015		0.50	0.50	44.91	44.41	9.09
2016		0.52	0.52	50.35	49.83	9.10
2017		0.53	0.53	55.78	55.25	9.01
2018		0.55	0.55	61.22	60.67	8.84
2019		0.57	0.57	61.22	60.65	7.89
2020		0.58	0.58	61.22	60.64	7.04
2021		0.60	0.60	61.22	60.62	6.28
2022		0.62	0.62	61.22	60.60	5.61
2023		0.64	0.64	61.22	60.58	5.01
Present values			49.21	340.43	123.26	123.26
					NPV =	123.26
					IRR =	33.8%
					MIRR	19.2%

16. The Table 3.4 below summarizes the results of the seventeen cases considered for the economic analysis of the Corridor Improvement Program. The first case consists of the all sixteen grade separation facilities combined. The sixteen others are each facility as an addition to the other fifteen. The base case against which to compare all and every grade separation facility consists of the traffic management and parking programs.

Table 3.4: Summary of the Economic Analysis of the Corridor Improvement Program

	Modified IRR MIRR (%)
All sixteen intersections appraised	18.5
Marginal Investment in:	
<u>Corridor 1. Corniche El-Mazraa</u>	
(#8) - Adlieh	29
(#9) - Museum (Abdallah Yafi)	38
<u>Corridor 4. Chatila - Tayounneh - Sami el-Solh - Adlieh</u>	
(#5) - Tayounneh	27
(#10) - Sami El-Solh and Damascus Road	37
<u>Corridor 6. Airport Road - Bechara El-Khoury Boulevard</u>	
(#1) - Airport Road and Chiyah Boulevard	26
(#6) - Bechara El-Khoury and Omar Beyhum at Beit El Atfal	24
(#7) - Bechara El-Khoury and Independence	
<u>Corridor 18. Old Saida Road</u>	
(#16) - Bchamoun Ararnoun	36
<u>Corridor 19. Northern Entrance</u>	
(#13) - Dora	34
(#14) - Jal El Dib	35
(#15) - Antelias	34
<u>Corridor 20. Chiyah Boulevard</u>	
(#2) - Mucharrafiéh	30
(#3) - Mar Mekhael	26
(#4) - Galerie Semaan	31
<u>Corridor 22. Saloume - Hayek - Mkalles</u>	
(#11) - Hayek and Saloume	31
(#12) - Mkalles	33

Annex 5: Financial Summary
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

Years Ending December 31

	Implementation Phase						
	2003	2004	2005	2006	2007	2008	2009
Total Financing Required							
Investment Costs							
Traffic Management Program	4.48	10.95	7.97	1.98	0.68	0.68	0.12
Parking Management Program	1.56	3.14	2.28	0.31	0.19	1.75	1.16
Corridor Improvement Program	12.66	14.03	16.10	13.12	15.05	4.41	0.00
TA to the Ministry of Public Works and Transport	0.26	1.27	1.20	0.72	0.05	0.00	0.00
Project Management	0.34	0.22	0.22	0.22	0.19	0.05	0.00
	19.30	29.60	27.76	16.36	16.15	6.89	1.29
Recurrent Costs	0.58	2.39	3.59	4.54	6.15	7.33	7.96
Total Project Costs	19.88	31.99	31.36	20.90	22.31	14.22	9.25
Interest during Construction	1.25	2.51	3.69	4.29	4.49	4.55	4.09
Front-end fee	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Total Financing Required	21.78	35.15	35.70	25.84	27.45	19.42	13.99
Financing							
IBRD	11.41	20.35	19.27	9.82	3.22	0.92	0.00
GOVERNMENT (Central)							
Land Acquisition	6.00	4.50	3.00	1.50	-	-	-
Interest during Construction	1.25	2.51	3.69	4.29	4.49	4.55	4.09
Counterpart Funds for Investment Costs	2.54	4.75	5.49	3.35	0.99	0.13	0.00
O&M Costs of the Corridor Improvement Program	-	-	-	-	0.28	0.41	0.42
Initial O&M Costs of the Traffic and Parking Programs	0.42	0.97	1.10	-	-	-	-
	10.21	12.72	13.28	9.14	5.76	5.09	4.52
Co-Financiers	-	-	-	-	3.76	11.26	2.89
User Fees	0.17	2.07	3.15	6.88	14.70	2.15	6.59
Total Project Financing	21.78	35.15	35.70	25.84	27.45	19.42	13.99

	Operation Phase				
	2010	2011	2012	2013	2014
Total Financing Required					
Investment Costs					
Traffic Management Program	0.83	1.59	2.14	2.28	2.08
Parking Management Program	1.69	1.76	1.18	1.65	1.25
Corridor Improvement Program	-	-	-	-	-
Technical Assistance to the Ministry of Public Works and Transport	-	-	-	-	-
Project Management	-	-	-	-	-
	2.53	3.35	3.32	3.93	3.33
Recurrent Costs	8.11	8.27	8.43	8.59	8.77
Total Project Costs	10.64	11.61	11.75	12.52	12.10
Interest During Construction	4.09	3.21	2.32	1.44	0.55
Front End Fee	0.65	0.65	0.65	0.65	0.65
Total Financing Required	15.38	15.47	14.71	14.62	13.30
Financing					
IBRD					
GOVERNMENT (Central)					
Land Acquisition					
Interest During Construction	4.09	3.21	2.32	1.44	0.55
Counterpart Funds for Investment Costs					
Operation and Maintenance Costs of the Corridor Improvement Program	0.43	0.45	0.46	0.47	0.49
Initial Operation and Maintenance Costs of the Traffic and Parking Programs					
	4.53	3.65	2.78	1.92	1.04
Co-Financiers					
User Fees	10.85	11.82	11.94	12.70	12.26
Total Project Financing	15.38	15.47	14.71	14.62	13.30

Annex 5- Financial Summary for Revenue earning Project Entity
Lebanon: Urban Transport Development Project
Traffic Management Organization (TMO)

(Calendar Year)
(In 000' of Current US\$)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Income Statement												
Internal Sources												
Operating Revenue	167	1,392	2,450	5,073	7,339	9,131	10,778	11,263	11,775	12,234	12,715	13,218
Operating Income (before depreciation)	-418	-965	-1,096	613	1,579	2,346	3,533	3,879	4,247	4,558	4,887	5,233
Depreciation	0	301	611	2,377	2,983	3,496	3,453	3,659	3,784	3,947	3,063	2,936
Net Operating Income (after depreciation)	-418	-1,267	-1,707	-1,765	-1,404	-1,150	81	220	463	612	1,824	2,297
Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Govt. Grants (Initial Operation Costs)	418	965	1,096	0	0	0	0	0	0	0	0	0
Govt. Grants (Initial Capital investment)	6,043	14,087	10,246	2,295	870	870	0	0	0	0	0	0
Total Resources	6,043	13,786	9,635	531	-534	-281	81	220	463	612	1,824	2,297
Capital Expenditures	6,043	14,087	10,246	2,295	870	870	1,289	2,528	3,347	3,318	3,927	3,333
Debt Service	0	0	0	0	0	0	0	0	0	0	0	0
Total Application	6,043	14,087	10,246	2,295	870	870	1,289	2,528	3,347	3,318	3,927	3,333
Balance Sheet Items												
Net Fixed Assets	6,043	19,829	29,464	29,382	27,269	26,203	24,039	22,908	22,470	21,842	22,706	23,103
Debt	0	0	0	0	0	0	0	0	0	0	0	0
Equity (Government grants + net income)	6,043	19,829	29,464	29,995	29,461	29,180	29,260	29,480	29,943	30,555	32,379	34,676
Total Liability and Equity	6,043	19,829	29,464	29,995	29,461	29,180	29,260	29,480	29,943	30,555	32,379	34,676
Financial ratios:												
Net Income as % of Operating Revenue			-70%	-35%	-19%	-13%	1%	2%	4%	5%	14%	17%
Return on Average Invested Capital			-7%	-6%	-5%	-4%	0%	1%	2%	3%	8%	10%

Annex 5 - Appendix 1: Financial Capacity of GBA Municipalities

1. The project provides essential investments to improve the efficiency of the urban transport system within the Beirut greater metropolitan area. A total of 16 municipalities/grouping of municipalities within the metropolitan area will benefit from the investments financed through the loan. These are Beirut, Sin el Fil, Chiah, Ghobeiri, Furn el Chebak, Jdeida, Borj Hammoud, Jal el Dib, Antelias, Choueifet (Aramoun), Tahouita-el Ghadir-Leilakeh-Mreijeh, Hadad, Hazmeih-Baabda, Dekwaneh, Zalka-Amaret Chalhoub, and Borj el Barajneh. In this regard, it is important to assess the role that these beneficiary municipalities might play in the implementation of the project within the scope of the responsibilities assigned to local governments in Lebanon in the provision of local infrastructure.
2. Lebanon has a fragmented local government system with numerous small municipalities lacking the fiscal base and revenue-raising powers to ensure effective delivery of services – hardly an environment conducive to improving and upgrading the existing infrastructure network, which has fallen in to a state of disrepair. Following years of poor maintenance and neglect, with little or no investments made in capacity expansion, upgrading local infrastructure facilities has become a key priority for municipal governments faced with a steady growth in demand for services.
3. Although municipalities are expected to provide a range of services to citizens, the services actually delivered are limited in scope and quality. This is partly due to the lack of clarity in regard to expenditure assignment between local and central governments, and partly to the narrow municipal revenue base. In any case, within the broad assignment of responsibilities among government tiers in Lebanon, the local government responsibilities for service delivery are limited compared to those of the Central Government. Indeed, the supply of electricity and water, and the provision of education and health, are the responsibility of the national Government, which must fund these capital-intensive services. As for the scope of local services, municipal spending authorized by law includes such activities as street paving and lighting – restricted to intra-city, municipal roads as opposed to national or inter-city roads – solid waste collection, drainage, fire protection, slaughterhouses, and libraries. The disbursement process for municipal funds, even in small amounts against authorized activities, remains cumbersome and subject to central controls from the Ministry of Municipal and Rural Affairs and/or the (national) Accounting Board. Moreover, municipalities have mostly out-of-date organizational structures and are largely understaffed as a result of inter-alia, a centrally imposed freeze on hiring as well as low salary levels that do not allow municipalities to attract and retain quality personnel (salaries of municipal employees are pegged to those of the Central Government, usually at the low end of the pay scale).
4. The investment program proposed under the project would contribute to the development of an efficient transportation network, and would support selected high-priority investments that are part of the Greater Beirut Area Transportation Plan established by the National Government in 1994, which addresses the most critical urban transport issues through the year 2015. Thus by design a national program – and Lebanon’s largest single investment over the next decade – it will require significant planning, consensus building and resource mobilization efforts that go well beyond the financial, technical and institutional capacity of the municipal governments that are part, and beneficiaries, of the project.
5. Moreover, as a consequence of the destruction of the urban transport physical and institutional infrastructure during the war years, the project focuses on building key institutions which, given the very nature of the transit system that spans a group of municipalities, may not be established in a cost-effective and sustainable manner on the local (municipal) level. Cost-effectiveness and efficiency objectives call for the scheme to be established on a broad base that goes beyond municipal boundaries. The institutional capability in

parking management that the project seeks to build requires that even the component related to regulating on-street parking – which some municipalities have the institutional capability to manage, as it is traditionally within the scope of local responsibilities – be designed and implemented on a broader regional or national level.

6. More broadly, the sector focus of the project in terms of capacity building in the areas of traffic management, traffic congestion on main corridors (some of which are part of the national grid) linking highly dense urban areas, and parking management, does not allow a fragmentation of project implementation responsibilities among the various participating municipalities. This is because of the narrow technical base and lack of institutional vehicles that would permit effective coordination among those local entities on transport-related issues outside the municipal perimeter. This is particularly the case in regard to: (a) design of the traffic management program to improve the performance of existing infrastructure capacity (using technologies to provide information to road users and reduce congestion, transport emissions, and traffic accidents); (b) the establishment of an autonomous traffic management center to monitor/control traffic operations at the greater metropolitan area level; (c) formulation of an integrated supply/demand-oriented urban transport strategy including capacity building in the field of regulation/organization of public transport services; and (d) the development of appropriate regulations, pricing, and institutional arrangements for on-street parking control (although separate concession agreements will be entered into with each of the concerned municipalities for the operation of its parking program).

7. Finally, in terms of financing requirements, the corridor improvement schemes to eliminate major bottlenecks and facilitate traffic flows represent a financing envelope that by far exceeds the funding capabilities of individual municipalities. In this regard, many of the investments foreseen under the project will not be part of the municipal road network under municipal purview, and will thus fall outside the scope of local government responsibility. To assess the financial capacity of the concerned municipalities to sustain such investments – regardless of the conventional expenditure assignment among government tiers in Lebanon – the associated outlays were compared to the financial resources of the municipalities. More specifically, the proposed outlays under the project were measured against the capital expenditures of the municipalities as reflected in the FY99 accounts (FY2000 for Beirut). (In this regard, the right approach would have been to compare, for each municipality, the project expenditures with municipal outlays earmarked for transportation; in most cases, however, transport-specific figures are not available.)

8. The comparison confirms that the planned expenditures under the project are well beyond the funding capacity of most municipalities. The review of the financial statements of municipalities – small or large – also underlines the dominance of current expenditures as a share of overall municipal budgetary outlays. Thus, in the case of Beirut, for instance, the planned expenditures under the project are clearly not within the city's funding capability, as the city's US\$11.7 million budgetary envelope for annual capital expenditures (including maintenance and expropriation costs) represents less than 30 percent of the US\$35.9 million in estimated project outlays. (Current expenditures account for some 85 percent of the city's overall budget.)

9. The breakdown of project costs – covering construction of grade-separated facilities at 16 intersections, and traffic signals/layout improvements at 211 intersections – among the municipal entities that would benefit from the project (Table-1 below) shows the following cost allocation per municipal entity and the municipality’s latest available capital budget.

Table 1: Project’s Expenditure Allocated by Municipality 1/

Municipality	Project Expenditure US\$ million	Capital Budget of Municipality US\$ million	Municipality	Project Expenditure US\$ million	Capital Budget of Municipality US\$ million
Beirut	37.50	11.7	Choueifet (Aramoun)	2.66	
Antelias	6.65	1.1	Hazmieh - Baabda	0.77	
Jai El Dib	5.33	1.8	Tahouita – Ghadir	0.39	
Jdeida	3.85	1.2	Dekwaneh	0.31	
Borj Hammoud	4.36	2.5	Borj El Barajneh	0.31	
Chiah	9.74		Furn El Chebak	0.23	
Sin El Fil	11.90		Zalka-Amaret-Chalhoubj	0.15	
Ghobeiri	8.33		Hadad	0.15	

1/ The grade separation facilities at Quantina (P. Gemayel), Zalqa, and Dekwaneh are not included.

Annex 6: Procurement and Disbursement Arrangements
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

Procurement

1.1 The Council for Development and Reconstruction (CDR) will be responsible for all project-related procurement and disbursement activities except those pertaining to the fourth component, Technical Assistance to the Ministry of Public Works and Transport (MPWT), which will be the responsibility of the MPWT's Directorate General of Land and Maritime Transport (DGLMT).

1.2 CDR, which is the implementing agency for most Bank-financed projects in Lebanon, has a satisfactory record of project implementation. It is currently upgrading its information systems to integrate all project information and produce comprehensive Project Management Reports (PMRs), as per Bank (LACI) requirements. Planning, coordination, and monitoring of procurement activities and their linkages with the disbursement function, will be the responsibility of the Project Management Unit (PMU) established at CDR. The PMU will be responsible for consolidating procurement reports included in PMRs, and preparing quarterly progress reports. Under this project, a procurement/construction manager specialist will be recruited at the PMU to be responsible for all procurement activities and contract monitoring.

1.3 DGLMT will be responsible for implementing the fourth component of the project, including all associated procurement, financial management, and reporting functions. It will benefit from the procurement procedures developed for the Bank-financed National Roads Project (NRP).

