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REPUBLIC OF LEBANON

COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

Republic of Lebanon
Office of the Minister of State for Administrative Reform
Center for Public Sector Projects and Studies
(C.P.S.P.S.)

GREATER BEIRUT TRANSPORTATION PLAN

REPORT NO. 3

MASS TRANSIT IN GREATER BEIRUT

A DIAGNOSIS

JULY 1994

TEAM INTERNATIONAL - IAURIF - SOFRETU

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EXECUTIVE SUMMARY

Currently, the mechanized trip market is mainly ensured by the use of private car (60 %) in contrast with the use of all other modes (mass transit 40%), in the Greater Beirut Area

Mass transit includes all types of vehicles (buses, vans, shared taxis), all types of situations (legal, illegal) and mostly without organization.

The situation of mass transit is very worrying as the public transport company (TCB) is near of vanishing, leaving the field clear for the private initiative, specially illegal transport, with all well known consequences on transport supply.

The most important points emerging from the diagnosis are :

→ the absence of a Transport Regulating Office, being an authority on all transports,

→ the failure to appreciate all micro-economic and macro-economic incidences of transport system and its cost,

→ the inadequate use of all collective transport means, all being individually run without any coordination,

leading to the following consequences :

→ the prospect of an appreciable downgrading of level of service in Greater Beirut Area,

→ the progressive emergence of a "two-level" society in front of the transport, with important social effects.

The disorganization is never profitable to anyone. Operators, as they will be more and more numerous, will have more difficulties to balance expenditures. While passengers, do not have all the same mobility, thus leading to serious social problems.

Main objectives are of two different natures :

→ one is at a national level; it is to restore the authority of the State on transport, first by the creation of a Transport Regulating Office to implement a balance between private and public sectors. It is also the recapture of the market of mass transit by improvement of the image of collective transport and the limitation of the use of the private car ;

→ the other is more technical : to preserve economic balance by an optimization of the transport cost, both for households and communities, and, thus to permit operators to achieve the balance between operation expenditures and revenues and enable vehicles renewal.

FOREWORD

The Immediate Action Plan is defined as a series of measures that can be put into service as quickly as possible, using more efficiently all existing means and minimizing additional investments. The Immediate Action Plan for mass transit is included in this perspective and has to permit to put into service, in the short term, a mass transit system which could provide a good level of service. Proposed measures can of course be implemented in stages.

This present report constitutes the diagnosis established after all data collection. Some data, necessary both for immediate action plan and mid-term or long-term plans, such as household survey, and traffic surveys, were not yet at a stage which allows using their results in this report. These results provide better knowledge on current demand and will be used later to design the future network.

The diagnosis is mainly oriented to the analysis of the current mass transit system :

- → the institutional environment,
- → the operation as seen by passengers,
- → the evolution of capabilities.

1 - PROBLEM STATEMENT

From a long time, mass transport in Beirut has never been a main worry of all actors. Last twenty years of unstability, has marginalized public services, and enforced private initiatives resulting in the division and even the "atomization" of transport.

It can be seen that Railways and Public Transport Office displayed even before the war, a transport supply below that offered in a conurbation of the same size, about one million of inhabitants. In fact, Beirut was operating a fleet of 110 buses, compared to Dallas (USA) which operated 725 buses and Genova (Italy) which operated 540 buses. Currently, about 30 buses of public transport only are still available.

GBA is served currently by four types of transports open to all passengers :

- → public buses belonging to TCB , the public transport company,
- → private buses, so-called "bostas" belonging either to companies of variable sizes or to individual operators. Buses of a capacity of 40 seats, are providing, urban, suburban or intercity services,
- → private vans, operating as shared-taxis, with a capacity of 10 to 15 seats each, operating most of them in southern suburbs of Beirut,
- → shared-taxis, so-called "taxis-services", operating passenger cars that can be distinguished by a red license plate, are abundant.

Beside these operators, illegal operators are abundant, most of them are operating cars or small vehicles as buses or vans in a total illegality, i.e. having black license plates.

Beside these "open-to-all" transport, special transport is provided by employers and schools. Some is owned transport, some is chartered transport. This special transport is not taken in account in all calculations of this report, when talking of "collective" or mass transit transport. A brief analysis of this special transport is carried out further in this report.

The numbers in the hereafter form were collected in April and May 1994. Some of which are rounded up as the situation of transport, mainly illegal transport, is fluctuating everyday and difficult to assess. Entry and exit is according to economic reasons (inflation, fall in value of money, unemployment, ...).

General features of networks (*)				
Network	Routes or corridors	Average operating fleet	Daily number of passengers	Part of market of each mass transit
- TCB	9	30	20 000	2 %
- Bostas	9	100	40 000	4 %
- Vans	3	450	50 000	5 %
- Taxis services (legal)		5 000	200 000	22 %
- Taxis services (illegal)		15 000	450 000	50 %
- Special vans and buses		-	140 000	16 %
TOTAL	-	20 580	900 000	100 %

(*) Rounded up numbers

Although complete and definitive results of the data collection are still in the analysis, and final values could be different, but in order to clarify the debate about the role of each mode, the number of all "mass transit" trips in GBA was estimated at 900 000. Shared-taxis, legal or not, operate more than 70 % of all needs, while public TCB buses serve only about 2 %.

2 - URBAN AND SOCIO-ECONOMIC ENVIRONMENT OF GREATER BEIRUT AREA (GBA)

2.1 SPATIAL ORGANIZATION OF THE TERRITORY

The evolution of the structure of mass transit, from a radial design to the downtown with a point of convergence located at Place des Canons to the nowadays design of routes, reflects the urban structure of the GBA. This concordance between the network and the localization of main traffic areas shows the current dispersal of urban functions ensured in the past by the downtown.

The city does not have currently a downtown, but several commercial and business centers. These centers are located on both sides of the ex-demarcation line :

- → west side, within Beirut city limits, as Mar Elias, Verdun, Hamra,
- → east side, within Beirut city limits as Achrafié, and outside city limits as Zouk, Antélias, Sin el Fil.

This new repartition of central functions was accompanied by a upward tendency of housing on land away from fighting zones. South of the west side was invaded by spontaneous housing, and slopes above Khaldé were covered with residential buildings. On the east side, urbanization invaded the coastal corridor, and from it, most of Metn and Kesrouan hills.

The resulting land organization is currently as follow :

- → sectors of never ending dense housing in Beirut city, southern suburbs to the airport, along the north coastal corridor and on the hills till Bikfaya and Broumana,
- → sectors of industrial activities, on one hand, along the sea from Quarantine Harbour till Antélias, on the other hand, located along the Beirut Périphérique,
- → sectors of commercial centers, mainly set up at north, along the expressway,
- → sectors of schools and universities spread over all territory with some main concentrations at Râs Beirut (American University of Beirut), at Achrafié and Haddath with the opening of the Lebanese University.

The graphic representation of the land use, drawn up by the IAURIF (Institut d'Aménagement et d'Urbanisme de la Région Ile de France), is featuring in plan n° 1.

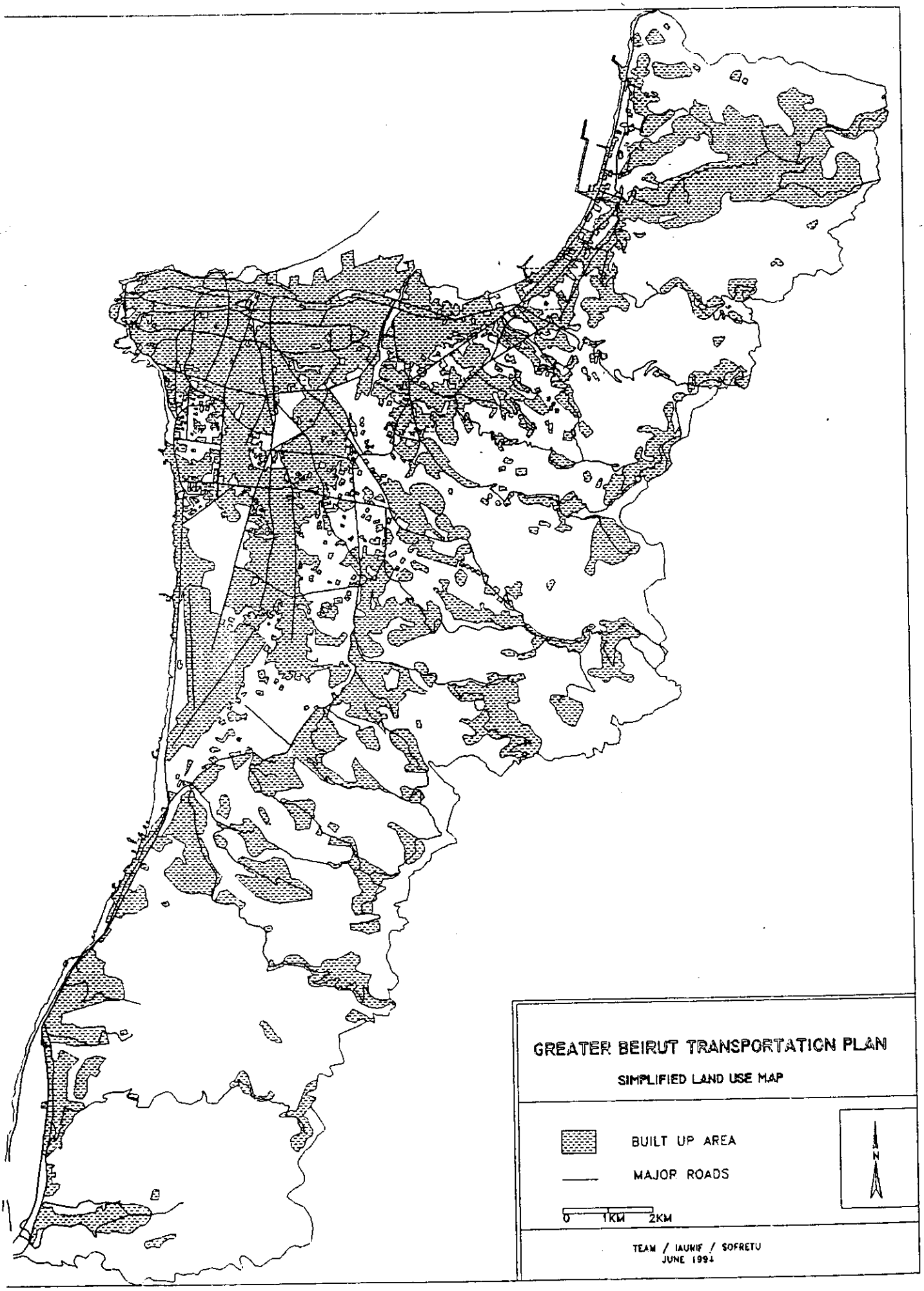
2.2 LOCATION OF THE POPULATION

According to the most recent estimation, GBA would count currently about 1 300 000 inhabitants. The study carried out for the CDR in April 1988 by Gicome and Mass Institute (Urban and intercity transport in Lebanon) provided a distribution of the population in 1985 (plan n° 2). The household survey, recently completed, will provide an update of this distribution.
Population distribution shows particularly an important concentration in the southern suburbs of Beirut. This low resourced population concentration ingenerated many trips leading to spontaneous creation of illegal van routes.

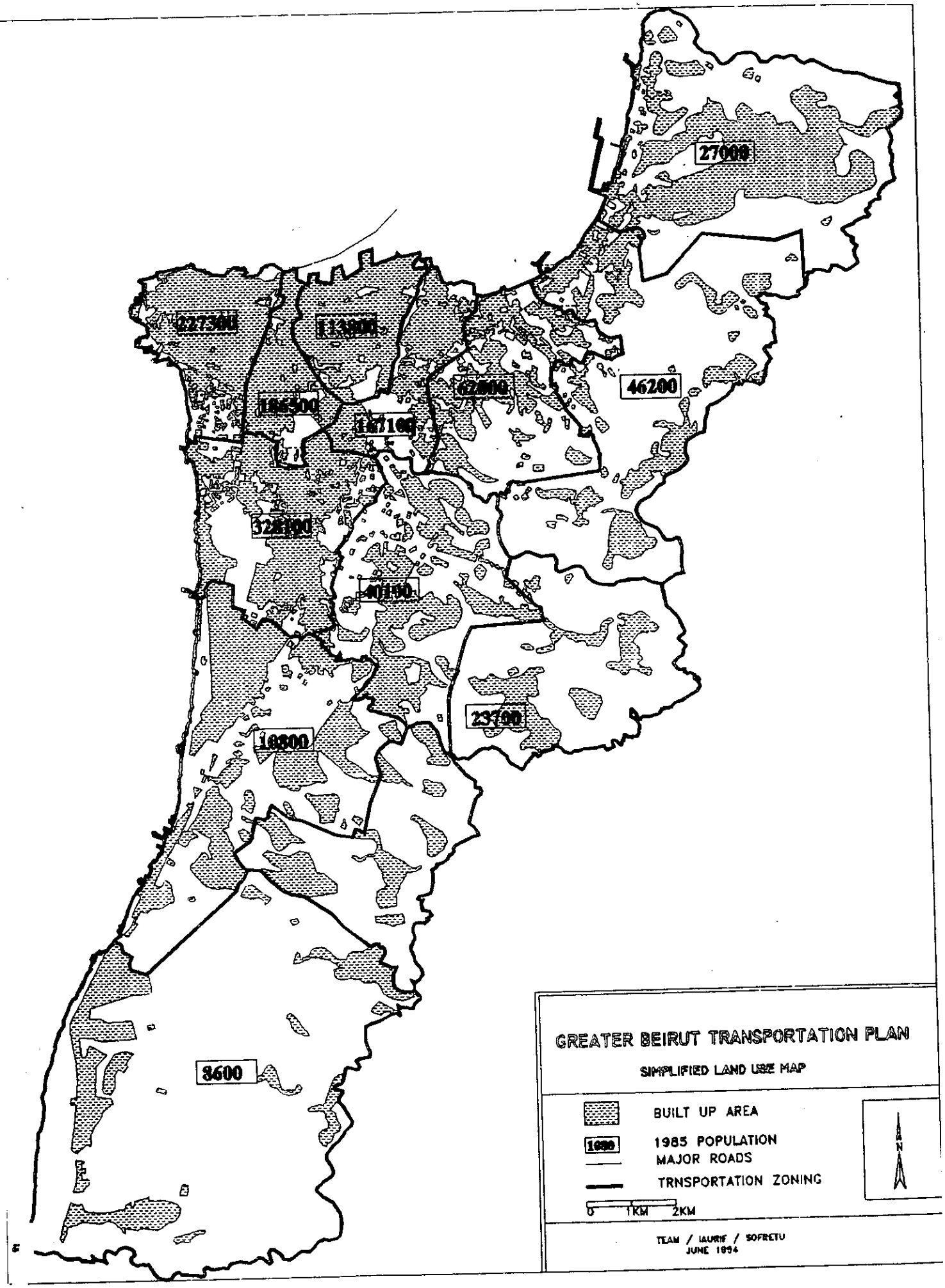
2.3 CAR OWNERSHIP

Private car is in Lebanon the privileged means of transport. In 1985, the *Schéma Directeur assessed the part of trips made by private cars about more than 75 % in a country* where 1 000 000 cars were circulating (source : The white book of Lebanese economy).

PLAN N° 1 - SIMPLIFIED LAND USE MAP



PLAN N° 2 - LOCATION OF THE POPULATION



Same statistics about GBA are not yet available but applying the national car ownership rate per inhabitant to the population of the GBA leads to 430 000 private cars in this area. It shows a very high rate of household car ownership, more than 1 car per household. If these calculations turn out to be correct, GBA motorization rate would be at the same level, perhaps higher, than that of Ile de France region.

However, it is not true to conclude that there are no mass transit captives among the citizens of Beirut. In fact, on one hand, the size of a household is higher than that in Ile de France region, while on the other hand, the proportion of motorized households is lower, involving a rate of multi-car households. At some intervals of a day, 80% of the population has to use anyone of the mass transit modes.

2.4 TRANSPORT INFRASTRUCTURE

2.4.1 Road network

The road network reflects the topography and history of the city. The topography explains partly the structure of the 3 main radial links :

→ on one hand, coastal expressways linking Beirut city to north and south of the country,

→ on the other hand, the road link Beirut - Damascus.

This "T-bone" structure involves a traffic concentration on these roads forcing all trips between mountainous districts to transit by the seaside or nearest suburbs.

In Beirut city, historical narrow streets were changing step by step to a hierarchical network :

→ set up and development of a ring road, with two lanes in each direction, on the Corniche Mazraa, Corniche Gemayel and along the seaside corniche.

→ set up of several main east-west roads, as the" Ring" located at limits of the former downtown, Independence Avenue or Fouad Chehab Avenue,

→ planned development, till the downtown, of penetrating streets coming from the airport and from southern suburbs.

Beirut city has a road network twice as dense *(23 km/km2)* as that of Paris (11 km/km2), (source : Schéma Directeur 1986). But, there are important missing links in the nearest suburbs, particularly in the southern suburbs. However, the rehabilitation program of the southern suburbs will create the needed infrastructure : namely Ouzaai/Hazmiyé and Borj El Brajné/ Haddath.

2.4.2 Current congestion of the road network

The current congestion of the road network can be explained by :

→ the attractivity of Beirut city on all the region and the country,

→ the discontinuous situation for some routes,

→ the deficiencies of the suburban road network, given to the topography, leading to a "petal-shaped" service that increase the congestion of central districts, where all flows accumulate, even suburb to suburb flows,

→ the lack of well-run public transport

→ the chaotic use of the roads that have to complete several functions (circulation, parking, trade),

→ the undisciplined driving (no respect to the highway code, circulation on the left lane, boarding of passengers anywhere in contempt of any steady flow of the traffic, double even triple stopping,).

→ the lack of road maintenance .

To provide a performing mass transit system, able to compete with the private car and whose operating costs would be reasonable, it will be necessary that measures in favor of public transport be implemented.

2.5 TRAFFIC AND TRIPS .

The end of the war has certainly marked the beginning of a high increase of mobility of Lebanese people and particularly Beirut residents. In the same time a wider permeability between the different zones of the conurbation occurred, trip origins and destinations were multiplicated.
The results of the household survey and several investigations and counts, in course of analysis, will provide in a few weeks precise information.
For now, information at disposal are, on one hand, old data analyzed in the Schéma Directeur (1984), and, on the other hand, the first results of counts per type of vehicle carried out on 3 cordons of the study area (plan n° 3), given 34 places of counts.
The Schéma Directeur estimated, in 1984, 1 600 000 vehicular daily trips made by GBA population. These trips were shared approximately 1/3 inside Beirut, 1/3 between Beirut and suburbs, 1/3 inside suburbs.

These values have for sure widely modified, both in total volume, and in origin and destination. Other lessons that can be reasonably learned are showing following evolutions for last years :

→ a doubling of the number of penetrating trips in Administrative Beirut , main part of this increase is made by trips coming from the south (+ 150 %),

→ a tripling of flows crossing a line Bir Hassan - Hazmiyé, so confirming the increase in traffic coming from the south,

→ a very high increase in trips coming from zones outside the GBA.

This increase is mainly due to the revival then the acceleration of exchanges between Beirut and the southern zones, and secondary, due to the normal increase of exchanges between densely populated zones of the north of the conurbation.

In term of modal choice, observations carried out along the 3 concentric cordons around Administrative Beirut provide an approximation of market share of each mode .
Globally, motorized trips are done :

→ 60 % by private car,

→ 20 % by illegal taxi-service

→ 9 % by legal taxi-service,

→ 11 % by vans, bostas and buses.

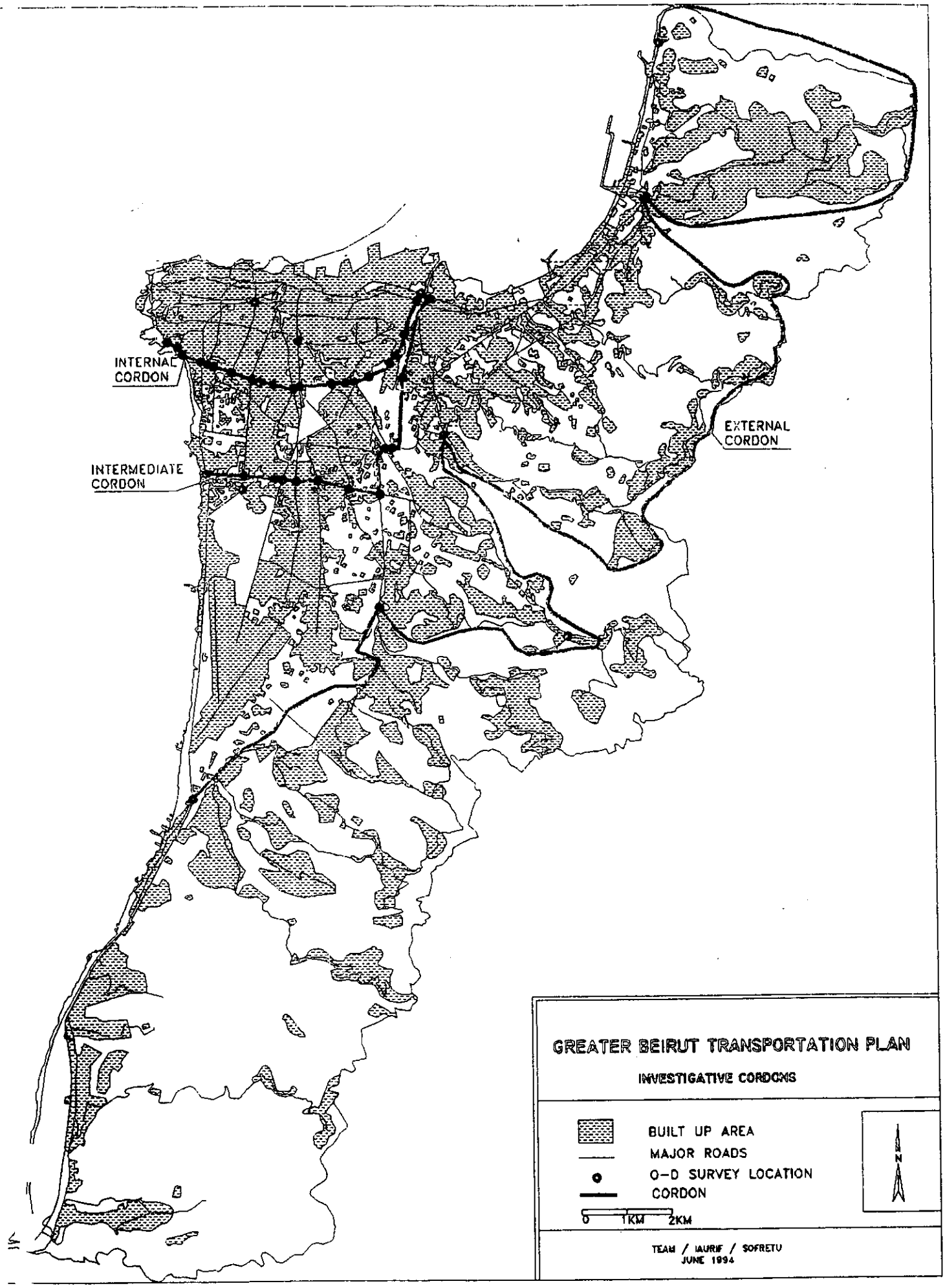
The Schéma Directeur (1984) assessed 76 % of trips by private car but made an inventory of only 7 % of illegal cabs. The first analysis of the 1994 counts confirm :

→ the high use of car,

→ the low performance of TCB (1%),

→ the high demand from southern suburbs residents (17 % of illegal cabs and 8 % of illegal vans).

