

Figure 7.6.1 Functions of the Study Area Intersections

7.7 Traffic Signals

Traffic signals are installed at 78 locations in the Study Area as shown in Figure 7.7.1. All these traffic signals are controlled individually. As for signal phasing; 49 locations have two-phase formula accounting for 63% of the total, as shown in Figure 7.7.1. Pedestrian phase or pedestrian signals are mostly unavailable.

Table 7.7.1 Number and Phasing of Traffic Signals

No. of Phases	Number of signalized intersections	Share of total signalized intersections (%)
2	49	62.8
3	28	35.9
4	1	1.3
Total	78	100.0

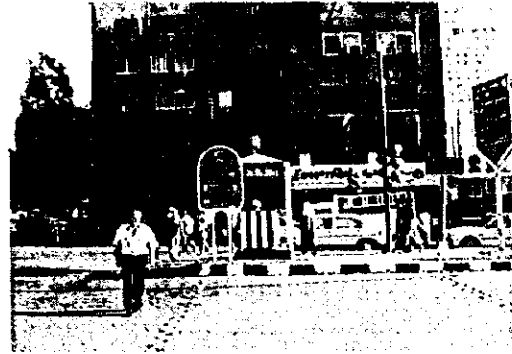
Traffic signals are installed at 15 rotary intersections only to control the traffic inflow into the intersections. Controllers in use are those manufactured by four different companies, two of which are foreign. One advanced Australian-made controller operated by optimum control is installed at Tishreen - Ath Thawra intersection.

Though control of a traffic signal is supposed to be automatic, at peak traffic periods the intersection traffic control is done manually by the policeman along with the traffic lights, mostly in flashing mode. For this reason, suitable distribution of green light interval is not frequently performed during traffic congestion, which partially occurs for the inflow section.

At several rotaries with traffic signal, not all the approaches are controlled by signal. The non-signalized approaches usually have smaller traffic volume entering the square causing little problem in terms of capacity. But for more efficient operation and higher safety, all approaches must be controlled by signal if signal is ever used.

Pre-green display is commonly used and red and yellow signals are lit simultaneously before a green signal. But its effectiveness is limited by the fact that there are many signals with non-functioning bulbs and the first car in the waiting queue can hardly see the signal indication because of the inadequate location of signals.

Signals are placed on the near side of intersections. No signal is installed at the far sides. Advantage of this layout is that vehicles on the crossing street cannot see the signal thus preventing them from early start at the end of their red light. Signal acts as a stop line and indicates the location where cars are expected to stop. On the other hand, this layout causes a visibility problem for the first few cars stopping at the approach resulting in a delay-start and consequently capacity reduction for the intersection.



At several intersections, it has been found that the signal is placed far from the intersection and vehicles stop beyond the signal, as there is no painted stop-line on the pavement. In such case, vehicles at the front cannot see the signal at all and the cars behind them urge them to start by honking their horns when the signal turns to green.

The green-wave system is applied at few locations of one-way streets in the city center but it is based also on fixed-time operation for the whole day, which decreases the system's efficiency to a large extent.