Procurement Methods

1.4 Expenditure categories and procurement methods, summarized in Table A, have been estimated based on the activities to be partially financed by the Bank. Bank-financed civil works, equipment, and goods would be procured in accordance with the Bank's *Procurement Guidelines for Procurement under IBRD Loans and IDA Credits* (January 1995, revised in January and August 1996, September 1997, and January 1999). Procurement of consultant services and technical assistance will follow the Bank's *Guidelines for the Selection and Employment of Consultants by World Bank Borrowers* (revised January and September 1997, and January 1999).

1.5 The following standard documents will be used: (a) Standard Prequalification Document for Procurement of Works (September 1999); (b) Standard Form of Bid Evaluation (April 1996) for all bid evaluation reports for procurement of goods and works; and (c) Standard Request For Proposals (1997, revised April 1998 and July 1999), which incorporates Standard and Small Assignment Contracts - Sample Form of Evaluation Report - Selection of Consultants, October 1999.

1.6 A procurement plan is included in the Project Implementation Plan and provides a schedule for each step of the procurement process. It will be updated annually and furnished to the Bank for its review and approval, in accordance with the provisions of paragraph 1 of Appendix 1 to the *Guidelines*. All Bank-financed procurement shall be undertaken in accordance with the approved plan.

Works

1.7 *Component 1-Traffic Management*: There will be two contracts for intersection layout and street improvement works, which will not be included within the traffic signals supply and install contract (see paragraph 1.9 below). The two contracts, which will have an average size of about US\$1.4 million, will be awarded according to National Competitive Bidding (NCB) procedures acceptable to the Bank.

1.8 *Component 3-Corridor Improvement Program:* The grade separation works will be packaged in individual contracts ranging from US\$2 million to US\$6 million. International Competitive Bidding (ICB) procedures will be used for all contracts. Prequalification of contractors will be required for all grade separation works.

Goods and Equipment

1.9 Goods and equipment contracts will be for:

Component 1-Traffic Management:

- Traffic signals, including associated installation and intersection layout improvement works, controllers, close-circuit television (CCTV) cameras, equipment for traffic detection, equipment for traffic monitoring and video surveillance (TMC equipment), communication equipment, and construction of the Traffic Management Organization (TMO) building will be packaged into one supply and installation contract of about US\$19.23 million, which will also include maintenance services for about three years. A two-stage bidding procedure will be used for the contract.
- Equipment for traffic police will be packaged into three contracts: towing trucks (about US\$0.50 million); traffic police motorcycles (about US\$1.54 million); and traffic police cars (about US\$1.34 million).
- Cars for the Traffic Management Organization (including vehicles for parking enforcement) will be procured through one contract of about US\$0.29 million.
- Office equipment and computers for about US\$0.45 million will be purchased for the Traffic Management Organization.

Component 2-Parking Improvement Program. About 580 pay-and-display parking meters, along with signs, booting equipment, and hand-held computers necessary to operate 6,500 paid on-street parking spaces will be procured in one supply and installation contract of about US\$5.64 million, which will also include maintenance services for about three years. A two-stage bidding procedure will be used for the contract.

Component 5-Project Management. Computers and office equipment will be procured for a total amount of about US\$0.11 million.

1.10 Goods and equipment contracts of more than US\$300,000 equivalent will be awarded under ICB procedures. For the traffic system turnkey contract (about US\$19.23 million) and the parking turnkey contract (about US\$5.64 million), prequalification of suppliers/contractors will be required.

1.11 Goods and equipment estimated to cost less than US\$300,000 will be procured according to International Shopping, based on at least three price quotations from two eligible countries, with aggregate amount not to exceed US\$750,000. Goods and equipment contracts estimated at US\$100,000 or less may be procured according to National Shopping (NS) procedures, with an aggregate amount not to exceed US\$150,000.

Consultant and Training Services

1.12 Consultant and training services for the project's technical assistance components and detailed engineering and construction supervision services will be contracted in accordance with the Bank's *Guidelines for the Selection and Employment of Consultants by World Bank Borrowers* (revised January and September 1997, and January 1999). These services include studies, technical assistance for capacity building, training, engineering designs, and construction supervision services, for which proposals will be requested from three to six short-listed firms.

Procurement methods (Table A)

Table A: Project Costs by Procurement Arrangements
(US\$ million equivalent)

Expenditure Category	Procurement Method ¹				Total Cost
	ICB	NCB	Other ²	N.B.F.	
1. Works	40.07 (28.05)	2.80 (1.96)	()	17.91 (0.00)	60.78 (30.01)
2. Goods	28.54 (24.26)	()	0.62 (0.52)	()	29.16 (24.78)
3. Services	6.39 (6.39)	3.04 (3.04)	()	()	9.43 (9.43)
4. Operating Cost	()	()	0.16 (0.13)	()	0.16 (0.13)
5. Front-end fee	()	()	0.65 (0.65)	()	0.65 (0.65)
6. Land acquisition	()	()	()	15.00 (0.00)	15.00 (0.00)
7. Interest during construction	()	()	()	()	0.00 (0.00)
Total	75.00 (58.70)	5.84 (5.00)	1.43 (1.30)	32.91 (0.00)	115.18 (65.00)

^{1/} Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

^{2/} Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff in the project management office, training, technical assistance services, and incremental operating costs related to (a) managing the project, and (b) re-lending project funds to local government units.

Table A1: Consultant Selection Arrangements (optional)
(US\$ million equivalent)

Consultant Services Expenditure Category	Selection Method							Total Cost
	QCBS	QBS	SFB	LCS	CQ	Other	N.B.F.	
A. Firms	6.52 (6.52)	0.50 (0.50)	0.00 (0.00)	0.00 (0.00)	0.28 (0.28)	0.00 (0.00)	0.00 (0.00)	7.30 (7.30)
B. Individuals	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	2.13 (2.13)	0.00 (0.00)	2.13 (2.13)
Total	6.52 (6.52)	0.50 (0.50)	0.00 (0.00)	0.00 (0.00)	0.28 (0.28)	2.13 (2.13)	0.00 (0.00)	9.43 (9.43)

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection

QBS = Quality-based Selection

SFB = Selection under a Fixed Budget

LCS = Least-Cost Selection

CQ = Selection Based on Consultants' Qualifications

Other = Selection of individual consultants (per Section V of Consultants Guidelines),
Commercial Practices, etc.

N.B.F. = Not Bank-financed

Figures in parenthesis are the amounts to be financed by the Bank Loan.

Prior review thresholds (Table B)

1.13 All ICB contracts for works and goods will be subject to prior review. In addition, all NCB contracts for works with an estimated value above US\$1.0 million and all NCB contracts for goods with an estimated contract value of US\$100,000 will also be subject to prior review. It is estimated that this review will cover 100 percent of the works contracts and 98 percent of the goods contracts. Consultancy contracts of US\$50,000 and above for both firms and individuals will be subject to prior review by the Bank. These thresholds will account for about 99 percent of Bank-financed contracts. Terms of reference for all services to be provided will be subject to prior review by the Bank. Contracts under these thresholds (civil works, goods, and consultancy) will be subject to selective post-award review during supervision mission, or by the auditor (see Table B).

Table B: Thresholds for Procurement Methods and Prior Review¹

Expenditure Category	Contract Value Threshold (US\$ thousands)	Procurement Method	Contracts Subject to Prior Review (US\$ millions)
1. Works	2,500	ICB	57.98
	1,000	NCB	2.80
2. Goods	300	ICB	28.54
	100 to 300	International Shopping	0.45
	100	National Shopping	
3. Services	50	QBCS	6.52
	50	QBS	0.50
	50	CQ	0.20
	50	Individual Consultants	1.50
4. Miscellaneous Operating costs	50		0

Total value of contracts subject to prior review: 97.49

Overall Procurement Risk Assessment

Average

Frequency of procurement supervision missions proposed: One every 6 months (includes special procurement supervision for post-review/audits)

¹ Thresholds generally differ by country and project. Consult OD 11.04 "Review of Procurement Documentation" and contact the Regional Procurement Adviser for guidance.

Disbursement

Allocation of loan proceeds (Table C)

2.1 Allocation of loan proceeds by expenditure category will be based on an assessment of investment needs, and is summarized in Table C.

Table C: Allocation of Loan Proceeds

Expenditure Category	Amount in US\$million	Financing Percentage
Works	26.82	70 percent of all expenditures
Goods and equipment 4.03 - Components 1,2,3 and 5 = 22.113 - Component 4 = 0.043	22.16	100 percent of foreign expenditures 100 percent of local expenditures (ex factory costs); and 85 percent of other items procured locally
Services (including training) - Components 1,2, 3 and 5 = 5.354 - Component 4 = 3.080	8.43	100 percent of all expenditures
Operating costs	0.12	100 percent of all expenditures up to December 31, 2004; and 75 percent of all expenditures thereafter
Unallocated	6.82	
Total Project Costs	64.35	
Front-end fee	0.65	
Total	65.00	

Documentation for Withdrawals:

2.2 Disbursements will be based on traditional methods, which include the use of Statements of Expenditures (SOEs). Once CDR's financial management information system is operational and all conversion requirements have been met, full conversion to PMR-based disbursements will be considered, based on the Borrower's agreement. It is expected that CDR will be able to submit quarterly Project Management Reports to the Bank within one year of effectiveness. Prior to certification for PMR-based disbursements, withdrawals from loan proceeds will be made utilizing the Bank's traditional disbursement instruments, including SOEs and Special Accounts (SAs). The replenishment of SAs will be based on receipt of appropriate documentation.

Use of statements of expenditures (SOEs):

2.3 During the transition period, when the Borrower is not ready for PMR-based disbursements and when traditional methods are used, disbursements for contracts not governed by the above paragraph will be made on the basis of Statements of Expenditures. When using the Bank's traditional disbursement procedures, withdrawal applications for contracts valued at more than US\$1 million for works, US\$300,000 for goods, US\$100,000 for consulting firms, US\$50,000 for individual consultants, and US\$50,000 for training activities will be presented with full documentation for disbursement. During negotiations, assurances were given that supporting documentation will be maintained by the PMU and made available for review by Bank supervision missions. These will be phased out when the project is converted to PMR-based disbursement.

Special account:

2.4 To facilitate the management of funds, the Government will establish two Special Accounts in the Central Bank of Lebanon to be operated, respectively, by CDR and the Ministry of Public Works and Transport under terms and conditions satisfactory to the Bank. When the project is considered LACI compliant and ready for PMR-based disbursements, the Special Accounts will be replenished based on PMRs submitted by the PMU. To facilitate disbursements against eligible expenditures before the project is declared ready for PMR disbursements, the Bank would, upon request, allocate of US\$5 million to CDR's Special Account, and US\$0.35 million to MPWT's Special Account.

2.5 Replenishment of the SAs will follow Bank procedures, and a bank statement of SA activity will support all replenishment applications. The minimum amount for applications for direct payments and special commitments will be 20 percent of the respective authorized allocations to the SAs.

2.6 The SAs will be audited annually by independent auditors acceptable to the Bank. The auditors' engagement letter defining the scope of the audit should be sent to the Bank for no objection prior to effectiveness for the first year of operation, and at the beginning of every year thereafter. The audit report should be submitted to the Bank for review within six months of the end of each fiscal year.

Audit Arrangements

2.7 CDR Financial Department, in coordination with the PMU, will be responsible for consolidating project accounts for all components, including the one to be implemented by the Ministry of Transport, and for submitting annually audited financial statements. Project accounts, including Special Accounts and SOEs, will be subject to external auditing by a qualified independent auditor under terms of reference acceptable to the Bank. All audit reports will be submitted to the Bank, in English, no later than six months after the end of each fiscal year, or by June 30 of the following year. In addition, the auditor shall prepare a management letter describing the internal control and operating procedures affecting project implementation, and any other matter which should be drawn to management's attention. The auditor is expected to be appointed prior to effectiveness.

Summary of Financial Management Assessment and Financial Management Action Plan

3.1 An assessment of the financial management systems and procedures of the two implementing agencies, the Council for Development and Reconstruction (CDR) and the Ministry of Transport's Directorate General of Land and Maritime Transport (DGLMT), was undertaken by an accredited Financial Management Specialist.

I. Council for Development and Reconstruction (CDR)

Financial Management at CDR

3.2 CDR, throughout the project, will be responsible for managing the project funds allocated to the components 1,2,3, and 5. The DGLMT will issue and remit periodically to CDR reports reflecting the financial status and activities under component 4 of the project. This will allow CDR to issue consolidated project reports reflecting the project accounts and activities for all components.

3.3 CDR's financial system was assessed, by examining the accounting system, accounting policies and procedures, budgeting system, reporting, staffing, internal controls policies and procedures, internal auditing and external auditing arrangements. This assessment showed that the system in place at CDR is based on principles and procedures defined by the legal framework and operational decrees applicable to CDR. The control environment at CDR was found to be adequate; however, the financial system lacks the support of a budgeting module and requires enhancement to become capable of generating timely project reports. This assessment concluded that the system is satisfactory and meets the Bank's minimum requirement.

3.4 An effective organization and financial structure characterize the control environment at CDR. Segregation of duties and responsibilities such as invoice processing, accounting duties and issuance of payments is well observed in the day-to-day transactions. CDR records are subject to post audit by the Government Court of Accounts, and an external independent auditor performs the annual audit to its financial statements. CDR's accounting policies follow fund accounting on cash basis principles, and the consolidation of the 7 funds created by CDR generates the Council's financial statements. Bank-financed projects and other international donors are accounted for under funds 1 and 4 being the "*Revenues et Comptabilité des Projets*" funds. CDR's financial system uses the signed contracts as cost allocation centers, without any link to the financing source or activity. However, and in order to prepare the year-end Project Financial Statements (PFS), CDR links manually the expenditures under ongoing contracts to the funding source. For every new project, a separate ledger account is created in order to monitor the source of funds and to reconcile the project SA opened at the Central Bank of Lebanon. All Bank-financed projects implemented by CDR have been based on traditional methods of disbursements using SOEs and direct payments.

3.5 During 1998, CDR embarked on the implementation of a comprehensive plan to modernize its Financial Management and Contract Monitoring systems and integrate them with project management and other information systems. This plan was supported in part by a Bank IDF grant in the amount of US\$150,000. This grant partially financed the strengthening of the management information system to allow an interface between the various information systems of the finance, procurement and project physical progress. Among other outputs, CDR should produce a new chart of accounts that would have allowed adequate financial data for reporting that replies to project management requirements. Presently, CDR is revising the project targets and adjusting the plans for the completion of the tasks in order to bring the upgraded system into operation by end of year 2002. Meanwhile, and until the new system is fully

operational, CDR is implementing interim arrangements capable of generating reliable project reports.

CDR's Interim System

3.6 CDR's system is capable to follow on financial transactions; however, to avoid the risk of CDR not being able to generate timely reports for project management and monitoring purposes, interim arrangements are being implemented to overcome this shortcoming in the system. Until CDR's upgraded system is fully operational, accounting and reporting activities related to Bank-financed projects and other international donors will be undertaken separately but in conjunction with CDR's control policies and procedures. To that end, CDR has appointed a full time Financial Officer who reports directly to CDR's Controller with a specific mandate to establish and operate this interim system. Presently, this officer is assessing available accounting software in the Lebanese market, and software used by other Bank-financed projects implemented by other sector ministries, in order to proceed with the installation and configuration. The system should be able to account separately for each of the projects financed by international donors and implemented by CDR. This interim system is expected to be operational by mid 2002, thus CDR will be able to generate, quarterly, the project reports required under the project for monitoring and decision making and for disbursement if PMR based disbursement is considered.

3.7 As the procedures of the above interim solution are not reflected in CDR's legal framework or operational decrees and in order to ensure the accuracy and completeness of the interim system data, CDR's management will introduce a new activity requesting the monthly reconciliation between CDR's main accounting system and the interim one. This will ensure the mirroring of all transactions in both systems. In addition, CDR's Finance Department will prepare an annex to CDR's manual of procedures outlining the interim system and detailing:

- the Financial Officer's responsibilities within the Finance Department; and the relation with the PMU;
- the chart of account which should reflect the classification of the main chart, where applicable, for easy reconciliation;
- the budgeting process;
- the reconciliation procedures, timing and output between the two systems;
- the document flow;
- the frequency and forms of the financial reports; and
- others.