PLAN N° 3 - INVESTIGATIVE CORDONS



3 - INSTITUTIONAL ENVIRONMENT

Several institutional actors deal with the field of passenger transportation in the Greater Beirut Area. Each one is more or less in charge of the organization of the transportation system, and its functions have more or less consequences on economic and financial matters. The functions and the decisions of these actors fit over the whole public transport system which is operated by a Public Transport Authority (TCB) and a lot of private ones.

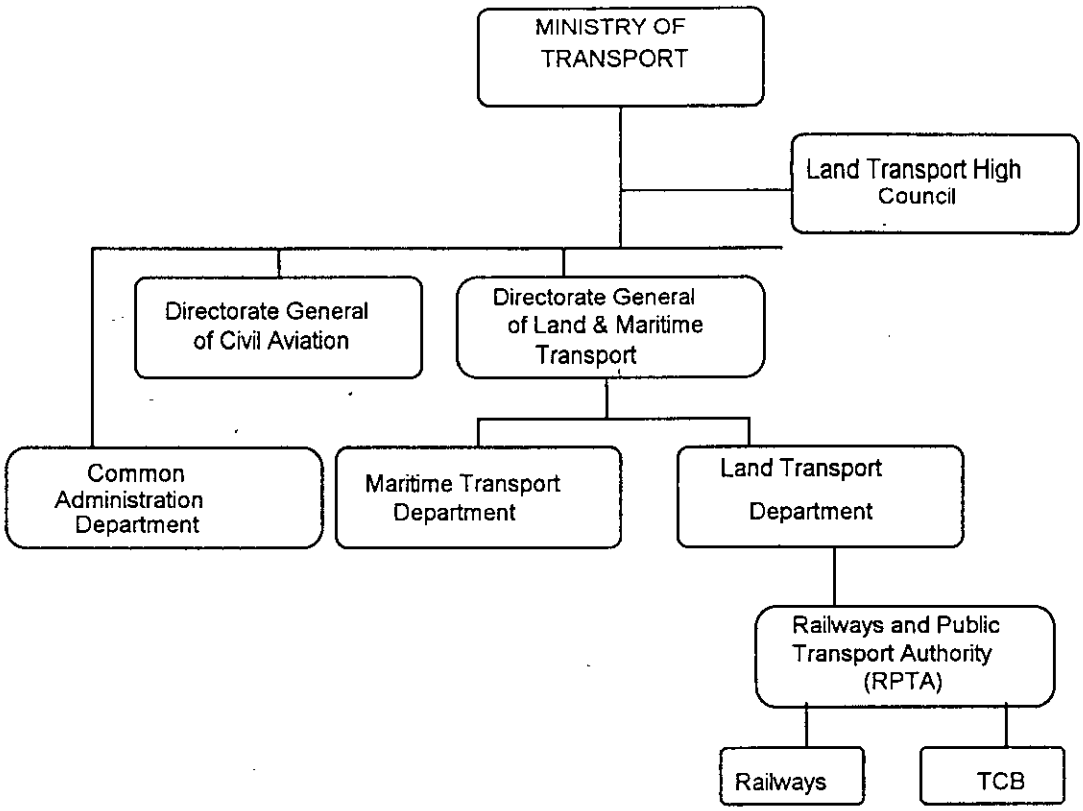
Passenger transport have both micro-economic and macro-economic consequences and also social ones. The level of industrial and commercial activities depends on the accessibility to manpower and customers. Households need an efficient transport system for their home-to-work trips and also to carry out private activities according to an optimal travel time and best price. Raising the transport expenditure implies, generally, the drop of the purchasing power for other domestic needs.

As far as the macro-economic effects concerned, the increase of the use of private cars in the urban area raises the road congestion and multiplies the effects of negative "externalities" : pollution, noise, road accidents, waste of time, loss of production, effects of car and oil purchasing on the trade balance, etc. which produce handicaps for the national economy. Some externalities have immediate effects ; others will have consequences in the middle and long terms.

The efficiency of a public transport system obviously depends on the know-how of the operators. But it depends mainly on the institutional actors in charge of its general organization, of its development and control. Moreover, to guarantee this efficiency for the short, middle and long terms, the organization and the development of the public transport system must be continuously adapted to the urban evolution. So, the public transport policy (and choices) must be defined at the upper policy making level .

3.1 INSTITUTIONAL ACTORS

The present organization of public transport deeply limits the role of the institutional actors . The chart below gives a schematic presentation of these actors.



A PARTIAL ORGANIZATIONAL CHART OF THE LAND TRANSPORT FUNCTION WITHIN THE MININISTRY OF TRANSPORT

It is necessary to notice that the organization of a public transport system is not only based on the competencies of institutional actors and on the operational and technical know-how of the transport operators. The legal framework must be also adapted to an efficient organization which allows each actor to exercise its functions without any ambiguities.

The analysis of the legal framework of the public transport system will allow to clarify, through the main laws and statutory-orders (decrees), the rights and duties of each main actor.

The Ministry of Transport was created in 1993. Before that the transport function was part of the Ministry of Public Works (MPW).
The Directorate General of Civil Aviation and of Transport (Maritime & Land) were moved from the MPW to the newly created Ministry.
The Railway and Public Transport Authority (RPTA) was widened in responsibility to take care of Public Transport in the entire country and not only Beirut, as it was earlier. The RPTA is under the supervision of the Ministry, but is an idenpendent public authority, which has its own Board of Directors.

As far back as 1966, the Land Transport High Council was formed, but it never convened. Lately this council is being revised and its membership widened. It remains as an advisory and coordinating body headed by the Minister of Transport. It is due to meet, for the first time, on July 27, 1994.

3.1.1 The Directorate General of Transport (DGT)

The decree 1611 of July 21 1991 spells out the mission and the mainstake of the Directorate General of Transport, which includes both land and maritime tranport. As far as land transport this decree spells out the mission, summarized as follows:

→ to organize and to co-ordinate the land transportation activities and their development ;

→ to control the implementation of these activities ;

→ to set the land transportation fares ;

→ to analyze and control the evolution of every land transport mode;

→ to forecast and analyze the effects of activities with regard to national economy ;

→ to compare statistical data to land transportation ratios with that of foreign countries.

The tasks of the Directorate General of Transport (DGT) is strategic. Indeed it must be in a position to promote the development of the transport system and to propose it to the government through the Ministry of Transportation. But this strategic function implies also that the DGT has enough power to enforce the instructions and the choices of the government vis-a-vis specialized organisms, the transport companies, and all entities which deal with the transport system.
This general mission of the DGT does not allow it to distinguish between the passengers and the goods transportation. Both are strategic as far as economy, social, way of life, is concerned and the duties and tasks of the DGT applies to each one.

It is also interesting to notice that the decree does not mention whether the transportation activities which depend on the transportation policies applied by DGT may be operated by public or private sectors. More than twenty years ago, when this decree was promulgated, the question of the organization of public transports by public or private operators was probably not topical. It seems to day that the importance of private operators must be taken into consideration in order to reinforce the organization and co-ordination tasks which might become more and more strategic.

3.1.2 The Railways and Public Transport Authority

The railways and the public transport depends on the same Authority which was set up in 1961 (law April 14th and decree n° 6479). At the beginning, this Authority was only responsible for the Beirut urban area i.e. the municipality of Beirut and the suburban municipalities. Since 1988, this office is in charge of the public transport system for the entire Lebanese territory.

The main objective of this extension of its attributions appears to be the urban expansion of Beirut and also the expansion of other main agglomerations. But other purposes may explain this extension : the progressive increase of long-distance trips and, above all, the necessity to take as a whole the problem of public transport through a single organism in charge of the implementation of a public transport policy taking into account the various characteristics of passenger trips.

According to this legal framework, the missions of the Railways and Public Transport Authority may be summarized as follows :

→ to manage and to operate the railway network (2 coastal lines linking Beirut to the North and the South of the country and the line Beirut-Rayak and beyond to Syria) ;

→ to manage and to operate the public transport system, and especially the urban one.

The Authority is managed by a Board of 7 directors, 2 of them are President and General Manager. As far as the financing of the networks is concerned, the third article of the decree n° 6479 specifies that the Railways and Public Transports Authority has a special account which may be credited in particular with the following resources : operating receipts, sales of movable and immovable properties, subsidies brought by the Lebanese State, loans with the State guarantee,...

Referring to these legal missions, this organism might be really in charge of implementing the public transport policy which is defined by the government. Its role might be very important with regard to the development of the network and the general organization of the bus and railway supply : choice of routes, frequencies,... It means that the Authority might have a huge role in the evolution of the supply according to the increase of the transport demand and for the general management of projects.

At present, this office is no more in a position to perform this role. The situation of the railway is very bad and it cannot be improved before several years. The situation of TCB is also worrying. The war has damaged the "brand image" of the bus network not only because of the material destruction but also because a trip by bus was more dangerous (a bus may be a target) than a trip by a personal mode. Moreover, since the end of the war, the transport supply by TCB company is continuously decreasing. Furthermore, the RPTA does not have the capacity to coordinate the activities of private companies (or operators). Its role in the general coordination of the Beirut trip market is therefore notably reduced.

3.1.3 The Land Transportation High Council

Land Transportation High Council was created through the decree n° 5540 (September 17th 1966). When analyzing this decree, it appears that the objectives were mainly to create an organism in charge of the general co-ordination of all transportation activities, at the top level of the Ministry of Transport.

By this way, it seems that the lawmaker has wanted to gather all people who have responsibilities in the field of transportation (goods and passengers sector) in order to solve specific questions with the most efficient representatives (including the publics works for the road maintenance, the management of the road network, the security of the road traffic, the fleet of cars, trucks, buses, taxis,...).

The President of this Council is the Minister of Transportation and it includes, in particular, the Director General of Transport, the General Manager of the Railways and Public Transport Authority, the Director of Roads (Ministry of Public Works), the Director of Department of the Vehicle Registration (Ministry of the Interior), etc. The decree stipulates also that the Committee may call on any competent person according to the subject and the problem to solve.

An analysis of the various missions charged to this High Council by the decree n° 5540 confirms that it concerns a lot of activities within the field of transportation. This legal attributions may be summarized as follows :

→ general studies and projects for the development of the transport system i.e. the increase of the capacity of the transportation networks (evolution and needs of railways, situation of the road system and conditions of use by the different modes) ; creation of new public transport lines,....

→ projects and studies as far as the taxi licensing is concerned ;

→ creation of new companies and new public organisms in the field of the land transportation

→ preparation of training programs for various road users and for the road network management ;

This summary of the legal functions of the Land Transport High Council shows that the law gives it proxy to intervene in the whole field of the land transportation and to give directives to various authorities to take the appropriate measures.

As far as the public transport is concerned, it seems however that these functions may be sometimes redundant with the missions and duties of the two organisms which are described above (it must be underlined that the Director General of Transport is the vice-chairman of the Council and the General Manager of TCB is member of the Council)

Most laws and decrees are now between 20 and 30 years old. During this long period, the transportation environment has notably changed, in particular because of the war, but also because of the evolution of the urban way of life.
The transportation organization must be adapted to the reality of the trip market. Formerly, the Ministry of Transport was pooled with the activities of the Public Works within a single ministry. Since 1993, the Ministry of Transport is a full ministry. The internal organization of its services has to be precised by new laws and decrees.

3.2 INSTITUTIONAL STATUS OF THE TRANSPORT FUNCTION

The current institutional set up is restricted to the legal relationship of the RPTA with the Ministry of Transport. In practice, both the railways and the TCB are both practically dormant, and are not offering any services.

This situation has caused an emergence of para-transit activities, mainly the Bostas and vans, not to mention the proliferation of the illegal taxi-service also.

The current passenger transport sector is completely deregulated. Operators can freely enter or abandon the service. The fares charged by the TCB, on its limited routes, seems to act as a defacto regulator of fees. While there is no regulation to scope of service, its coverage, or level of service.

It is necessary to recreate quickly jurisdictional and organizational links between the public transport operators (public and private) and the public authorities to meet the increase of the transport demand in the agglomeration of Beirut, by changing the image of the public transport while preserving their social role for the community. This new jurisdictional and organizational framework is urgent for the bus network.

3.3 ECONOMIC AND FINANCIAL ISSUES

The modification of the laws and of the different decrees which deal with the organization of the public transport system will have to take into account some economic and financial issues which concern more or less the land transportation function. This modification will have to define the choices of the public authorities as to the financing of public transport. To estimate the financial stakes of a reform, it seems useful to present some data dealing with the budget of the Lebanese State and with the fiscal system, namely as far as the ownership and the use of private cars are concerned.

The information which were collected through several meetings with representatives of the Ministry of Finance allow to specify the financial stakes with regard to the State budget and with the specific expenses for the public transport. Other data come from " Le livre Blanc de l'économie Libanaise " which was drafted in 1993 by a group of Lebanese managers.

The budget of the Lebanese State For 1994 is around 4100 billions LL (LL - Lebanese Pounds). The autonomous budget of the Railways and Public Transport Office receives each year subsidies from the State to balance the expenses of Railways and of the TCB company. The amount of these subsidies were 8 billions LL 1992, 11 billions LL 1993 ; it should be 10 billions LL 1994. Moreover, the State gave a specific subsidy to the Office (1992 : 9,75 billions LL) in order to get the public transport operating again. The available data concerns only three years but it is significant to notice that the yearly average amount is approximately 10 billions LL i.e. 0,25% of the budget of the State. The budget of the Ministry of Transport is around 2% of the general budget.

The contribution of the State through the subsidies which are granted to the Railways and Public Transport Authority are significant but not disproportionate with regard to subsidies granted by the public authorities in countries which have chosen to support the social role of public transport by subsidizing it (for operation activities and possibly for investments). However, in the present situation, the ratio "State subsidy / vehicle x kilometer is very bad because the railways are completely out of active service and the activity of TCB company is very low. As far as the TCB is concerned, the ticket resources are less than 10% of the operating charges and are progressively decreasing. According to the accounting data collected through interviews, but without official document, the TCB operating charges should be between 3 and 5 billion LL per year.. The Railways have only charges in the form of salaries to the employees ; their amount was not given. It should be necessary to go further into the accounts of the two companies in order to obtain data to compare the amount of the subsidy of the State.

More than the amount of the subsidies, the worrying problem is therefore the lack of productivity of the two companies. In this case the subsidy is a complete waste.

But in addition to the budgetary consequences, the lack of productivity (and the very low level of the supply) and the deficiency of the urban public transportation have huge macro economic effects on the whole community.

According to the available statistics (source : The white book of Lebanese economy), the number of cars was around 240 000 vehicles in 1975 for the whole territory (with regard to a total number of motorized vehicles around 260 000). It has increased slowly during the war and was approximately 770 000 vehicles in 1990 (namely around 1% per year). The estimate fleet for 1991 is more than 1 million vehicles (the data for this year concerns only 11 months) ; 930 000 of which were private cars (+19% in relation, to 1990). The last available figures show that this number has increased very fast during years 1992 and 1993 ; According to the Registration Office Manager, the total number of vehicles at the end of 1993 should have been about 1,7 million , of which half is driving in the Great Beirut Area. Such number would confrim that the rate of increase of about 20% registered between 1990 and 1991 would be the same from 1991 to 1994. This number seems very high and will be cross-checked when the results of the household survey are available.

This increase of the car fleet and of the daily use of these vehicles have significant negative effects on the road congestion which has become very serious during the last years. The space consumption of cars has become more and more worrying notably because of the traffic but also because of the lack of parking areas. This situation increases the trip time for all users of the road network; it is therefore a loss of time and money for the community.

On an other hand, the tightening of credit for consumer goods has reduced noticeably the capacities of households to buy new or late-model cars, and this situation becomes more pronounced because of the increase of the import duties. In addition to the growth of the number of cars, this fleet is therefore growing old ; its maintenance costs and its fuel consumption charges are more and more important for the users (the yearly average cost - amortization, repairs, fuel consumption and insurance - of a small-engined car is estimated at 2 to 4 million LL). It is also more expensive for the community because of the increase of the pollution and of the road accidents due to mechanic failures.

For the households, it is interesting to notice that the main part of car expenses links with the ownership (amortization which includes the import duties, registration tax, special tax yearly levied on cars, insurance,...). With regard to the running costs, the users generally take into account only the marginal costs, i.e. the cost of fuel. But the present price of various fuels is very low (around 370 LL for a liter of regular gasoline) compared to international prices. The difference with others countries is mainly due to the fuel taxes which do not exceed 35% of the basic price in Lebanon. An increase of the fuel price should probably limit the use of cars ; it should be also useful to regulate the parking in order to clear the roads.

Through lack of an efficient policy to put right the public transport system and a policy to limit the use of the private car in the Beirut urban area, the costs of the urban transportation will increase strongly in the next few years, both for households and for the Lebanese society.

3.4 STRENGTHS AND WEAKNESSES

The paragraphs 3.1 to 3.3 present the general framework of the institutional environment of the public transportation in Lebanon and the status of the main economic and financial parameters which may influence its evolution. But the situation is very specific because it concerns an after war period which links with an institutional organization 25 or 30 years old (without evolution because of the conflict) and the new situation of the trip demand which results from the fast resumption of national activities and from the beginning of the economic recovery.

In most cases, the analysis of strengths and weaknesses of a transport system shows that the situation does not generally present only weaknesses or only strengths. The situations are complex and the systems react to compensate for the imbalances which may occur when a strength or a weakness is suddenly reinforced. Some improvements can be introduced by the public authorities or the transport companies to help to balance again the system with limited additional means. The Lebanese situation is fundamentally different and the analysis of strengths and weaknesses must obligatorily take into account the characteristics of the after war period.

This analysis may be done according to three main and interdependent aspects :

→ the legal framework and the institutional organization ;

→ the sharing of the trip market between public and private operators ;

→ the ability to regulate the urban trip market.

3.4.1 The legal framework and the institutional organisation

The main weakness of the legal framework is its inadequacy to allow people in charge of the organization to solve the present problems.

The most recent evolution came from the law n° 214 (April 2nd, 1993) which has created the Ministry of Transportation (separate from the Ministry of Public Works). It might be also a direct consequence of the enforcement of the government bill n° 5175 (May 25th, 1994) which deals with the organization of the Directorate General of Land and Maritime Transportation.

However, this bill seems very imprecise as to the functions and the prerogatives of a new Directorate of Land Transportation to solve the problem of passenger transportation in the urban areas. An efficient evolution of the legal framework should require a law including a detailed description of the prerogatives of this office and mainly its prerogatives as an authority responsible for the organization and the co-ordination of all urban public transport operators (public and private).

It seems to be also necessary to distinguish the status of bus operators and those of the railway . Their activities must be coordinated but the stakes and the financial need (in particular as to the investments) are different and might justify specific legal arrangements.

3.4.2 The sharing of the trip market between public and private operators

The legal framework and the prerogatives of the authorities and offices which deal with the land transportation give no possibility to these entities to regulate the activities of the private companies which operate in the Great Beirut Area. This lack of legal tools is worrying because it gives up progressively the trip market solely to the law of supply and demand. The incapability of TCB to develop again its supply (and even to uphold it) worsen day by day, this weakness risks to render the situation irreversible.

It is urgent to look for institutional arrangements which restore the authority of the government through the Ministry of Transport in the field of urban trips. The weakness of the present system is not only due to the imbalance of capacities between public and private operators. It links also with the multiplicity of private operators (some ones have only one bosta or one van) and with the increase of the number of companies. These operators risk to have more and more difficulties to balance their operating budget and they will meet difficulties to renew the rolling stock (and perhaps to maintain it and to preserve the safety).

The capacity of the private sector to partly operate the Beirut public transport may be considered as a strength. But the fragmentation of this capacity through a great number of operators is a weakness. It is necessary to implement an organization which regulates the possibilities and the conditions to operate passenger transport in the Beirut agglomeration. This necessity applies not only to buses, bostas and vans operators but also to taxis and taxi-services.

At last, the situation of TCB is not irreversible and it is a strength for a future organization of the public transport. In particular, TCB has potential industrial capacities (depots and workshops) and a part of its staff is qualified to operate efficient urban transport bus lines.

3.4.3 The ability to regulate the urban trip market

Not only the weaknesses of the organization of the public transport and the inadequacy of the supply, but also societal phenomena which have direct and indirect effects on the behavior and the choices of people toward transport, have huge consequences on the urban trip market. The main one is the road congestion due to the traffic and the parking of cars whose number increases quickly.

In a way, the increase of the car fleet and of the motorized mobility may be considered as a favorable parameter ; it corresponds to an economic recovery and it means that the activities get going again. But in another way, the road congestion will become a worrying weakness which will bring difficulties for all users of roads : passengers of public transports, passengers of private cars, goods transportation, professional activities,....

It does not look that the public authorities have, at present, the possibility to regulate the use of the road network in order to minimize the negative effects of congestion. Some tools (legal and organizational) have to be developed by the Ministry of Transport. But this question does not concern only this ministry. The definition and the implementation of traffic and parking rules depend also on the Ministry of the Interior ; on an other hand, fiscal arrangement might be taken by the Ministry of Finances to limit the use of cars and make the public transport more attractive (under the condition to improve their quality and to change their image), etc.

The ability to regulate the trip market depends on a general policy and needs the agreement and the coherence of various institutional actors. In a first step, it should be necessary to prepare a diagnosis of the costs of the passengers transport in the Beirut urban area in order to know the macro-economic effects of the present situation and to study the economic measures which might be put in addition to road regulation decisions. This diagnosis is not possible at this moment because the information requested is not available.

4 - ANALYSIS OF THE MASS TRANSIT SYSTEMS

4.1 BEIRUT PUBLIC TRANSPORT (TCB)

4.1.1 General data on TCB

4.1.1.1 Former network structures

- Before **1965** (source : Guide bleu Hachette 1955), GBA was served by private buses, linking the downtown to the suburbs, particularly to Furn El-Chebbaak. In Beirut city, there were two routes of tramway :

  - number one : Nahr Beirut, Nahr Street, Gouraud Street, Place des Canons, Basta Street, Ouzaï Street,
  - number two : Furn El-Chebbak (Museum), Damas Street, Place des Canons, Weygand Street, Georges Picot Street, Perthuis Avenue, Bliss Avenue, American University.

The Place des Canons was the very downtown of the city, where all routes converged.

In 1965, the tramway routes were closed and replaced by buses.

- A map of the **1971** network is featuring in next page (source : Schéma Directeur), the Place des Canons was always the center point of all routes. The network was constituted of 8 routes, serving the conurbation with 110 buses Saviem - Chausson. Main outlines of this network are featuring in the first form in attachment n° 1.

- The **1988** network was constituted of 11 routes. The same form is featuring in the second part of the attachment n°1 (source : Gicome & Mass Institute - Urban and intercity transport in Lebanon).
Palais de Justice is a place close to the Museum, as it can be seen on the general map of the city. But, as Museum was located on the demarcation line, bus-line terminus was transferred to the nearest main place. Buses were not allowed to run through this demarcation. Passengers had to walk in this area.
The network was different in its design, as the sector of the Place des Canons, included in the demarcation line zone, was largely damaged and inhabitants had left. So, buses could not make stops in this neighbourhood, and anyway, there was nobody to pick up. Some link routes were not served anymore as "Dora - Ouzaai" or "Ain Roumaneh - Bain Militaire".

