5. Road Facilities and Road Traffic

(1) Existing Road Conditions

1) Roads

Within the urban area of Baku, arterial roads usually called avenues form the radial and ring road system. The roads in the center of the city form a grid pattern.
The total length of the roads in Baku amounts to 2,013km, and no less than 80% of the total length is paved. However the deterioration of these roads is happening due to the lack of maintenance/repair works.

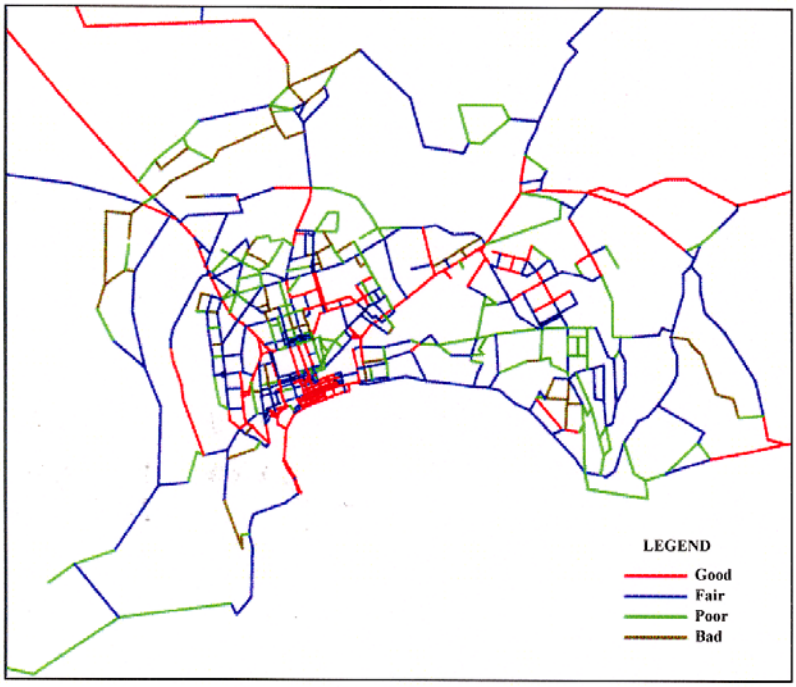

Figure 5.1 Condition of Pavement

2) Road Related Facilities

Azeravtonagliyat is only the body, which is making policy for cargo transport by road and giving licenses for trucking companies. The trucks more than 20 tons from foreign countries are charged at the border when they entered Azerbaijan. There are more than 10 truck terminals within Baku. And they have mostly only parking lots for trucks.
The volume of handled cargo at Baku Port has decreased drastically since 1990. However after 1995, cargo seemed to recover with 3.6 million tons in 1999.
According to the TRACECA project funded by EU, access road to ferry terminal (400m) is proposed.

(2) Existing Road Traffic

1) Traffic Volumes

The major thoroughfares in the city, the Tbilisi Ave., Karl Marx Ave., and Safarov Ave. carry

more than 50,000pcu/day. Also, Moskva Ave. carries similar volume of traffic a day. The highest traffic volume was measured at the Baku-Sumgayit Highway and at the airport road.
Compared with survey results in the previous JICA Integrated Environment Management Study, it is found that during winter, the traffic volume declines to 90 % from that of the summer volume.
The cordon line survey revealed that a total of 93,500 vehicles a day cross the cordon line in both direction. The traffic across the cordon line is comprised mainly of passenger cars, 57% and trucks, 10% and buses 23%.

2) Parking

No-parking-regulated area is established and there is no rule for the parking-regulated area. Though underground parking facility with capacity of 100 vehicles is provided in the center of the city, there are very few parking lots operated publicly and privately in Baku.
Parking on the road is common. In the peak period, the parking spaces on the road and off the road are occupied nearly to the capacity limitation in the central area of Baku. In case of the presence of a guard for on-road parking, a guard collects 500 to 1,000 manats per vehicle.

(3) Traffic Management System

One-way system is enforced on the grid-form road network in the central area of Baku. Azadlig Ave., the north-south road flows one way to the south, and some circular routes are provided. Also the Baku City Traffic Police regulates against large vehicles coming into the city.
The intersections of the main highways connecting with the suburban areas are basically of rotary type. But there are some intersections where signal control, such as yellow signal blinking, is executed for smooth traffic flow. Signals are installed at 204 points.
Regarding accidents, the number of contact accidents with pedestrians is the highest, accounting for more than 60%, and collision of vehicles, 25%. It is notable that a high rate of about 60% of all accidents occurred in the nighttime. The accident cases increases in the order of Airport Highway, Moscow Ave., Buniyatov Ave. and Tbilisi Ave.