Flow of Funds and Controls for Components 1,2, 3 and 5

3.8 All invoices for activities financed under components 1,2,3 and 5 of the project will be subject to CDR's controls and procedures, which are considered adequate, and will be honored through payments issued by CDR. CDR's Finance Department will be responsible for the project funds and for the management of the SA, as is the case in other Bank-financed projects implemented by CDR. CDR will transfer funds from the loan account to the project's SA, opened at the Central Bank. Deposits into and payments out of the SA, to pay contractors/consultants, will be made in accordance with the provision of the Loan and Projects Agreements.

Auditing Arrangements

3.9 CDR will remit to the Bank not later than six months after the end of each year the audit report of the project. The external audit report shall encompass all the project's activities, including the component implemented by the Ministry of Transport and shall be in accordance with internationally accepted auditing standards e.g., International Standards on Auditing (ISA). The annual audit report of the project accounts shall include a separate opinion as to whether the SOEs submitted during such fiscal year, together with the procedures of internal controls involved in their preparation, can be relied upon to support related withdrawals. Also, the audit report shall include a separate opinion on the SA reconciling opening and year-end balances. In addition to the audit reports, the auditor will prepare a "management letter" identifying any observations, comments and deficiencies, in the system and controls, that the auditor considers pertinent, and shall provide recommendations for their improvements. The external independent auditor should be acceptable to the Bank and his TOR will be prepared and submitted for the Bank's no-objection, at least nine months prior to the end of the project fiscal year

II. Directorate General of Land and Maritime Transport (DGLMT)

3.10 DGLMT, throughout the project, will be responsible for managing the project funds allocated to the component 4. The financial management system at DGLMT is subject to Government accounting and budgeting procedures. DGLMT's financial management system, which is integrated with the Government's unified accounting system, is computerized and permits DGLMT to track the procurement process and to register liabilities by supplier. Funds management, including the processing of payments, is managed by the Ministry of Finance.

3.11 To ensure proper financial management and compliance with Bank guidelines, it was agreed that responsibility for managing the accounting and reporting functions associated with DGLMT's project-related financial transactions would be entrusted to the financial controller at the Project Implementation Unit (PIU) in charge of the Bank-financed National Roads Project (NRP). The financial management system for the NRP is based on International Accounting Standards (IAS) and capable of producing quarterly Project Management Reports and complies with all Bank requirements, as outlined in OP/BP10.02. The system can adequately accommodate the limited number of transactions associated with the Technical Assistance component implemented by DGLMT. The PIU has satisfactory internal controls with adequate segregation of duties in all accounting and payment functions, including dual signatories on checks and approval of all financial transactions. The accounting and budgeting system is adequate, accounting policies and procedures have been documented, a qualified accountant is on board, and there are relevant audit arrangements in place. To manage DGLMT's financial transactions, the PIU will set-up a separate Chart of Accounts, general ledger, and sub-ledgers. DGLMT will prepare monthly financial statements, including sources and uses of all funds, and submit them to the PMU at CDR for project's accounts consolidation.

3.12 DGLMT will also be in charge of managing its own Special Account, which will be used to facilitate implementing the Technical Assistance activities defined in component four of the project (estimated at about US\$4 million). The Special Account will be established at the Central Bank (*Banque du Liban*).

3.13 DGLMT opted to use traditional methods of disbursement, which includes the use of SOEs. DGLMT agreed to submit quarterly reports, the format of which will be agreed during negotiations and incorporated in the financial management system. DGLMT's Special Account will be operated using dual signatories with the Minister of Transport, or his deputy, as signatory A, and the Director of DGLMT as signatory B.

Traffic Management Organization

3.14 The Traffic Management Organization will not be part of any financial transaction involving proceeds from the Bank loan. However, since it is a prime project's beneficiary, the Traffic Management Organization would: (a) establish and maintain financial accounts and statements in formats acceptable to the Bank; (b) have its accounts audited each fiscal year in accordance with Bank guidelines and by independent auditors acceptable to the Bank; and (c) furnish the Bank with the auditor's management letter and other reports which the auditors may provide to TMO management.

Report on the Assessment of Project for PMR-Based Disbursements

Ineligible for PMR-Based Disbursements

Part I - Financial Management System:

I have reviewed the financial management system relating to this project. The objective of the review was to determine whether the project has in place an adequate financial management system as required by the Bank/IDA under OP/BP 10.02.

My review, which included visits to the CDR and the MPWT (implementing agencies), was based on the Bank's guidelines for "Review of Financial Management System", and focused on the assessment of the project's accounting system, internal control, planning, budgeting and financial reporting system, selection of an auditor as well as the format and contents of the Project Management Report (PMR) to be submitted by the borrower in support of Withdrawal Applications.

I confirm that the project satisfies the Bank's minimum financial management requirements. However, in my opinion, the project does not have in place an adequate project financial management system that can provide, with reasonable assurance, accurate and timely information on the status of the project (PMR) as required by the Bank/IDA for PMR-Based Disbursements.

I have detailed in the attachment the inadequacies that I found in the system together with an agreed action plan by the borrower to remedy the situation.

Signed by:

Financial Management Specialist(FMS-OPR)



Ayman Abu-Haija, MNSIF, April 27, 2001

Part II - Procurement/Contract Management System

I have reviewed the procurement/contract management system relating to this project. The objective of the review was to determine whether the procurement/contract management system adopted by the project conforms to the Bank's guidelines for procurement in investment projects.

My review was based on the "Assessment of Agency's Capacity to Implement Project Procurement, Setting of Prior Review Thresholds and Procurement Supervision Plan" guidelines issued by the Bank.

I confirm that the project satisfies the Bank's minimum procurement management requirements. However, in my opinion, the project does not have in place an adequate procurement/contract management system that can provide the appropriate data on major procurement and contract management (PMR - Section 3) as required by the Bank/IDA.

I have detailed in the attachment the inadequacies that I found in the system together with an agreed action plan by the borrower to remedy the situation.

Signed by:

Procurement Specialist



M Mohammed Feghoul, MNSIF, April 27, 2001


Part III: Physical Monitorable Indicators and Overall Assessment

I have reviewed the project's system for monitoring physical implementation progress, including its monitorable indicators for major outputs. In my view, the system cannot provide the appropriate data on physical progress (PMR - Section 2) required by the Bank/IDA.

I have detailed in the attachment the inadequacies that I found in the system together with an agreed action plan by the borrower to remedy the situation.

Also, based on the assessments of the FMS-OPR and PS, and/or considering my overall assessment of the project, I am of the view that this project is not suitable for PMR-based disbursements.

Signed by:
Task Team Leader


Mohammed Feghoul, MNSIF, April 27, 2001

Part IV: Concurrence of LOA for Eligibility of Project for PMR-Based Disbursements

I have conducted a reasonableness review of the process followed by the Task Team in assessing the project, and I concur with its recommendation that this project is not eligible for PMR-Based Disbursements.

Signed by:
FMS-LOA/DO


Andrina Ambrose-Gardiner, April 27, 2001

Annex 7: Project Processing Schedule
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

Project Schedule	Planned	Actual
Time taken to prepare the project (months)		
First Bank mission (identification)	03/09/1997	03/09/1997
Appraisal mission departure	09/14/1998	03/18/2000
Negotiations	12/19/1998	04/23/2001
Planned Date of Effectiveness	06/30/1999	10/31/2002

Prepared by:

Council for Development and Reconstruction (CDR)

Preparation assistance:

Japan PHRD Grant, French Trust Fund

Bank staff who worked on the project included:

Name	Specialty
George Tharakan, TUDTR	Transport Sector Manager
Mohammed Feghoul, MNSIF	Senior Municipal Engineer, Task Team Leader
Stephen Lintner, ESSD	Senior Technical Advisor (Environment)
Keith Rennie, MNSRE	Senior Social Scientist
Ramiz Al-Assar, TUDTR	Senior Transport Specialist
Koji Tsunokawa, TWUTD	Transport Specialist
Roger Gorham, Consultant	Transport Planner
Rekha Pillai, Consultant	Transport Economist
Kang Hu, Consultant	Traffic Engineer
Vincent Pearce, Consultant	Traffic Management Systems
Patrick Carles, Consultant	Parking Management
Barbara Chance, Consultant	Parking Management
Ayman Abu Haija, MNSIF	Financial Management Specialist
James A. Reichert, MNSIF	Financial Analyst
Adrina Ambrose-Gardiner, LOAEL	Financial Management Specialist, Disbursement
Ghada Youness, LEGOP	Senior Council
Eugenia Dennis, MNSIF	Program Assistant
Quality Control	
Jitendra N. Bajpai, EASTR	Sector Director, Transport
Peter Midgley, OCSKM	Lead Urban Transport Specialist
Michel Loir, MNSID	Lead Transport Economist
Slobodan Mitric, ECSIN	Lead Urban Transport Specialist
George Rebelo, LCFST	Lead Urban Transport Specialist

Annex 8: Documents in the Project File*
LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

A. Project Implementation Plan

- Project Implementation Plan (PIP), April 2001

B. Bank Staff Assessments

- Identification Mission Aide Memoire, March 1997
- Preparation Mission Aide Memoire, March 1998
- Preparatory Study Terms of Reference, May 1998
- Pre-appraisal Mission Aide Memoire, December 1998
- Transport Sector Public Expenditure Review (1999)
- Financial Management Assessment April 2000
- Appraisal Mission Aide Memoire April 2000

C. Other

Greater Beirut Transportation Plan

- Greater Beirut Transport Plan – Report No. 2 (08/94)
- Mass Transit in Greater Beirut – A Diagnosis Report No. 3 (07/94)
- Immediate Action Plan – Municipal Beirut – Reports Nos. 6 & 16 - Volume 1 (02/95)
- Traffic System Management Studies for Ten Urban Areas in Lebanon – A Proposal (01/95)
- Conceptual Study and Proposal for Grade Separations Mar Mekhael, BCD Corridor and Mkalles Roundabout: (10/97)
- Parking Master Plan – Report No. 19 (07/95)
- Plan De Transport Du Grand Beyrouth – Rapport No. 12 – Dossier Technique Annexe
- Design and Preparation of Tender Documents for Traffic System Management, Progress Report No. 6 (12/10/96)

Preparatory Study

- Inception Report – Deliverable No. 1 (05/98)
- Environmental Assessment Work Plan – Deliverable No. 2 (05/98)
- Traffic Management Systems Strategy (First Draft) – Deliverable No. 3 (06/98)
- Parking Policy Regulations and Management (First Draft) – Deliverable No. 4 (06/98)
- Parking Districts Selection – Deliverable No. 5 (06/98)
- Grade Separations Justification (First Draft) – Deliverable No. 6 (06/98)
- Grade Separations Justification – Deliverable No. 12 (09/98)
- Traffic Management System & Strategies (Draft) – Deliverable No. 8 (07/98)
- Signals & Traffic Control Center – Draft Specs. – Deliverable No. 9 (08/98)
- Parking Zones Selection (Draft) – Deliverable No. 11 (08/98)
- Economic Analysis Methodology – Deliverable No. 14 (07/98)
- Signals & Traffic Control Center – Draft Technical Specifications – Deliverable No. 19 (03/99)
- Environmental Assessment (First Draft Report):
 - . Executive Summary – Deliverable No. 13 (12/98)
 - . Volume 1 – Main Report – Deliverable No. 13 (12/98)
 - . Volume 2 – Technical Appendices – Deliverable No. 13 (12/98)

- . Volume 3 – Public Participation – Deliverable No. 13 (12/98)
- Environmental Assessment – Draft Final Report (January 2000)
 - . Executive Summary in English
 - . Executive Summary in Arabic
 - . Volume 1 - Main Report
 - . Volume 2 - Appendices
 - . Volume 3 - Public Participation
- Environmental Assessment – Final Report (May 2000)
 - . Executive Summary in English
 - . Executive Summary in Arabic
 - . Volume 1 - Main Report
 - . Volume 2 - Appendices
 - . Volume 3 - Public Participation
- First Consultation Meeting (06/23/98)
- Social Assessment and Resettlement Action Plan:
 - . Social Assessment (January 2000)
 - . Resettlement Action Plan (January 2000)
 - . Resettlement Action Plan – Final (July 14, 2000)
- Economic Analysis – Draft – Deliverable No. 16 (03/1999)
- Economic Analysis – Final – Deliverable No. 24 (12/1999)
- Options for Reforming Public Transport Services, PriceWaterhouseCoopers, 1999
- Parking Reports
 - . Beirut On-Street Parking Improving Program (01/2000) (Chance Management Advisors, Inc.)
 - . *Le Stationnement A Beyrouth Et Au Caire – Missions d'expertise* (06/99) (SARECO)
- Traffic Management System: Appraisal Report (Booz Allen and Hamilton, 04/2000)
- Urban Air Quality Monitoring Program for the GBA, Lebanon – Final Report (09/22/97)
- Public Administration National Administration Rehabilitation Program (1995-1997)
 - . Republic of Lebanon -- Minister of State for Administrative Reform
 - . National Administrative Rehabilitation Program (NARP)
 - . Railways and Public Transport Authority – Program 1996-1998 (01/96)
- World Bank reports
 - . Global Review of the Transport Sector in Lebanon:
 - . Private Sector Development – Lebanon – Draft (07/96)
 - . Private Sector Development – Lebanon – Final report (03/97)
 - . Transport Sector Public Expenditure Review, March 1999.
- Other reports:
 - . Passenger Transportation Options for a Revitalized Beirut – A Report on Year 1 Activities (01/93):
Principal Investigators: Isam Kaysi (AUB) & Fred Salvucci (MIT)
 - . Overview – Traffic Congestion Management Program for Greater Beirut Area
- Traffic Management Organization: Financial Model (April 2001)
- Project Implementation Plan (04/2001)

*Including electronic files

Annex 9: Statement of Loans and Credits
LEBANON: URBAN TRANSPORT DEVELOPMENT PROJECT
02-May-2002

Project ID	FY	Purpose	Original Amount in US\$ Millions		Cancel.	Undisb.	Difference between expected and actual disbursements*	
			IBRD	IDA			Orig	Frm Rev'd
P071113	2001	LB - Community Development Project	20.00	0.00	0.00	20.00	0.42	0.00
P045174	2000	LB-GENERAL EDUCATION	56.57	0.00	0.00	55.39	16.32	0.00
P050544	2000	LB-FIRST MUNICIPAL INFRASTRUCTURE	80.00	0.00	0.00	73.41	20.41	0.00
P038687	1998	VOCATIONAL & TECH.ED	63.00	0.00	34.00	28.38	48.94	1.54
P038674	1997	LB-NATIONAL ROADS	42.00	0.00	0.00	28.55	28.42	4.38
P034037	1997	AGRI.INFRA.DEVEL.	31.00	0.00	7.00	14.64	17.84	0.00
P034035	1996	LB-ADMIN. REHAB.	20.00	0.00	0.00	4.02	4.02	3.02
P005345	1995	SOLID WASTE/ENVIRONMENT	55.00	0.00	30.00	18.90	48.90	0.01
P034004	1995	HEALTH PROJECT	35.70	0.00	0.00	23.74	23.74	21.04
P005344	1994	LB-IRRIGATION	57.20	0.00	0.00	17.92	17.92	0.00
P005340	1994	LB-TA FOR REVENUE ENHAN	19.90	0.00	0.00	6.21	6.21	6.21
Total:			480.37	0.00	71.00	291.15	233.13	36.20

LEBANON
STATEMENT OF IFC's
Held and Disbursed Portfolio
Jan - 2002
In Millions US Dollars