4.1.1.2 Current structure of the network

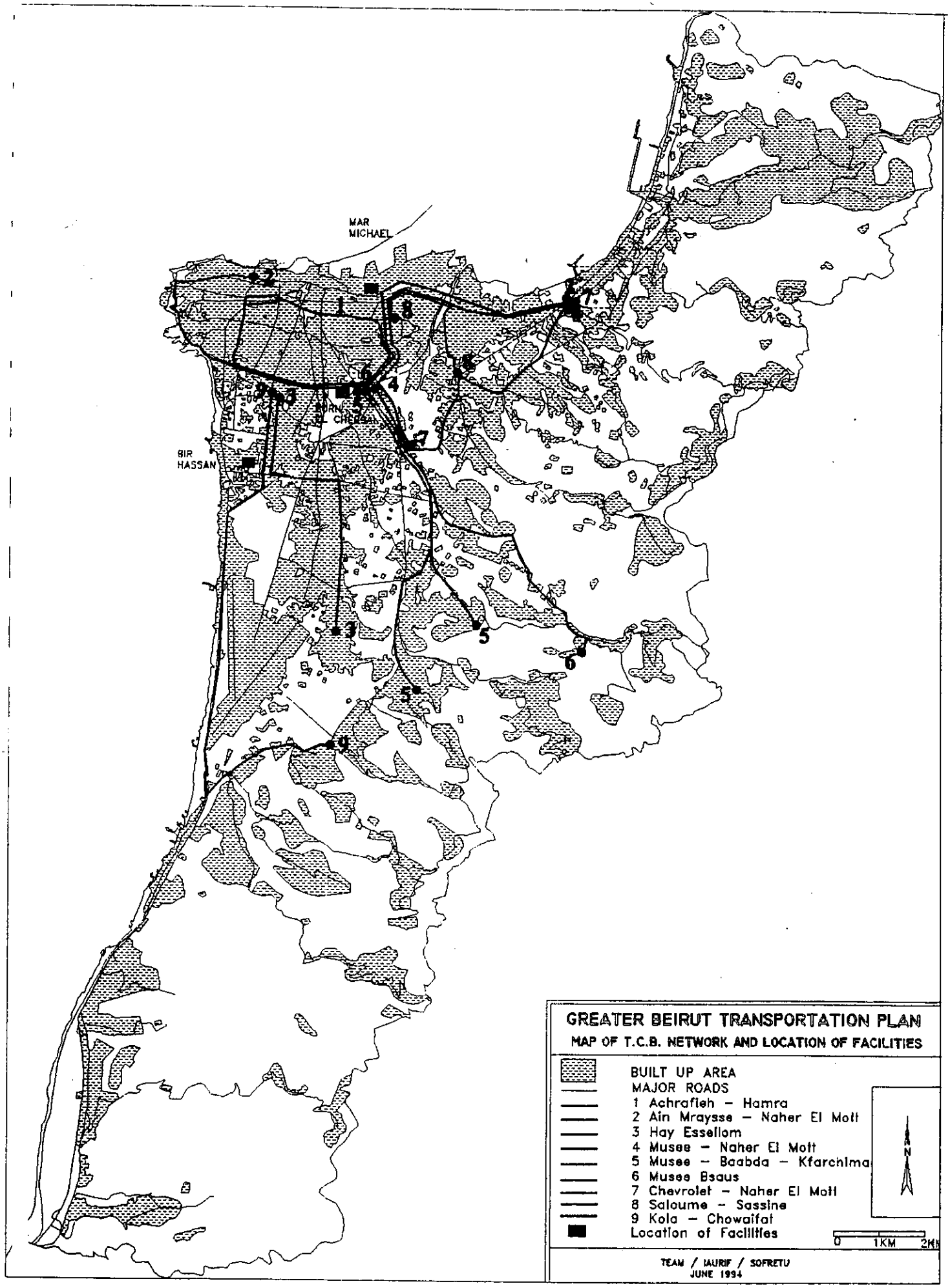
On April 1994, some routes were still operating. A map of the current network is in plan n° 4. TCB is for now managing the scarcity. A part of routes are not served any more. All remaining means have been concentrated on the more crowded routes, even on the more crowded parts of routes. The current network is organized around some important stops as Museum, Kola where routes are passing by. So, people can connect from one route to another .

The characteristics of the currently operating service (April 1994) is summarized in Attachment No. 1.

The patronage is an estimation based on the statistics of daily ticket sales, increased by a percentage to account for other passengers, legally exempted or not (see § 4.1.1.5).

The number of passengers accommodated on Museum - Bsouss route must be more than the estimation, as several important military headquarters are located enroute. As described further (§ 4.1.1.5), soldiers wearing uniform are legally transported free of charge.

PLAN N° 4 - MAP OF TCB NETWORK AND LOCATION OF FACILITIES



Comments :

- On the current structure of the network

This network serves 3 main entrances to Beirut city :

- north road from Jounieh,
- Chamoun avenue through Furn El Chebbak,
- Cité Sportive avenue from southern suburbs.

The routes coming to Beirut by these roads are connected to ring routes. Routes whose terminals are located at Kola do not connect to ring routes, passengers have to walk about 300 meters to join the Corniche Mazraa.

The largest ring route has a gap between Ain Mrayssié and the Electricité Du Liban building due to the destroyed area of the downtown.

At the southern part of the network, the route serving Ouzaai, Khaldé and Kfarshima has a long part of road without anybody to pick up, between the shore and the airport, but it is a link route between the two suburbs Ouzaai and Kfarshima, whose inhabitants are very close all together.

- On the evolution of the network

The changing of main characteristics of the network and the evolution of some performance indicators can be measured from above information.

The following information and ratios are extracted from attachment n° 1 figures.

Year	Total length of routes (in km)	Number of operating buses	Average speed (in km/h)	Kilometers per day per bus	Patronage per day per bus
1971	115, 5	110	14, 9	181	918
1988	152, 2	57	16, 4	115	1 280
1994 (April)	99,3	28	9,93	77	613
Variations					
- 1971/1988	+ 32 %	- 48 %	+ 10 %	- 36 %	+ 39 %
- 1988/1994	- 34 %	- 49 %	- 39 %	- 33 %	- 53 %
- 1971/1994 (in %)	- 14 %	- 74 %	- 33 %	- 57 %	- 35 %

The main remark is that the situation is deteriorating at each step :

- number of operating buses,
- average speed,
- kilometers per bus per day,
- number of passengers per bus per day.

If performance ratios are compared to World Bank standards, the TCB situation is poor.

- Kilometers per bus per day : World Bank standard : 210 - 260

The situation of Beirut (77) is inferior to that of Calcutta (120) or Khartoum (125).

- Number of passengers per bus per day : World Bank standard : 1 000 - 1 200 for standard buses with a crush capacity of 80

The situation of Beirut (613) is inform to that of Buenos Aires (800) or Kuala Lumpur (820).

- The average speed, for such a congested city, is not surprising. 9.9 km/h is not a bad result. For instance, it is close to the average speed of Paris Mass Transit Authority (RATP) which is about 11 km/h for the whole conurbation.

4.1.1.3 Transport supply

TCB's facilities are located at Bir Hassan and Furn El Chebbak (on Badaro Street) for the two depots. The central workshop is located at Mar Michael, close to the former railway station. This facility is in charge of the heavy maintenance and buses rehabilitation, it is no more considered as a depot.
On the network map (plan n°4), the location of the three facilities is featuring.

- Routes per depot

The following table was prepared from information collected from depots managers. This is the situation of days on the beginning of April 1994, April 1st for Bir Hassan and April 12 th for Furn El Chebbak.
This form shows that 9 routes are still operated by TCB. Five routes were given up for lack of buses.
In this network, Museum and Kola appear as main terminals of routes.

Depot	Routes	Length of trips (in km)	Number of operating buses		Daily tickets income (in LL)
			planned	real	
Bir Hassan	1 - Achrafié - Museum - Hamra	11,0		3	642 750
	2 - Nahr El Mott - Ain Mrayssé	14,0	8	4	501 750
	3 - Kola - Mcharafié - Hay Es-Sellom	8,0	8 6	2	693 250
	9 - Kola - Chouaifat	13,5	4	2	336 000
	- Kola - Mousaïtbe	4,5	6	0	0
	- Kola - Basta	3,5	6	0	0
	- Museum - airport	7,0	6	0	0
	- Kola - Wadi Ez Zéiné	32,0	6	0	0
Furn El-Chebbak	4 - Museum - Nahr El Mott	8,0	16	7	534 500
	(by Furn El Chebbak)	9,0	)		
	5 - Museum - Baabda/ Kfarshima (2 missions)	11,0 12,3	)4 2	4 2	169 000 26 750
	6 - Museum - Bsouss				
	7 - Chevrolet - Nahr El Mott	9,0 3,5	16 2	3 1	75 500 84 250
	8 - Salomé - Place Sassine				
	- Museum - Nahr El Mott (via Sin El Fill)	9,0	6	0	0
TOTAL		155,3/99,3	96	28	3 063 750

Comments :

- The way routes are assigned to the depots is generally correct.
The circular route (Museum/Achrafihé/Hamra) and the Corniche route (Ain Mrayssié - Nahr El Mott) could be also operated by Furn El Chebbak depot, as the stop "Museum" is closer from this facility than from Bir Hassan. To assign these routes to Furn El Chebbak depot would decrease the dead mileage .

- The gross daily income of a bus is about 109 400 LL (≈ 65 US $).
The daily income per kilometer per bus is, on the average, 109 400/77 = 1 420 LL (0.85 US$) and the daily income per passenger, including fare evasion estimation, is on the average 3 063 000/ 17 200 = 178 LL (0.10 US$).

- Planned main features of still operated routes per depot

These features are relative to a working day, Monday to Friday. On Saturdays, public offices, administrations and banks are opened only in the morning. Shops are opened all day and close around 6.00PM.

Sunday is the normal day off .

Route number	Number of trips	Round trip time allowed	Headway	Spreadover	Number of driver duties
Bir Hassan					
- 1	96	65 mn	16 mn	6.10AM-19.10PM	16
- 2	48	130 mn	16 mn	6.15AM-19.50PM	16
- 3	32	100 mn	25 mn	6.00AM-19.10PM	8
- 9	36	130 mn	22 mn	6.00AM-19.00PM	12
Furn El-Chebbak					
- 4	96	120 mn	15 mn	6.00AM-19.00PM	32
- 5	96	120 mn	15 mn	6.00AM-19.00PM	32
- 6	32	120 mn	24 mn	6.00AM-19.00PM	8
- 7	16	120 mn	22 mn	6.00AM-19.00PM	4
- 8	16	120 mn	24 mn	6.00AM-19.00PM	4

Comments :

- The spreadover shows that after 19.00 PM, there are no more buses running. This can be the result of the labor rules of the drivers, and also the result of years of curfew. Currently, the service is oriented to work and business trips only.

- The same trip time is allowed all day long for a route. But the circulation and the number of passengers are different according to the time of the day. Managers do not care of peak and off peak hours. For instance, the circulation is easier after 4.00 PM, as buses are running till 7.00 PM, the trip time would be adapted to the real conditions of driving. In the morning, the conditions of circulation are very different between the suburbs and the downtown ; the localization of traffic jams is moving according to the hour of the day from suburbs to the downtown. This notion of trip time would be calculated according to hours of the day to optimize fleet utilization. All applied trip time has to be checked.

- The planned headways are the same all day long. The same kind of comment can be made. The headway is calculated according to the number of passengers to accommodate. Headways are different at peak time, at off peak time, at night, ...

- Current Route Services

This form has been collected on different days for each depot

Route Number	Nber of trips	Headway (in minutes)	Number of passengers		Lost trips for	
			tickets (1)	others (2)	lack of buses breakdowns/accidents	lack of drivers
Bir Hassan						
- 1						
- 2	36	32 mn	2 571	1 028	60	0
- 3	24	32 mn	2 007	803	24	0
- 9	16	50 mn	1 344	537	16	0
	12	44 mn	2 773	1 110	14	0
Furn El-Chebbak						
- 4	54	30	2 138	855	0	42
- 5	18	120	676	270	0	78
- 6	32	24	107	43	0	0
- 7	16	22	302	120	0	0
- 8	16	24	337	134	0	0

(1) This number is calculated after the daily revenue of each route divided by the price of the ticket.
(2) "Other passengers" is an unfollowed statistics as passengers counts are not made by the TCB supervisors. All the consultant could get as information about this idea is explained in § 4.1.1.5.

Comments :

- The main remark is that both depot have very different situations. The rolling stock is the main problem at Bir Hassan, the staff is the main problem at Furn El Chebbak. This is leading to a puzzling situation : available buses stay in a depot while drivers have no buses. Depot managers are aware, it happens that buses are loaned from one depot to the other one. A manager said that, on religious holidays, drivers also are "loaned" between depots and those drivers agree easily. But, transfers of staff is not a usual act.

- About 50 % of all planned journeys are lost each day. On the above examples, 58 % losses for Bir Hassan and 48 % for Furn El Chebbak. If this percentage is applied to the total patronage, it is about 10 000 passengers more which could be accommodated by the public transport. This number would also increase by the better presence of TCB buses in the whole city.

4.1.1.4 Fare system

- Fares

In 1974, the fares were as follows (source : Thesis of Mr. Bassil - American University of Beirut - Feb. 1993):

- ordinary ticket	0.15 LL
- tickets for policemen and soldiers in uniform	0.10 LL
- 3 months pass for students	27 LL
- 3 months pass for public	50 LL
- 6 months pass for public	90 LL
- year pass for public	170 LL

Currently, the flat fare is 250 LL per trip. There are no passes or special fares.

Lebanese policemen and soldiers wearing uniform are legally exempted to pay. But, in fact, all persons wearing a uniform do not pay .

If passengers have to make a connection between routes, they have to pay for each trip. A ticket is valid for one trip traveled on one bus. The rate of interchange is not known by the managers.

- Ticketing and control

Passengers buy tickets when they board the bus by the front door. The collector is sitting at this door (picture n° 1). He has two kinds of ticket blocks : white and blue, for one way and for the other way. Both tickets are used interchangeably now.
There is no ticket punching as it was in the past.
The collector has to register on his running board, for each trip, the number of the first ticket remaining in the open block. At bus terminals, the supervisor (so-called "chef de ligne") has to check and sign the running board. When a controller is boarding a bus, he has also to check and sign the collector's running board before checking passengers tickets.
At the end of his duty, the collector has to deliver to the depot, to the revenue manager, the running board and the money. The manager has to check.
Tickets can be purchased only aboard buses, there is no off -bus sale.

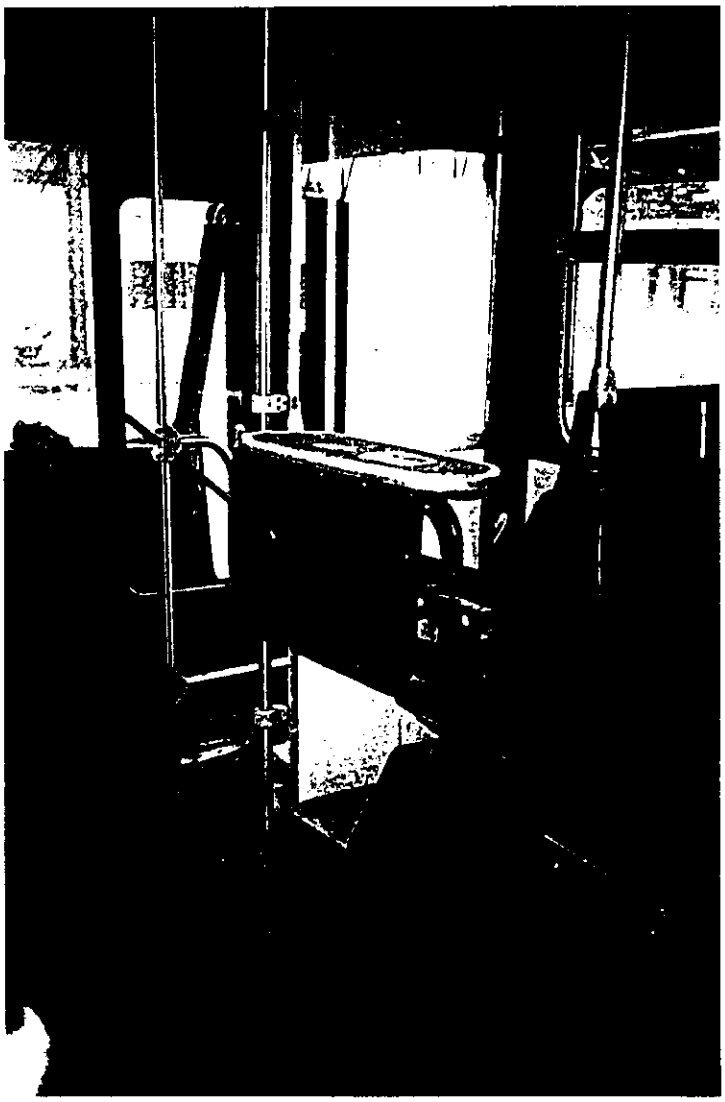
4.1.1.5 Traffic

The number of paying passengers is well known through the running boards of the collectors. These numbers can be analyzed per route, per bus, per trip, even per collector, but they are not.

Other passengers are more difficult to estimate. Controllers do not make passengers counts. After the managers, at peak time, 50 % of total passengers do not pay, at off peak time, 15 to 20 % of passengers do not pay, whether legally exempt or not.
Studies carried out by students from Beirut University, thesis directed by Miss Annie Tohmé, after surveys aboard buses, led to understand that about 10 to 15 % of passengers are "rabbits".
It is estimated that about 40 % of passengers, on the average, do not pay, whether legally exempt or not. The revenue leakage is important.
This calculation means that, on a normal day, the TCB has a revenue of 3 063 750 LL, which means about 13 000 paying passengers. If this number is corrected by 40 % (of exempted and "rabbit" passengers), it means that TCB carries per day about 18 000/20 000 passengers. On routes served both by Bir Hassan Depot and private buses, private buses were on strike for several days. On the third day of this strike, the income of TCB buses increased of 34 %. The most important increase was on the route linking Achrafiyé to Ain Mrayssié and reached 68 %. The evolution of passenger traffic, according to the average daily patronage given by figures in § 4.1.1.1, is as follows.

Year	Daily patronage	Annual patronage	Variations
1971 (*)	*101 000*	*30 300 000*	-
1988 (**)	73 000	21 900 000	- 27 %
1994 (***)	20 000	6 000 000	- 72 %

(*) Source : Schéma Directeur
(**) Source : Gicome & Mass Institute study
(***) Estimations
- The annual patronage is calculated after the daily one and a number of 300 working days per year (World Bank standard). For year 1994, it is an estimation based on collected data per day, the daily patronage has been rounded up to 20 000.



Picture n° 1 - Collector's location in the bus

4.1.1.6 Staff management

TCB is directly headed by the General Manager of Railways and Public Transportation. There is not, as for Railways, a deputy manager for TCB. There is no real fixed organization chart of TCB. The three facilities are subordinated to the General Manager.

- Sharing of the facilities staff

The sharing between managers, supervisors and workers, as reported by managers, is as follows.

Facility	Bir Hassan	Furn El Chebbak	Mar Michael
Depot director	1	0	0
Operations			
- manager	1	1	-
- route supervisors	10	7	-
- chief controllers	1	1	-
- controllers	18	9	-
- chief driver	1	1	-
- drivers/collectors	177	201	-
Maintenance			
- manager	1	1	1
- foremen	3	8	)
- mechanics	6	7	)
- electricians	4	4	)
- sheet metal work	5	1	)
- painters	3	0	) 50 to 60
- tires	4	3	)
- radiators	0	1	)
- cleaning/oil change	12	12	)
- pump attendant	2	4	)
- surveyors day/night	17	5	)
- emergency repairs	6	0	)
Store			
- storekeeper	1	0	1
- dispenser	0	0	1
- tool dispenser	2	0	3
Accountancy	5	5	3
TOTAL	280	271	59 to 69

Comments :

- Only Bir Hassan is headed by a depot manager. Furn El Chebbak is currently headed by the operation manager, the central workshop and its store are headed by the workshop manager.

- The total for all staff would be about 620 employees, for the three facilities. The staff of headquarters is not included in this figure, as not communicated. As said by General Manager, the total staff of TCB would be about 900/1000 employees as a part of them are retiring, the total staff of the Railways would be about 130 to 150.

A recent document written by the United Nation Development Program (UNDP) mentions that 843 employees are still registered in the company. This document mentions also that 389 jobs are vacant. As shown by the above form, the number of drivers and collectors seems comfortable to operate the bus fleet. But, for instance, for Furn El Chebbak depot, the sharing of the 201 workers is :

- 30 old collectors work in TCB offices,
- 41 old drivers work in TCB offices,
- 127 new drivers/collectors remain, among them 20 never show up to work, and 14 work in offices or as controllers,

Only 90 persons are available to make up crews. According to the duty-rosters, a part of them are on days-off during the monday-to-friday period, particularly, people who work on week-end days only (24). The very best situation on a Monday would be 66 persons, 33 in the morning, 33 in the afternoon, so it means 16 crews at the same time. Eighty crew duties are necessary to cover every week day at this depot, 40 in the morning, 40 in the afternoon. The situation has no solution for the moment.

- Classification and salaries of the staff

The classification follows the number of years in the company. Most part of the depot managers are old people, working in the company for 40 years, recruited when tramways operated.
The salaries are following the same system : "older is better". For a new recruited employee, the monthly salary is about 145 000 LL (US$ 86). For a senior employee, the salary can reach 338 000 LL (US$ 200). These salaries do not include family allowances.
The minimum salary in Lebanon is 118 000 LL (US$ 70). The average salary is 186 000 LL (US$ 110), (source : The white book of Lebanese economy, year 1992).
Many public sector employees have a second job, sometimes two other jobs. As they work in the morning, from 8.00 AM to 13.00 or 14.00 PM, they have time enough to have another activity. Some TCB drivers are also private company drivers or taxi drivers.
There is no incentive for the staff.

- Recruitment

Recruitment is made by advertising in newspapers. Conditions of recruitment for a driver are :

- age between 25 and 35,
- to have a truck with trailer driving license,
- to read and write,
- a medical certificate of good health.

Staff is not only recruited because of their qualification, certain factional quotas are still respected although not any more required by law after the Taef agreement. In TCB, no recruitment was made since 1988.

- Training

There is no training for the staff. When a driver is recruited, the duration of the training to understand how to drive a bus is two days. Later, during his career, training is no more provided. For mechanics, if the initial training carried out by the manufacturer RVI, when buses were delivered, is excepted, there is no training or retraining.
The qualification is very low, even if many mechanics are "wizards", as they make repairs with very few spare parts and tools.
As said by managers, a large part of the drivers are not well qualified and they do not take care of the rolling stock. For instance, if some warning light on the dashboard turns red, the driver does not always take care and sometimes, a breakdown happens that can be very serious (engine, brakes,...).

- Absenteeism

As shown in § 4.1.1.6, there is a gap between the registered staff and the reality. Some people never come to work. The regulations say that after 14 days of absence, an employee is fired. So people do not come for 13 days, they show up for one day, and so on. Firing employees is written in the regulations, but it is a very long procedure, the Minister has to be approve it.

Eighteen days of holiday are allowed per year.

4.1.1.7 Passenger information

- At bus stops

Bus stops are not delimited, some posts and shelters are still standing from place to place in the city (picture n° 2). Currently, buses stop under people request, to get in or to get out. At main termini, there is no information, but as supervisors are staying there, people can ask what they need. Supervisors are difficult to identify as they do not wear any uniform or piece of uniform, or badge.
There is no map of the network, which can be understood, and the network is diminishing as buses are failing.

- Aboard the buses

- Outside
All buses were equipped with destination blind, featuring route number and destination, the destination was posted on the right side of the bus, the number of the route was posted on the back windscreen.
For now, except for one or two buses still equipped, no information appears as the destination blinds are out of order, no more tissue or breakdown of the winding mechanism. Also, as buses are failing one after one, those remaining are running on any route. Most of the drivers are using a hand written notice board showing the destination of the bus. They put this notice board behind the windscreen.

- Inside
There is no information about the route, the fares, but as the collector is sitting just at the entry of the bus, the passengers can get the information they need immediately.