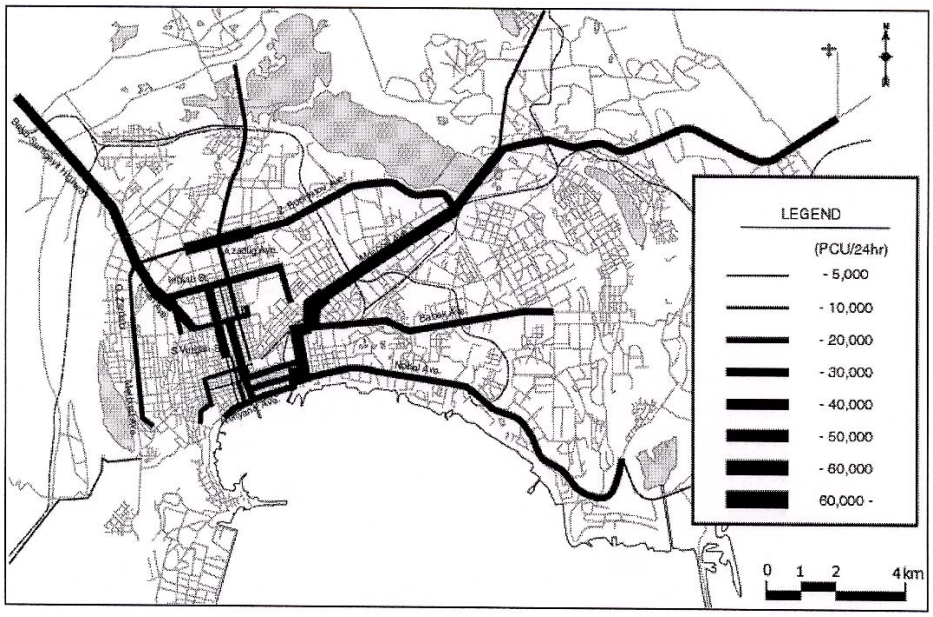

Figure 5.2 Road Traffic Volumes

6. Public Transport

(1) Public Transport Types in Baku

No.	Mode & Facility	Organization/Operator	Regulated/Controlled by
1	Subway (Metro)	Bakinski Metropolitan	Cabinet of Ministers
2	Tram	Transport Department, Baku Municipality	Executive Authority of Baku
3	Trolley Bus	Transport Department, Baku Municipality	Executive Authority of Baku
4	City Bus	Transport Department, Baku Municipality	Executive Authority of Baku
5	Mini Bus	Private sector	Transport Department, Baku Municipality
6	Taxi	Private sector	Transport Department, Baku Municipality
7	Railway (Suburban lines)	Azerbaijan State Railway	Cabinet of Ministers
8	Baku Port	Baku International Sea Trade Port	Cabinet of Ministers
9	Airport	State Concern of Civil Aviation (AZAL)	Cabinet of Ministers
10	Bus Terminal	Azeravtonagliyat (Inter-city, International)	"Azeravtonagliyat"

(2) Subway

The total length of subway in operation is 28.3km. The number of passengers has the tendency to decrease. In 1999, 357 thousand passengers per day on the average were transported.
Percentage of free riders drastically decreased in 2002 due to the abolition of free pass to all public transport modes. Under the fare level of 250 manats per passenger journey in 1999, the revenue from fares covered only 55% of necessary expenditures for operation,.
Future plans by Baku Subway are;

- extension of eastern section from Akhmedli to Hazi Aslanov (1.46km),
- extension of northern section from Memar Adzhemi to Dranagyul (3.6km), and
- extension of southern section from S.I.Khatai to Gyunneshli (10.6km).

(3) Bus, Tram, and Trolley bus

In 2000, 348 bus routes were operated by both private and public sectors. Out of those bus routes Department of Transport operated 30 bus routes. However, after the admission of minibuses to the public transport market, the number of routes for buses went down and working ratio of buses rapidly decreased. 2,700 minibuses were operated by the private sector in 2000.
There were 5 tram routes and 6 trolley bus routes. However, only 3 routes for trams and 3 routes for trolley buses are actually in operation. The number of tram cars and trolley buses are also decreasing.
Fares of trams, trolley buses and subway were at the same level at 250 manats per passenger journey in 2000. While minibuses charge 500 to 1,000 manats per passenger journey in 2000.
According to the statistical data, the number of passengers transported by public transport modes excluding railway and privately operated buses was 471 thousand passengers a day in 1999, 40% of that in 1995.
The operation expenditures per 1 manat revenue were 1.75 manat, 6 manat, and 8 manat for buses publicly operated, trams and trolley bus, respectively.