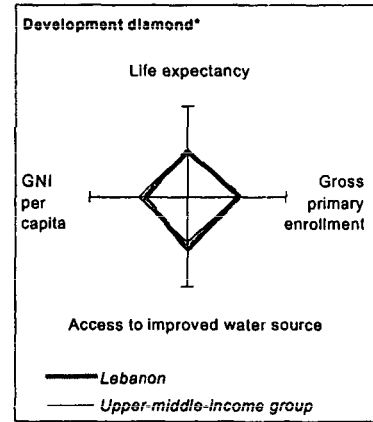
FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1997	ADC	3.33	0.00	0.00	0.00	3.33	0.00	0.00	0.00
1993/96	BBAC	2.81	0.00	0.00	3.59	2.81	0.00	0.00	3.59
	Bank of Beirut	6.31	0.00	0.00	0.00	6.31	0.00	0.00	0.00
1997	Banque Audi	9.81	0.00	0.00	0.00	9.81	0.00	0.00	0.00
1993/96/98	Banque Saradar	0.00	11.00	0.00	0.00	0.00	11.00	0.00	0.00
1997/99	Byblos Bank	22.83	0.00	0.00	19.96	22.83	0.00	0.00	19.96
1993/96/99	Cimenterie Nat'l	4.40	0.00	0.00	5.60	4.40	0.00	0.00	5.60
1995	FTML Services	0.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00
1997	Fransabank	2.70	0.00	0.00	3.42	2.70	0.00	0.00	3.42
1993/94/96	Idarat	5.00	1.50	0.00	0.00	5.00	1.50	0.00	0.00
1998	Idarat SHV	3.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00
1998	Leb. Credit I.r.s.	0.00	0.50	0.00	0.00	0.00	0.50	0.00	0.00
2000	Lebanese Leasing	6.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00
1995/99/01	Libano-Francaise	5.63	0.00	0.00	7.69	5.63	0.00	0.00	7.69
1994/96	SGLEB	4.22	0.00	0.00	5.89	4.22	0.00	0.00	5.89
1994/96	Uniceramic	0.00	0.00	0.80	0.00	0.00	0.00	0.80	0.00
1993									
	Total Portfolio:	76.04	13.00	10.80	46.15	76.04	13.00	10.80	46.15

FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic
	Total Pending Commitment:	0.00	0.00	0.00	0.00

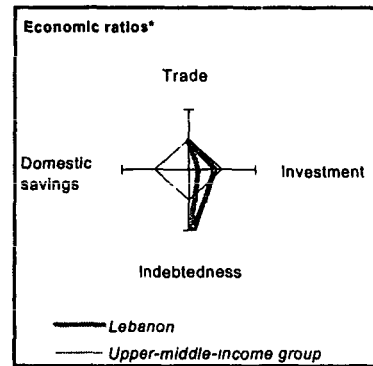
Annex 10: Country at a Glance

LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT

POVERTY and SOCIAL	Lebanon	M. East	Upper-
		& North	middle-
		Africa	income
2000			
Population, mid-year (millions)	4.3	296	647
GNI per capita (Atlas method, US\$)	4,010	2,040	4,620
GNI (Atlas method, US\$ billions)	17.4	602	2,986
Average annual growth, 1994-00			
Population (%)	1.6	2.0	1.3
Labor force (%)	2.7	2.8	2.0
Most recent estimate (latest year available, 1994-00)			
Poverty (% of population below national poverty line)
Urban population (% of total population)	90	59	76
Life expectancy at birth (years)	70	68	69
Infant mortality (per 1,000 live births)	26	44	28
Child malnutrition (% of children under 5)	3
Access to an improved water source (% of population)	100	89	87
Illiteracy (% of population age 15+)	14	35	10
Gross primary enrollment (% of school-age population)	111	95	107
Male	113	102	106
Female	108	88	105

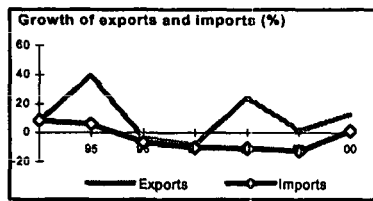
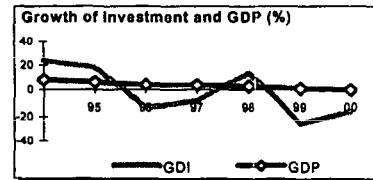


KEY ECONOMIC RATIOS and LONG-TERM TRENDS	1980		1990	1999	2000
GDP (US\$ billions)	..	2.8	16.5	16.5	16.5
Gross domestic investment/GDP	..	17.8	21.6	18.1	18.1
Exports of goods and services/GDP	..	18.0	11.8	13.0	13.0
Gross domestic savings/GDP	..	-64.1	-4.4	-6.7	-6.7
Gross national savings/GDP	..	21.8	1.5	-0.5	-0.5
Current account balance/GDP	..	4.0	-20.1	-18.6	-18.6
Interest payments/GDP	..	0.4	1.3	1.8	1.8
Total debt/GDP	..	62.7	50.2	61.3	61.3
Total debt service/exports	..	3.3	10.6	14.6	14.6
Present value of debt/GDP	51.6
Present value of debt/exports	305.1
	1980-90	1990-00	1999	2000	2000-04
(average annual growth)					
GDP	..	6.0	1.0	0.0	3.1
GDP per capita	..	4.2	-0.4	-1.3	1.3
Exports of goods and services	..	9.7	1.0	12.4	11.0



STRUCTURE of the ECONOMY

	1980	1990	1999	2000
(% of GDP)				
Agriculture	11.9	11.9
Industry	22.0	22.0
Manufacturing	10.3	10.3
Services	66.1	66.1
Private consumption	..	139.6	89.9	87.8
General government consumption	..	24.6	14.4	18.9
Imports of goods and services	..	99.9	37.5	37.8
	1980-90	1990-00	1999	2000
(average annual growth)				
Agriculture	..	1.8	1.1	1.1
Industry	..	-1.6	1.1	1.1
Manufacturing	..	-4.3	1.1	1.1
Services	..	4.1	1.1	1.1
Private consumption	..	3.2	-0.3	-2.4
General government consumption	..	4.3	24.6	31.5
Gross domestic investment	..	8.8	-25.0	-16.3
Imports of goods and services	..	1.4	-12.9	0.7

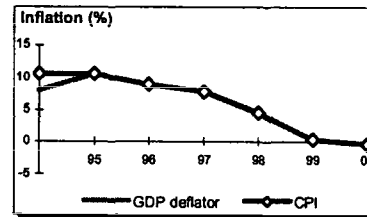


Note: 2000 data are preliminary estimates.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

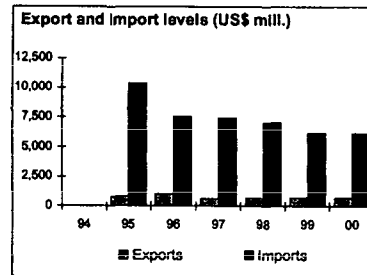
PRICES and GOVERNMENT FINANCE

	1980	1990	1999	2000
Domestic prices				
<i>(% change)</i>				
Consumer prices	..	68.9	0.3	-0.4
Implicit GDP deflator	..	15.5	0.2	-0.4
Government finance				
<i>(% of GDP, includes current grants)</i>				
Current revenue	..	6.4	19.6	18.7
Current budget balance	..	-31.3	-9.9	-19.6
Overall surplus/deficit	..	-33.0	-16.5	-21.7



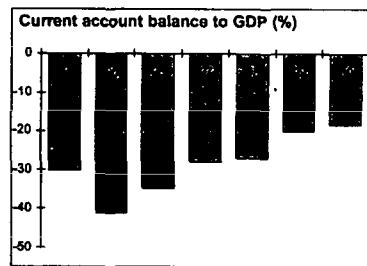
TRADE

	1980	1990	1999	2000
<i>(US\$ millions)</i>				
Total exports (fob)	695	712
Livestock, animal, and vegetable products	230	246
Fats and oils	112	117
Manufactures
Total imports (cif)	6,207	6,228
Food
Fuel and energy
Capital goods
Export price index (1995=100)	103	105
Import price index (1995=100)	104	107
Terms of trade (1995=100)	99	99



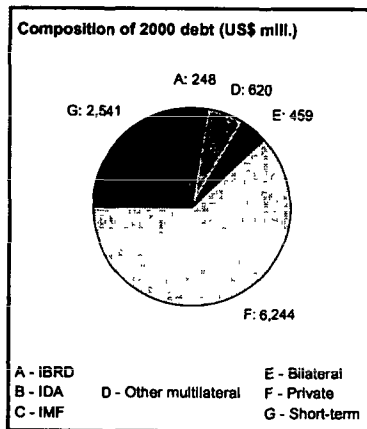
BALANCE of PAYMENTS

	1980	1990	1999	2000
<i>(US\$ millions)</i>				
Exports of goods and services	..	511	1,912	2,141
Imports of goods and services	..	2,836	6,207	6,228
Resource balance	..	-2,325	-4,295	-4,087
Net income	..	622	888	932
Net current transfers	..	1,818	90	90
Current account balance	..	115	-3,317	-3,065
Financing items (net)	..	-412	3,578	2,776
Changes in net reserves	..	297	-261	289
Memo:				
Reserves including gold (US\$ millions)	10,405	8,420
Conversion rate (DEC, local/US\$)	..	695.1	1,507.8	1,507.5



EXTERNAL DEBT and RESOURCE FLOWS

	1980	1990	1999	2000
<i>(US\$ millions)</i>				
Total debt outstanding and disbursed	510	1,779	8,304	10,112
IBRD	27	34	234	248
IDA	0	0	0	0
Total debt service	53	99	296	448
IBRD	5	11	25	31
IDA	0	0	0	0
Composition of net resource flows				
Official grants	199	213	111	53
Official creditors	43	-22	118	98
Private creditors	70	6	1,129	..
Foreign direct investment	0	6	740	886
Portfolio equity	0	0	129	-67
World Bank program				
Commitments	0	0	0	137
Disbursements	8	0	49	42
Principal repayments	3	7	12	17
Net flows	5	-7	36	26
Interest payments	2	4	13	14
Net transfers	3	-11	24	12



**Additional
Annex 11**

**LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT
Summary of the Resettlement Action Plan**

A. Summary

1. This annex presents the Resettlement Action Plan (RAP) for the Urban Transport Development Project (UTDP). The UTDP requires a total land expropriation of 31,369m², comprising 4,158m² of land under servitude from earlier expropriation decrees, together with new decrees that would expropriate 27,211m² of land from 205 lots at 12 different sites for the construction of grade separation facilities. This expropriation directly affects the residence of 42 occupant families (181 persons), 33 businesses and (because of multiple ownerships) about 1,437 property owners. The purpose of the RAP, prepared by Lebanese consultants for the Expropriating Authority, the Council for Development and Reconstruction (CDR), is to ensure that the loss of land and other assets is appropriately compensated and that any adverse impacts will be mitigated.

2. Lebanese law enshrines the principle of full and prior compensation for land and other assets expropriated in the public interest and there are effective, judicially independent institutions to implement expropriation and compensation. However, a special provision of the law permits the taking of land for roads and highways without monetary compensation with respect to the first 25 percent of the original lot area. This provision is based on the presumption that the owner's compensation will come from the increased value automatically accruing to the property as a result of the project. The expropriation instrument for roads and highways is termed an Alignment Decree, as distinct from an Expropriation Decree, which covers other purposes. In the case of UTDP, it is accepted that this latter provision cannot be fully applied because the concerned properties have already benefited from most of the value-added resulting from their being adjacent to long-established major roads. The expropriations to adjust the right of way (ROW) in order to accommodate the works will not automatically bring further value-added to adjacent properties, although in specific cases some value may accrue to the owners.

3. With the exception of the owners of about 43 plots, all property owners who lose assets through expropriation will receive equitable compensation for lost value under current expropriation practice, and in the majority of cases the impacts are minor. The RAP details what this compensation would comprise and how it would be determined. However, some cases require individual evaluation: in particular, the owners of about 43 lots affected by expropriations that total over 10,000 m², apparently risk significant loss for which, within the existing expropriation mechanisms, the RAP has adequate measures to ensure and verify that owners receive equitable compensation for their losses. These measures are as follows:

- Where the UTDP alignment decrees (or associated implementation of earlier decrees) result in taking of any asset without automatic entitlement to compensation, the Expropriation Committees shall estimate the impact of the expropriation on the owner and provide equitable compensation for lost asset value.
- To enable the Expropriation Authority to undertake this work (see para 1), a ministerial decision will place at its disposal the necessary additional expertise in land evaluation from the Ministry of Finance or from other qualified sources.
- The Expropriating Authority (CDR) will ensure the availability of funds sufficient for the estimated level of compensation awarded.

4. For each intersection, the Expropriating Authority will prepare a report that will document in a format agreed upon with the Bank the expropriation and compensation awarded in respect of each lot. Every intersection will require formal clearance by the Bank.

B. Background

5. Beirut's severe traffic congestion is addressed by the Greater Beirut Area Transportation Plan (GBATP), which the proposed UTDP will support in three key areas: (a) traffic management improvement, (b) parking improvement and (c) a corridor improvement program to improve traffic flow along major corridors. The corridor improvement program will improve the flow of through traffic, relieve congestion and improve local access by the construction of nineteen grade separation facilities.

6. The works at 12 of these sites require land expropriation detailed below. Every effort has been made to minimize the area and impact of the expropriation through criteria for site selection and technical design, resulting in which the original proposed expropriations being greatly reduced. The works in question include six underpasses at Beit al-Atfal, Bechara el-Khoury (Sodeco), Airport, Mar Mekhael, Tayounneh and Adlieh; and seven overpasses at Airport, Musharrafiéh, Galerie Semaan, Dora, Hayek, Mkalles, and Bchamoun-Aramoun. Four sites are not included in the following tables. At Sami Solh (Corridor 4) and Museum (Corridor 1), no land expropriation is required, the existing right of way being sufficient to accommodate the separations. The final configuration of two further grade separation facilities, Antélias and Jal el-Dib on the northern Corridor 19, had not been approved at the time of writing, and figures for expropriation, which are small, have not been included in the tables below. Once these sites are finalized and a decision made to include them in the project, these two sites will be subject to the same RAP consultation, compensation, and clearance procedures as all other sites.

C. Impacts of Expropriation

7. **Social Assessment.** The estimation of expected socioeconomic impacts of expropriation was the subject of a social assessment (SA) carried out by an experienced Lebanese social scientist (a professor of sociology) working with the consultancy team that prepared the project, supplemented by field visits by a Bank social scientist. It comprised, an unofficial census, interview and questionnaire survey of every family and business that would be displaced, and a review of the operation of laws and institutions relating to expropriation and compensation. The social scientist also attended the consultative meetings for the environmental assessment. (A further component of the SA, related to the parking component, does not concern the RAP). The SA was able to enumerate and classify the impacts as detailed in the tables below, and took account of the attitudes and concerns of those affected. This prior survey was an innovation, because the normal procedure has been to issue the decree first and thereafter to identify those affected through a judicial process. Protocol required that care be taken to maintain a low profile and an informal approach, in order not to appear to anticipate the operation of the law. The SA found that: (a) those who would be relocated were understandably concerned to know whether the compensation would be sufficient to enable them to remain in the vicinity (especially in the case of long-term residents); (b) businesses would likely be able to continue operations in the vicinity; and (c) squatters, victims of earlier displacement due to physical insecurity, were eagerly awaiting the opportunity of assistance from the Ministry of Displaced Persons to relocate outside the context of the project, and that expectation of such future benefit was the major factor in maintaining squatter status. An informal review of prior recent involuntary relocations of residence and business showed that residential relocations (both owner and tenant) and business relocations had been sufficiently generously compensated to enable relocation within the general vicinity and a distinct improvement in standards of living or business operation. Those affected by expropriation only of strips of land were scrupulously identified in the SA and included in the RAP; they were not, however, included in the social survey since the issue in this case is

one of compensation for lost value.

8. **RAP preparation.** The findings of the SA enabled the RAP to be prepared that utilizing Lebanese laws and procedures, while at the same time enabling the Bank to ensure that its safeguard criteria are observed, by means of a monitoring and clearance procedure for each site. As elaborated below, the Expropriation Authority will determine the amounts and eligibility for compensation for each property, site by site. A monitoring form reproduced at the end of this Annex details each type of loss incurred by expropriation together with the compensation awarded, and will enable the Bank to verify that this compensation meets Bank standards. The RAP was prepared in English by Lebanese consultants for the Expropriating Authority CDR following intensive, plot-by-plot site visits, discussions with those most directly affected, an extensive review of expropriation procedures, and the operations of the three Beirut-based Expropriation Commissions. The document has been made available through the Bank's InfoShop and Resident Mission and at a number of locations in Beirut.