4.1.1.8 Reporting

The depots have to report everyday on the absenteeism and problems of the day to the Head Office. Information about fuel consumption and daily mileage are sent by the maintenance managers to the Central Workshop of Mar Michael.
This information does not seem to be always studied by the Head Office, they are filed.
The General Manager meets the depot and central workshop managers. In the past, such meetings happened once a week, but, currently, there is no previous timetable. Except for these meetings, the Head Office does not give information to the depots.
Every morning, the daily fare revenues are given to the Bank of Lebanon. The money is paid into transport office's account. The receipt, established by the bank, is given to the Head Office of Transport.

Picture n° 2 - Bus stop in Hamra (Dunant Street)

4.1.2 Operations

4.1.2.1 Main outlines

The depot head manager is responsible for three departments : operations, maintenance and revenues. Each department is headed by a manager.
The staff of each depot operations department is described here above.

- The route supervisors are standing at bus termini, to countersign collectors running boards, and to survey the buses and the crews. As the changing of the crews is made at bus termini, if there is no relief for the morning crew, the supervisor has to decide what to do. These supervisors have no action on schedule control, they do not make retiming.

- The controllers are running over the routes of their depot. They check the tickets and the collectors running boards. They do not make passenger counts.

- The chief driver is able to provide some training to other drivers.

- Among drivers and collectors, there are 2 categories. The oldest people are only drivers or collectors, not both. People recruited in 1988 are both. The oldest (about 35 % of the driving staff) do not drive anymore, they are employed in the offices of the depot or of the head office.

For Bir Hassan, it means 30 managers and supervisors, 1 chief driver and 177 drivers/collectors.
For Furn El Chebbak, it means 19 managers and supervisors, 1 chief driver and 201 drivers/collectors.

Comments :

The number of supervisors have to be adapted to the number of bus termini tied to each depot and to the characteristics of each route (number of operating buses, length of the trip).

- The duty of the supervisors should be extended to include retiming and to make passenger counts for controllers. They must have a more active work than currently practiced.

- The survey of collectors is organized to avoid revenue leakage. Currently, it is a good organization. Even if collectors would not exist any longer, the same control would be applied to drivers running boards.

4.1.2.2 Training of the staff

Except two days of taking account of the bus for the drivers when they are recruited, there is no more retraining.
As staff is promoted by seniority, oldest drivers can become controllers. But, their experiment in driving is not always sufficient as they have no training in supervision.

Comments :

- Because to drive a truck and to drive a bus are very different, the drivers are not well qualified in their job. Buses and trucks are also different in their conception and building. For technical reasons, they can not be driven in the same way. Also, the bus driver has to take care of the comfort and the safety of passengers. It is said that goods are carried while passengers are accommodated.

- Promotion by seniority exists in any company. But training has to be implemented to help promoted drivers to perform better in their new jobs.

4.1.2.3 Scheduling

- *Trip time*

As seen above in § 4.1.1.3, the planned trip times are the same all day and year long, without taking into account the variations of the circulation according to the hours of the day or to the month of the year. These trip times are said to be calculated after surveys carried out on each route, but nobody remembers when it was calculated.

The trip times include layover time at each bus terminal of the route to reduce delays, to give a little rest to the crew and the rolling stock.

- *Headways*

There is a kind of headway policy as on the planned main features of routes (§ 4.1.1.3), routes running in Beirut city have shortest headways. On the circular routes (Hamra - Museum and Ain Mrayssié - Nahr El Mott), planned headways are 15 minutes.

The radial routes have wider planned headways : 22 to 25 minutes.

Comments :

- Headways and trip times are not calculated according to the conditions of circulation and to the number of passengers.

- There are no time graphs to represent the movement of vehicles.

4.1.2.4 Labor rules

The main remaining of labour rules is that people (drivers, collectors, controllers) are working on one shift whose duration is about 7h30. Duty rosters exists, but can't be really applied because of the absenteeism rate. The custom is that people work 3 days , then have 3 days-off. Some people are only working on week-end days.
Computers are not used to make the duty rosters.
Custom is that people can have several jobs (2 or 3) without any problem. Some of them are not coming to the office or the depot and do not have any problem.

4.1.2.5 Work of the staff

- Drivers and collectors
All buses have a driver and a collector. They do not work on the same bus everyday.
One driver and one collector are not a crew, they do not work always together, to avoid arrangements.
Drivers and collectors work on several routes of the depot to avoid collusion with passengers. There are no scheduled reserve drivers or collectors.
- Route supervisors are always working at the same bus terminus.
- Route controllers are working on all routes of the depot.

4.1.2.6 Operations documents

- Drivers have a timecard describing the bus duty, listing the times of the various trips and situations making up the working day of that vehicle.
- Collectors have a running board to register all tickets sales.
- Supervisors have also a time card, listing the times and situations of all planned buses running on a route.

4.1.2.7 In-the-field operations

Except for the collectors running board, the in-the-field operations are not monitored or even really surveyed. But, when only 25 to 29 buses are operating, what kind of monitoring need be made ?
Buses are sinking in the traffic, without bus lanes, without traffic signs or traffic lights. Planned schedules and headways can not be realized. Retiming is not possible as there are so few buses.
Daily reports are sent to the head office, listing all main problems without clear result.

4.1.3 Maintenance

4.1.3.1 Facilities

TCB facilities are constituted of two depots and a central workshop They are located all around the city (plan n° 4) :

- Mar Michael, the central workshop, at the northeastern neighbourhood, in the site of the railway station,

- Furn El-Chebbak, the oldest depot, at the southeastern neighbourhood, close to the Museum,

- Bir Hassan, the second depot, at the southern neighbourhood, close to the Cité Sportive.

Facility	year of building	surface	bus capacity
Mar Michael	1964	14 000 m2	150
Bir Hassan	1983	8 400 m2 (*)	90-100
Furn El-Chebbak	1920/1930	10 000 m2	100

(*) Another land of the same surface, belonging to TCB, is bordering the depot. This land is not used, but could permit, in the future, to extend the depot. The capacity is calculated without including this land.

Mar Michael is, for now, totally dedicated to heavy maintenance. It is also the main store of all the TCB.

Both depots, Furn El Chebbak and Bir Hassan, have three functions, headed by deputy managers :
- to operate routes,
- to maintain buses daily,
- to collect and check the daily revenue of routes,
under the authority of a depot manager.

Comments :

The location of the facilities is very efficient and well shared around the city. It is very important to locate depot as close as possible to main terminals and to routes. So, too many pull-in and pull-out dead mileage can be avoided.
- Mar Michael, when it was also a depot, close to railway station, close to Dora, was well located for routes serving the Nahr El-Mott or the ring around Beirut city.
- Furn El-Chebbak, close to routes serving Ain Roumanné, located near two main termini (as Museum and Sassine Plaza).
- Bir Hassan, close to routes serving the south of MRB as Ouzaai, Borj El-Brajné, Haret Hreik, located near Kola terminus.

- The central workshop of Mar Michael

This facility is no more used as a depot. It is said to be the central workshop where all heavy repairs would be made.
The building had been severely damaged during the war, but now the roof and the framing are new.
The surface is divided in two areas : workshop and parking.

The workshop, the stores and the office of the workshop manager are located at the front part, parking and technical premises (electricity, tires, ...) are located at the rear part.

The workshop
- At the entry of the depot, there were four fuel pumps, two were stolen, the two remaining are not in use, the four tanks, whose total capacity is 14 800 liters, still exist.
- Just after this area, are the pits : first, two of them, dedicated to diagnosis, eight other pits are further (picture n° 3), built under the floor level and all linked. The location of these 10 pits is very good. According to the driver's signalement, the diagnosis mechanics can dispatch the bus to the most appropriate part of the workshop. There are no power jacks.

The *stores* are divided in three units : intermediate store, main store and tool-store.
- The intermediate store is located close to the pits, to provide small spare parts and current hardware easily to the mechanics without too many moving of them. All compartments are empty for a long time.
- The main store is located close to the workshop manager office, equipped with shelves divided in to compartments. All shelves are marked out, organized in main subjects : electricity, body, gear box, engine, ... and well-ordered. All items are followed up by index cards system, listing all in and out stock, with dates and quantities. There is no computer. All removed ticket punchers are stowed in the store, ready to be used, but the inkers are to replace. This main store is poorly lighted, but enough to see the dust all over anything. If a worker needs a spare part, he has to fulfill a form, then signed by the foreman. The form is registered by the store keeper, then given to the worker.
- The tool-store is well-kept by three persons. Tools are fixed on the walls, very clean. Each worker needing some tool has to sign a book to take off any tool and to bring it back. All tools are a set of box spanner, a set of open end wrench, one adjustable spanner, one hacksaw, hammers, screwdrivers, cutting pliers, universal pliers. Most of tools are Facom trade mark. This set of tools is very poor, as it is for all workers. Mechanics have not any own tool box.
Store keeping looks to be very seriously made.

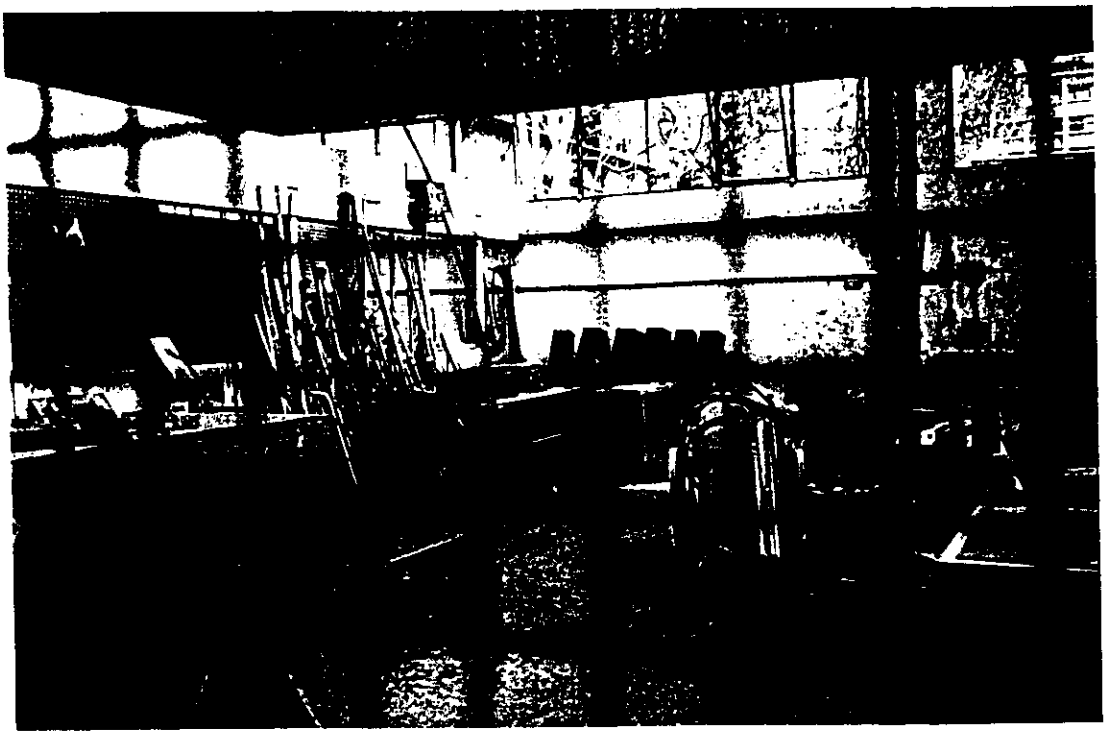
The *technical premises* are :
- the electricity room, where batteries are recharged and ignition coils rewinded, scrapped generators and starters are kept,
- the window panes room, where all collected units are kept and all gaskets collected from worn out buses ordered according to their type,
- the body shop, where new bumpers are built and collected handrails are kept, the main tools can be seen on picture n° 4,
- the upholstery room, as shown on pictures n° 5, some engines, still in delivery conditions, are stored in one of the two upholstery rooms,
- the joiner's shop, with old machine tools, whose use is not certain.

Some heavily damaged engines are lying on the floor as shown on picture n° 6 : burned out connecting rod , melted down head of block.

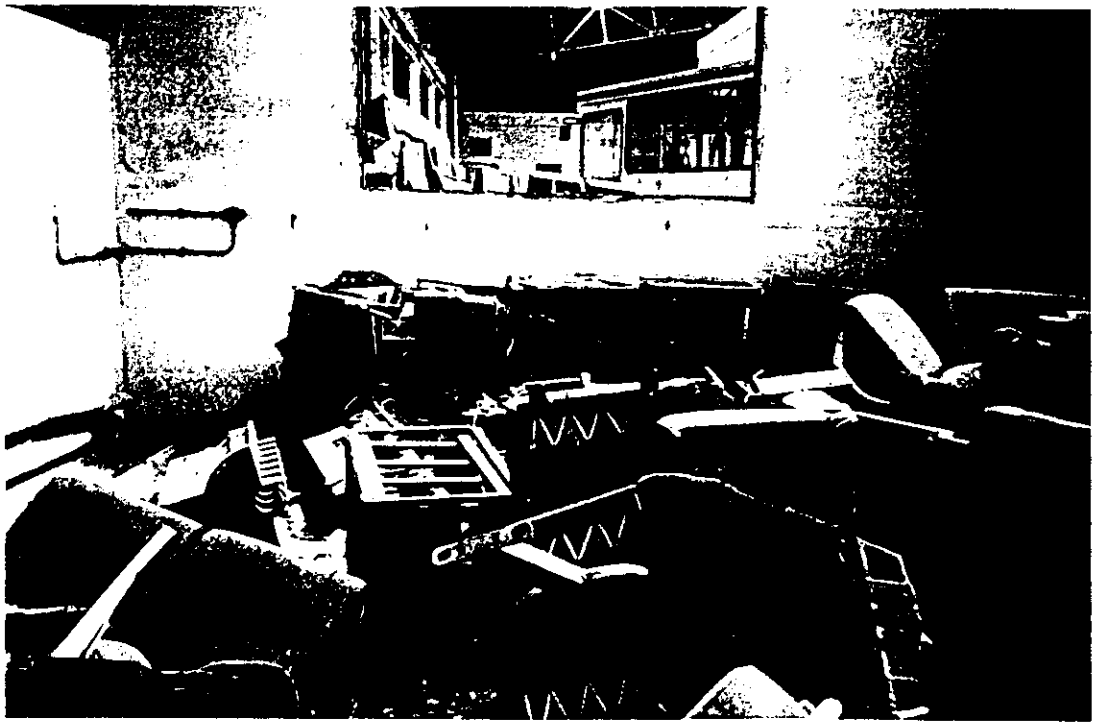
Some of the technical rooms have been built up recently, probably for the rehabilitation works provided by the workshop. The result is that the access to the oil change pit and to the washing pit is possible only by the outside of the workshop, if the door is still on order. The oil change pit is to clean.

In the *parking*, 55 Berliet "PR 100" buses are remaining, most of them worn out after heavy damages due to the war (mines, bursts of gunfires, ...). 1 Chausson "OP5" is rusting in a corner of the parking area.

Picture n° 3 - Mar Michael workshop - the pits



Picture n° 4 - Mar Michael - the body shop



Picture n ° 5 - Mar Michael - the tack room

Picture n° 6 - Mar Michael - worn out engines

The *administration offices* are located between the two parts of the depot, facing the entry and the parking area. The staff manager is helped by three other persons.

Comments :

- The organization of the facility was very efficient, surfaces were wide enough.

- The rehabilitation should be carried out : new doors at main entry and at emergency exit, windows were they are missing, cleaning everywhere to eliminate rubbish of any kind.

- The conception of the new technical places led to the closing of areas : for instance, the oil change pit and the washing pit have no easy access. A bus is remaining in this place, walls seem to be built up around it.

- The main access, located on Ibrahim Pacha street, has to be enlarged, and all car parking has to be forbidden on this street, between the access and Charles Hélou avenue, to facilitate the moving of buses.

- Furn El Chebbak depot

This depot, located along Badaro Street, is the oldest facility of the TCB. The depot was built for the tramways. Roofing is newly made, as the depot was bombed during the war. The access of the depot is on Damas street, closed by walls and a large gate. Damas street is a large one-way road, from east to west. Ground is in concrete, everywhere in the depot.

The *administration building* is at left of the entry of the depot. This building is largely damaged, but some rooms have been rehabilitated and are used as offices. At right, newly built rooms are sheltering the revenue manager and his offices.

When buses are entering the depot, they can be dispatched :
- at left, to the fuel pump, then to the parking areas, that are all covered areas,
- at right, to the workshop and the pits.
The workshop manager office is located at the crossing of both.

The *workshop* is organized around the pits (picture n° 7) : 1 diagnosis pit, then 5 pits under the floor level and all linked, 1 oil change pit. All pits are equipped with benches and some tools. The used oil is barreled, not poured on the ground.

There is no *store* at all. Worn out buses are used as spare part stores. If the workshop mechanics need some spare parts they do not have, they send a worker to the Mar Michael central workshop with an in-due-form order. There is no tool store, mechanics work mainly with their own tools. Tires are stored along one of the pits.

The *parking* areas of the depot would be wide enough, if there were not so many worn out buses on. The roof collapsed on buses because of bombs and buses are still there, even after the rehabilitation of the roofing. At the rear part of the depot, there is a small uncovered yard, leading to the emergency exit, but blocked by worn out buses.

Comments :

- The organization of the depot was very efficient, surfaces were wide enough.

- The rehabilitation of the depot should be carried out as in Mar Michael, the cleaning of all places also.

- A local store has to be constituted, to increase bus availability and to help mechanics to work better.

Picture n° 7 - Furn El Chebbak - the pits

- Bir Hassan depot

This depot was opened in 1983. Main part of it is used as a large parking for unavailable buses. An area, on the other side of the avenue, is completely dedicated to park buses. The whole site is enclosed by a chain link fence. The ground is partly in concrete, partly in grass.

The *administration* building is located at left when entering the depot. The depot manager office, the operation manager office, the revenue staff offices are located in this small building.

When buses are entering the depot, they can be dispatched to the workshop at left or to the parking area. The fuel pumps are in front of the entry.

The *workshop* is a small unit, with only one pit. Technical rooms are very small, blocked with many old spare parts. Benches look small facing the work to be done. The diagnosis pit is blocked by an out of order bus, flat tires.

The *store* is located in the workshop building, at first floor. It is an intermediate store as only small items are stored here, such as lamps, joints, hardware, ... If more important units are needed by the workshop people, they have to send somebody to Mar Michael, as Furn El Chebbak. The stocks are followed-up by index cards, the same as Mar Michael. The store is very clean and very well kept by the store-keeper. There is a small tool store, mechanics have to work with very few equipment.

The *parking* areas are in the open air. They are congested with buses, confusedly parked. Some of them were partly cannibalized, but not in a systematic way. Spare parts stay lying inside most of buses. Some worn out buses are also remaining on the parking.

Comments :

- This depot looks more like a store for unavailable rolling stock.

- The workshop is too small and under-equipped to be really efficient even if mechanics try to do their best. It is organized more as a secondary depot if compared to Furn El Chebbak.

- The dimensions of the depot would be well sized, but the depot was built up during the war, due to circumstances, and clearly it was hurriedly conceived.

- Maintenance staff

Mar Michael

The staff is about 60 to 70 workers, the number was not communicated, working mainly in the morning, from 8.00 AM to 14.00 PM. The afternoon activity is very low. The number of personnel cars parked in the parking of the workshop is very few in the afternoon.

Furn El Chebbak

The total maintenance staff is 46 persons composed of 37 workers, 8 foremen and 1 manager. The 37 workers include 5 day or night guards. The managing rate is 1 for 4 workers.

The staff is working in 3 shifts : 5h30/10h30, 10h30/14h, 14h/19h30-20h. In fact, workers come to an agreement to make all the work without always respecting the duty hours.

The maintenance staff.ratio, compared to the total fleet attached to the depot (80 buses), is 0,57 (46/80) ; if compared to the operating fleet (18 buses), the ratio is 2,55 (46/18). The World Bank ratio is 0,5 to 1,5 per operating bus. The number of maintenance staff would be acceptable for only 31 operating buses.

Picture n° 8 - A sample of the PR 100 current fleet of TCB

Bir Hassan

The maintenance staff is 66 workers, including 59 workers, 8 foremen, 1 manager and 3 store keepers. The 59 workers include 17 day or night guards. This number looks very high, but the site at Bir Hassan is divided in two areas, only closed by a chain link fence . It is necessary to have a lot of guards to avoid robberies on the rolling stock.

The maintenance staff ratio, compared to the total fleet attached to the depot (91 buses) is 0,72 (66/91) ; if compared to the operating fleet (11 buses), the ratio is 6 (66/11). The number of maintenance staff would be acceptable for only 44 operating buses.

Comments :

- Among the staff of Mar Michael, foremen and manager are old people, working in the company for 40 years, on the average. But, some newly recruited workers are there. Foremen said that they should be re-qualified to make good work, and that tools, machines and spare parts should be provided quickly before they retire to help to train younger workers.

- In the future, when the fleet will reach a best availability, the number of depot technicians such as mechanics, specially for diesel engines, and electricians should be increased to face all needs.

4.1.3.2 Fleet

- Chronological account of fleet

In 1965, the total fleet was 150 buses, Saviem/Chausson OP5, purchased from France. Manufacturer's engineers came to assist the TCB to put into service the buses : maintenance organization, training of the mechanics and of the drivers.

In 1970, there were still 110 buses operating. In 1973, only 97 were remaining. This fleet has been destroyed during the war, except two, worn out, that can be seen in Mar Michael workshop and Furn El Chebbak depot. These remaining two are not taken into account in the following calculations.

In 1977, the Paris Mass Transit Authority gifted 50 second hand buses (Berliet PCMR type). RATP's engineers came in Beirut, for the delivery of buses and technical assistance.

All these buses were totally destroyed during the war.

In 1978, 220 Berliet buses had been purchased from France(picture n° 8). They were delivered between 1980 and 1990. After the first shipments of 1980 (55 units) and 1982 (30 units), the deliveries were stopped because of the unavailability of terminal space to store new buses. The remaining buses (135) were shipped later at the end of the eighties. A part of them was stored in Cyprus, at the harbour, and in Lyon-Vénissieux, at the manufacturer's plant. At Lyon, the buses were maintained by Renault Véhicules Industriels, as Lebanon signed a contract for that.

The main features of the buses are reported on the form hereafter.

Trade mark	Model	Engine	Gear box	Vehicle capacity		
				total	seated	standing
Berliet (RVI)	PR 100 MI	Berliet MIPS 186 ch	Voight	73	28	45

On this fleet of 220 buses, 48 were burned or totally destroyed, some of them on the storage delivery space. The remaining 172 buses were destroyed, damaged (at different levels) or even stolen. It is said that about 60 buses were still available in the beginning of 1990.

The maintenance department of Mar Michael was assigned on October 1990, to perform all possible repairs. In spite of the total lack of equipment and tools, destroyed or stolen during the war, and the absence rate among workshop technicians, 48 buses have been repaired over a period of 16.5 months, from October 1990 to February 1992. This result means an average number of 3 buses rehabilitated per month. The program stopped completely in March 1992 because of insufficient funds to purchase spare parts (source : Thesis of Mr. Bassil - American University of Beirut).

During the war, about 40 Indian manufactured Tata buses were donated by Saudi Arabia. But, were mostly stolen right after delivery. Only two out-of-order Tata buses, are still parked at Bir Hassan depot. These buses are not included in all following calculations.

- Current fleet (April 1994)

For now, unavailable buses are remaining in the facilities, even if worn out. Some of them are not written off, but it looks to be difficult to get listings of the written fleet.

The situation of the fleet, in April 1994, is the following, as estimated by the consultant.