(4) Railway

The number of railway passengers to/from Baku is also declining. In 1999, sunburn lines in Baku carried about 8,600 passengers per day, about half of those in 1995. The operation expenditure per 1 manat revenue was 6 manats.

(5) Inter-modal Facilities

In Baku, there are 25 intra-city bus terminals, and one inter-city/international bus terminals. In general, buses have their terminal points or stops at stations of subway and railway. Those bus terminals concentrate in the narrow areas near Old Baku and 28 May stations. At present, inter-city/international bus terminal with 38 berths is located next to the 20 January intersection.

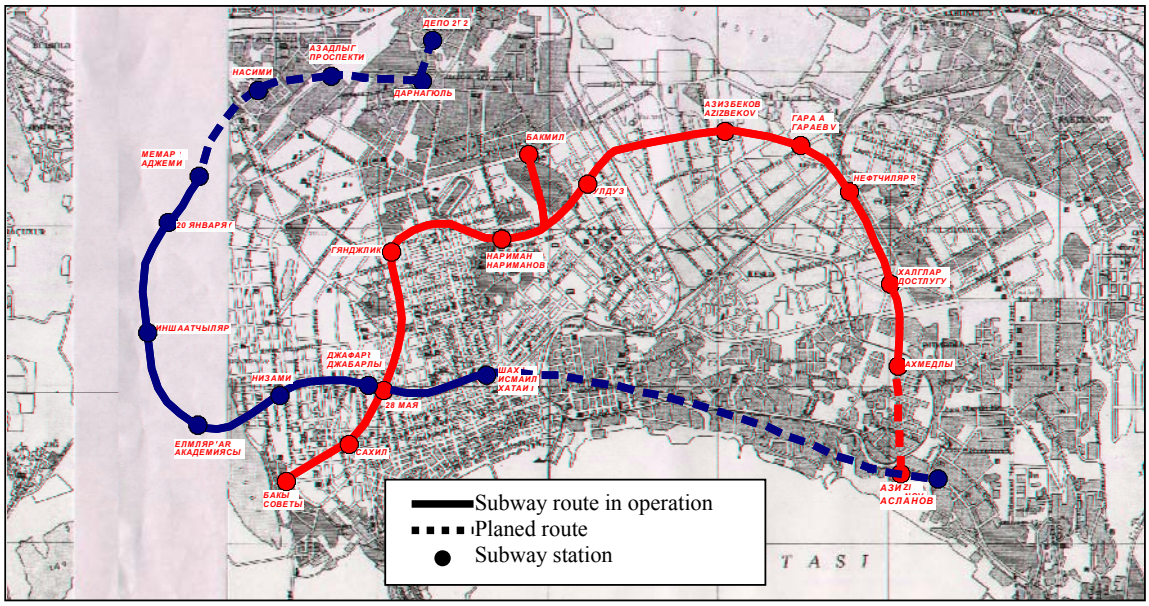

Figure 6.1 Subway Network in Baku

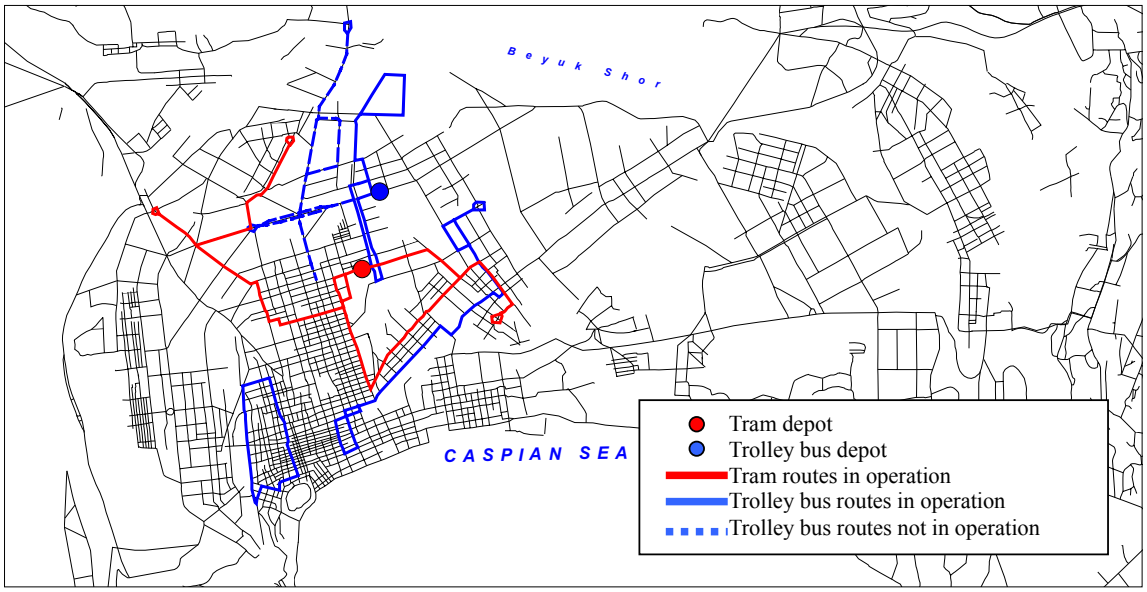

Figure 6.2 Tram and Trolley Bus Routes

7. Problems and Issues

(1) Transport Problems and Background

Transport problems and their background are summarized below.

Background

- Transport service to transport demand become outdated due to the delay of institutional and urban structure reformation. It is especially important in public transport service
- Discrepancy between transport demand generated in densely populated areas with industrial development and existing public transport network has emerged.
- Continuous deficit in operation of public transport service constrains the maintenance and rehabilitation of transport facilities.
- Coordination among transport services became difficult because of the privatization to become a self-sustained organization.
- Law to control car use is not strictly enforced despite the increase in vehicles.
- Large international trade zone including EU, Asia and CIS countries is progressing. Baku is located on such international trade route.
- Transport demand concentrated to/from the central area is increasing with the change in the transport demand pattern caused by the intensification of business activities in the central area.
- Historical buildings and blocks are existing in the central area, on the other hand, land ownership and building ownership are complicated. Such situation restricts the redevelopment and construction works in the central area.
- Large amounts of diverse subsidies for deficit in operation, investment, free riders, etc. are still remaining until now.
- No clearly defined legal frame for the procurement of indirect benefit by the investment in transport sector and beneficiary-pay principle are existing as yet.
- Manpower and funds within the government organizations involved in the implementation of the plan are insufficient.

Problem

<Public Transport>
- Non-hierarchy arranged transport network
- Difficult to identify transport network
- Uncomfortable passenger facilities
- Inconvenient transferring facilities
- Obsolete and outdated facilities and infrastructure
- Inconvenient access to the central area