9. The total land expropriated for physical improvements at all sites will be 31 369 m² (3.1 ha) taken from 205 lots at 12 of the 16 intersections. The great majority of these expropriations are small excisions of strips and edges of property, and seldom affect the use of the property. However, nine buildings will be wholly or partly expropriated, including residential and business premises. The impacts are of four types: (a) residential relocation (42 families); (b) small business relocation (30); (c) minor impacts on businesses (30); and (d) loss of land only, without other impacts (145 plots, of which 43 are significant). These are presented in the following paragraphs and in Tables 1-6 below, and described in more detail in the socio-economic survey report in the project's files.

10. **Residential Relocation.** Seven occupied buildings and two with unoccupied or abandoned residences at six sites (Beit al Aftal, Airport, Musharrafieh, Mar Mekhael, Hayek and Bchamoun-Aramoun) will be expropriated. These comprise 26 occupied apartments and 8 vacant ones. A total of 42 families (181 persons) will have to move as a result of expropriation, and in addition the owners will lose assets in land and structures. For the purposes of this plan and socioeconomic survey, a family is defined as a nuclear family (married couple with or without children, and economically independent). Thus a household could comprise two families, parents, and married son with children. Of those affected, 25 families (181 persons) are squatters, a special category presented separately. The others are middle-class professionals. Residential impacts are summarized in Table 1 below.

Table 1. Loss of Residential Accommodation

Status	Families	Persons	Apartments
Owner-occupied	6	28	5
Rental tenant	11	53	10
Squatter	25	100	11
Vacant/abandoned	0	0	8
Total	42	181	34

11. **Business relocation.** Most buildings affected contain small businesses. Forty small business premises on 15 plots will be expropriated, of which 6 are run by owners and their partners/shareholders, 18 are rented, 6 are run by squatters, and the remaining 10 are vacant. These impacts are summarized in Table 2 and detailed in Table 5 below.

Table 2. Loss of Business Premises

Status	Business entrepreneurs	Premises
Owner-occupied	6	6
Rental tenant	18	18
Squatter	6	6
Vacant/abandoned	0	10
Total	30	40

12. **Minor impacts on business and other premises.** The loss of strips adjacent to the main road will affect 18 businesses in a variety of minor ways, none of which will require the business to cease operating or relocate. Such impacts include relocation of signs and enclosures; reconfiguration of gas stations; and movement of temporary structures to another part of the same plot. At the owner's discretion, the compensation can be made in kind, with the works contractor paid to make good any damage.

13. **Reduction in plot area.** The majority of plots are affected by the expropriation of land. Of these, 145 plots affected only by the taking of land, in amounts as small as less than 1m² with a median of less than 80 m², averaging about 6 percent of the area of the affected plots. The expropriations include the actual takeover of 4,158 m² of land for which an earlier expropriation decree has been issued, but not executed. In determining its compensation awards, the Expropriation Commissions use all relevant factors in land evaluation that apply to a particular lot: size, shape, location, use, structures, and the impact of the project on the value of the remainder. The commissions seek to be consistent, and the past history of awards show a tendency to favor the owners. The procedures are described in detail below.

D. Compensation

14. In Lebanon, compensation is determined by judicial process. When an Expropriating Authority, in this case CDR, wishes to implement an expropriation decree, the expropriation files are sent to the Expropriation Commissions for the adjudication of compensation. In the case of the proposed project, the sites requiring expropriation fall under the authority of one of three Expropriation Commissions (Beirut, Mount-Lebanon North, and Mount-Lebanon South) set up by decree. They comprise a chairperson (a judge or magistrate) and two members - an engineer and a property valuator. The Expropriation Commissions are competent to: (a) determine all entitlements or compensations resulting from expropriation; (b) decide on requests by owners for total expropriation and full compensation; (c) determine the value of small portions of land that cannot be used for building; (d) settle disputes regarding the division of compensation between shareholders; and (e) determine matters related to the integrity of a plot and the cumulative effect of successive excision of land from a property. CDR is represented at the commissions by a legally qualified representative. Individual landowners may represent themselves, or use a lawyer. Where individual citizens appear not to be aware of their rights, the presiding judge should apprise them of compensation. Judges attempt to ensure that citizens are not deprived of their rights, and tend to lean more toward the citizen than to the administration in such matters. Expropriation Commissions have wide discretion, and any type of damage or unfair treatment may be subject to compensation.

15. **Adequacy.** Before expropriation becomes effective, compensation is paid to all affected persons by CDR on award of the Expropriation Commissions. These commissions determine the amounts to be awarded, and all persons entitled to receive them, according to a procedure summarized in the next section, and then

implement the expropriation by notifying the Lands Department of the Ministry of Finance. Awards may be appealed by either party, but once final have the force of a court order. The awards cover four aspects: residential premises and relocation, business premises and relocation, other impacts on business, and loss of land. The entitlements are shown in Tables 3-6 below. The actual monetary amounts cannot be predicted prior to the expropriation process because these are set by judicial prerogative upon independent assessment. Awards are not publicly announced in order to avoid comparisons. However, research information on recent experiences in Beirut has shown that awards easily meet the standards of full replacement costs, enabling property and business owners to acquire premises normally superior to those expropriated, and adequate to cover transition and transaction costs of relocation. The exceptions to this principle are dealt with in the following two paragraphs.

16. **Alignment decrees: less than under 25 percent of the plot surface.** Where more than 25 percent of the plot's original surface area (all previous expropriations being included) is expropriated under an Alignment Decree (which covers public roads, highways, and public open spaces such as parks), the Expropriation Commission awards the full current market value of that expropriated area in excess of the first 25 percent. Historically, market values have been generously interpreted, resulting in substantial awards to those so entitled. However, in this project it is not possible to maintain the assumption that any expropriation under 25 percent of the surface area will automatically be offset by a corresponding rise in the value of the remainder occasioned by the works. Special consideration has therefore been agreed upon for those affected by loss of land only - that is, less than 25 percent of the original plot. In all, 154 privately owned properties are so affected, involving about 1,303 registered landowners, multiple ownership being common both through inheritance and vertical subdivisions (individual apartments in a block).

17. Compensation arrangements are agreed as follows, according to criteria detailed in Tables 3, 4, 5 and 6:

For 18 properties (339 owners), expropriation was judged purely nominal, with no appreciable loss of value to the owners (e.g., less than 10 m²; apartment block with impact of less than 1 percent of land area per owner; or legal technical rectification of de facto public ROW).

For 93 properties (724 owners) that will lose less than 10 percent of the property: a range of compensation measures is open to the Expropriation Commissions, subject to demonstration of any type of actual economic loss, prior expropriation, or acceptance of the owner's request to expropriate the entire plot with compensation on grounds of lost utility of the remainder. Alternatively, the Expropriating Authority will verify that the rise in value of the remainder of the property will indemnify the owner against any economic loss.

For 43 properties (240 owners) that will suffer significant property loss—between 10 and 25 percent of their original area, and over 350 m²—the Expropriation Commissions will exercise the maximum discretion to identify, award and demonstrate grounds of adequate compensation.

18. The Expropriation Commissions will be guided by the assumption that the alignment decrees would not necessarily apply and that CDR is prepared to implement the awards. CDR has estimated the total compensation package under the RAP to amount to US\$15 million, an amount which accords with Lebanese law and practice, and which the Bank considers appropriate.

19. **Squatters.** Squatters, by definition, have no legal claim and thus do not fall within the competence of the Expropriation Commissions. The 25 squatter families who will be required to move, and the 6 squatter businesses, will be enabled to move through financial assistance from the Displaced Persons Fund (DPF) under the Ministry of Displaced Persons, access to which is a common motive for maintaining squatter status. The

policy is to enable people to resettle either in their original villages or another place of their choice, in improved conditions, and where applicable to reestablish an affected business enterprise. Past experience shows that compensations paid by the fund have been generous, and mostly exceed compensation paid to a tenant renting an expropriated building. They are usually sufficient for 12-18 months' rent. The total value of this assistance, for which no estimate is available, is additional to the estimated amount that CDR would pay through Expropriation Commission awards.

20. **Monitoring.** CDR will submit the actions taken on each grade separation site to the Bank for its approval using the attached monitoring form, which was developed specifically for this project. The form will enumerate the different losses incurred by expropriation and show the compensation for each lot, justify any assumptions of increased property values, and detail actions taken in respect to squatters. The Bank's approval is required before disbursement for the site in question. Supervision missions will include Bank social science staff, who will verify the socioeconomic outcome. The implementation of the RAP will be assessed as part of the Mid-Term Review and evaluated for the ICR.

E. Institutional Arrangements

21. The legislation, institutional arrangements and procedures for expropriation and compensation are presented in full in the RAP. What follows is only a very brief summary.

22. The exercise of eminent domain for expropriating private property in the public interest is governed by the Expropriation Law of 1991, which sets out in detail the different types of expropriation and compensation. Under the provision for expropriation of land in the public interest, the Council for Development and Reconstruction prepares a draft roads alignment decree for signature by the Minister of Public Works, the Prime Minister, and the President. Annexed to the decree are: (a) a sketch of the project; (b) a plan of the land expropriated; (c) a comprehensive list from the registry of lands showing the registration number of each property, its location, the names of all the owners and rightholders; and (d) drawings of any affected structures. Once the decree is signed, these documents are publicly available. An alignment decree is in force until amended or annulled by another decree.

23. The decree places the properties under servitude (they may be bought and sold, and buildings may be maintained, but no improvements may be made until the expropriation process has been completed. Properties are not held to have been expropriated until the decision of the Expropriation Commission is handed down, which decision is communicated to the Lands Registry for amendment of title and map. A decree may apply to any portion of a property. It is up to the owner to request full expropriation.

24. The Expropriation Commissions, of the first instance and appeals, are established by law in each province. The constitution and powers of the commissions of the first instance have been described at the beginning of the preceding section. They attempt to contact every owner in person, and every holder of a legal right is entitled to be heard. Individual landowners normally represent themselves at the first instance (often obtaining informal guidance from a lawyer or another expropriated person), but appeals require legal representation. The appeals commissions—again one for each province—are similarly constituted, but with more senior members. They hear appeals from either party, and may confirm awards or revise them upward or downward. Their decision is final.

25. CDR has an experienced expropriations unit staffed by a lawyer and expropriations expert which prepares the decrees and provides additional services to the expropriated persons, including free professional counseling and advisory services to affected persons on certain weekdays. It also liaises with the Ministry of

Displaced Persons with respect to squatters, and may frequently settle disputes or complaints amicably.

Table 3: Project-affected Persons and Compensation for Loss of Residence

Loss	Status	Number of principals	Number of persons	Compensation payable under expropriation procedures	Non-monetary entitlements
Residential property (apartment)	Owner-occupied	6	28	Full monetary compensation for property and disturbance, sufficient for replacement and transition costs.	Counseling and advisory services from CDR.
	Absentee owner (vacant apartment or house)	8	-	Full compensation for property, sufficient for replacement.	
	Absentee owner (squatted apartment)	5	-	Full compensation for property, sufficient for replacement. In addition, owners gain freedom from encumbrance.	
Residence	Rental tenant (all except one pre-1992)	11	53	Compensation based on remaining value of lease. Compensation for loss of secure tenancy and disturbance based on length of tenancy and present rights, often around 50% of value of premises. For one post-1992 tenant (without secure tenancy), compensation is based on value of outstanding lease, not less than one month's rent.	
Occupancy	Illegal occupant	25	100	None unless legal rights can be demonstrated.	Counseling and advisory services from CDR. May not be evicted without Ministerial approval.
Total	55	181			

Table 4: Project-affected Persons and Compensation for Relocation of Business

Loss	Status	Number of principals	Compensation payable under expropriation procedures	Compensation/assistance under other policies	Non-monetary entitlements
Business property with active business	Owner/entrepreneur	6 plus 9 partners	Lump sum compensation for land, building, business enterprise and transition costs sufficient to enable reestablishment in similar situation and location		Counseling and advisory services from CDR.
	Rent tenant	18 (13 before 1992, 5 after 1992)	(All) lump sum compensation for transition costs of business enterprise, sufficient to enable reestablishment in similar situation and location; (13 pre-1992 tenants) compensation for loss of secure tenancy and disturbance based on length of tenancy and present rights, often around 50% of value of premises; (5 post-1992 tenants), compensation based on value of outstanding lease, not less than one month's rent.		
Temporary structure with micro-enterprise	Squatter	6		Lump sum payment from Displaced Peoples Fund, sufficient to continue business nearby.	
Business premises (vacant)	Absentee owner	5	Replacement cost of land and building.		
Total	46 + 9 partners				

Table 5: Project-affected Persons and Compensation for Minor Impacts on Businesses

Loss of part of structure or site	Status	Number	Compensation payable under expropriation procedures	Non-monetary entitlements
Gas station: effect on pumps, tanks, or canopy (business will continue on property)	Owner/entrepreneur	5	Structure at current market valuation; compensation possible for any demonstrated loss or prejudice to business.	(a) Free contractor services to make good; and (b) Counseling and advisory services from CDR.
Shop (minor loss of floor area)	Owner	3	Floor area at current market valuation; difference in value of structure caused by reduced area; compensation possible for any demonstrated loss or prejudice to business	
Owner (loss of part of basement area)	Owner	4	Floor area at current market valuation; difference in value of structure. Note: No compensation for structures illegally erected in public domain.	
Temporary or squatter business, to be relocated on same site	Tenant, temporary structure	5	Note: No compensation for structures illegally erected in public domain.	Assistance to relocate business on site as required through project's contractor at no charge to tenant (subject to landowner's agreement); or Assistance to reestablish business under Displaced Persons Fund.
Storage shack		1	To be determined	
Total		18		

Table 6: Project-affected Persons and Compensation for Loss of Land Only

Loss of land only, with absence of direct impacts on residence or business premises or activity	Status	Number	Compensation payable under expropriation procedures	Non-monetary entitlements or compensation
Category C. Loss of less than 10 percent of lot area (93 lots); an average of 70 m2 per lot, and not exceeding 300 m2 .	Owner/ shareholder	724	(a) Case-specific awards. Any loss or prejudice directly caused by expropriation, e.g. costs of (i) restoration of fences, walls, enclosures etc., (ii) compensation or outright purchase of land no longer adequate for original purpose or too small to be viable, on owner's request; (iii) any prejudice to business; (iv) loss of specific function or legal right (e.g., reduced building permission for vacant lots, loss of parking); or (b) The Expropriating Authority shall provide site-specific evidence that the project outcomes are expected to enhance the values of the unexpropriated portions by an amount at least equal to the value of what was expropriated.	CDR advisory and counseling services
C2. Negligible effects (18 lots): either (a) area expropriated is less than 10 sq. meter, or (b) vertical subdivisions (apartments) limits impact to less than 1% of land area per unit., or (c) purely technical expropriation, to conform to de facto situation (e.g. sidewalk outside church).	Owner/ shareholder	339	Insignificant impact on asset values, too minor to determine.	
B. Substantial effects (43 lots) over 10 percent of surface area, or over 350 sq. meter, with prejudice to the value of the remainder of the property.	Owner and shareholder	240	Compensation to be determined by the Expropriation Commissions on case by case basis based on the value of the lost asset, using as a basis the full range of awards open under the law. The adequacy of the awards will be individually monitored.	
Total		1303		

**Additional
Annex 12**

**LEBANESE REPUBLIC: URBAN TRANSPORT DEVELOPMENT PROJECT
Summary of the Environmental Management Plan**

A. Overview

1. **Background.** Beirut is the core of the service-based economy of Lebanon, possessing one-third of the population and contributing in excess of two-thirds of the total value added in the economy. The city and its metropolitan area, however, suffer severe traffic congestion, the result of an extremely deficient transportation system. This implies high economic losses and deteriorating environmental quality. As sustained growth of the service-oriented economy is underpinned by efficient infrastructure, Beirut needs to improve the operational and economic efficiency of its urban transport system. Prior to the conflict in Lebanon, it had an extensive urban transport system, including well-developed bus and trolley-bus systems. With the prolonged period of conflict, this infrastructure deteriorated.