- The first figure, hereafter, shows, per facility, the sharing of the fleet, resulting both from information received from the maintenance managers and of the consultant's view.
This figure shows clearly the case of Bir Hassan depot, "storing" a lot of unavailable buses (37% of the total fleet). The number of 5 worn out buses, said by the maintenance manager of Bir Hassan, must be neglected, but as buses are parked in a very confused way, it is difficult to estimate the condition of each bus.
At the contrary, Furn El Chebbak had sent most of its unavailable fleet to the central workshop, to save space in the depot.
Among the 55 units of unavailable fleet seen at the central workshop, about 40 are worn out. Some buses are blowed up or tattered by bombs and gunfires (pictures n° 9 &10).

Facility	TOTAL	Available for operation	Unavailable staying at depot	Unavailable staying at Mar Michael	Worn out staying at depot
- Mar Michael	15	0	-	15	-
- Furn El Chebbak	80	18	8	34	20
- Bir Hassan	91	11	69	6	5
TOTAL	186	29	77	55	25

- The second figure shows the sharing of the fleet according to the bus condition, as seen by the consultant.
The number of 29 available buses was the number as seen in April 1994. Some of them were not operating everyday in Furn El Chebbak depot, for a lack of drivers and collectors.
The 14 under repairs buses are located in the three facilities.
The 78 buses awaiting for spare parts are located also in the three facilities, some awaiting for small spare parts as brake bands, or major parts as gear box or engine.
The number of 65 worn out buses is the minimum number, as said here above, to get an exact estimation would need an assessment of all unavailable buses.

Picture n° 9 - Worn out buses at Mar Michael

Picture n° 10 - Worn out buses at Furn El Chebbak

Written fleet	available		unavailable	
	for operation	under repairs	awaiting for spare parts	worn out
186	29	14	78	65

Comments :

- rate of availability is 24 % (29 / 186 - 65).
World Bank standards are between 80 and 90 %. This result is difficult to compare to World Bank norms, as Lebanon suffered 17 years of war.

- Life duration of buses

For now, the life duration is "as long as possible". The average age of buses is about 14 years . But all written fleet is taken into account in this count. The managers have , for now, no clear idea about life duration of buses. This is not a priority in fact.
Currently, still operating buses have, on the average, a total mileage of 100 000 km each. Even if these buses are "young", according to this mileage, the poor condition of maintenance, the lack of spare parts and good tools, the way they are driven, the seaside climate, the dust and the variation of the climate - (very hot in summer, and very cold in winter) - make them age prematurely.
Most of the heavily damaged buses have a mileage, as seen by the consultant on remaining odometers, between 45 000 and 55 000 km. It means that the operating life of such buses had been very short, about one year, one year and a half.

4.1.3.3 Fleet utilization

- Evolution of availability rate

The evolution of the fleet according to the number of available buses is reported hereafter.
(source : Mr. Bassil - Thesis - American University of Beirut - Feb. 1993).
The situation, on the average, in April 1994 is according to the consultant view.

Date	October 1990		September 1991		October 1992		April 1994	
	number	%	number	%	number	%	number	%
- operating	14	*8*	42	*21*	24	*12*	26	*14*
- reserve	1	-	13	*7*	43	*22*	3	*2*
- mechanical damages	119	*61*	99	*51*	87	*45*	92	*49*
- body damages	33	*17*	20	*10*	18	*9*		
TOTAL	167	*85*	174	*89*	172	*88*	121	*65*
destroyed or worn out	29	*15*	21	*11*	23	*12*	65	*35*
Written fleet	196	*100*	195	*100*	195	*100*	186	*100*

Comments :

- The result of the rehabilitation works done by Mar Michael maintenance department between October 1990 and September 1991 can be seen in several points :
1) the number of destroyed buses was decreasing, as they were cannibalized,
2) the number of body damages, leading to unavailability, was reduced,
3) the number of mechanical damages was also reduced, all leading to a better rate of availability (from 8 to 21 %)

- In October 1992, the rate of availability dropped out (21 to 12 %). The number of reserve buses is increasing, but these buses are not available for operations, it means that they are awaiting spare parts or drivers or are under repairs.
But, also, the rehabilitation works done by the central workshop do not have lasting results, one year after : only 24 buses were still operating in October 1992 instead of 42 buses one year before.
At Paris Mass Transit Authority (RATP), it is well known that the rehabilitation of a bus needs about 1000/1100 hours of work, including body, mechanical, frame, electricity, painting, locksmithing and joinery. The cost of spare parts is about 17 000 US $ for the body and about 25 000 US $ for mechanical parts (date of value : January 1993). This rehabilitation gives a bus an increase in life duration according to its operating conditions varying between 5 and 8 years.
The quality of rehabilitations made by the central workshop is doubtful, perhaps due to the spare parts used .

- In April 1994, the rate of availability is at same level than in October 1992, as the number of operating buses. The situation looks to be stable, 3 buses are consdered "in reserve" for lack of drivers at Furn El Chebbak depot.
A part of worn-out buses have been removed from the category of " under repairs" or "awaiting spare parts buses" by the consultant.

- Current situation per depot

A quick investigation carried out on the daily results of February 1994 for both depots of the fuel consumption and the mileage covered each day per bus, shows that differences occur between depots. The figures are in attachment n° 2.

Available buses are all buses registered in the forms analyzed, and running out of the depots, even for few days. The number of days took into account for Bir Hassan is 28 days, for Furn El Chebbak, only 27 (one form was lost).

Main results are following.

Depot	Bir Hassan	Furn El Chebbak
Written fleet per depot	91	80
Number of available buses	15	27
Total number of bus x day (1)	420	729
Number of bus x day unavailable	115	173
Rate of availability (2)	72.6 %	75 %
Fuel consumption (in liters) - per day - per 100 km	 56.7 63.5	 66.0 57.5
Average number of available buses per day	10, 8	19, 8
Daily mileage	86.8	112.6

(1) The total number of bus x day is the number of available buses multiplied by 27 or 28 days.
(2) The rate of availability is calculated by comparing the total number of bus x day and the total number of bus x day unavailable.

Comments :

- Between February and April 1994, the situation of the fleet is deteriorating.
On February, 37 buses were available for operations, by the end of the month, only 26 remained. The higher number was 42 available buses.
On April, 29 buses were available.
Between February and April, the number of available buses dropped out by 20 %. Such trend of 10 % less per month would lead to not any available buses in less than a year.

- The daily mileage is just "indicative", as many odometers are out of order or subject to failures. If compared to the average operation daily mileage of the § 4.1.1.2 (77 km per bus per day), the situation of each depot can be analyzed further.
Bir Hassan buses have a difference between both results about 10 km of dead mileage. The percentage of dead mileage (10%) is realistic even if half the fleet has no more odometers in order.
Furn El Chebbak buses have a difference between the two results of 36 km. But, this important rate of dead mileage (30%) is explained by the distance between the depot and the termini of routes (Nahr El Mott, Baadba, Kfarshima, Bsouss). This result is reliable as only 30% of odometers are out of order.
The yearly mileage can be estimated about 30 000/35 000 kilometers per bus.

- The fuel consumption calculated is correct for the type of bus and the type of routes. It means that engines are well tuned without any electronical help, as mechanics have a good ear.

- The results of Furn El Chebbak are better, even with their lack of drivers and the poor condition of the workshop, i.e: better rate of availability, lower fuel consumption. This depot could offer better quality of service if they had more drivers. Most of mechanics of the depot are seniors , they were trained by Saviem then Renault engineers in the past, which mean that they have a good knowledge of the rolling stock.
Mechanics of Bir Hassan are younger, the maintenance manager was trained in Germany, on other type of rolling stock, so the PR100 is not the type of bus they know the best.

- Number of breakdowns

The number of breakdowns per day per depot is about 5 to 7, all reasons included.
Breakdowns affect mainly engines, gear boxes, brakes, pneumatic circuit, tires and window panes.

Engines
The life duration of an engine is estimated about 5 years by the central workshop manager. During a year, the mileage of an engine is between 25 000 and 35 000 kilometers. That mean a short life for each engine.
In depots, mechanics think that the quality of oil is doubtful. The oil looks dirty after only 2 000 kilometers. Everyday, oil level of each operating bus has to be completed by 2 to 3 liters.
Mechanics also think that drivers do not care about the buses. When a light turns red on the dashboard, the drivers do not stop or slow down. They drive as if nothing was happened till the breakdown.

Gear box
Buses are equipped with automatic gear boxes.

Brakes
The main brake problem is the failure of the brake shoe. In spite of the price of this spare part (in Beirut, about US $ 70), those are not available and have to be ordered overseas, which means delays.

Pneumatic circuit
The main problem is that mechanics are under qualified for handling such equipment and are not always able to repair it.

Tires
Two to 3 punctures occur per day , according to the central workshop manager. They are mainly due to the bad condition of the roads. The purchasing is made through tenders. So, tires are a mixture of types, tender after tender. The experience of the maintenance workers, is best with Michelin tires.
Life duration of a tire is about 2-3 years. Tires are not retreaded.

Window panes
They are often broken, accidentally or intentionally. The main problem is to replace the windscreens, front or back, the more expensive ones. Side window panes can be replaced more easily by cannibalization. New windows are bought from a Lebanese manufacturer. Buses are not available for a lack of such spare parts as, in the same time, worn out buses could be cannibalized.

4.1.3.4 Maintenance methods

In this part, organization and methods of heavy, light, preventative and curative maintenance and emergency repairs will be assessed.

The sharing of maintenance is organized around the tasks given to different facilities.
Heavy and a part of curative maintenance is dedicated to the central workshop.
Light and preventative maintenance is made by depots.
Emergency repairs are currently made by depots.

- Heavy maintenance

All this work is made by the central workshop. Rehabilitation is the main part of heavy maintenance. But, as this workshop has no more equipment and appropriate tools, it is difficult to talk about heavy maintenance. The central workshop does not sub-contract any work. Particularly, there is no sub-contract with the bus manufacturer.
Rehabilitation of engines could be sub-contracted to the manufacturer as PR 100 MIPS engines are still operating on this type of bus.
In case of heavy breakdown, mainly engine, gear box, rear gear, the bus is brought to Mar Michael, and stays under repair as long as necessary. A bus can be stopped at the workshop for a long time, awaiting spare parts. If the lacking spare part has to be purchased overseas, the delay can be very long.
Recharging batteries can be made at central workshop.

- Light maintenance

Light maintenance falls within the competence of the depots.
- Small repairs have to be done by depot mechanics : body accidents, changing lamps, batteries, ...
As for the central workshop, the lack of sets of tools reduce the capability of mechanics to make good work.
- Cleaning is made by depots : inside and outside washing, window cleaning. All is manual, as the depots have no automatic washing machine. A washing area is reserved for this work, equipped with garden hoses. This work is well made, even if detergents are not very efficient. Usually, it is not done daily , but when the bus does not run, for oil change , technical inspection or small repairs. Cleaning is made by workshop workers, not by the drivers.
- The fill up is daily made, when the bus is running out at Bir Hassan depot, when the bus is running in at Furn El Chebbak. The pump attendant is in charge of this job, not the driver. Then the bus is parked by the driver.

- Curative and preventative maintenance

- Curative maintenance, as seen here above, is shared between central workshop and depots.
- Preventative maintenance falls within the competence of the depots. Change of oil happens every 7000 kilometers. During the immobilization of the bus, some technical inspections are carried out : brakes, brake bands, ... There is no allotted time for each inspection. The duration of these inspections is between 2 hours and one day, according to the repairs to be done.

Comments :

- Mechanics are aware of preventative maintenance, but they are afraid to reduce availability more if they manage such organization.

- As odometers are not reliable, the best base would be fuel consumption to organize preventative inspections.

- Emergency repairs

If a breakdown occurs en route, the driver or the collector has to give the depot a call. Then, the depot sends a truck (or a bus) with a tow bar. A reserve bus is sent to replace the failing one, if reserve buses are available. The failing bus is checked at the depot, if the breakdown is serious, it is sent to the central workshop ; if not, the repairs are carried out at the depot. The consultant did not see any towing truck. The only emergency repair van, seen at the central workshop, is out of order for a long time (picture n° 11).
Each depot works in the same way.
The managers reported many breakdowns en route which are due to the heat and the bad care drivers took of buses.

- Rolling stock and main parts follow-up

- Buses are not followed-up, it means that during a whole bus life, all maintenance actions are not registered on a book, for instance, dates of change of oil, of brakes inspections, of exchange of spare parts, of accidents. Usually, this description book is always following the bus wherever it could be, in a depot, under heavy repairs at central workshop, if second hand saled.

- Main spare parts should be followed-up in the same way. Each engine, gear box or any other main part, has to be followed-up : repairs, number of bus on which it is set up. It permits to have a good view about liability and life duration of parts. This kind of information is not available in the TCB. There are no computers in the TCB, for maintenance or operations.

- Breakdowns follow-up

- At the central workshop, all broken down vehicles brought to this place are registered every day : bus number, depot, nature of breakdown. No statistics are calculated about frequencies and types of breakdown, number of unavailability, ...

- At the depots, all maintenance actions are registered on a book, with bus number, nature of breakdown, spare parts exchanged, name of the mechanic. It is almost a "central registrer". All included information would permit to get serious statistics about the breakdowns and the repairs. But, as for the central workshop, no statistics are calculated.

A lot of information is available in the depot, but there is no reporting currently. In the past, according to senior depot managers, technical reports were daily sent to the head office.

4.1.3.5 Purchasing and storage

- *Purchasing*

Purchasing is subject to tenders each year. The limit of agreement purchasing is US $ 440. Any purchase above this limit has to be made by tender. Tires, batteries, spare parts are tendered each year, and the same for fuel and oil.

Any supplier has to give a sample (oil, fuel, tire) to the TCB. This sample is analyzed by a laboratory. If the quality is according to the terms of references of the tender, then the supplier can be accepted. But, during the duration of the contract, there is no more quality control of the delivered goods.

- *Storage*

Main store is located at the central workshop. Only Bir Hassan has a small store, looking more like an intermediate store. Stores are described in § 4.1.3.1.
If a depot needs some spare part from the central workshop, a worker is sent with an in-due-form voucher to get the item. The conveying of spare parts is made by bus (or private cars), as no truck looks to be on order. Worn out spare parts are not conveyed, they stay in the depot.
As said here above, the store-keeping is well and seriously made, but computers are missing.

4.1.3.6 Staff qualification

All maintenance managers are regretting the poor level of qualification of the staff. Senior workers, foremen, maintenance managers will retire shortly, most of them in the 4-5 years to come as they have worked in the company for about 40 years. Some of them are real "wizards" and provide miracles, to have still available buses.

Even if young workers were well qualified, since appropriate tools and spare parts are not available, day-to-day practice and training missing. Main lack is for diesel and turbo-engine mechanics. As diesel engines are not allowed to operate in Lebanon, except for TCB, this specific qualification is difficult to recruit among Lebanese .

4.1.4 Questions and projects

4.1.4.1 About rolling stock

- *Purchasing of new buses*

CDR invited tenders to purchase 140 new buses. As seen in the advertisement in the newspaper "L'Orient- Le Jour" (March, 25th), the tender is about midi-buses, length between 7.50 and 9 meters, with a capacity of 20 seated and 40 standing passengers.
All proposals are to be received by CDR on May, 26th. The first deliveries could be at the end of 1994.

Serious questions about this new fleet are worrying as the TCB depots are in a poor condition.

- How are these buses going to be maintained ? As seen here above, technical equipment is no more existing, staff is under qualified. In a simple way, where are these buses going to be parked as depots are overcrowded with worn out or unavailable rolling stock ?

- How are these buses going to be operated? on which routes? by under qualified drivers ? If buses are wide spread on several routes, they will not be useful, it will be "a drop in the ocean".
In the current situation of the TCB, these buses will not operate for a long time, they will operate till the first breakdown, then after, they will join the unavailable fleet.

- It would be better to keep these buses away from operation as long as a real structure is not put into service. Real structure means technical organization, operation organization, but also the image of the network. TCB needs a new image to attract and win the loyalty of customers : a service of good quality with comfortable and reliable buses. It means also showing the presence of TCB in the city : new bus stops, information signs, new appearance for buses, ... Anyway, the reconquest of the territory.

- Rehabilitation of the fleet

Part of the PR 100 fleet could be rehabilitated.
It would be a possibility to increase the number of available buses as a part of the fleet looks to be rescued : structure looks safe, body easily repaired, some parts still in order. Rehabilitated buses, during the four years after the rehabilitation, do not cost more than a new one. But, from the fifth year on, the maintenance expenses of such buses increase 10% quicker than for new buses. Economically, rehabilitation is a short term solution whose advantage is to defer purchasing of new buses. The average cost of the rehabilitation of a bus, as calculated by Paris Mass transit (RATP), was mentioned in § 4.1.3.3.

- But, on one hand, this rehabilitation involves a technical audit of all buses, to identify those that can be quickly rehabilitated from those to be cannibalized. This work has to show reliable results in a short time, so only best buses, with not too many heavy repairs to carry out, have to be rehabilitated. The choice of buses to be repaired has to be realistic. At first glance, about 50 to 60 buses could be in this situation. The remaining ones should be cannibalized to store all re-usable spare parts.

- On the other hand, it means capabilities to make the rehabilitation : equipment, tools, qualified staff. This work could be sub-contracted to companies able to carry out such tasks, even to the manufacturer, or done by TCB.
If done by a private company, or by the manufacturer, after audit, buses will be brought and repaired in a competent plant. TCB has to control the quality of repairs and has to put in service a quality assurance process.

If done by TCB, the central workshop has to be re-equipped and staff re-trained. This choice has to be studied in terms of delays, investments and long term rentability. Delays as it needs time for instance to list all machine-tools, equipments and parts to purchase, to invite tenders, to organize deliveries and putting into service ... Investments as it needs financing. Long term rentability as the question is : after the rehabilitation, does TCB really need a central workshop with such costly equipment ? The fleet will never be really much more than 400 to 500 vehicles and this size may not be large enough to require a central workshop.

4.1.4.2 About staff

Total staff

The main question is the total number of staff still registered on the public transport payroll.

- Railway employees are still about 130 to 150, but they will retire in the next five years.

- According to the managers, about 900 to 1000 employees are monthly paid by TCB (the UNDP document mentioned in § 4.1.1.6 was talking of 1200 employees). About 650 are still coming to work. 250 to 350 employees at least are paid but they never come to the office or to the depot. This question has to be solved as salaries amount to 90% of TCB expenses. Decisions have to be found to make people leaving the company, to retire under good conditions for older employees, while unproductive or absent employees be fired.

Picture n° 11 - Mar Michael - out of order emergency repairs truck

Staff qualification

Among working employees, the most worrying question is their qualification.

- A part of depot managers are old and will soon retire. Some of them, in spite of all their good will, are thinking that they are not enough qualified to be in such jobs. Youngers need to be trained in other mass transit organizations in Europe. Currently, TCB has neither competence in transport engineering studies nor in operation studies due to lack of well qualified executive staff.

- Supervisors should have new tasks in daily operation observation, in daily organization of operation and maintenance to be real assistance to the managers.

- Drivers are under qualified in driving. It leads to the idea that standard buses are not adapted to the local circulation, but, in fact, drivers are not trained to drive buses, even smaller ones, as they have no basic notions of bus gauge, overhang, back pivot, ... which can be seen according to the condition of the bodies. And, moreover, they do not care about warning lights on the dashboard, causing often serious breakdowns.

- Mechanics were qualified, as some of them are still able to repair buses rather good. But, the better are the older, they will soon retire without having time enough to teach and train youngers. As they do not really work every day, for lack of spare parts and tools, they also forget what they know.
Another questions is on specific qualification of diesel mechanic, as diesel powered engines are not allowed in Lebanon.

4.1.5 First conclusion

The objective of the study is an immediate action plan. It means that visible and lasting actions have to be realized in a short time.

According to the hereabove analysis of TCB situation, the first question in mind is what should be the quicker way to organize a good quality mass transit :

- to rehabilitate TCB ?

- to search for another solution, such as privatization under a new organization to be defined ?

The first possibility, in terms of delays and financing, would need a long time to rehabilitate all depots both for rolling stock and technical equipments, to organize staff retiring or firing as staff has the statute of public companies employees, to train new staff, to define a new managing and technical organization, ...

The second possibility need to think about is to explore all juridical and financial arrangements with the State, the Ministries and private partners. Whatever chosen arrangement, contracts and charters have to be clearly written down, discussed with all actors before signatures.

4.2 PRIVATE BUSES (BOSTAS AND VANS)

Before the war and actually until only the last 2-3 years, no mass transit services were provided within Greater Beirut other than the limited services of TCB and the taxi-service. Due to the high demand for such services the private sector entered this domain benefiting from a complete lack of any regulation. Some of the buses that were used by the private transport companies either in intercity services of for chartered services, were directed for work in Greater Beirut. Recently a new type of service utilizing vans, was also introduced. This section covers these two mass transit services.

4.2.1 General data

- Bostas companies offer different types of vehicles according to the purpose of travel : suburban (Dodge, Fargo) or tourism (Mercedes Pullmann). Urban and suburban bostas are mainly midi-buses, accommodating 35 to 45 seated passengers. They are very easy to identify, colorful, with an American school bus looking (picture n° 12).

To operate legally a bosta in Lebanon one needs to purchase a red plate number. The plate number is delivered to someone and attached to this person, not to the car. So, the plate number can be dismounted from a car to another.

Total number of red plate licensed Bostas is 618. All were operating before the war. Currently only 336 are still operating, shared as following (source : Lebanese Transport Co.).

Routing	Operating before war	In operation now
- North way	90	15
- South way	90	20
- Bekaa way	80	20
- Beirut - Ain Rimaneh	40	35
- Beirut - Jounieh	30	-
- Beirut - Jbail	8	-
- Beirut - Faraya (Kisrawan)	15	-
- Beirut - Douhour Choueir-Bolonia	40	3
- Beirut - Alnahr	50	-
- Beirut - Chiyah	35	15
- Beirut - Chouf	15	5
- Beirut - Souk Algharb	12	-
- Beirut - Bhamdoun	25	-
- Beirut - Chehim	5	8
- Beirut - Rashaya	5	-
- Beirut - Airport	15	15
- Touristic offices	63	-
- Schools	-	200
TOTAL	618	336

- Vans are mainly small vehicles as Combi Volkswagen or same type of Japanese manufactured , such as Nissan, Toyota, with a total capacity of 10 to 14 seated. Most of them have black plate number. The estimated fleet of operating vans is about 450.

Picture n° 12 - Bosta in Beirut city

4.2.1.1 Bostas and vans activity

- Activity of the bostas is oriented to tourism and intercity passengers transport. When these buses belong to companies, they are red plate numbered or green plate numbered. The green plate numbers are for tourism trespassing Lebanese borders, some routes are traveling to Europe. Bostas companies have insurance policies for the vehicles and for the passengers. The drivers have special driving license and are trained for their job. They have better wages than in the public sector, about twice. Some companies own a workshop to maintain buses. The garages are located outside GBA, at Saida or Tripoli, according to the main office of the company.

Before the war, bostas were not allowed to accommodate passengers inside Beirut city, except at the termini of routes, mainly located at the Place des Canons. These buses were allowed to move inside the downtown, as most of companies had their garages located around the Place des Canons area. All the bostas companies had their ticket offices at the Place des Canons. Passengers were not allowed to board or alight along their routes between the suburbs and the downtown. Currently, intercity bostas pick up passengers all along their route, even in urban and suburban zones.

The hereafter form shows the sharing of main activities of some companies.