- Low density of public transport network in the unusual areas
- Tram is not used for the whole transport corridor/line route

<Road Transport>
- Insufficient transport capacity in north-south direction in the central area
- Incomplete trunk road network
- Obsolete and dilapidated pavement roads in suburbs and residential area
- Obstruction to road traffic by kiosks and small shops on the road
- Obstruction to road traffic by parking on the road especially near Old Town
- Passenger safety problem at intersection due to the insufficient marking on the road and signals
- Influence on environment by emission and vibration of vehicles
- Shortage of traffic signs and signals

<Public Transport Management>
- Lack of incentives for efficient operation and management
- Shortage of investment funds and resources for maintenance
- Shortage of revenue for self-sustainable management due to the low fare that is politically defined

<Public Sector>
- Insufficient institutional arrangement for planning and coordination in transport sector
- Lack of minimum civil standards for passenger transport
- Insufficient standard for emission gas and vibration of vehicles

(2) Issues on Urban Transport Improvement

<Transport System>

In the near future, the motorization is expected to proceed rapidly. On the existing condition of historically formed urban areas and transport infrastructure, and in consideration of the trend in the urban functions under the market economy, introduction of traffic demand management measures is an overall issue in Baku.

<Public Transport>

Formation of public transport network combining major public transport means including subway, tram and large bus and feeder servicing public transport means is an important issue. For such purposes, distribution of terminals at suitable location for the formation of public

transport network should be pursued.
Utilization of existing public transport infrastructure including tram should be realized.
Regarding the surface public transport, improvement of punctual operation and speed should be achieved with the improvement of road infrastructure and traffic system management measures.
Improvement of attractiveness of public transport through renovation of old stations, stops and terminals or replacement of outdated vehicles and rolling stocks with modern ones, is also an important issue to prevent the passengers' modal shift from public transport.

<Public Transport Management>

The management of public transport operation is now required to improve the profitability as a self-sustainable entity. Improvement of financial condition of public transport management by the diversified management including advertisement and commercial businesses should be pursued. Lowering the rate of free riders and establishment of beneficiary pay principle are issues to be solved in consultation with government.