2. **Changes in urban structure.** Over the past two decades, major changes have also occurred in Lebanon's demography due to urbanization, displacement of residents from the south and relocation of businesses from Beirut to various locations along the coast. These have led to important changes in traffic patterns throughout the Greater Beirut Area (GBA), which in turn generate severe congestion both in and around Beirut and particularly at GBA's entrances, including the connections with the coastal highway to the north and south. The problem of congestion is exacerbated by heavy reliance on private cars, which number approximately 300,000 for a population of some 1.2 million in the GBA (about 250 cars per 1,000 inhabitants). More than 68 percent of total motorized person trips, more than half of which are home-to-work, are made by private car. Shared taxis account for nearly 15 percent of all trips, while just 17 percent of the population is served by private or public buses. In addition, latent travel demand is high and would materialize with improved supply of transport capacity.

3. **Greater Beirut Area Transportation Plan.** For Beirut to develop as a competitive regional center for finance, trade, services, and tourism, it needs an efficient transport system. To this end, the Government has prepared a comprehensive Greater Beirut Area Transportation Plan (GBATP), which addresses the most serious urban transport issues, analyzes needed investments through the year 2015, and recommends a large phased investment program (about US\$4.2 billion, including the cost of land acquisition). The prioritization and phasing of this program, which will be the largest single investment need in Lebanon over the next ten years, will require significant planning, consensus building, and resource mobilization. The proposed Urban Transport Development Project (UTDP) will provide the fundamental urban transport apparatus needed to address the particularly diverse and complex transport issues the city faces, and will support selected immediate actions of the GBATP.

B. Urban Transport Development Project

4. **Proposed project.** The UTDP will increase the GBA's economic productivity by improving the operational and economic efficiency of its urban transport system. Specifically, the project will help reduce the ever-worsening traffic congestion in the GBA and increase the mobility of its inhabitants. Significant savings in travel time and costs are expected as the direct outputs of project investments. The proposed UTDP will implement the initial phase of the GBATP by supporting five complementary components:

- (a) *Component 1. Traffic Management Improvement Program.* This will support: (i) installation of traffic signals and layout improvements for all significant intersections in the GBA, which

includes more than 200 locations; (ii) establishment of a Traffic Management Center (TMC) to monitor and control traffic operations using Intelligent Transportation Systems (ITS) technologies; (iii) capacity building in traffic operation and the area of ITS; and (iv) procurement of equipment and training services for the Traffic Police.

- (b) *Component 2. Parking Improvement Program.* This will support: (i) installation of pay-and-display parking meters along with necessary parking signage and marking to control about 6,500 on-street parking spaces, and procurement of towing trucks and booting equipment; and (ii) capacity building in the area of parking management; and (iii) development of appropriate regulations, pricing, and institutional arrangements for on-street parking control.
- (c) *Component 3. Corridor Improvement Program.* This will support: (i) construction of grade separation facilities at 19 highly congested intersections along 7 main corridors that are the main entrances to Beirut; and (ii) detailed design studies, construction supervision services, environmental mitigation and monitoring (including measures for cultural heritage), and implementation of a Resettlement Action Plan covering both resettlement and land acquisition. If changes occur in the number and location of intersections to be improved over the course of implementation, they will be subject to site-specific environmental and social review consistent with the approach used for those currently included under the project.
- (d) *Component 4. Technical Assistance for Public Transport Regulation, Urban Transport Planning, and Air Quality Management.* This will support: (i) regulation and organization of public transport services; (ii) preparation of an urban transport strategy for the GBA and other transport planning studies that would include engineering, economic, environmental and social studies as appropriate; and (iii) preparation of an Air Quality Management Plan.
- (e) *Component 5. Project Management.* This component will support project management services and operating costs and provide equipment for project management.

C. Environment, Resettlement, and Cultural Heritage

5. **Complementary studies.** Evaluation of issues concerning environment, cultural heritage, involuntary resettlement, and land acquisition has been an integral part of planning and design studies undertaken by the Government of Lebanon to support identification, preparation, implementation, and operation of the UTDP. The Council for Development and Reconstruction (CDR), the implementing agency for the UTDP, with the assistance of an international consulting firm, has undertaken preparation of an environmental assessment, including a detailed archaeological assessment; a resettlement action plan (RAP); and a social assessment (SA) as elements of the feasibility study. The findings and recommendations from the SA and RAP are addressed in Annex 11.

6. **Policy and legislative framework.** The environmental assessment and archaeological assessment have been prepared in compliance with the requirements of: (a) the Government of Lebanon, including the procedures of the Ministry of Environment and Directorate General of Antiquities of the Ministry of Culture; and (b) the procedures of the World Bank, including Operational Directive 4.01, "Environmental Assessment"; Operational Policy Note 11.03, "Management of Cultural Property in Bank-Financed Projects"; and Environmental Assessment Sourcebook Update No. 8, "Cultural Heritage in environmental assessment." It should be noted that Lebanon does not have a formal requirement for the preparation of Environmental Assessments for major investment projects; however, they are often prepared for projects that are supported by international financial institutions and donor organizations.

7. **Environmental assessment.** A detailed environmental assessment in compliance with the provisions of OD 4.01 for a “Category A” project has been prepared for the project. It includes an analysis of planning and design alternatives, development of an environmental mitigation and monitoring plan, and extensive public consultation. During the preparation process, the proposed construction of underground parking garages, initially included in Component 2 and finally dropped, would have required major adverse impacts in established urban public parks. The focus of the environmental assessment was on activities under Component 3 since they involve the greatest potential impact and require the majority of the mitigation and monitoring measures. The environmental assessment was submitted to the World Bank in advance of the appraisal and made available at the Info Shop and at a number of locations in Beirut. The Executive Summary, available in Arabic and English, has also been distributed to the Executive Directors of the World Bank.

8. **Participatory approach.** The preparation process for the Environmental Assessment included an active public participation program, conducted in three stages, to facilitate a broad-based dialogue and allow for transparency in project development. This process was complemented by additional consultations undertaken in preparation of the RAP and SA. The public hearings conducted for the environmental and social aspects of the project broke new ground in the use of consultative processes in Lebanon. Development of the environmental assessment benefited from two national-level consultations and 17 site-specific consultations, which were conducted by the CDR with the support of the consultant. Participation in these meetings included, but were not limited to, representatives from the Ministry of Transportation and Public Works, Ministry of Interior and Municipal Affairs, Ministry of Environment, Ministry of Health, Directorate General of Antiquities, National Scientific Research Council, municipal governments, Lebanese universities (American University of Beirut, Arab University, Lebanese University), SOLIDERE, merchants' associations and other private sector parties, community organizations and non-governmental organizations (Beirut Issues, Development and Environment Media Association, Green Forum, Lebanese Environment Forum, Order of Engineers, Rotary Club, etc.). A record of these consultations is provided in the *Environmental Assessment – Volume 3 – Public Participation*.

D. Environmental Assessment

9. **Evaluation of potential environmental impacts.** The environmental assessment found that the project will result in an overall improvement in urban environmental quality in Greater Beirut as a result of reduced traffic congestion in the vicinity of major intersections and access routes, and through complementary improvements in parking that will also improve overall traffic flow. The primary benefits will come from reduced noise from vehicles, especially horns, lower emissions from quicker-moving vehicles, and reduced light at street level in the evenings. The primary adverse environmental impacts are associated with the construction period and are discussed in detail below. In addition, there will be temporary impacts associated with the rerouting of traffic around the construction areas. These impacts can be mitigated by careful planning of the staging used for construction and rerouting of traffic, careful supervision of construction activities, and use of environmental monitoring to support management decisions by the CDR and other parties.

10. **Potential environmental impacts.** The Environmental Assessment found that the greatest potential environmental impacts will occur during the construction phase, particularly with respect to dust and noise emissions and from the temporary rerouting of traffic. Impacts include the following:

- (a) *Construction impacts.* Temporary impacts from the construction phase of the proposed project include: (i) noise, dust, vibration and light from demolition and construction activities; (ii) disruption of existing access roads during the construction process including noise and air quality impacts from vehicle emissions; (iii) establishment of temporary construction sites at intersections; (iv) damage to structures from dust and vibrations; and (v) improper disposal of waste oil and lubricants from construction equipment. Other important impacts are damages to

landscaping in public areas, temporary alterations in drainage patterns, and expansion of existing quarries for construction materials. Given the significant risk that unrecorded buried archaeological sites may be encountered during the excavations required for grade separation investments, an archaeological assessment was prepared. It includes mitigation and monitoring measures and is discussed in Section E, below.

- (b) *Operational impacts.* The primary operational impacts associated with the project include: (i) visual intrusion of overpasses constructed at certain intersections to improve traffic flows; (ii) routine traffic noise and vibrations in areas adjacent to the improved intersections and their access corridors; (iii) air quality impacts associated with emissions from trucks, buses and cars using the road; (iv) impacts associated with landscape maintenance measures; and (v) localized impacts from routine road maintenance activities.

Given the highly urbanized nature of the project area, the UTDP is not anticipated to have significant impacts from project-induced growth or land-use changes. More than 90 percent of all land in the vicinity of the intersections and along their corridors has been built and is largely occupied by medium and high-rise commercial and residential buildings and, at some locations, industrial facilities and warehouses.

11. **Analysis of alternatives.** The analysis of alternatives for the UTDP was conducted at three levels: (a) a strategic analysis was prepared in the short, medium and long-term proposals included in the GBATP, from which selected immediate actions were considered for project support; (b) a review was made of proposed Project component alternatives, including review of the no action alternative for each component; and (c) field-based site-specific design alternatives were evaluated for the grade-separation improvements at intersections.

- (a) *Strategic alternatives.* The GBATP evaluated two contrasting scenarios of transport patterns, which included a heavy mass transport network and a road-oriented network, and proposed a compromise between the two to determine the components of the immediate, medium-term and long-term action plans. The UTDP improvements in traffic management and parking will decrease the level of congestion required to operate public transport, beyond service taxis, at an acceptable level-of-service. The environmental assessment noted the importance of moving forward with the design phase of the mass transit element in order to identify and obtain the land and right-of-ways required for terminals, stations, and park-and-ride facilities.
- (b) *Project component alternatives.* All project components were analyzed from an engineering, environmental, and social perspective. This analysis supported the decision not to proceed with construction of the proposed underground parking garages beneath established parks in central Beirut, which would have resulted in significant construction period impacts. In the case of the parking facilities, the work focused on the identification of areas most appropriate for on-street parking and selection of the metering approach. Grade separation investments were evaluated for a range of potential sites and the type of structural changes that would be considered for implementation at each location. In addition, an analysis was made of alternative communication systems for use by the Traffic Management Center.
- (c) *Site-specific alternatives.* Analysis of site-specific alternatives focused on proposed grade separation improvements at major intersections. The focus of this analysis was the identification of measures that could minimize potential adverse environmental impact during the construction and operation periods. Adopted alternatives focused on changes in sequence of construction, modifications in the layout of structures, and adoption of design revisions.

These alternatives were discussed at the two national consultation meetings, which included the use of

questionnaires to assess views in a structured manner. They were also presented at local public consultation meetings, during which design drawings were reviewed and changes proposed and discussed with participants.

E. Environmental Management Plan

12. **Environmental Management Plan.** An Environmental Management Plan (EMP) has been prepared by the CDR, in consultation with the Ministry of Environment. It has a special component for addressing cultural heritage that was developed in consultation with the Directorate General of Antiquities (see Section F below). Mitigation actions would focus on environmental supervision of the construction contractors and actions to reduce traffic flow problems during the construction phase. The key mitigation activities of the EMP include:

- (a) *Design phase.* The detailed design process will finalize alignment of roads and layout of grade separation improvements, including lighting at intersections and supporting infrastructure. This process has incorporated final review of the designs by environmental specialists working on the project team. Issues addressed through a highly interactive process between environmental and engineering staff include: traffic routing schemes, air quality measures in open areas and tunnels, technical measures for noise control, actions to reduce impacts of landscape and visual intrusion, provisions for erosion control and drainage, and evaluation of options for proper disposal of waste materials. Applicable health and safety laws, regulations, and procedures have been evaluated.
- (b) *Construction phase.* Specific measures to reduce potential construction phase impacts will be implemented through provisions in design and construction tenders, consideration of these issues in the construction process, and performance monitoring by environmental consultants. Mitigation measures include rerouting of traffic around sites and extended construction hours; technical interventions to control air quality impacts, especially dust; actions to control noise from construction activities and rerouted traffic; provisions for protection of existing vegetation; planting of greenbelts and use of appropriate colors; erosion and water management; and clear guidelines for disposal of waste materials.
- (c) *Operational phase.* The project will address operational impacts through a combination of carefully detailed design approaches, increased enforcement of noise limits and, over the medium term, application of vehicle standards, maintenance requirements and routine monitoring.

The elements of the Environmental Mitigation Plan are provided in the Project Implementation Plan.

13. **Measures for construction contracts.** The EMP includes special measures for construction tenders and contracts:

- (a) *Construction tenders.* All construction contracts will include specific provisions concerning environmental, health, and safety measures. The EMP includes detailed briefings of potential construction contractors concerning their responsibilities to address these issues during a pre-tender conference. These briefings will outline the specific provisions of the construction tender documents and contracts.
- (b) *Pre-tender conference.* All pre-qualified contractors will be called to a pre-tender conference at which environmental, health, and safety issues of special interest or concern will be outlined.
- (c) *Bid documents.* To support the stipulations of the pre-tender conference, contract bid documents will include specific requirements and procedures concerning environmental, health,

and safety issues. In addition, the set of final engineering drawings will identify areas that require special measures due to their environmental sensitivity. Provisions will also be included concerning the proper transport and disposal of demolition, excavation and construction wastes at authorized disposal sites.

14. **Environmental Monitoring Plan.** The Environmental Monitoring Plan will be implemented by consultants working under the CDR in coordination with the Ministry of Environment. Environmental monitoring will undertaken during both the construction and operation phases to check the accuracy of the impact analysis, evaluate effectiveness of mitigation measures, respond to unanticipated environmental impacts, and improve traffic management and environmental control based on monitoring data. This will include provisions for:

- (a) *Continuous monitoring.* The monitoring plan will provide for continuous monitoring, during the construction phase, of health and safety conditions at the work sites and along the routes used for moving materials and personnel to and from the construction sites. Measures will also be included to ensure that demolition, excavation, and construction waste is disposed of at authorized sites.
- (b) *Quarterly monitoring.* The monitoring plan will provide for air, noise, and water quality measurements, which will be conducted on a quarterly basis to provide baseline and trend data to support management decisions. It will also include collection of monitoring data on a quarterly basis for traffic, landscape conditions, and vehicle and pedestrian accidents at intersections and traffic access routes as appropriate. Monitoring will be undertaken in and adjacent to equipment and vehicle service areas and fuel storage to reduce soil contamination and water pollution from improper management of waste materials.
- (c) *Provisions for site access.* Regular and frequent site inspections will be required to permit effective monitoring of the contractor's compliance with applicable environmental, health and safety guidelines, regulations and statutes, and contract specifications. For the EMP to be effective it will be necessary, during the course of construction and operation, for environmental consultants to have guaranteed access to all sites, related to any project component, at all times. Provisions to allow this access will be included in all contract documents and operating agreements.

The Environmental Monitoring Plan is included in the Project Implementation Plan.

15. **Environmental Monitoring Reports.** The consultant would prepare Environmental Monitoring Reports on a quarterly basis as an element of the overall reporting for the project. Monthly reports on health and safety monitoring, which will be summarized in the quarterly reports, will also be provided. These reports should contain an overview of progress achieved in implementation of the EMP. They should also note any areas of governmental and/or contractor non-compliance with the EMP and provide remarks on the recommended actions to be taken to address these issues. The significance of any non-compliance should also be noted. Copies of these reports should be sent to the CDR, the supervising engineer, and the contractors for their action.