Company	Number of buses	Tourism	Intercity	Urban	For entreprises	For schools
- Salamco	7	x				
- El Kotob	7	x	x			
- El Ahdab	10		x			
- Lebanese Transport	65	x	x			
- Rida Travel	27	x		x	x	
- Saad Travel	4	x	x		x	
- Dora Union *	?	x	x	x	x	x

Gathering of drivers owing just one bus (or taxi-service).

Bostas routes have terminals at main points as Kola, Barbir, Museum or Dora, according to their direction in the country. A map of bostas and vans routes is featuring in plan n° 5.

Bostas can be black plate numbered, so their owner (who is also the driver) is illegally working, usually without insurance policy and unsufficient level of maintenance of the bus.

- Vans activity is mainly oriented to urban and suburban passengers transport. Most of them are illegally working, on the same routes as TCB buses or legal bostas (legal in the sense of having a red plate). They also replace failing TCB on some urban or suburban routes. But, some vans are bearing red plate numbers.

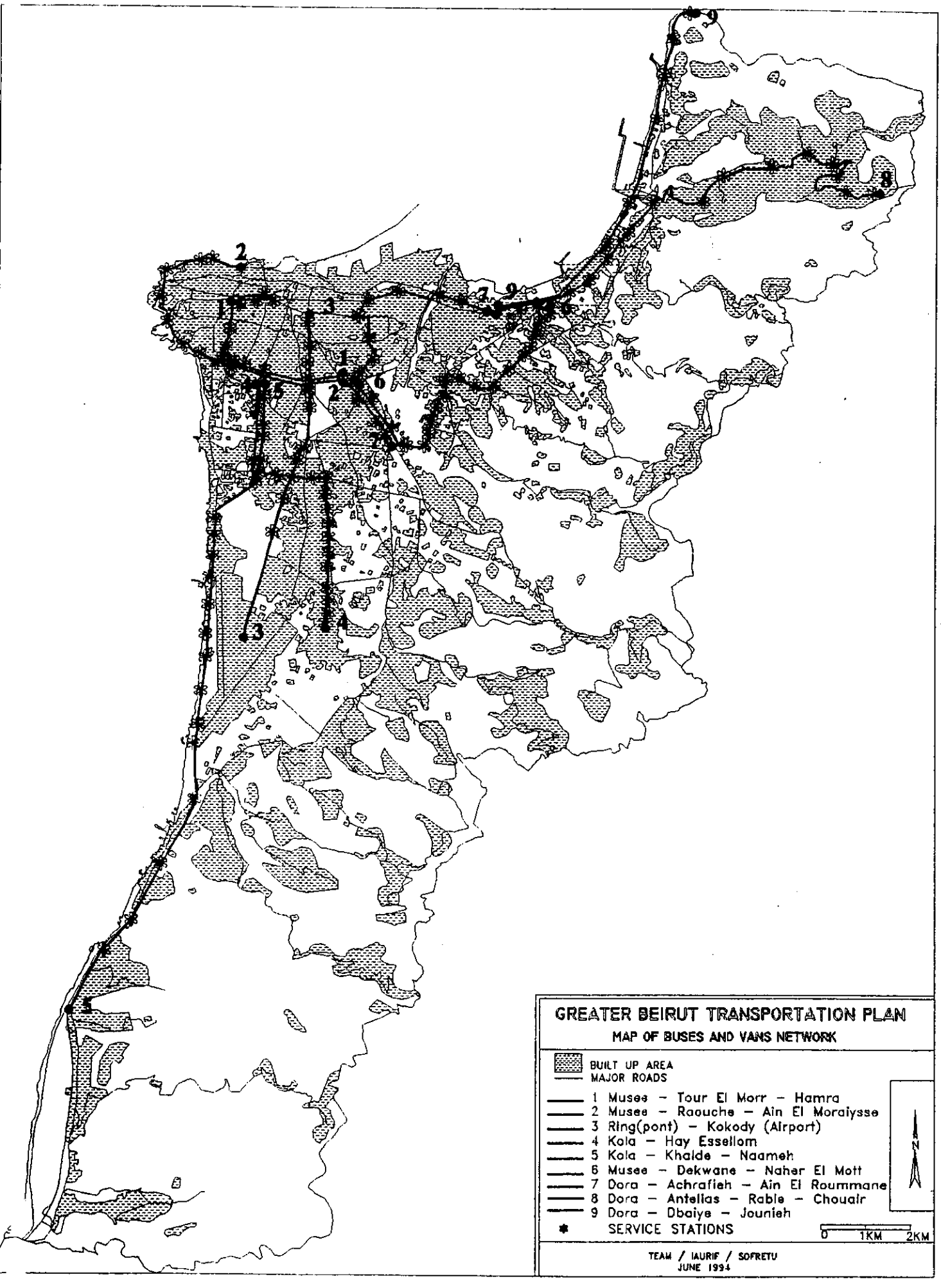
4.2.1.2 Legal statute of private buses

- *Bostas companies*

In the past, bostas companies needed official agreement to serve routes. They had to respect a charter.

Currently, bostas replaced failing TCB on some urban routes as it is shown by interviewing bostas companies managers and by the surveys made in May and June 1994. Even if charters are still existing, they are no more respected, particularly by bostas not belonging to a company, but to its own driver. This situation is understandable, as people need transport.

PLAN N° 5 - MAP OF PRIVATE BUSES AND VANS NETWORK



About 10 companies are existing, of very different sizes. They are all private companies, SA or SARL legal statute. Some of these companies are bearing the name of their owner, as Mr. El Kotob or Mr. El Adhabe. The bostas of these companies are bearing red or green plate numbers.

As said before, some drivers own just one bus. If they own also a red plate number, it is more successful to be member of a Union, such as the Dora Union.

- Members of a Union

To be member of a Union offers some advantages both to driver and to passenger.

The Dora Trade Union has been operating for 47 years both for buses and taxis-services. The offices of the Union employ 15 persons, working in the administration, coordination and management. The Union is responsible for the parking of bostas and taxis at Dora. All vehicles allowed to park at this place are owned by Union members. Each vehicle is driven by its owner. To identify Union member vehicles, a sign is posted at the right of the windscreen. The sign is a cedar, red if the vehicle is allowed to park at Dora, black if not allowed.
All these vehicles have to bear red plate number, it is a condition to be member of the Union. Buses are Dodge manufactured between 1950 and 1963.
This Union gathers 4000 members who have to pay a monthly fee. All vehicles have an insurance policy.
Drivers have all a special health insurance that they credit pay.
The Union have special agreements with companies to credit supply drivers in spare parts and even furniture, with gasoline stations to get discount prices for petrol. The Union created "une caisse de prêt" to help drivers to finance heavy repairs to the vehicles.
The Union publishes a magazine twice a year.

- Black plate number vehicles

If the private bus does not bear a red plate number, it is illegal , except for school buses bearing the name of the school. These buses are usually dedicated to school transport and have special arrangements.

Comments :

But, as red plate numbers were not issued for almost thirty years, as TCB is failing, as 50 % of bostas are no more running, as the needs of the people are increasing and the applicable laws are stagnant, all these reasons encouraged step by step this illegal situation.

4.2.2 Intercity routes served by private buses

Even if intercity passengers transport is at the periphery of the study, a short look on it is interesting to have an idea of the fleet of regular intercity buses and the number of passengers accommodated.
Only for the Beirut - Tripoli route, on average, the daily number of passengers is about 1900/2000 for both directions, as said by company managers, including some passengers in urban and suburban zones.

Fares are the same for all companies. For instance, some fares have been communicated :
- Beirut to Saida : 1500 LL,
- Beirut to Tripoli : 2000 LL,
-Beirut to Jounieh : 1000 LL.
Special fares are given to students and soldiers in uniform, about 30 % of discount.

The most important idea is about the localization of the terminals in GBA. The bostas should be integrated in the project of the first future central bus station located at Charles Hélou Avenue, near Quarantine Harbour.

For now, bostas terminals are mainly located at Dora, Kola and Barbir.

- From Dora, bostas are serving the route to Jbail and Tripoli, about 10 departures per day.

- From Kola, bostas are serving the intercity routes to Chouf, Equlime, Saida, Chtaura and Western Bekaa, Masnaah, about 10 to 15 departures per day for all these destinations. At Kola, 8 international travel offices are represented, they organize tours to Syria, Jordan, Saudi Arabia, Mecca, Egypt, Turkey, Libya, Romania and Bulgaria .These offices are operating various vehicles : 120 large American or Mercedes "yellow cabs", 20 vans of 12 or 24 seats, 35 Pullmans of 45 or 55 seats. As these offices do not have specific parking areas, the vehicles are stopped in front of the offices, causing traffic troubles. Cabs and vans depart when all seats are occupied, and the scheduled departures for the Pullmans are 5 to 8 per day..

- From Barbir, bostas are serving the route to Jbail and Tripoli, about 20 to 25 departures a day. These bostas stop at Dora to pick up passengers.

These numbers do not include tourism bostas or special tours made on request. All these bostas are legal ones, belonging to a company or member of a Union. Illegal bostas and vans are not included.

The here above places are congested by buses, taxis, vans and pedestrians as they are important connecting stops or terminals for many routes. To move all these vehicles to places in the city, as the Quarantine future central bus station, would make easier the circulation in all the city. But, to accommodate all passengers served by bus, other central bus stations have to be located in different places in the GBA : railway station, airport, ... The terminals must always have a good accessibility from major highways and arterials.

In the study of the first central bus station, regarding its size, ticket offices, numbers of berths (bus loading points), luggage offices, pedestrian access, the number of places for dwell time of buses has to be included.

4.2.3 Urban and suburban routes served by private buses

4.2.3.1 Map of the routes

Most of the routes are both served by bostas and vans, legal and illegal vehicles. As shown on the map (plan n° 5), some routes are both served by TCB and private buses.

The 6 following routes are served by bostas :
- n° 1 - Museum - Borj el Morr - Hamra,
- n° 2 - Museum- Raouché - Ain Mrayssié,
- n° 6 - Museum - Dekwané - Nahr el Mott,
- n° 7 - Dora - Achrafié - Ain Roummané,
- n° 8 - Dora - Antélias - Rabié - Chouair,
- n° 9 - Dora - Dbayé - Jounieh.

Route n° 9 is only served during summer, it is a kind of "beaches route".

The 2 following routes are served by vans :
- n° 3 - Ring - Kokody,
- n° 5 - Kola - Khaldé - Naameh.

One route is served both by bostas and vans :
- n° 4 - Kola - Hay es Sollom.

4.2.3.2 Main features of routes

- *Surveys*

These routes have been precisely identified through surveys carried out in May and June 1994 by the consultant. These surveys were carried out during few days, the size of the sample is small. But, even if results must not be generalized, these surveys gave, in a qualitative way, interesting lessons.

Two types of surveys were realized on working days :

a dynamic survey
This survey was carried out aboard buses and vans. The investigator registered the departure time of the bus from terminal, then stop by stop, arrival and departure time, number of passengers boarding and alighting, arrival time at the other terminal. Stops are made by request, but some main points have been defined, they were named according to the name of a road, a shop or any important building. When successive stops were very close, they were gathered under one name (or number) after a verification in-the-field. The investigator did not ask any question to the driver or to the passengers.

a qualitative survey
Aboard the bus or the van, the investigator asked some questions to the drivers, then to some passengers. The questions asked to the drivers were about the route : number of vehicles, trip time, number of trips, mileage, patronage, fares, incomes and labour rules. The questions asked to the passengers were about expected trip time, fares, purpose of the journey, connections with other buses or vans or taxis-services.

Questions were well accepted by everyone, drivers or passengers, and all interviewed people were very fair.

- *Main features*

Main features of all routes are registered in the attachment 3.*Repartition between bostas and vans*
The three routes served by vans are all in the south part of the GBA, routes n° 3, 4 and 5. All routes serving Beirut city and the eastern part of GBA are bostas routes. Most of the vans are bearing black plate numbers.

Fares

Usual fare is 250 LL per trip. For all urban trips, it is a flat fare for every passenger. No exemption had been observed. For some suburban trips, as on route n° 3, linking the Ring to Kokody, the fare is 250 LL from the Ring to Berbir , and 500 LL from the Ring to Kokody. The same situation is seen on routes n° 5, 8 and 9 whose fares are graduated related to distance : Kola - Khaldé : 250 LL, Kola - Niameh : 500 LL, Dora - Antélias : 250 LL, Dora - Chouair : 1500 LL.
On urban and suburban bostas, fares are collected aboard by the collector without delivering a ticket. On intercity bostas, tickets are delivered at the office located at the terminal, with a seat number assigned. When passengers are picked up along the route, they pay to the driver the right amount, the driver does not deliver any ticket.

Comments :

Urban fare is the same as TCB's. There is no fare competition. TCB looks to act as a regulator, which means that if TCB would increase its fares, all private buses would do the same.

Daily number of passengers

Depending on collected information on daily revenue, the number of daily passengers can be estimated on average for a working day. It is supposed that fare evasion is negligible, as drivers of private companies have to take care to the revenue, and the driver of his own bus pays more attention to the revenue because it constitutes his salary.

Route	Revenue per bus (in LL)	Fare (in LL)	Passengers per bus	Number of buses	Passengers per day
Bostas (*)					
1	125 000	250	500	20	10 000
2	150 000	250	600	20	12 000
4	70 000	250	280	30	8 400
6	150 000	250	600	6	3 600
7	50 000	250	200	28	5 600
Vans					
3	30 000	250/350	100	15	1 500
4	35 000	250	140	200	28 000
5	35 000	250/500	90	200	18 000

(*) Route n° 8 is not taken into account as it is more an intercity route than a suburban route. Route n° 9 is not taken into account as too casual : this route is only operated on summer, to serve beaches.

For bostas

The total number of passengers accommodated per working day by all bostas is about 39 600, which means on average 380 passengers per bosta per day on average.
In other cities (source : World Bank surveys, studies and field mission reports), this ratio is about :
- 480 passengers in Jakarta,
- 400 passengers in Karachi,
- 530 passengers in Santiago del Chile.

For vans

The total number of passengers accommodated per working day by all vans is about 47 500, that means 110 passengers per van per day on average.
In other cities (source : World Bank surveys, studies and field mission reports), this ratio is about :
- 100 passengers in Cairo,
- 125 passengers in Jakarta,
- 140 passengers in Mexico city.

Gross daily income

As the daily income of a bus running on each route is known, it is possible to calculate the total daily income of all routes, and then the gross daily income per bus on average. As said here above, fare evasion is supposed to be neglectable.

Route	Income per bus per route (in LL)	Number of buses	Income per route (in LL)	Gross income per bus (in LL)
Bostas (*)				
- 1	125 000	20	2 500 000	
- 2	150 000	20	3 000 000	
- 4	70 000	30	2 100 000	95 192
- 6	150 000	6	900 000	
- 7	50 000	28	1 400 000	
Vans				
- 3	30 000	15	450 000	
- 4	35 000	200	7 000 000	34 819
- 5	35 000	200	7 000 000	

(*) Route n° 8 is not taken into account as it is more an intercity route than a suburban route. Route n° 9 is not taken into account as too casual : this route is only operated on summer, to serve beaches.

The gross daily income of a bosta (≈55 US $) is almost three time the daily income of a van (≈ 20 US $).

Mileage and commercial speed

Route	Mileage per route (in km)	Mileage per bus per day (in km)	Trip time (one way in minutes)	Commercial speed per route (in km/h)	Average commercial speed (in km/h)
Bostas (*)					
- 1	4.500	54	45	6.00	
- 2	7.750	108	35	13.28	
- 4	7.000	56	50	8.40	12.41
- 6	8.000	80	33	14.54	
- 7	7.350	59	45	19.84	
Vans					
- 3	6.800	204	35	11.65	
- 4	6.900	97	43	9.62	14.84
- 5	15.500	217	40	23.25	

(*) Route n° 8 is not taken into account as it is more an intercity route than a suburban route. Route n° 9 is not taken into account as too casual : this route is only operated on summer, to serve beaches.

- Mileage covered per bus per operating day is, on the average, 71 for a Bosta and 173 for a van.

- Commercial speed for private buses is rather good according to the congestion of the city. In comparison, the Paris Mass transit (RATP) has a commercial speed of 11 km/h.
If the route n° 5 is excluded, vans commercial speed in urban zone is about 10.63, that is close to the bostas speed.

On the route n° 4, served both by bostas and vans, the commercial speeds are also very close.

Stops

Route	Mileage per route (in km)	Number of main stops	Stop spacing per route (in meters)	Average stop spacing (in meters)
Bostas (*)				
- 1	4.500	15	300	
- 2	7.750	12	650	
- 4	7.000	16	450	450
- 6	8.000	14	575	
- 7	7.350	26	300	
Vans				
- 3	6.800	16	425	
- 4	6.900	16	430	430/700
- 5	15.500	12	1300	

(*) Route n° 8 is not taken into account as it is more an intercity route than a suburban route. Route n° 9 is not taken into account as too casual : this route is only operated on summer, to serve beaches.

Stop spacing is usually between 400 to 600 meters.

- Bostas routes have spacing in the usual standard.

- Vans have different spacing : on urban routes, spacing is the same as bostas ; but, on suburban routes, as route n° 5, a long trip on expressway is gone down without any stop. The usual spacing for vans routes is about 430 meters. On same routes, both stop at same places.

4.2.4 Questions and projects

4.2.4.1 About the fleet

Bosta fleet is growing older and needs to be renewed for a part of it. But, the main problem is that bostas companies are not allowed to import diesel powered buses, but only petrol powered ones. This ban is applied since the beginning of the sixties.
The main problem, that would occur in a short delay, will be to purchase new buses. Most of the manufacturers sell only diesel powered buses, except in China. If this rule is not changed, bostas owners will have to overhaul old buses several times, not only at mid-life for instance. The life duration of such buses would be extended, risking their safety.
Currently, all public sector vehicles have official permission to be diesel powered, as it the case for the TCB buses.
This question was approached several times by bosta company managers and for the moment, the law is not modified. This situation could be critical particularly if tourism increase in Lebanon, as it should be, and that Lebanese travel offices could not offer to customers vehicles of good quality.

4.2.4.2 About competition

In urban and suburban sectors, the competition between "mass operators" is erased as fares are same for all : 250LL. As mentioned above, TCB fares act as fare regulator in Beirut city. In intercity activity, fares are also regulated as same prices are applied by all companies on same routes as explained in § 4.2.2.

- Bostas have replaced TCB as its services have failed. Passengers board indiscriminately a bosta or a TCB bus on the same route. Talking of competition between TCB and bosta would be a nonsense according to the poor condition of TCB and the number of buses still operating.

- Railways are not operating for now. When the Railways will be re-operating, it can lead to competition between both modes. But, bostas can act as feeders to the railway or as a "coasting "network along the railway.

- Taxis-services can not be a competitor because of the size of vehicle, of the prices passengers have to pay, of the nature of service provided (mass transport or shared taxis).

- Illegal bostas or vans can be considered as competitors, but more about quality and image of the transport. The increasing of the demand, the insufficiency of mass transport means gave birth to this paratransit and allowed its expansion. If buses of companies are well maintained, drivers have a bus driving license and are qualified, transport is scheduled, companies have insurance policies both for rolling stock and for passengers, illegal bostas are not at the same level. Not all drivers have a bus driving license, it is said that some of them do not have any driving license. Buses and vans are not well maintained, are often overcrowded, so the security of passengers is not taken into account. Most of these buses have no insurance policies.

The mass transport have not currently a good image as seen by passengers : long waiting time, dirty, uncomfortable, bad drivers. Illegal bostas and vans can not improve this image as far as quality and security. This bad image is psychologically enforced also by the weight of the past : a bus could be a target, causing many victims, it can explain partly the disaffection of the mass transport.

4.2.5 First conclusion

- It is clear that private companies have capabilities to adapt their routes to the demand quicker than public companies as they do not have any authorization to ask to serve one route. They do not have to ask any subsidies from the Government. They have to get a balance between costs and revenues, to make profit.
They do not have to locate and maintain bus stops, information signs, shelters, they just have ticket offices at terminals for intercity routes.
They do not have to abide by the same laws for staff management such as recruiting and firing.
Private companies have a good level of professionalism and are competent operators.

- Individual operators, owning just one bus, felt the necessity to be members of a Union, to be strong in front of local authorities, to have their rights recognized, to obtain better prices for spare parts, for petrol ... Anyway, they are featuring a political force, an economic force, they also represent an "institution".
The result of this "roundup" is that they have more power to defend themselves in front of illegal operators or in front of Lebanese authorities.

- Illegal operators, as they offer a kind of answer in front of emptiness, specially in southern suburbs, must be one day be taken into account. Without talking for now about legalization, their case is very worrying and has to be solved. People living in this part of the city have very poor resources, need mass transport of good quality as far as frequencies, comfort, security, and low prices.

All this private mass transport has to be supervised and partly organized by a central authority in charge of the coordination of the work of each but without interferences in the daily operation of the network and the routes.

4.3 SHARED TAXIS

4.3.1 General data

Shared taxis are called "Taxis-services" in Lebanon. Most of them are Mercedes.200/230 type. A part of them are bearing a sign on the roof with the word "taxi" mentioned in French and in Arabic. A taxi cannot board more than 5 passengers.
"Services" can serve intercity routes or suburban/urban routes. Passengers can board at stations in the cities or anywhere along the routes.
In Beirut, a taxi can be boarded at a station, when cruising or called by an office.
Fares are graduated, related to the distance, not to the duration of the trip. For a trip, if a passenger wants to be alone in the taxi, he has to pay the same price as if five passengers were boarding.
The total number of legal taxis for whole of Lebanon is 10 649, related to the sales of red plate numbers. Since 1965, no more red plate numbers have been delivered by the Ministry of Interior.
A driver can be the owner of both car and plate number (65% of all taxis), but he can rent the car or the plate number. In this second case, he has to share the revenue with the owner.

4.3.2 Organization of the shared taxis

4.3.2.1 Legal authorizations

- The first step is to buy a red plate number. In the past, they were delivered by the Ministry of Interior.
In 1965, the official price of one was 7 500 LL (≈ 3 200 US$ according to 1965 parity), at black market, it was 13 500 LL (≈ 5 900 US $ according to 1965 parity). The plate number was credit sale and the repayments could be spread out over 20 years if officially purchased. As since 1965, no new red number plates were delivered, the price of such plate number, in 1975, reached 22 000 US $ and had to be paid cash.
For now, the cash price at black market, of a red plate number is about 6 000 US $. The price decreased a lot because of the increasing of illegal taxis.
The red plate number belongs to the owner who can keep it his whole life, whatever the car.

- The taxi driver has to get a special driving license by the driving license office. This license must be renewed each five years. Before the war, the fee for a license or its renewal was 25 LL (10 US $), currently, it is 50 000 LL (30 US $).

- Taxi drivers have to pay annually a tax. It is about 30 000 to 40 000 LL (18 to 25 US $) according to the condition of the car, its engine power, its age.

- Cars were submitted to technical inspections twice a year before the war. Currently, except if the driver is member of a Union, such inspections are no more carried out.

- Lebanese Government permits only to import second hand cars whose age is no more than 8 years. In 1994, Mercedes cars imported were manufactured in 1986. According to the President of the Taxi Drivers Trade Union, the price of such cars is about 14 000 to 16 000 US $, taxes and customs dues included (≈ 3000 US$). We investigated the market and found that these figures were over stated, and they are actually US$ 10000 - US$ 12000, if not less.

4.3.2.2 Regional repartition of legal taxis

- For whole Lebanon

The President of the Taxi Driver Trade Union proposed a repartition according to the Mohafazat (region) organization. It means that the 10 649 plates are to be assigned as follows :
- south Lebanon : 1500 numbers,
- north Lebanon : 2500 numbers,
- Beqaa : 1000 numbers,
- Beirut and Mont-Liban : 6000 numbers.