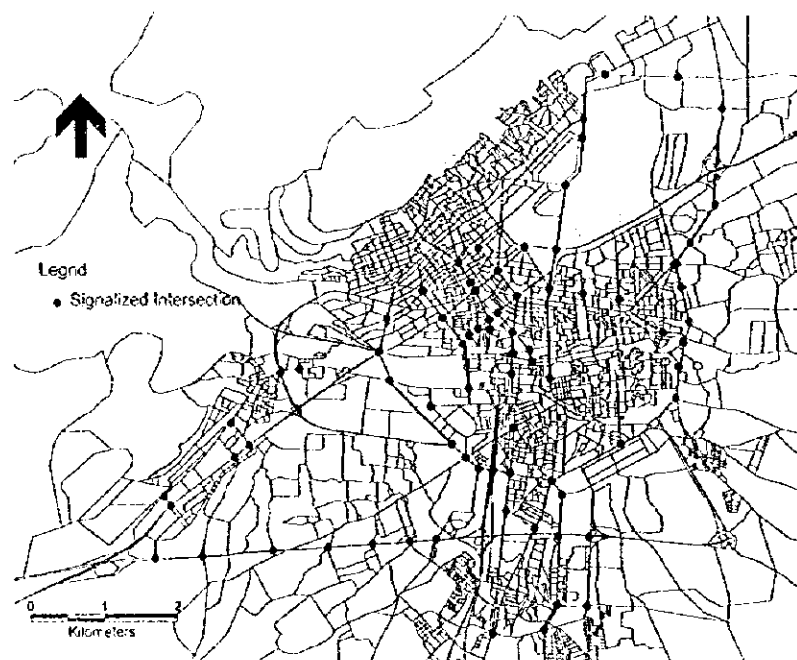


Figure 7.7.1 Location of Existing Traffic Signals

7.8 One-way Traffic Control

In most streets of the central area, one-way traffic regulation is in force on most of the main undivided-streets, the exception is being the inner ring road and some other few streets, as shown in Figure 7.8.1



Figure 7.8.1 One-way Traffic Regulations on Principal Streets

7.9 Parking Facilities

7.9.1 Off-street parking

In Damascus City there were no laws to force constructors of buildings to prepare parking space. Consequently, residents and office workers park their vehicles mostly on the street or in empty nearby lots. Recently, a new law is being applied to force building owners to include parking space in all new buildings in the city.

A parking capacity survey was conducted in 1994, and the results are quoted in Table 7.9.1. Of the total 7,181 off-street parking spaces surveyed at that time, 252 spaces, or 3.5% of the total, were in garages.

In the area inside the inner ring road, the off-street parking areas have a capacity for 979 vehicles. Compared to the number of registered vehicles, the capacity of off-street parking areas is low and much on-street parking and illegal parking is observed.

Table 7.9.1 Off-street and on-street parking capacity (1994)

	Off-street parking		On-street parking		Total
	Open space	Garage	Suitable*	Unsuitable, illegal	
Damascus city	6,292	252	48,179	17,153	71,876
Area inside inner ring road	897	82	9,254	3,359	13,592

Note: **Suitable* refers to on-street parking that does not create traffic flow disturbance, and *Unsuitable* indicates illegal on-street parking or that that creates traffic flow disturbance, as defined by the 1994 study

Source: Damascus City Urban Master Plan Study, Special Report on Transportation, 1996

7.9.2 On-street parking

In the central area of Damascus, parking is prohibited on about 70% of the streets, as shown in Figure 7.9.1. However since parking facilities are largely not available in the buildings, on-street parking is the only available choice. In general, it can be said that the no-parking regulations are widely unobserved.

According to the 1994 survey, on-street parking that does not adversely effect the traffic flow is available for 48,179 vehicles, while 17,153 on-street parked vehicles either disturb the traffic flow or are parked in illegal parking space. When comparing the total registered vehicles in 1994 of 65,900, as stated in the 1996 study, it is apparent that the large deficit in parking facility supply and demand is covered by illegal parking.

On-street parking occupies 1 to 2 lanes of the road, which decreases the street capacity and significantly obstructs other vehicles passage. This influence is especially notable in the central city area where the demand for parking areas is very high.