16. **Estimated cost and implementation schedule for the EMP.** The CDR and consultants, in coordination with the Ministry of Environment, have prepared cost estimates for implementation of the EMP. A separate budget has been prepared for the EMP-CHC due to the number of actions required (see Section E). In addition, the CDR and the consultants are preparing a comprehensive implementation schedule that integrates the activities of the EMP into the overall schedule. The costs for implementation of the

environmental elements of the mitigation plan during the design and construction phases have been included in the cost estimates for these activities. During the operational phase, the costs of the mitigation actions will be assumed by the municipalities in which the investments have been made, and will be an element of their operation and maintenance budget. It is currently estimated that the quarterly and continuous monitoring activities under the EMP for the construction phase will have a total cost of about US\$0.6 million. The monitoring will be carried out by the supervision consultant, who will be commissioned for the overall supervision of corridor improvement. The supervision consultant will perform the monitoring activities either directly or through subcontracting to qualified consultants. A budget and schedule is provided in the Project Implementation Plan.

F. Cultural Heritage

17. **A rich cultural heritage.** The GBA has an extensive history of human settlement and includes a wide range of archaeological and historical sites. Beirut is well known for its long and complex history, and numerous major archaeological finds have occurred over the last 50 years in the course of construction. On the basis of the archaeological record and previous experience, it is anticipated that archaeological sites may be buried under some of the intersections at which grade separation improvements are planned. In order to address this concern, the environmental assessment includes preparation of an archaeological assessment that provides an evaluation of potential impacts to cultural heritage.

18. **Archaeological assessment.** The Archaeological assessment includes site-specific evaluation of potential risks, provisions for archaeological investigations, and monitoring during the construction phase, and use of archaeological chance find procedures in case significant materials are encountered. This study was prepared by the American University of Beirut/Archaeological Collaboration for Research and Excavation (AUB/ACRE) under contract to TEAM International. The work was done in coordination with the Directorate General of Antiquities and is similar in nature to work undertaken in the reconstruction of the Beirut Central District by SOLIDERE. The potential impacts of the project on unknown archaeological sites that may be located under intersections were discussed during the national and local-level consultation meetings held for the project.

19. **Methodology.** The aim of the archaeological assessment was to determine whether any cultural heritage resources would be threatened by the project, understand the evolution of settlement within the project area, study the function and date of the architectural remains, and identify historical land use patterns. A team of five international and Lebanese archaeologists conducted the study during 1998 and 1999. This work included two phases of investigation:

- (a) *Literature review.* A detailed review of both published and unpublished reports of excavations, surveys, and finds was made using the well-developed archaeological libraries in Beirut. This was supplemented by reviews of historical maps, photographs, and other records that show pre-urban or early urban conditions in the project area. The information was used to develop a preliminary assessment of the potential for archaeological and/or historical materials to be encountered during construction activities at individual intersections.
- (b) *Surface survey.* The team also conducted surface surveys of all the proposed intersections to assess local topography, current sediment morphology, depth of soil cover, and the visual presence of archaeological and/or historical materials in the area. This information was used to refine the preliminary assessment developed on the basis of the literature review, and site-specific evaluations were prepared for each of the intersections proposed for grade separation improvements.

It should be noted that the areas proposed for construction are not susceptible to more traditional methods of survey since they are in completely built-up urban areas and/or have been subject to urban site formation processes. These conditions render almost all sub-surface feature detection equipment, such as flux-gate gradiometers or resistivity meters, of limited use due to the complex nature of urban archaeological deposits.

20. **Findings and recommendations.** The archaeological assessment was designed to provide findings and recommendations that could be directly used to support project planning and implementation. It included:

- (a) *Evaluation of archaeological sensitivity.* All proposed sites for grade separation improvements were evaluated with regard to the potential types of archaeological materials and their state of preservation, archaeological periods that may be represented at the site, and the risk of encountering special features such as ancient graveyards with skeletal remains.
- (b) *Review of proposed construction-related excavation.* Representatives of The American University of Beirut (AUB/ACRE) worked closely with design engineers and surveyors from TEAM International to review the construction drawings for each intersection to determine the nature, extent, and depth of proposed construction-related excavations. This was followed by site inspections conducted by surveyors and archaeologists to check the drawings on the ground.
- (c) *Site evaluation methodology.* On the basis of the evaluation of archaeological sensitivity and type and extent of proposed construction-related excavation for each intersection, recommendations have been prepared concerning proposed site evaluation methodology. These vary, from evaluation excavations in selected areas subject to disturbance, through a watching brief where an archaeologist is available to inspect areas as construction-related excavation is undertaken.
- (d) *Chance find procedures.* The consultants has prepared chance find procedures that would be used by the CDR, Directorate General of Antiquities, engineering and archaeological consultants, and the construction contractors to provide timely and cost-effective measures should unanticipated archaeological materials be encountered during the construction process.

21. **Graveyards and burials.** The archaeological assessment, including the site visits, did not identify the presence of any cemeteries or individual graves in or around the areas proposed for construction activities; however, the possibility of unrecorded graveyards and burials cannot be ruled out given the long human occupation in Greater Beirut. If, in the course of construction activities, graves are discovered, the CDR's engineering consultant and cultural heritage consultant will immediately stop work in the area and consult with municipal and religious authorities to determine appropriate measures for the removal and reburial of the human remains in the graves.

22. **Archaeological mitigation plan.** The approach adopted in the archaeological assessment is that measures for identification, excavation, recording, and possible conservation of archaeological sites and/or cultural materials uncovered during the course of project-supported construction activities will vary according to the character, significance, size, and location of the site, and the nature of the threats affecting its integrity. Included in the archaeological assessment is a detailed overview of site-specific mitigation measures, which will be conducted by archaeological consultants working under the supervision of CDR. In addition, CDR, working in coordination with the Directorate General of Antiquities, is prepared to work with the construction contractor to modify the plans for grade separation improvements, when well justified, to avoid and/or minimize adverse impacts to significant finds. The planning process used in project preparation will minimize the need for salvage operations, and the use of chance find procedures provides a framework for actions required if

unanticipated materials are located.

23. **Measures for construction contracts.** Issues related to the effective implementation of the EMP-CHC by contractors will be addressed through specific activities as part of the tendering process. Actions will include:

- (a) *Pre-tender conference.* All pre-qualified contractors will be called to a pre-tender conference regarding cultural heritage issues, and the contractors will be briefed on: (i) chance find procedures; (ii) exclusion areas; (iii) special procedures to be adopted in the vicinity of sites defined as requiring protection; (iv) penalties for non-compliance; and (v) coordination with and responsibilities of the project's archaeological consultant.
- (b) *Bid documents.* To support the provisions of the pre-tender conference, contract bid documents should include a set of final engineering drawings on which areas planned for site-specific archaeological investigations and their schedule will be provided to the contractors. They will also be advised of the application of the chance find procedures during the construction process.
- (c) *Chance find procedures.* All contracts will include specific provisions for the use of archaeological chance find procedures in the event that unknown archaeological and/or historical sites or materials are encountered during the course of construction activities.

24. **Archaeological monitoring plan.** An archaeological consultant retained by the CDR will implement the monitoring element of the EMP-CHC. He/she will provide for continuous monitoring of the contractors' performance during the construction phase with regard to implementation of the archaeological mitigation plan, including contract provisions for site access and use of archaeological chance find procedures. As in the case of environmental monitoring, archaeological consultants will conduct regular and frequent site inspections to monitor the contractor's compliance with the archaeological mitigation plan and contract specifications. Provisions to allow this access will be included in all contract documents and operating agreements.

25. **Archaeological monitoring reports.** The consultants will prepare archaeological monitoring reports on a quarterly basis that will be an element of the Environmental Monitoring Reports. They will also provide monthly reports on archaeological monitoring that will be summarized in the quarterly reports. These reports should provide an overview of progress achieved in implementation of the EMP-CHC. The consultants will be formally instructed to immediately contact the CDR if construction contractors are operating in violation of the provisions for management of archaeological values, including the application of chance find procedures, included in their contracts. Copies of these reports should be immediately sent to the CDR, the supervising engineer, and the contractors for their action. If this type of situation arises, CDR will work directly with the Directorate General of Antiquities to make certain that archaeological values are protected and that the contractors comply with the special provisions in their agreements concerning cultural heritage.

26. **Estimated cost and implementation schedule.** The CDR and its consultants have prepared cost estimates for implementation of the EMP-CHC. In addition, the CDR and consultants have prepared an implementation schedule that integrates the activities of the EMP-CHC into the overall schedule. It is currently estimated that the EMP-CHC will cost US\$1.5 million to implement. This cost is included, on a site-specific basis, in the estimated construction costs of the Corridor Improvement Program. The estimated budget and schedule are provided in the Project Implementation Plan.

G. Policy and Training Program

27. **Planned activities.** The project includes support of a policy study for urban air quality and an

environmental training program:

- (a) *Urban air quality policy.* This study will be commissioned by the Ministry of Public Works and Transport and coordinated with the Ministry of Environment, with the participation of a broad range of government organizations, private sector interests, academic and applied research institutes, and non-governmental organizations. It will include evaluation of a range of preventive and curative measures that could be taken in a phased manner to improve urban air quality in Beirut. It will also include review of fuel improvements, vehicle emissions testing, emission-related taxes, and emission-related registration fees. Actions will also be identified to address other sources of air pollution in the GBA. The study will also examine issues related to traffic-generated noise and measures to address this concern.
- (b) *Environmental training.* The project will support a program of training that includes a series of sessions targeting the needs of national and local government officials, consulting firms and construction contractors, and local non-governmental organizations. The objective of the training program is to ensure environmental awareness, develop knowledge of environmental issues, and provide skills for implementation of the EMP. Training sessions will be conducted twice a year for a period of one day during the construction phase. Issues to be covered include: environmental legislation, pollution prevention measures, health impacts from pollution, environmental monitoring methods, conservation of cultural heritage, traffic and pedestrian safety issues, etc. These activities will be undertaken by the consultancy firm, which will be hired by CDR for supervision of the Corridor Improvement Program.

H. Reporting and Supervision

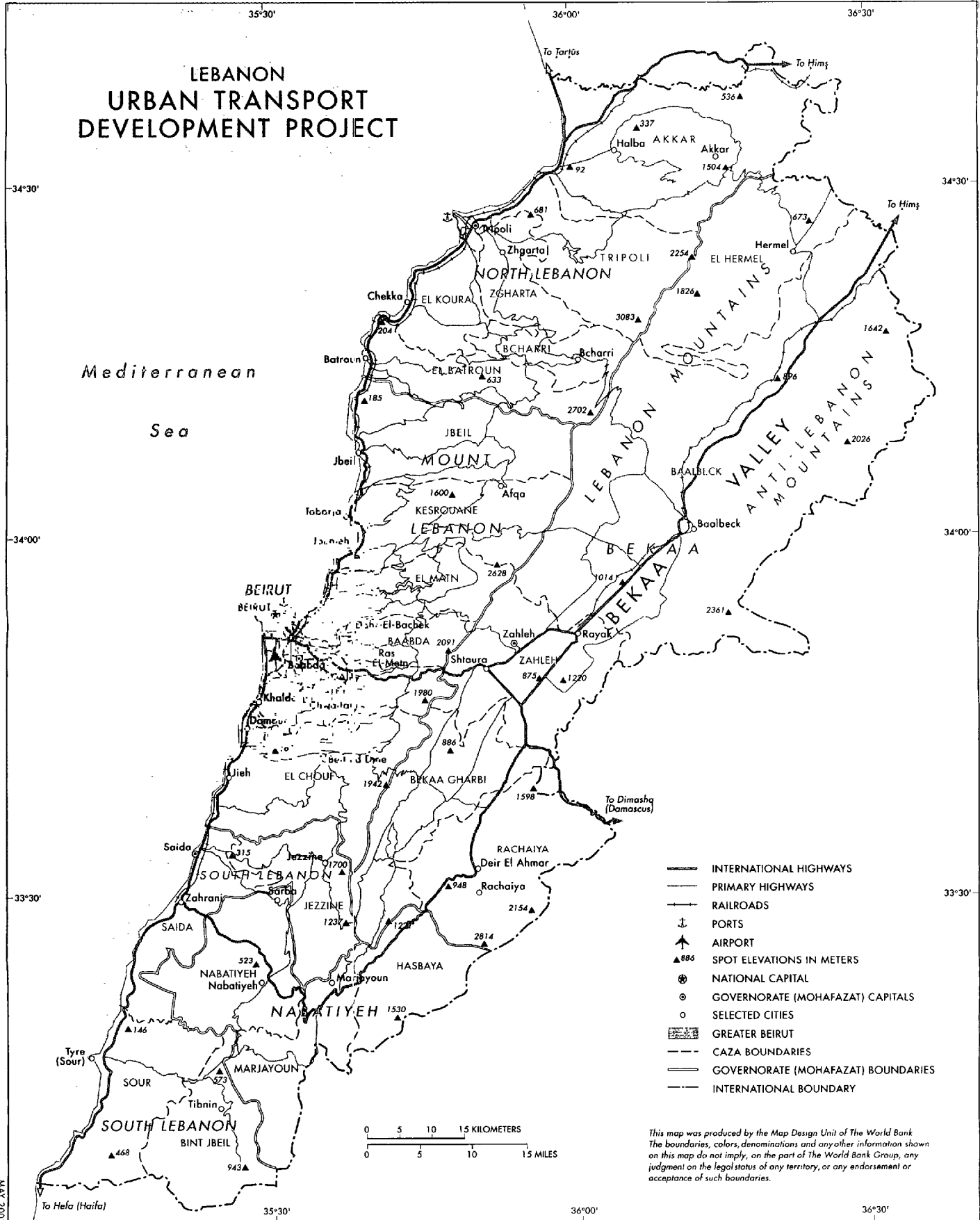
28. **Reporting.** As an element of project reporting, the CDR will prepare routine reports concerning progress in implementing of activities related to environment and cultural heritage included under the EMP, and activities for policy study and training. The reports should contain information on consultant performance, status of actions, and expenditures, and should identify issues requiring resolution. As necessary, supplemental reports with greater detail than the routine reports will also be prepared on these topics.

29. **Project supervision.** The supervision plan for the project will include participation of World Bank environmental and cultural heritage staff, or appropriately qualified consultants, in major missions to review progress in implementation of the EMP, including measures to address cultural heritage issues. The performance of the CDR, cooperating government organizations, consulting engineers, and construction contractors in the implementation of these activities will be a standard element of project supervision reports and included in the Mid-Term Review and the Implementation Completion Report.