The two Mohafazat of Beirut and Mont-Liban are legally considered together for this sharing.

- For Beirut

Organization

In Beirut, taxis are shared out among stations, main terminals or roundups and taxis offices with phone. Main taxi services stations are featuring on map n° 6.

- The stations of Beirut are located at the international airport, the harbour and by hotels. In the past, it was by Saint Georges hotel, currently, it is divided according to the operating hotels. 600 taxis are serving these stations and work most as ordinary taxis.

- Main terminals or roundups are served by about 5000 cars. These terminals can serve urban, suburban and intercity "routes". These "routes" have main terminals at Dora, Barbir, Kola, Hamra. Intercity routes are serving cities as Tripoli, or regions as Beqaa, ... According to the demand of passengers, taxi driver is running to any place in the city. Along his route, he tries to pick up passengers going to same destination, or anywhere along.

- Taxis offices are located mainly in Beirut city.

Daily work of a taxi driver

In the past, taxis were working in the morning, from 6.00AM to 13.00 PM, or in the afternoon from 13.00PM/16.00PM to 19.00PM/22.00PM. It was enough to earn a living. For instance, in 1970, the minimum monthly salary was about 170 LL (≈ 75 US $ in 1970 parity) and a taxi driver earned about 400 LL (≈ 175 US $ in 1970 parity).

Currently, taxis are working almost all day long. Most of them are working in "two shifts", in the morning from 6.00AM to 1.00PM and in the afternoon, from 3.00PM to 8.00PM. The total duration of work is about 11 hours. A taxi driver has to work longer for two reasons. On one hand, the demand increased as mass transits were failing and ineffective. On the other hand, he has to earn more money as inflation rate increased given to a fall in value of the Lebanese pound. For instance, the inflation rate in 1987 was 730% in Lebanese pounds. Between December 1988 and August 1992, the cost of living has been multiplied by 9 (source : The white book of Lebanese economy).

The average gross daily income of a taxi, as calculated according to the interviews, is 40 000 LL (≈ 25 US $), the net income per day is about 24 500 LL (≈ 15 US $), the gap is explained by the petrol, taxes, fees, ... Per month, the net salary of a taxi driver is about 300 US $, but, as inflation is increasing, the purchasing power is lower. Legal taxi drivers have also to face the competition of illegal taxis.

4.3.2.3 Unions organization

Such Unions have no responsibilities toward routes served by taxis. They are mainly guarantors of the capability of their members as explained hereafter. They are also responsible for the management of taxi parking at each roundup.

- The "Dora Union", described in § 4.2.1.2, offers same advantages and guarantees to taxi drivers as that to bosta drivers. The members are drivers of bostas or taxis in all Lebanon.

- The members of the "Taxi Drivers Trade Union" are only taxi drivers in Beirut. All vehicles have to bear a red plate number, that is a condition to be member of the Union. Taxis have an insurance policy. The Union puts into service a health insurance for drivers. The State agreed to pay a part of the insurance, but never did. Technical inspections of the car are carried out by the Union. The Union have a store with main spare parts drivers need. As this cooperative store had best prices than anywhere, drivers were customers. But, other spare parts stores decided to discount their prices to be at the same level, then drivers can purchase elsewhere. Taxi drivers do not have discount price on the petrol.

The importance of these Unions is not negligible as they represent, as for bostas, a political and economic institution .
They constitute also a , a lobby force in the mass transport, even if the capacity of taxi is not comparable to that of a bus. Taxi-services are an answer to the lack of public transport and are considered more secure than buses, by passengers.

4.3.2.4 Illegal cabs

Obviously, to operate an illegal cab, there is no any legal authorization to ask. According to the President of the Taxi Drivers Trade Union, the number of illegal taxis would be about 3 to 4 times more than legal ones. It means, for Beirut city and GBA, that about 15 000 to 20 000 illegal cabs would operate. These cabs are also driven by foreigners who do not have Lebanese driving license.
The total number of illegal cabs, estimated from all traffic counts, shows that for each legal taxis, 3 illegal are going by.

4.3.2.5 Technical information about shared taxis

- Mileage and commercial speed

According to the results of investigations carried out by questionnaires near taxi drivers, the daily mileage of a taxi is about 150 kilometers. The commercial speed, calculated according to the number of working hours and to the mileage, is 13.6 km/h.

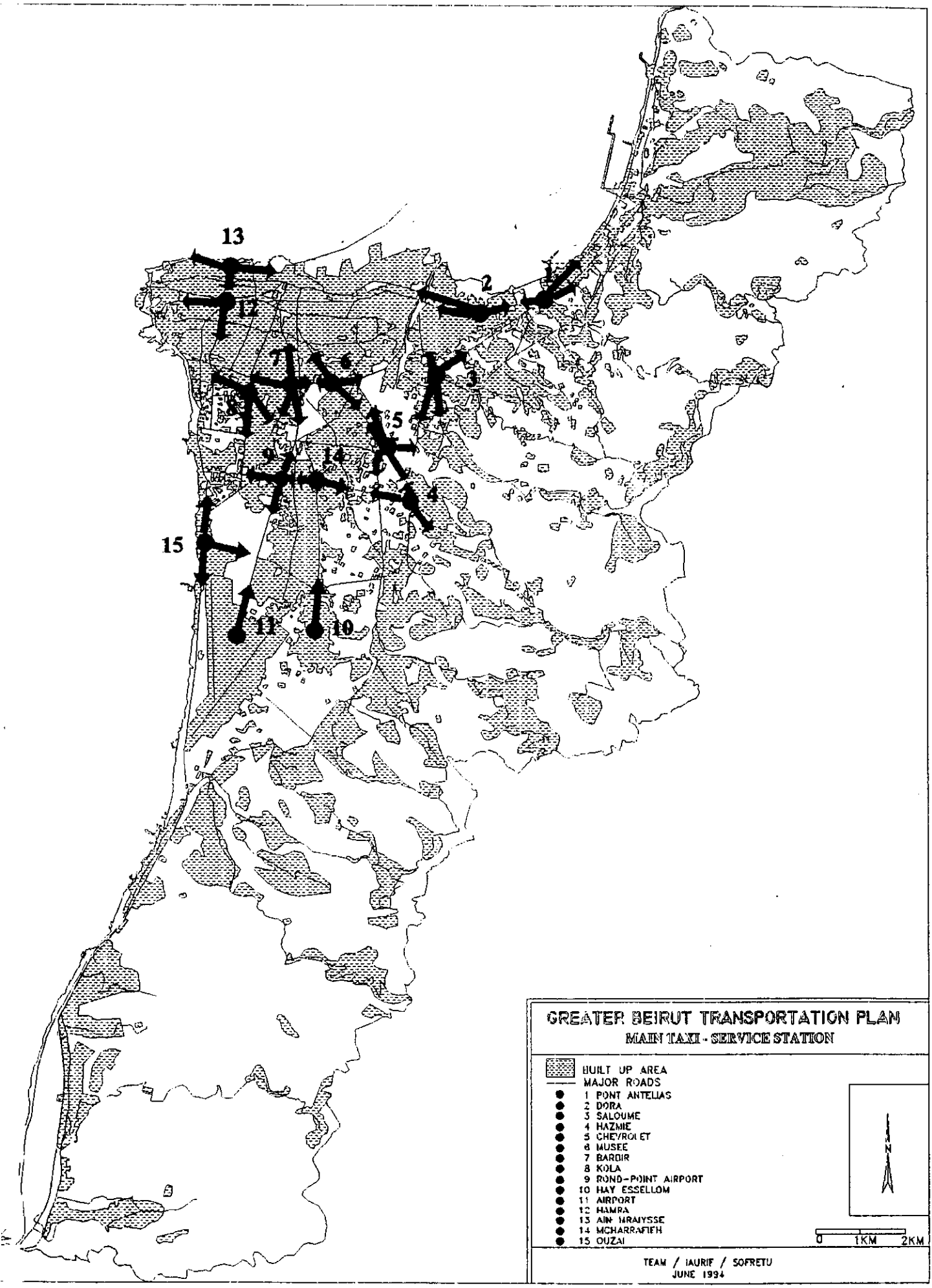
- Fares

Fares are graduated related to the distance, not to the duration of the trip. Passengers are aware of the fare of the trip. If not, fare is discussed before getting in the car as there is no taximeter. The driver is paid when the passenger arrives at his destination.
In Beirut city, the fare is 1000 LL (0.60 US $).

- Patronage

According to the results of investigations carried out by questionnaires addressed to taxi drivers, the number of passengers accommodated per day is 40 on the average. That means per day, about 200 000 passengers accommodated by legal taxis, and 600 000 by illegal taxis.

PLAN N° 6 - MAIN TAXI-SERVICES STATIONS



- *Gross daily income*

The average gross daily income of a taxi, as calculated according to the interviews, is 40 000 LL (≈ 25 US $), the net income per day is 24 500 LL (≈ 15 US $), the gap is explained by the petrol, taxes, fees, ...

4.3.3 Questions and projects

4.3.3.1 About the number of legal cabs

As the number of legal cabs was frozen for 30 years, the Unions would like that some more red plate numbers be delivered, but the proposed increase has not been estimated. According to the President of the Taxi drivers trade Union, the work of the legal taxis would be re-organized, particularly for new numbers. The work of these new taxis should be limited to a Mohafazat (region) and not allowed to work in another one. "Senior taxis" would not change their organization. It means that legal cabs should be two-levels organized.

The price of the new numbers and the credit sale arrangement have to be discussed to avoid large purchases by financial consortiums.

4.3.3.2 About the cars

The "Taxi Drivers trade Union" proposed to the Government to agree a special derogation of the restriction on the age of imported cars, used as taxis in order to allow to part of the fleet at a cheaper price. Second hand cars of 1986 and later are expensive (10 000 to 16 000 US$), while a Mercedes model 1980 would cost only 2000 to 2500 US $, all taxes included.

Currently, imported Mercedes are 8 years old, as expected life duration is about 15/20 years in Lebanon, cars are to be renewed after more than 20 years of total life. Most of them are worn out cars, or at least unsafe, before the end of such life duration even if private mechanics are very clever.
To accept introduction of about 14 to 15 years old cars, would lead to a general aging of the taxi fleet as taxi drivers would buy only cheapest cars. The expected second life duration of cars could not be more than 8/10 years. The maintenance of older cars is more costly, as breakdowns are more frequent and spare parts more difficult to purchase.

The Union would like to find an arrangement with the Government about the amount of import taxes, to help taxi drivers to buy more recent cars. The use of diesel powered engines was not approached.

Comments :

Red plate number taxis fleet have to be renewed, as part of them is very old cars and in bad condition. In fact, if yearly technical inspection was strictly observed, a part of current cabs would not be authorized to run any more. To import older cars would not solve the problem of renewal and quality of cars. Legal taxis must be better and safer than illegal cabs. It would be more appropriate to have a discussion with authorities about import taxes and discount of the price of petrol, for instance.

4.3.3.3 About illegal cabs

As for bostas, illegal transport is a competitor. The cars used as taxis are very old ones, bought at very low prices (500 to 1000 US $) without any technical inspection. Drivers do not have taxi driving licenses, some do not have any driving license. They do not have insurance policies, they do not pay the special tax disc.
They apply the same fares as legal cabs.
As for bostas, the southern suburbs of GBA are mainly served by illegal cabs.

Police is aware of numerous registered complaints about robberies or crimes committed by persons under the cover of driving a taxi (illegal taxi).
These illegal taxis do not have authorized roundup places, they are mostly cruising, making frequent stops or slowing down horning pedestrians, stopping anywhere and anyhow, congesting the streets.

4.3.4 First conclusion

The importance of taxis in Beirut is considerable.

As seen here above, they ensure main part of the mass transit everyday, a kind of transfer from the public or private buses to taxis is occurring and this phenomenon increases with the proliferation of illegal cabs.

Such a proliferation is usually the consequence of important economic problems in the country : demographic growth of low resources people, failing of public transport, increasing inflation, fall in value of money, loss of purchasing power. This phenomenon was witnessed in the former USSR, when all institutional frames were deregulated. It was also witnessed in the past in Iran, but as soon as economic recovery began, the number of illegal cabs decreased.

To increase the number of legal cabs is not a major priority for now. When deregulation will decrease, this question could be examined but not currently.

Taxis have their place in the transport, but as usual taxis or feeder system from surroundings which could not be served by buses, whatever the size. The way taxis are cruising along the streets to pick up passengers is causing traffic congestion. Most private car drivers do not circulate on the right lane, as cabs are cruising along and can stop without taking care of other roads users.

4.4 SPECIAL TRANSPORTS FOR COMPANIES AND SCHOOLS

4.4.1 Origins and reasons of the implementation of special transports

Some companies and schools operate transports for employees and pupils. The reasons for each of these organizations are different from one another.
Most of them were operating before war.
Inquiries have been carried out, to complete mass transit diagnosis.
The interviewed companies were Sleep comfort, SIDEM, Coca-Cola, Gandour, Middle East Airways.
The interviewed schools were Collège Protestant, Grand Lycée Franco-Libanais, Lycée National, Faculté Haddath. Then, a larger survey was carried out at 26 schools located in GBA.

4.4.1.1 For companies

- The main reason was the revival of economy after the war. Companies had to imagine how to make it easy and reliable for employees to come on time at the factory or at the office. Anyway, transport was a priority economic need.
According to the localization of the company, what kind of transport was reliable ?
Public transport was failing. Private buses could not serve all the GBA as they do not have enough vehicles and have to make profit. Taxis services do not have enough capacity and are expensive for employees with low salaries.
All these reasons have led company managers to organize the transport of their employees.

- Some companies are working non-stop all day, according to their production. For the night shift, workers have to arrive on time, and companies must have their own transport as most of workers do not have cars.

4.4.1.2 For schools

- To operate own transport is very important for the fame of the school. These transports make the parents feel secure about children. It shows the quality and the organization of the school, parents are confident.

- Schools are turned to serve only children living in the surroundings, they also want to attract children from other neighbourhoods of the GBA to mix children from different horizons. This is not possible without school buses, as parents do not always have cars or time enough to bring children at school.

- A deeper study of school transport will be concluded early in the fall, when schools are open again.

4.4.2 Different types of organization

- Buses are the property of the company or the school

Companies

Some companies own their buses, ensuring driving and maintenance of the fleet. Usually, the driver is an employee of the company, paid overtime to drive the bus. Buses go on definite circuits to pick up employees at main points. It is not a door-to-door service. The driver is living close to the far terminus of the circuit and park the bus by his home to run early in the morning. The departure time from the far terminus is calculated according to the time people have to be at work and to the duration of the trip. Usually, companies are opening around 7.00AM, which means departure time around 45 minutes to 1 hour before. The closing is about 17.00PM, and same time is necessary for the return travel.
Companies have insurance policies for this transport.
This transport service is free of charge for employees of the company.
Vehicles are of different sizes, from the bosta or van to the private car.
Middle East Airlines uses vans for crew members and private cars for managers of the company and have to serve almost whole Lebanon, as crew members are living in the all country.
Coca-Cola company uses small buses, one of them has been built by the company, using an old truck rehabilitated into a bus.
Some of the companies have their own workshop, as Middle East Airlines, Coca Cola or Gandour, usually those owning a truck and car fleet.
Main problem will be the renewal of buses, as said by Sleep Comfort managers whose buses are aging (about 20 years).
These buses are private and are bearing black plate numbers, but the name of the company is painted on the body.

Schools

Some schools have their own buses. In this case, buses are driven and maintained by school employees. Each bus is running on a precise circuit, providing a door-to-door service, picking up each child at home (or very close to it), to make the parents feel secure. As the buses are parked at night in a yard of the school, the drivers have to leave early in the morning. The circuits are usually leaving the school from 6.00 AM to 6.40, as schools are opening at 7.30AM and according to the length of the circuit. Circuits are leaving the school in the afternoon at 14.00PM for the first way out and at 16.00PM for the second one.
The transport has to be paid by parents, fare is related to distance. The yearly fare is graduated from 120 to 350 US $, related to the distance and to the quality of the school.

Vehicles are of different sizes, from bostas to vans.
Some schools do not have any more buses, as the Collège Protestant, and regret this situation. But for security reasons, they sold 13 out of the 15 owned buses during the war. The two remaining buses are used from time to time for special trips to theater, sports, ...
A particular arrangement was made by the Grand Lycée Franco-Libanais who chose to sell buses to the drivers. The buses are bearing the name of the school, are parked at night in the schoolyard. Owners of the buses have to maintain them, to get insurance policies from the company chosen by the Lycée. Technical inspections are carried out by the transport manager of the Lycée.
These buses are private, with black plate number, but as the name of the school is painted on the body of the bus, it is like an endorsement from the school.

- *Buses are chartered*

Companies

Some companies charter all buses or a part of them, as they have not enough buses of their own.
They sign a contract with a private operator, operating mainly red plate number bostas.
For some companies, the chartered bostas can be all or partly dedicated to this transport only. If buses are dedicated exclusively, the amount of the contract is higher as the operator can not use them to another transport.
A part of chartered bostas are dedicated for the companies as Middle East Airlines and Sidem. Bostas are not dedicated for a company as Gandour.
Usually, contracts are negotiated according to the length of the trip, the type of road (mountains, city, ...). Cleanliness and maintenance are ensured by the operator, but technical inspections are carried out by the hirer. Insurance policies have to be provided under request of the hirer.
The contracts are monthly paid. Their amount has never been communicated, they are just said to be expensive.

Schools

Chartered bostas for schools have the same kind of organization than those chartered by companies. As they are bearing red plate number, they do not need to have the name of the school on the body.
During summer holidays, most of these buses are running on the summer route serving beaches, route n° 9 explained in § 4.2.

- *Patronage of these transports*

Companies

For the investigated companies, the repartition of different modes is summarized, as communicated by managers.

Company	Total staff	Using company transport	Living at the company	Walking or using cars
- Coca Cola	340	75	-	270
- SIDEM	577	300	90	187
- Sleep Comfort	300	140	50	110
- MEA *	1300	1200	-	100
- Gandour	870	600	-	200
TOTAL	3387	2315	140	867

* Only ground staff. The total number of crew members was not communicated, but most of them are using MEA transports.

Almost 70 % of the staff of this sample of companies use everyday the provided transport.
Employees living at the company are all foreigners (Africa, Sri Lanka).
Others employees are living close to the company, so they walk or use their own car.

Some are sharing one car to decrease the cost of transport.

For people using their own resources to go to work, the State implemented a transport allowance that companies have to pay to the workers. Some companies are paying this allowance in LL, between 500 to 2000 LL per day, others are paying it in petrol, between 40 to 100 liters per month. This amount is graduated, related to the distance. A control is implemented to regulate the payments and to avoid irregularities. As MEA provides a very complete transport, almost "personalized transport", this company does not pay this allowance.
The surveyed companies have parkings for staff cars and for buses. These vehicles are not parked anywhere along the streets, adding to the traffic congestion.

Schools

The results of the investigations carried out at schools and with pupils, are reported. Two forms are filled hereafter, in percentage, for schools of different levels : primary (P), complementary (C) and secondary (S) to get an approach of this transport according to the age of children.

- The first one concerns schools providing their own buses.

□ School	Walk	Buses			Collective car		Private car	
		School own	Chart. bus	Regular route	Taxis services	Paid arrange.	Family car	Pupil car
P	19	25	15	-	-	5	36	-
	19	*40*			*5*		*36*	
C	24	23	14	-	2	3	34	-
	24	*37*			*5*		*34*	
S	31	14	6	-	9	1	32	7
	31	*20*			*10*		*39*	
TOTAL	22	23	13	-	2	4	35	1
	22	*36*			*6*		*36*	

On the average, 42 % of pupils are coming by "collective" transport (bus, services, paid arrangement), 36 % are using family or own car and 22 % are walking.

78 % of children are coming by a mechanized mean, creating congestion all around the school. As schools generally do not provide parkings both for all day and for "kiss-and-drive", the congestion is a main problem around schools, twice a day.

According to the age of the pupils, growing older, they prefer to walk (19 % -> 31 %) or coming by car (private : 36 %-> 39 % or "shared" : 5 % -> 10 %).

School bus, owned or chartered, are used more by younger children : 40 % in primary.

- The second one concerns schools that do not provide owned buses.

School	Walk	Buses			Collective car		Private car	
		School own	Chart. bus	Regular route	Taxis services	Paid arrange.	Family car	Pupil car
P	13	-	42	-	-	6	39	-
	13	*42*			*6*		*39*	
C	31	-	24	2	1	8	34	-
	31	*26*			*9*		*34*	
S	45	-	12	2	6	4	30	1
	45	*14*			*10*		*31*	
TOTAL	24	-	32	1	1	6	36	-
	24	*33*			*7*		*36*	

On the average, 40 % of pupils are coming by "collective" transport (bus, services, paid arrangement), 36 % are using family or own car and 24 % are walking. 76 % of children are coming by a mechanized mean. Both forms are converging, walking has just more "weight" in this analysis.

According to the age of the pupils, growing older, they prefer to walk (13 % -> 45 %) and elder pupils do not have as many cars (1 % instead of 7 % in the previous form) which are the main differences between both forms.

4.4.3 First conclusion

According to the activity of the companies, implementation of public transport would interest some employees, but would not replace their own transports. Companies are located in the suburbs, three-shift working often, own transports are more flexible.

About schools, public transport would interest older students, but younger ones has to take bus or car anyway, when they do not live near the school.

4.5 SYNTHESIS OF MASS TRANSIT SYSTEMS

4.5.1 Technical and economical ratios

Main ratios are featuring in the hereafter tables, comparing all means, except special transport for schools and companies and intercity buses.

Vehicles	Capacity of the vehicles	Average operating fleet	Mileage of routes served	Km per vehicle per day	Capacity x km supplied	Commercial speed (in km/h)
TCB	73	30	99	77	170 000	9.9
Bostas	40	100(*)	50	71	300 000	12.4
Vans	12	450(**)	29	173	900 000	14.8
Taxis	5	20 000(**)	-	150	15 000 000	13.6
TOTAL	-	20 580	178	-	16 370 000	-

Ratios	Average fares	Average daily number of passengers per vehicle	Gross daily revenue per vehicle (in LL)	Average revenue per passenger (in LL)	Average revenue per km (in LL)	Market share of each type (in %)
TCB	250	600 (*)	109 400	178	1420	2
Bostas	250	400(*)	95 200	250	1341	4
Vans	250/500	100(*)	34 800	316	201	5
Taxis	1000	40(*)	40 000	1000	267	89
TOTAL	-	-	-	-	-	100

(*) Rounded up numbers
(**) Estimated numbers

Comments :

- All data are shows the failing of the TCB. As said in the section dedicated to its analysis , its capability to be usefully rehabilitated is doubtful. TCB has entered a downgrading spiral, increasing expenses and decreasing revenues. Rehabilitation of TCB would involve a complete recast of institutional framework, technical organization, staff management, ...

- All fleets in operation, whatever the vehicle, is about 20 000 units. If calculated in "standard bus equivalent", related to vehicles capacities, this fleet would represent 1200 buses.
According to the World Bank norms, the number of operating buses related to the population, is 1 bus per 2000 inhabitants.
For a population estimated about 1 300 000, the needs of buses would be 650/700. The results of the household survey will provide a better assessment of the GBA population.
The reality of needs is somewhere between these two numbers. The numbers are calculated in "standard buses" of a capacity of 80 passengers. But, this type of rolling stock is not able to penetrate easily anywhere in the GBA. Smaller vehicles are the only form able to penetrate the labyrinth of narrow streets found in part of the GBA. A realistic total number of operating buses would be about 900/1000 of various sizes : large, mid, small, operating besides taxis services, considered as feeder services or individual door-to-door services.