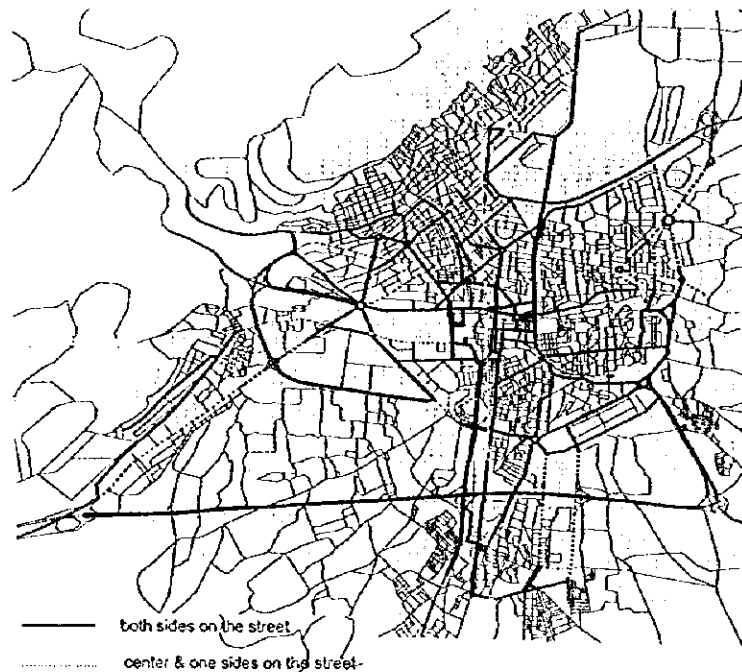


Figure 7.9.1 Parking Prohibition











7.10 Traffic Signs and Road Marking

The road marking and sign standards as well as the installation manuals appear to follow to a large extent the international standards.

The posted signs are for guidance, warning, teaching of regulations and directions and are in relatively good condition. Their locations on the arterial roads and streets are mostly suitable, however, they obstruct pedestrian movement when installed on the narrow sidewalks at the city center. Table 7.10.1 describes the various types and shapes of signs currently in use in Damascus city.

Road marking on the main arterial roads is in good condition, but marking on main and other streets are almost erased. Markings for lane lines (with directional arrows), stop lane, channelization lines, and pedestrian crossings need to be better implemented.

Table 7.10.1 Traffic Signs of Damascus City

Squ	Name of Sign	Type	Dimension	Qty	Location	Notes
1	 Cup Shape Traffic Sign	Identifying area and streets	2.5M x 2.5M	375	All streets, squares, intersection in the city center and surrounding	
2	 Cup Shape Traffic Sign	Speed Limits	2M x 2.5M		6 October, Ath Thawra Str., Badr Str., Uhod Str., Al muthanna bin Haritha, Maqdisi, Fayer Mansour, Southern Bypass, Airport road, Qadara Road, 17 April, Oumar Descent, Walid bin Abdul Malik, Eishah river, Soldier housing	
3	 Cup Shape Traffic Sign	Truck Paths	2M x 2.5M	15	Entrances of the city and the road surrounding it	
4	 Rectangle Shape Traffic Sign	Illustrative and Identifying the intersections	1M x 2M	50	Identifying, indication, preventing	
5	 Rectangle Shape Traffic Sign	Important areas and streets	1M x 0.8M	240	beginning of intersections, crossroad, beside of Large Traffic Sign.	A plan is being executed to cover all center streets and surrounding of the city.
6	 Over head Sign Identifying the respective Lane	Street Truss Crossing all the streets & carrying traffic sign	Different between (10-15)M	11	Southern Bypass between the interchanges (S & 11) -Airport road.	Spans range between 20- 30M
7	 Over head Sign Identifying the respective Lane	Overhead Sign on the Pedestrian Bridge and Road Bridge	Different	7	Pedestrian Bridge(Fahama- 6 October - Al Hayat- Annase- Shukri al Quwail).	Over head signs over road lanes only
8	 Direction Signs	Traffic Guidance to citizens & Drivers	0.25M x 0.5M 0.5 M x 0.5M 0.5 M x 0.8M 0.6 M x 0.9M	5436	All the city	Signal or together with traffic Sign
9	 Microbus Sign	Beside the microbus stop identifying the name of bus stop	60 cm x 90cm	600	Distribution for all bus stop in the city	
10	 Traffic Sign	Traffic warning or Rules	0.45M 0.60M 0.90M		All around the city	

7.11 Pedestrian Traffic Conditions In City Center

7.11.1 Definition of Damascus City Center

Based on field observations, the main corridors in the city center of Damascus with heavy pedestrian movement could be defined as follows:

- North: Central Bank and the zone north of Al Abed street and the Parliament.
- West: Southern part of Abou Romaneh street, along to Al Diyafeh square, Assad bridge and Sana intersection.
- South: Al Baramkeh terminal to Al Hijaz station, and south of Al Naser street.
- East: The entrances of Al Harika area and Al Hamidiyeh, the wall of Damascus Citadel, the southern part of Al Thawra street, the area east of 29 May street till the Central Bank.