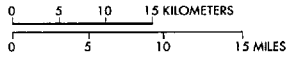
MAPS

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IBRD No. 30911
IBRD No. 30912
IBRD No. 30913
IBRD No. 30914***

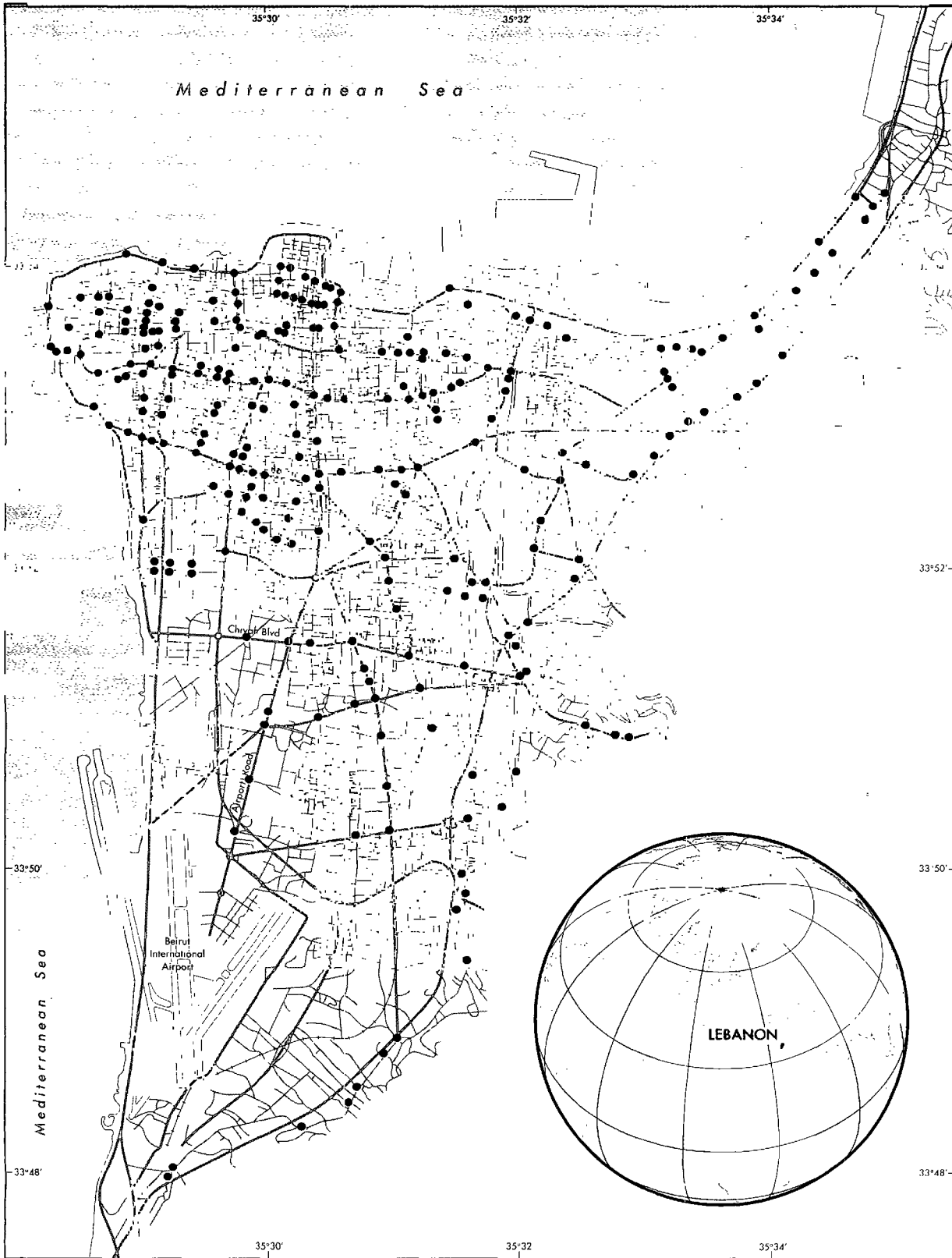
LEBANON URBAN TRANSPORT DEVELOPMENT PROJECT



- INTERNATIONAL HIGHWAYS
- PRIMARY HIGHWAYS
- RAILROADS
- ⚓ PORTS
- ✈ AIRPORT
- ▲ 886 SPOT ELEVATIONS IN METERS
- ⊙ NATIONAL CAPITAL
- ⊙ GOVERNORATE (MOHAFAZAT) CAPITALS
- SELECTED CITIES
- ▨ GREATER BEIRUT
- - - CAZA BOUNDARIES
- GOVERNORATE (MOHAFAZAT) BOUNDARIES
- INTERNATIONAL BOUNDARY



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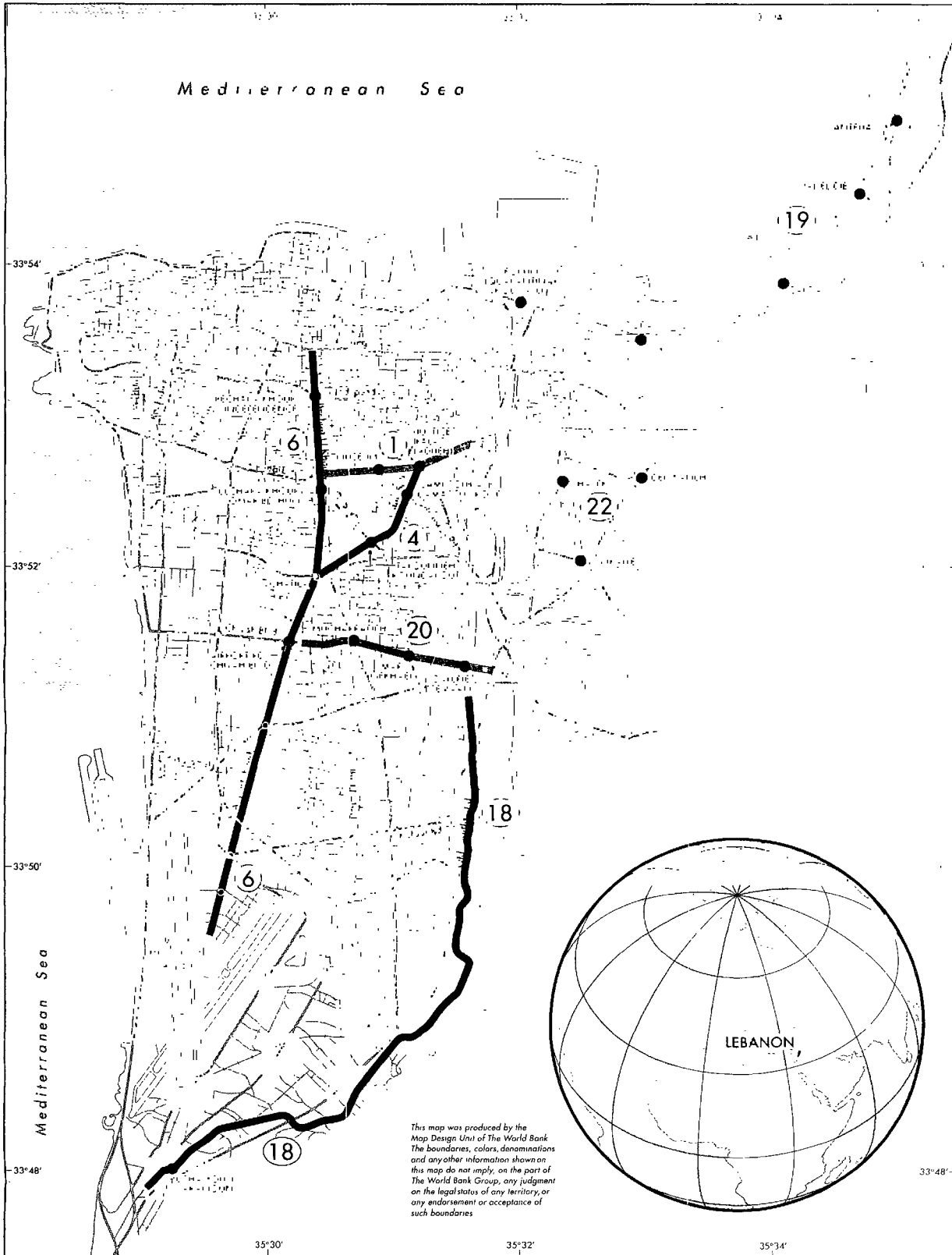


**LEBANON
URBAN TRANSPORT DEVELOPMENT PROJECT
TRAFFIC SIGNALS SYSTEM**

- PROPOSED SIGNALS
- EXISTING SIGNALS
- MAIN ROADS / STREETS
- SECONDARY ROADS / STREETS
- RAILROADS



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LEBANON URBAN TRANSPORT DEVELOPMENT PROJECT CORRIDOR IMPROVEMENT

PROPOSED GRADE SEPARATION LOCATION

- CORRIDOR 1: CORNICHE EL-MAZRAA
- MUSEUM
- ADLIEH
- CORRIDOR 4: CHATILA-TAYOUNNEH-SAMI SOLH-ADLIEH
- TAYOUNNEH ROUNDABOUT
- SAMI SOLH AVE/DAMASCUS ROAD
- CORRIDOR 6: AIRPORT ROAD-BECHARA KHOURY BLVD.
- AIRPORT ROAD/CHIYAH BOULEVARD
- BECHARA KHOURY/OMAR BEYHUM
- BECHARA KHOURY/INDEPENDENCE
- CORRIDOR 18: OLD SAIDA ROAD
- BCHARMOUN/ARAMOUN

CORRIDOR 19: NORTHERN ENTRANCE

- ANTELIAS
- JAL EL DIB
- ZALQA BRIDGE
- DORA BRIDGE
- FORUM (QUARANTINE/R. GEMAYEL)

CORRIDOR 20: CHIYAH BOULEVARD

- MUCHARRAFIEH
- MAR MEKHAEL
- GALERIE SEMAAN

CORRIDOR 22: SALOUME-HAYEK-MKALLES

- HAYEK
- MKALLES ROUNDABOUT
- DEKWANEH

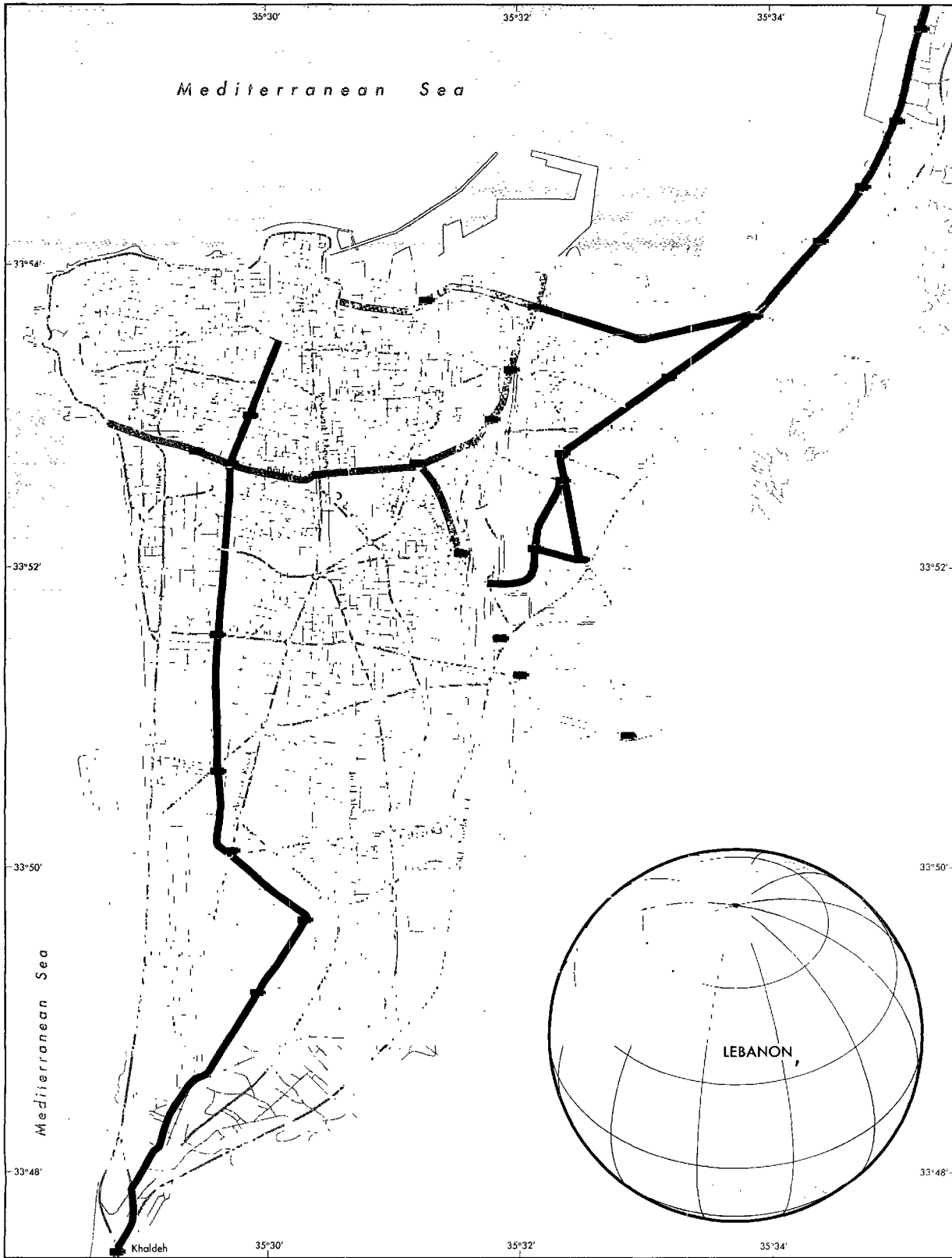
● GRADE SEPARATION INTERSECTIONS

— MAIN ROADS / STREETS

— SECONDARY ROADS / STREETS

— RAILROADS





LEBANON URBAN TRANSPORT DEVELOPMENT PROJECT CCTV SYSTEM

- COLOR CCTV CAMERA LOCATIONS
- MAIN ROADS / STREETS
- SECONDARY ROADS / STREETS
- RAILROADS



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35°30' 35°32' 35°34'

LEBANON

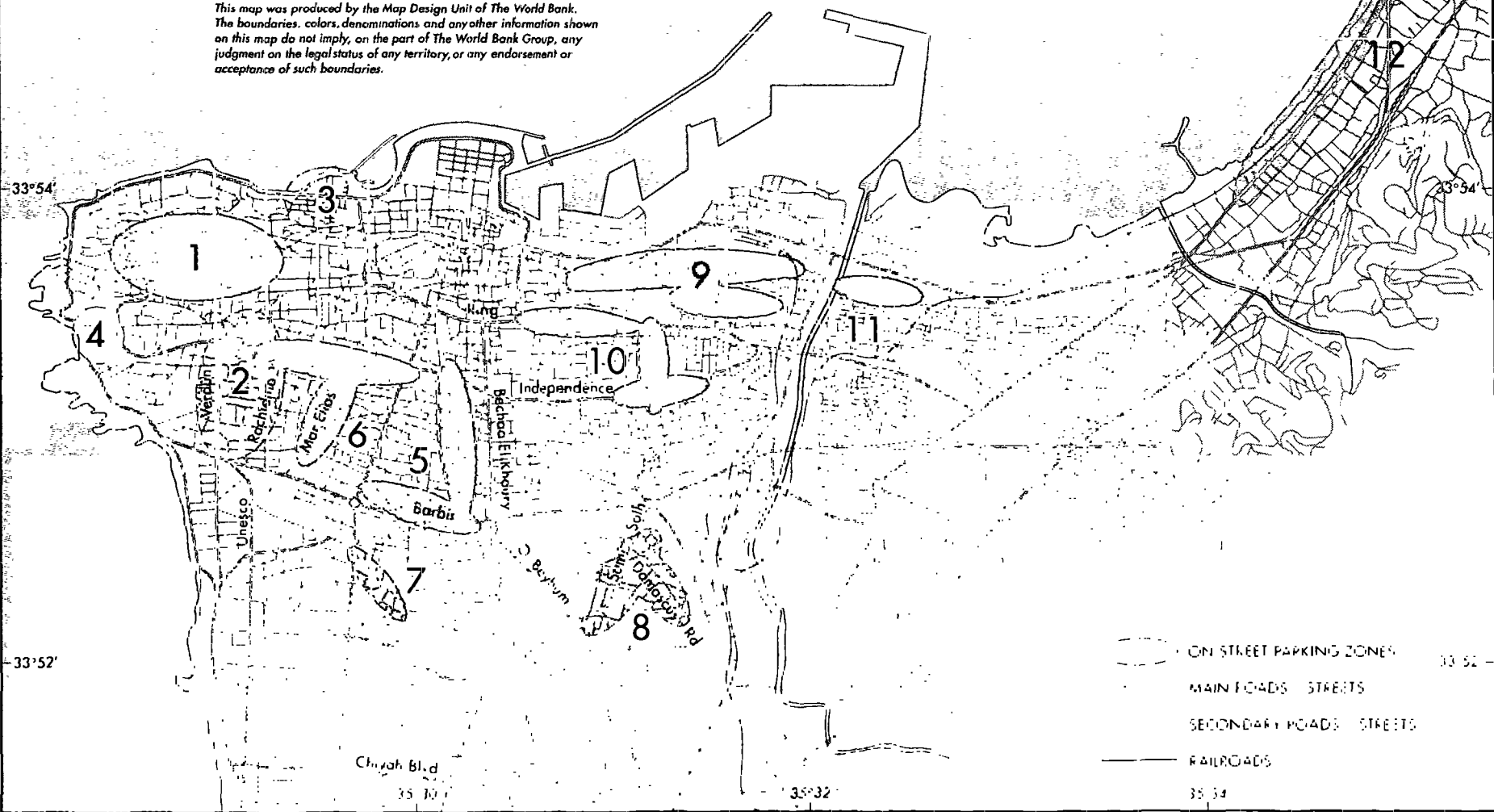
URBAN TRANSPORT DEVELOPMENT PROJECT

ON-STREET PARKING ZONES



Mediterranean
Sea

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IMAGING

Report No.: 20569 LE
Type: PAD