<Roads>

The improvements of the following bottleneck locations are necessary:
- Improvement of rotary intersections where many minibuses concentrate
- Improvement of complicated road network
- Improvement of alternative roads for historically formed blocks
- Elimination of missing links

Road improvement in combination with public transport such as arrangement of bus bays, zebra zones, and providing spaces for public transport should be pursued.
Road network to guide regional traffic directly to the regional artery should be considered.
In the central area of Baku, parking demand and supply of parking places should be balanced by the construction of parking places and parking restrictions.
Improvement of safety of pedestrians and smoothness of road traffic in an effective manner should be pursued. Also introduction of global environmental standards for emission, noise and vibration and environmental monitoring system should be pursued.

<Public sector>

The procurement of funds for the maintenance and rehabilitation of roads and construction of public transport infrastructure or management is a vital issue. Another essential issue is how to utilize transport market for the effective transport services.
Establishment of urban transport master plan has a significant meaning. The coordination of relevant organizations for the urban transport planning and implementation are necessary and required.

III. Future Transport Demand

8. Socio-Economic Frame

(1) Population Projections

Population projection of Baku City has not been officially made as yet. The government of Azerbaijan has made official projections of the country population up to the year 2020 assuming that the population of Azerbaijan will grow by 1% per annum. In this Study, based on this assumption the population of Baku city and planning area were projected.

The future population of Baku is estimated by making alternative assumptions on the size of the total urban population in Azerbaijan and the share of Baku in that total with consideration of the macro changes in the country and the role of Baku.

The growth of the economy is brought about primarily by the growth of secondary and tertiary industries as the productivity of primary industry is low. Those secondary and tertiary industries have the tendency to locate in urban areas. Therefore empirically it is proved that the concentration ratio of population in urban areas to total population is closely related to the growth of national economy.

The officially projected population of Azerbaijan in 2020 is 9,801,000.

In the high urban growth case, all of the natural growth in population in Azerbaijan will be accommodated in the cities and Baku will receive its share of the urban population. The implied urbanization rate, even under this optimistic assumption, remains at 60.2%. In this case the population of Baku in 2020 will be 2,177,000.

The forecasting formula is as follows

Population of Baku in 2020 = Population of Azerbaijan in 2020 x Urbanization Rate x Share of Baku

However in this scenario the population growth rate of Baku will be maintained at over 1.8% a year for the next 20 years. It seems too high if past trend is considered.

The past trend case assumed the same urbanization rate for the next 20 years, and the same share in Baku for the Planning Area. The same forecasting formula is adopted. The level of urbanization will not increase in this case in spite of the expected economic growth of Azerbaijan. This case seems not likely.

In this Study assuming a slight increase in urbanization rate, that is, 56%, the future population frame was projected.

	Present population	Projected population Resident population	Including Refugees
High growth case	1,495,355	2,177,185	2,413,185
Proposed in this Project	1,495,355	2,020,000	2,200,000
Past trend case	1,495,355	1,843,995	2,079,000

(2) GDP and Income of the Households

The future growth of GDP depends on the developments in the oil and gas sector. Fairly high growth rate of 8.7% per annum is assumed up to 2004 (average of past four years). The growth is assumed to be moderate over the medium term up to 2007 at the rate of 7%. After 2007 sustainable growth is assumed resulting in the growth rate of 5% up to 2020.

In this case, per capita GDP is expected to increase from its level of 619 USD in 2000 to 1,996 USD in 2020 in constant 2000 dollar prices.

(Constant 2000 dollar prices)

	In 2000	In 2020
Household Income per month	72	232
GDP per Capita	619	1,996

(3) Income and Car Ownership

Future car ownership was estimated assuming high elasticity of car ownership with respect to household income referring to the evidence in other countries after the future household income distribution.

The present car ownership rate of 75 veh. per 1,000 population is projected to increase to 165 veh. per 1,000 population in 2020. Combined with the growth in population, the number of private vehicles is estimated to increase from 119,080 in 2000 to 318,956 in the year 2020.

(4) Employment Levels and Sectoral Distribution

Out of total population of Baku in 2020, 972,000 is estimated as the working population.

The forecasting formula is as follows:

Working Population of Baku in 2020
= Population of Baku in 2020 x Labor Coefficient (Working Age Population Rate x Labor Force Participation Rate of the Working Age Population)

The sectoral distribution in 2020 is projected by assuming that the sectoral employment will first recover to its 1990 level of 694,100. The additional employment of 277,900 (the difference between the projected and actual in 1990) is distributed among the sectors in conformity with the projected socio-economic scenario that takes into account the shift of working population to the tertiary industry.