These corridors contain most of the traditional squares and main streets as well as many governmental departments, agencies and ministries, office buildings, hotels and shopping centers. The area is characterized by heavy vehicular traffic and pedestrian flow, of about 3,000 vehicle/hr and 10,000 pedestrian/hr at some intersections on daytime. Areas congested by heavy pedestrian flow are shown in Figure 7.11.1.

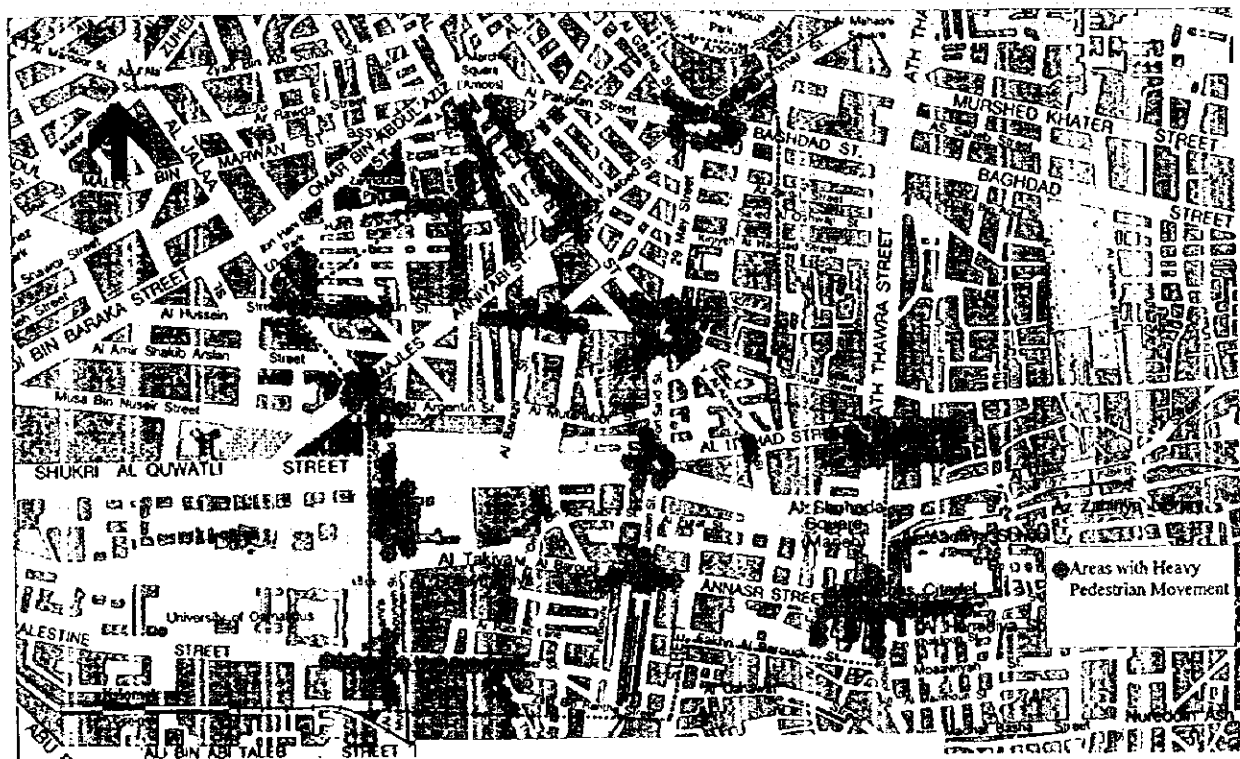


Figure 7.11.1 Main Directions of Pedestrian Movement

7.11.2 Pedestrian Facilities Assessment

Pedestrian movements depend mainly on the facilities provided in the city center for pedestrians, which are shown in Figure 7.11.2 and can be assessed as follows:

- 1) **Sidewalks:** In general, sidewalks in the city center have many sections which are seriously deteriorated and unpaved with different levels and widths which make the movement of pedestrians very difficult, especially for elderly and disabled people. Widths are insufficient in most places and installed obstacles, such as road and advertisement signs, are greatly decreasing sidewalk capacities.
- 2) **Crossing Areas:** They are not properly marked and the painting is very old, and there are no stop lines. The width is not suitable compared with the pedestrian traffic volume. Some areas are equipped with traffic signals but not always oriented for pedestrians. Personnel of traffic police organize the movement. Some pedestrians cross the roads in undesignated areas, which causes interference between the movement of cars and pedestrians, and consequently causes disturbance of movement, waste of fuel, danger to pedestrians, and pollution to the environment.
- 3) **Pedestrian Overpasses:** There are many pedestrian overpasses (up to 6m clearance) with concrete or metal structures. The stairs section of some of these overpasses causes obstruction for pedestrian as they occupy most of the sidewalk width. All of them are exhausting in use, especially for old people and children. Overpasses are generally too high for people with narrow entrance and their design does not match the features of a historical city like Damascus. People usually avoid the use of overpasses.
- 4) **Pedestrian Underpasses:** In Ath Thawra street, there are two well-designed under-passes in acceptable condition and there is another 6.0m depth underpass at Bab Al Jabiyeh, which was recently executed. Underpasses executed in Damascus have basically a leveling height of 3.5 m. Shops and restaurants are located at some underpasses. They are not properly cleaned nor with sufficient lighting, and sometimes they have drainage problems. In general, people avoid them especially at night.

7.11.3 Pedestrians Movement in The Old City

The Old City is considered separately here and not within the central area of the city. The Old City includes many historical monuments, edifices, Khans and a lot of old Damascus houses and traditional markets. In the middle of the city the Ommayyad Mosque is situated. The Citadel of Damascus is situated at the northwest side of the city and there are also a lot of churches in the southeast division.

The Old City was not planned or designed for car movement, but only for pedestrian and carriage movements, drawn by animals or man. In some parts, old houses were removed and replaced by new houses, thereby gradually reducing the old texture of the city.