- The mileage of routes served by each transport is different, but if both maps of network, featuring on plans n° 3 and 4, are compared, routes are mainly the same. It shows a convergence between modes, to board people where they are supposed to live and alight them where they need, mainly at work or at school.

- Kilometers per vehicles per day and commercial speed are directly related. TCB buses are running all day, without adaptations about peak time and off peak time. Headways are supposed to be the same all day long. Bostas have better commercial speed and run less kilometers, as they seem to adapt the so-called "schedules" to the demand.

- The offered seat x km supplied is the reliable ratio to measure the transport supply. About 90 % of the transport supply is given by taxis services. Taxis services represent 89 % of the market of mass transit.- Average revenue per passenger shows the importance of fare evasion and exempties for each mode.

4.5.2 Qualitative ratios

Qualitative ratios give an idea about transport from passengers view.

Rate of interchange
According to the results of investigations carried out by questionnaires near bostas and taxis passengers, the rate of interchange is about 36 %.
It means that 36 % of the passengers are connecting at least once per trip.
World Bank standard is 10 %. In Paris, the rate of interchange is 15 %.
This shows that no direct services are offered, a sign of bad network planning.

Average duration of transport per day
According to the results of investigations carried out by questionnaires near bostas and taxis passengers, the average duration of transport per day from and to home is about 90 minutes (1h30).

Average cost of transport per day per passenger
According to the results of investigations carried out by questionnaires near bostas and taxis passengers, the average daily cost of the transport per passenger is about 2000 LL (1.20 US$).

Part of the transport in the salary
The monthly amount dedicated to transport is 50 000 LL. The minimum salary is currently 200 000 LL. It means that the part of transport is 25 %. World Bank standard is 10 % for household expenditures on travel.

Purpose of travel

According to the results on investigations carried out by questionnaires near bostas, vans and taxis passengers, the main purposes of travel are :

- home work : 50 %
- home school : 13 %.

Comments :

- The very high rate of interchange is due to the structure of all mass transit systems which are existing one by one without any coordination all together. The old structure of the TCB network is still discernible under the current networks. The cut of the demarcation line between east and west is still visible, as networks do not overcome it, even if people do. Demand had to adapt itself to the transport supply, which is illogical.

- The transport allowance decided by the Government reduce the cost of the transport for employees. As seen in § 4.4, some companies pay it in money, others pay it in petrol. The last encourages people to use a car to go to work, and involves more congestion of the roads. New roads are forecasted, some are under construction, others are to be enlarged, or newly coated, encouraging also people to use cars, leading to more and more congestion.

- The very low price of petrol does not permit real comparisons about the part of transport in the household revenue.

4.5.3 Conclusion

The failure of TCB is for now an established fact, leaving private initiatives a clear field. All kinds of replacement modes are currently operating, without any organization or coordination among them.

All legal private bus companies can not, with their own means, replace the failing public company. They have to make profit, and serve mainly the intercity routes, providing some services in urban and interurban profitable zones.

Replacement modes are very different according to the region they serve : collective mode or individual one.

- Illegal transport, answering to the needs of part of the population, appeared and proliferated particularly in the southern outskirts of Beirut, where lives a population with low resources, displaced from their hometowns by war. Private and individual initiative, with unsafe and uncomfortable means provided transport by vans at cheap price, but profitable for operators, as they do not care about insurance, maintenance, quality of service for poor people. Illegal cabs are proliferating for same economic reasons.

- The car is the main answer to the lack of good quality transport. The result is that the private car ensures 60 % of all trips, which is a very high rate, compared to cities of same population size as Amman (44 %), Tunis (24 %), Stockholm (48%). The north coast of GBA, to Antélias and outside GBA, to Jounieh, is showing this choice of private car by colossal traffic jams occurring almost all day.

Patronage is not considered as "customers", but more as "users". A particular product, called "transport" does not exist in Beirut. Transport is felt as a pressure, to use own private car is felt as a freedom, even if big traffic jams occurring everyday make people waste a lot of time.

To restore the image of the transport, in terms of reliability, comfort, security will need serious taking into account of the notion of public utility.

5 - CONCLUSIONS AND GENERAL ORIENTATIONS

The main conclusion of all analyzed and compared data and information is that there is no consistent mass transport system in Beirut and GBA.

This situation can be explained by :

→ the total failing of all institutions, the disorganization of all public utilities, so as TCB,

→ the disappearing of the former downtown causing a splitting of focuses of interest, now shared in several commercial and business centers.

But, as people always need to make trips,

→ individual initiative took over in a logic of profit and competition that lead to an atomized system (the owner of a car has a capital with which he earns money without being stopped by any structure),

→ the design of former TCB network has survived, with the cut of the demarcation line not yet overcome by the networks, and is no more adapted to the needs of population, as proved by the high rate of interchange, but for lack of means of long term view, buses and bostas have been replaced by taxis then by the growth of illegal means as a quick and flexible answer to the needs of population.

This train of events has ended to a share of trip market as following :

→ 60 % by private car,

→ 40 % by "collective" modes, 70 % which are ensured by shared taxis.

That is shared taxis (legally and illegally operated) that provide 90% of the total supply of mass transit

- take care of 70% of trips done by mass transit.

- take care of 29 % of all motorized person-trips.

Main objectives are of two different natures :

- one is at a national level , it is to restore authority of the State regarding transport, first, by the creation of a Transport Regulating Office to implement a balance between private and public operators. It is also the reconquest of the market of mass transit by improvement of the image of collective transport and the limitation of the use of private car ;

- the other is more technical : to preserve economic balance by an optimization of the transport cost both for households and communities, and, to permit operators the balance of operating expenditures and the capability of vehicles renewal ;

but, objectives and priorities have to be decided in consistently in terms of a time frame and financial means.

GENERAL ORIENTATIONS

Main objectives	Politics to implement	Means of action	In the field actions
Restoration of the State authority	- Revision of the institutional framework, - Creation of Transport Regulating Office, - Integration of all current actors of the transport,	- Relationship between operators and Transport Regulating Office (charters and contracts), - Definition of the design of the network and the minimal level of the transport supply, - Regulation of fare system, - Etc ...	- Implementation of Trade Association, - Creation of feeder and structured services, - Creation of transport under request, - Etc ...
Reconquest of the market of mass transit and limitation of the use of private car	- Restoration of a good image of mass transit, - Limitation of the use of private car, - Freedom of transport,	- Implementation of a real transport supply adapted to current needs, - Legibility of the network, - Reliability of transport supply, - Reducing of the intetchange rate, - Reducing trip time, - Increasing of the commercial speed, - Increasing the comfort, - Attractive fare system, - Priority to mass transit, - Regulation of parking, - Fiscal measures, - Respect of the Highway Code, - Etc ...	- Well adapted and air conditioned rolling stock - Street furniture (shelters) - Passengers information - Maintenance of rolling stock and installations, - Monthly pass, - Right of way at traffic lights, - Bus lanes, - Bus stations, - Adaptation of the price of petrol, - Etc ...
Preservation of economic balances	- Optimization of the cost of transport both for households and for communities - Balance of operation expenditures for operators and capability of vehicles renewal	- Limitation of the use of private car and its costs, - Adapted fare system, - Legal and fiscal measures in favour of renewal of fleet, - Etc ...	- Monthly pass, - Adaptation of laws and fiscality regarding cars, - Authorization of diesel powered engines for transport, - Etc ...

ATTACHMENTS

LIST OF ATTACHMENTS

ATTACHMENT N° 1

1971 network structure

Route	Length of trip (in km)	Number of buses	Average speed in km/h	Number of trips per day	Patronage (daily)
1 - Ain Roumaneh - Bain Militaire	17, 4	28	12, 4	222	25 100
2 - Dora - Ouzaaï	24, 6	31	13, 6	218	28 200
3 - Nahr port - Musée - Nahr	17, 0	20	17, 0	232	17 200
4 - Place des Canons - Airport	16, 6	8	20, 8	126	9 000
6 - Place des Canons - Chiah	12, 9	8	16, 1	117	8 000
7 - Place des Canons - Plan vert	9, 2	9	13, 1	142	9 500
8 - Place des Canons -Chouaifat	17, 8	6	14, 3	55	4 000
TOTAL	115, 5	110	14, 9	1 112	101 000

1988 network structure

Route	Length of trip (in km)	Number of buses	Average speed in km/h	Number of trips per day	Patronage (daily)
1 - Palais de Justice/Nahr El Mott	17, 8	10	12, 5	75	11 000
2 - Mme Aoun - Nabaa - Dora	19, 7	4	10, 5	15	3 000
3 - Me Aoun /Achrafieh/Dora	20, 4	6	10, 0	35	7 000
4 - Palais de Justice - Kahalé	21, 4	2	20, 0	14	2 000
5 - Palais de Justice - Baabda	16, 7	2	14, 5	16	2 000
6 - Palais de Justice - Hadath - Kfarchima	16, 6	2	14, 5	16	2 000
9 - Barbir - Hamra	7, 6	7	13, 0	65	13 000
10 - Barbir - Aïn El Mraissé	13, 2	7	17, 5	65	10 000
11 - Kola - Mcharrafié	7, 6	6	18, 5	65	10 000
12 - Kola - Khaldé - Damour	19, 4	5	25, 0	30	5 500
13 - Barbir - Airport	12, 6	6	24, 5	65	7 500
TOTAL	152, 2	57	16, 4	461	73 000

1994 network structure

Route	Length of trip (in km)	Number of buses	Average speed in km/h	Number of trips per day	Patronage estimation (daily)
1 Museum - Nahr El Mott	8,0	7	8,0	54	3 000
2 Museum - Baabda / Museum - Kfarchima	9, 0 11, 0	4	10,0	32	950
3 Museum - Bsouss	12, 3	2	12,3	16	150
4 Chevrolet - Nahr El Mott	9,0	3	9,0	18	420
5 Salomé - Place Sassine	3, 5	1	3,5	8	470
7 Hamra - Achrafiyé	11, 0	3	10,1	36	3 600
7b Ain Mrayssé - Nahr El Mott	14, 0	4	12, 9	24	2 810
8 Kola - Chouwaifat	13, 5	2	16, 2	16	1 900
9 Kola - Hay Es Sollom	8, 0	2	7, 4	12	3 900
TOTAL	99,3	28	9,93	216	17 200

ATTACHMENT N° 2 a

DAILY GASOIL CUNSUMPTION AND MILEAGE PER RUNNING BUS

FURN EL CHEBBAK - FEBRUARY 1994

JOUR	43	85	42	79	51	47	9	86	36	32	93	65	83
1	64947 30	40749 60	121963 75	51203 80	62632 75	70133 40	49874 65	112190 70	145508 65	101804 65	112978 55		82144 50
2	65058 44	40749 60	122089 70	51382 85	62632 50	70245 68	49765 68	112248 35	145653 85	101857 35	113093 47		82270 65
3	65185 72	40749 54	122201 80	51546 76	62632 71	70371 75	49813 40	112341 60		101950 60	113217 51		82440 90
4	65322 78	40749 60	122324 74	51711 78	62632 75	70475 58	49970 91		146082 77	102035 47	113320 37		
5	65447 70	40749 60	122417 53	51877 73	62632 93	70594 60	50050 50	112398 32	146159 30		113433 64	110835 104	82590 80
6	58567 45	40749 80	122506 41	52021 70		70751 60		112571 80		102217 92	113584 80		82764 84
7	65698 75	40749 20	122668 70	52186 81	62632 60			112679 56	146333 81	102325 55	113692 30	110867 20	82874 50
8	65870 100	40749 40	122788 81	52343 73		70874 81				102425 52		111034 84	83001 75
9	66018 80	40749 50		52481 65		70981 75	50116 56		146503 65	102544 61			83676 75
10	66147 85	40749 30	122890 62	52592 50	62632 61	71009 15	50230 75	112781 54	146672 70	102665 70		111136 63	83286 82
11	66283 80	40749 50		52759 65	62632 85	71118 50	50359 75	112894 60		102798 70		111246 80	83390 55
12	66415 85	40749 60	122960 38		62632 71	71217 55	50396 36	113036 83	146830 67	102901 60		111350 74	83529 66
13	66559 60	40749 62	123016 40		62632 67	71386 64		113179 65	146968 53	103000 40			
14	66701 80	40749 76	123118 75		62632 50	71528 97	50531 90	113288 70	147184 95	103104 82	113809 80	111498 102	83635 85
15	66828 76	40749 67	123221 62	52991 140	62632 74	71633 66	50608 50	113379 52	147342 72	103192 50	113960 62	111564 45	83738 55
16	66943 61	40749 30	123347 70	53155 75	62632 90	71758 65	50731 81	113491 70	147419 31	103294 70		111620 40	83849 60
17	67082 78	40749 60	123417 45	53323 75	62632 90	71814 35	50830 77	113603 65	147568 65	103392 60		111676 41	83992 72
18	67180 50	40749 60	123509 55	53482 80	62832 65		50941 70	113693 55	147745 70	103519 70	114267 116	111779 65	84117 65
19	67307 67	40749 50	123621 50	53652 70	62632 57	71958 81	51050 54		147905 52	103632 53	111889 61	104098 45	84232 56
20		40749 64	123765 68		62632 75	72102 70			148105 70	103720 36			84370 75
21	67386 46	40749 40		53817 65	62632 60	72204 57		113782 50	148248 65	103829 55	114359 50	111997 58	84462 45
22	67529 74	40749 70	123880 60	53983 73	62632 88	72317 44	51187 84	113895 52	148294 60	103884 31	114448 26	112079 80	84568 52
23	67638 65	40749 60	123992 67	54148 80	62632 63	72449 65	51317 85	114027 87	148294 33	103940 41		112239 42	84675 60
24			124120 74	54233 41	62632 87	72550 55	51427 65	114141 67	148294 70	104071 55	114496 30		
25	67867 55		124227 55	54398 70		72652 50	51538 55	114228 50	148294 55	104172 70		112268 60	84797 70
26	67941 40		124341 50	54508 46	62632 52	72748 60	51641 67		148294 50	104311 72	114613 43	112405 92	
27	68044 55		124486 70		62632 53	72895 44	51727 60		148294 66	104410 41		112555 80	

JOUR	60	11	8	50	21	31	75	15	25	95	92	56	12	67
1	80338 65	55548 146	94465 85	112144 75	68865 95	93674 90	102647 70	86779 81	93117 100	70414 65	82660 95			57507 85
2	80338 90	55548 90	94584 72	112266 73	68865 75	93674 90	102767 70	86947 95	93171 40	70552 80		90454 80		57507 86
3	80338 70		94754 94	112374 60	68865 20	93674 100	102851 52	87042 65	93339 104		82660 96	90559 73		57507 60
4	80338 75	55548 86	94845 54	112544 87	68865 36		102963 68			70666 70	82660 94	90662 63	119572 165	57507 60
5	80338 93		94975 66	112649 54	68665 62		103085 70	87132 53	93467 80	70803 73	82661 60	90833 92	119644 40	57507 45
6	80338 67			112769 83	68665 61			87194 24	93640 90	70916 55	82661 95	90953 60		
7	80338 85	55548 60	95094 70		68665 70		103208 85	87314 50	93726 35	71016 51	82661 36	91108 65		
8	80338 64	55548 123	95263 103	112889 60	68665 37		103319 67	87438 72	93892 100	71138 66	82661 56	91218 63		57507 46
9		55548 40	95436 70	113008 70		93674 90		87612 70		71245 45	82661 65	91283 43		57507 50
10	80338 76	55548 63	95607 108	113172 75	68665 60			87780 103	94024 86	71358 70		91395 56		57507 77
11	80338 65	55548 65	95729 70		68665 60		103403 55		94152 75	71486 70	82662 65	91494 60		
12	80338 70	55548 64	95856 75	113310 101	68665 65			87928 83	94295 80	71486 90	82662 70	91602 66		57507 77
13	80338 60		95994 70	113412 50			103468 32	88073 56	94440 70					57507 63
14		55548 46	96105 65	113516 78	68665 87		103562 87	88217 112			82663 110	91874 85		57507 78
15	80338 90	55548 40	96190 51		68665 57		103669 82		94540 90	71486 107	82663 78			57507 74
16	80330 ← 60	55548 85	96296 65	113689 105	68665 65		103779 65	88354 85	94648 65	71486 50		91998 90		57507 80
17	80338 70	55548 79	96401 55	113780 80	68665 75		103894 80	88390 33		71486 65		92102 73		57507 60
18	80338 80	55548 66	96455 40	113886 55	68665 86		104006 65	88530 80		71486 65	82663 85	92216 81		57507 61
19	80338 51	55548 63	96597 75	113993 52	68665 74		104098 45	88634 66		71486 56	82663 77	92357 70		57507 60
20		55548 37	96729 65	114093 54	68665 60		104242 70	88736 57		71486 70		92459 50		57507 50
21	80338 55	55548 35	96861 70	114205 55	68665 60			88862 65		71486 29	82663 55	92588 65		
22	80338 60	55548 66		114312 60	68665 70		104310 31	88965 56		71486 66	82663 28	92680 56		57507 47
23	80338 80	55548 75			68665 82		104436 75	89104 90		71486 64	82663 72	92771 72		57507 53
24	80338 41	55548 73		114453 82	68665 60		104543 50	89242 90		71486 63	82663 66	92862 64		57507 61
25	80338 60	55548 75		114498 30	68665 50		104667 80	89375 70		71486 62	82664 85	93007 75		57507 60
26	80338 53	55548 60		114629 60	68665 68		104803 52	89473 63		71486 73	82664 70	93150 90		57507 44
27	80338 30			114784 50	68665 30		104947 50				82664 72	93252 40		57507 40

DAILY GASOIL CUNSUMPTION AND MILEAGE PER RUNNING BUS

BIR HASSAN - FEBRUARY 1994

JOUR	262	221	282	277	263	168	253	233	182	257
1	74396 52	101473 40	21123 87	16885 60	124509 46	41395 47	97065 55	32260 96	117655 50	117734 55
2	74487 60	101564 65	21123 170	16885 57	124600 55	41395 84	97289 108	32260 20	117655 80	107825 48
3	94495 43	1016555 61	21123 80	16885 102	124661 44	41395 60	97513 106	~~461082~~ 26	117655 52	118016 80
4		101867 122	21123 10	(97804) 58		41395 75	97604 58	32260 7	117655 70	118104 62
5	74039 50	102092 100	21123 75	16885 61	124711 32	41395 56	97695 57	32260 62	102092 100	118194 42
6	74650 53	102116 22	21123 85	16885 57	124758 41	41395 100	97836 67	32260 65	117655 38	118257 63
7	74756 79	102331 100		16885 39		41395 68	98059 94	32260 62		118401 77
8	74847 56	102422 63	21123 80	16885 100		41395 95	98282 100	32260 53	117655 32	118477 50
9		102513 61	21123 73	16885 103		41395 94	98505 96	32260 8	117655 11	118536 43
10	75035 115	102604 56	21123 56	16885 96	124784 36	41395 75	98582 46	32260 63		118606 34
11	75082 81	102688 84	21123 96	16885 33		41395 25	98766 88	32260 23		
12	75152 44	102764 52	21123 53	16885 85		41395 28	98960 96	32260 72		
13	75232 44	102834 51		16885 73		41395 72	99031 47	32260 12		
14	75379 70	103002 80	21123 108	16885 54		41395 36	99112 54	32260 52		
15	75437 40	103074 47	21123 41	16885 76		41395 55	99284 78	32260 74		
16	75606 78	103150 55	21123 86	16885 43		41395 43	99302 29	32260 52		
17	75666 37	103212 68	21123 75	16885 80		41395 61	99302 6	32260 79		
18	75836 78	103281 53	21223 50	16885 79		41395 27	99302 3	32260 50		
19	75912 47	103450 30	21123 47	16885 38			99471 76	32260 61		
20	75988 53	103524 43	21123 43	16885 72			99540 42	99540 42		
21	76079 42	103609 52	21123 50	16885 31			99708 63	32260 44		
22	76153 47	103731 81	21123 81	16885 45			99879 74	32260 53		
23	76320 73	103956 91	21123 24	16885 50		413015 84	100094 76	32260 47		
24	76390 53	104062 52	21123 43	16885 73			100217 76	32260 50		
25	56557 937	104130 54	21123 43	16885 68			100295 70	32260 56	117655 33	
26	76726 92	104199 47	21123 56	16885 31			100457 77	32260 48	117655 70	
27	76758 33	104368 74	21123 46	16885 48			100626 73	32260 51	117655 41	
28	76849 53	104505 75	21123 52	16885 77			100795 76	32260 51	117655 11	

JOUR	270	286	242	271	171
1	89141 75	120614 85	160802 25		
2	89210 45		160991 98		
3	89289 45		161114 15		
4	89290 18	120614 14	161114 15		
5	89375 44	120662 36			
6	89508 79	120752 62	161135 24		
7	89735 112	120975 100			
8	89848 68	121051 48			
9	89882 25	121142 64	161172 37		
10	89973 61	126232 52	161396 105		
11	90168 85	121241 20	161478 53		
12	90244 47	121247 34	161554 47		
13	90315 46	121247 67	161667 52		
14	90406 36	121247 76		74741 35	
15	90481 55	12147 46	161668 18	74741 13	
16	90651 76	12147 78	161739 44	74741 41	
17	90719 47	121247 48	161844 62	74741 50	
18	90856 67		161844 10		
19	91025 76	12147 45	161906 39	74741 50	
20	91194 73	121247 47	162024 47	74741 51	
21	91362 70	121247 66	162100 52	74741 10	
22	91432 47	121247 43	162162 33	74741 42	
23	91607 78	121247 43	162224 42	74741 10	
24	91673 41	121247 123	162293 40	74741 24	
25	91728 41	121246 15	162406 58	74741 31	86745 150
26	91805 43	121247 56	162411 19	74741 47	86620 44
27	91872 38	121247 31		74741 34	86787 75
28	91963 44	121247 21		74741 10	86955 31

ATTACHMENT N° 3

MAIN FEATURES OF PRIVATE BUSES ROUTES

route	number of buses		mileage of the route (one way in km)		trip time (one way in minutes)		spreadover		main stops		trips per day per vehicle		fares per trip (LL)	daily income per vehicle (thousands of LL)		vehicle capacity		patronage per trip per bus at peak time		number of drivers per bus per day	
	B	V	B	V	B	V	B	V	B	V	B	V	B/V	B	V	B	V	B	V	B	V
1	20	-	4.50	-	45	-	6.30 20.30	-	15	-	12	-	250	125	-	32	-	42	-	1	-
2	20	-	7.75	-	35	-	6.30 20.30	-	12	-	14	-	250	150	-	32	-	38	-	1	-
3	-	15	-	6.80	-	35	-	6.00 21.00	-	16	-	30	250 350	-	30	-	10	-	8	-	1
4	30	200	7.00	6.90	50	43	6.30 19.00	6.00 21.00	16	16	8	14	250	70	35	32	12	32	11	1	-
5	-	200	-	15.50	-	40	-	6.00 19.00	-	12	-	14	250 500	-	35	-	14	-	10	-	1
6	6	-	8.00	-	33	-	6.00 18.00	-	14	-	10	-	250	150	-	32	-	36	-	1	-
7	28	-	7.35	-	45	-	6.00 19.00	-	26	-	8	-	250	50	-	24	-	34	-	1	-
8	4	-	8.40 30.00	-	100	-	5.00 20.00	-	35	-	8	-	250 500 1500 2500	250	-	32	-	40	-	2	-
9*	8	-	7.50 14,00	-	60	-	5.30 21.00	-	20	-	10	-	250 500 1000 1500	150	-	32	-	30	-	2	-

B : Bosta
V : Van
* Route n° 9 is operated only in summer

Republic of Lebanon
Office of the Minister of State for Administrative Reform
Center for Public Sector Projects and Studies
(C.P.S.P.S.)