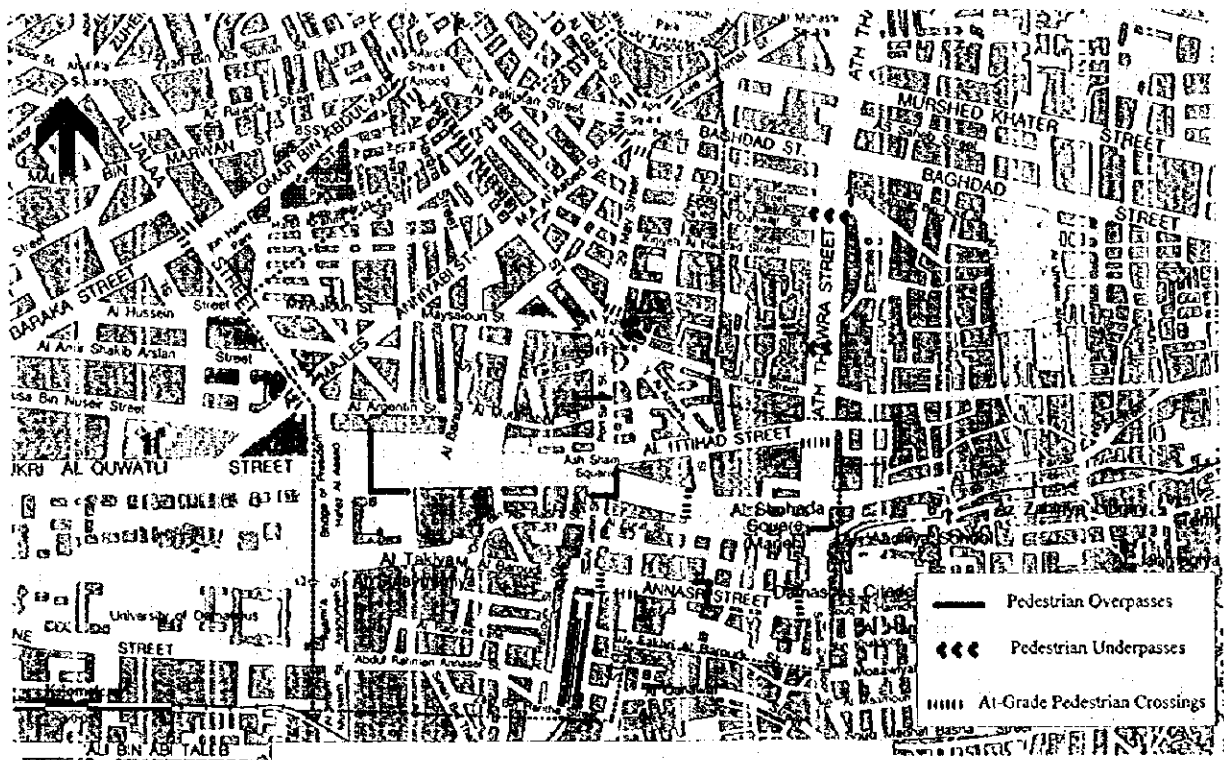


Figure 7.11.2 Pedestrian Crossings in City Center

Since a lot of economical activities exist in the Old City, beside commercial stores, professions, handicrafts and a lot of small-manufacturing activities, it attracts a lot of traffic movement to transport goods, products and different materials as well as for shopping and tourism. The type of cars differs from big trucks to small carriages drawn by hand together with the heavy pedestrian movement. In addition, the Old City has many old-tradition schools that are preferred by the citizens of Damascus.

From the traffic point of view, there is great interference in the movement between:

- All types of trucks with different sizes and shapes.
- Pedestrians and non-motorized traffic.
- Foodstuff, products and goods which are exposed on the side and middle of streets.

The Old City has a distinguishing and special character, which attracts tourists, but it is not comfortable, either for pedestrian or for car movements. The Governorate of Damascus has taken some measures to face these difficulties, such as:

- Unifying the directions of traffic in some streets.
- Restricting on-street parking on some streets.
- Applying pedestrian priority to some streets.
- Limiting the truck entrance inside the old city.
- Applying odd-even number system for car use.
- Increasing the police patrol in the streets.
- Limiting the repairs and changes of construction.
- Establishing a plan to remove some activities from inside the old city.
- The Prime Minister issued a decree, No. 356 on 4/2/1998 to form a committee for the protection of the Old City. The duties of this committee include studies necessary to organize traffic on the Old City streets.

7.12 Travel Speed

Travel speed is the synthesis of investigations on present road network conditions. Speed on each road is affected to a large extent by the total traffic volumes, congestion of the public transport vehicles of minibuses, number and frequency of intersections as well as other causes and traffic problems. Figure 7.12.1 shows the results of traffic speed surveys, which were conducted by the floating-car method.

Travel speeds of less than 5 km/hr were recorded along Bassel Al Assad and Al Brazil streets. Speeds less than 10 km/hr were recorded on half of the section composing the inner ring road. Other streets recorded higher speeds, but in general it can be concluded that the speed is low on most of the main streets of the network.

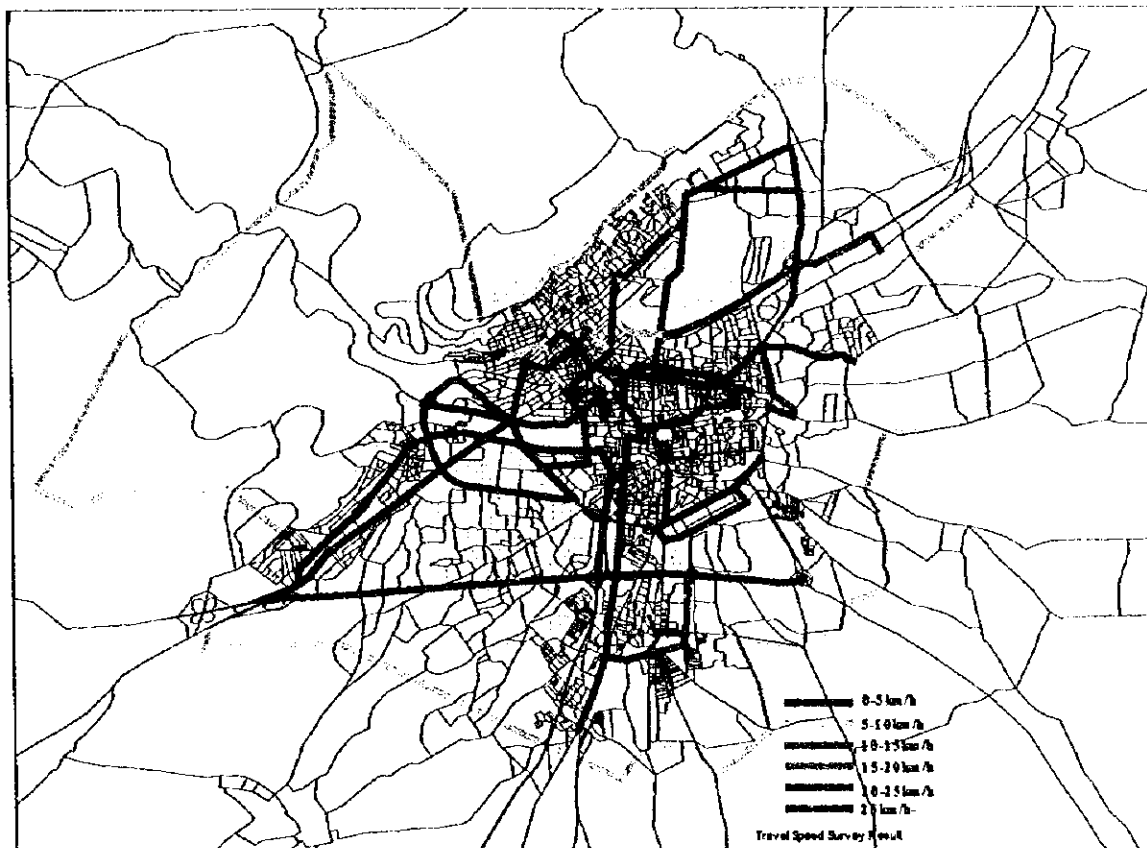


Figure 7.12.1 Travel Speed Survey Results

Chapter 8. ENVIRONMENTAL CONDITIONS

8.1 Institution and Legislation

8.1.1 Institutions

(1) Environment Protection Department

Based on the decree number 1912 for 1989 issued by the Governor of Damascus the Environmental Protection Department has been established in the Governorate, having the following main responsibilities;

- Determining and studying environmental problems in all the public services in the Governorate
- Proposing solutions for environmental problems, preparing related projects and supervising their implementation
- Preparing the plans for spreading environmental awareness and coordinating on environmental issues with the ministry of environment and related organizations

The department presently has 20 members who include engineers and environment specialists. The department resorts to scientific research centers as necessary to compliment the specialist staff and utilize equipment unavailable to it. The department also coordinates its activities with the environmental inspectors, or designated officers in each of the 14 Governorate service centers.

Since its establishment, some of the work actually done by this department is as follows;

- Cooperating with the Commission for Protection of the Old City to prepare an inventory of industrial activities within old Damascus City, which may have a harmful effect on the environment there.
- Monitoring industrial facilities and issuing permits for establishment of any new industrial facilities.
- Participating in the comprehensive environmental planning project for Damascus and its suburbs, which is being implemented by the General Commission for Environmental Affairs (GCEA).
- Studying management of medical waste.
- Studying of sanitary landfill implementation and the operation of the compost plant.
- Studying air pollution in Damascus in coordination with the higher research institute.
- Follow up on the wastewater management project under implementation.
- Follow up of potable water quality in the city.

This department has so far not been involved in any environmental studies related to transportation projects, however the effect of vehicle utilization on air pollution has been studied to a certain extent.

(2) Ministry of State for Environmental Affairs

The Syrian government was the first Arab country to establish a ministry for the environment in 1987, which indicates the country's concern for environmental issues. The ministry's organization chart is shown in Figure 8.1.1.

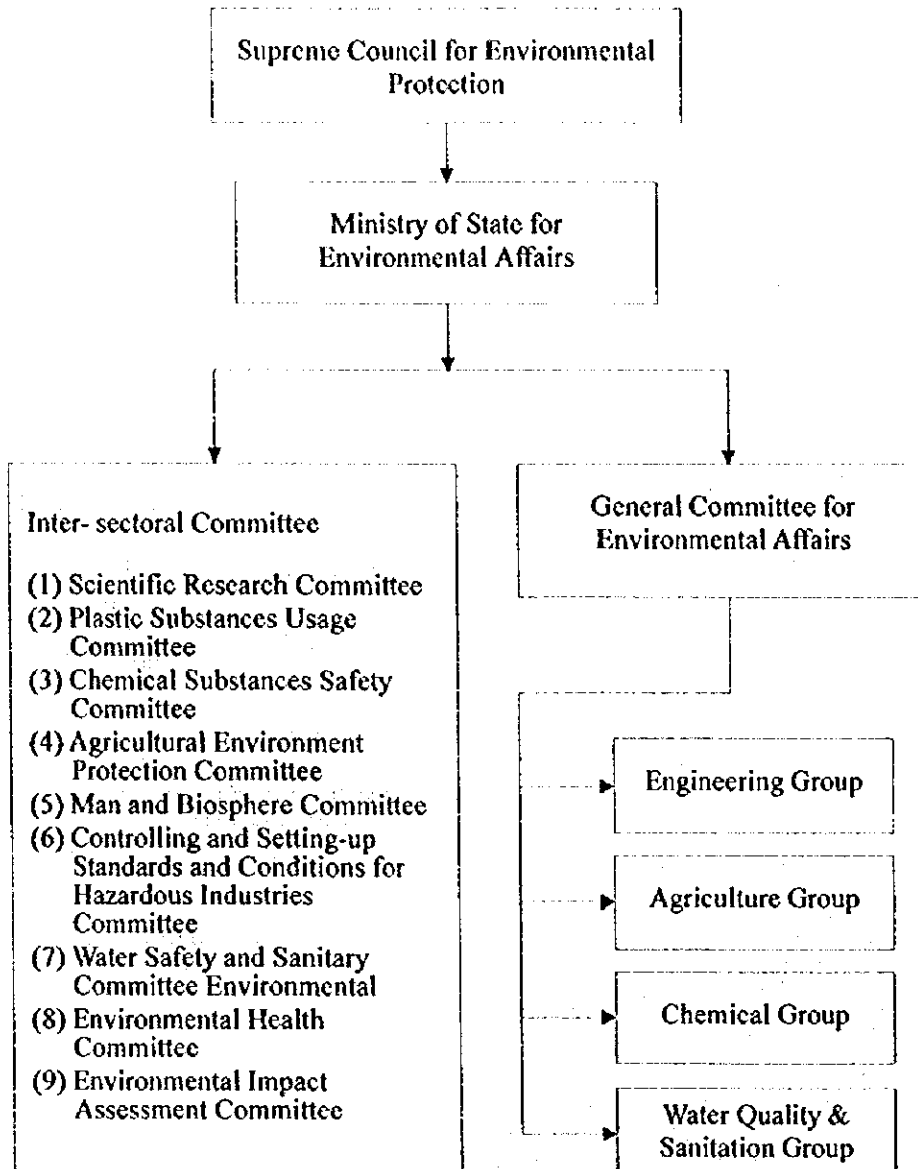


Figure 8.1.1 Organization Chart of Ministry of Environment

The highest authority responsible for implementing environmental protection resides in the Supreme Council for Environmental Protection, which is chaired by the Prime Minister and has as its members all the ministers. Technical aspects and studies are performed by the General Commission for Environmental Affairs. Technical support from other relevant governmental agencies and coordination between the ministry of environment and these agencies are implemented by nine inter-sectoral committees.

Of direct interest to this Study are the efforts being made by the GCEA in preparing the environmental impact assessment (EIA) guidelines and the EIA decree, which will be discussed in the following section.

8.1.2 Relevant Regulations

(1) Draft Environment Protection Law

Since 1995 there have been a number of draft environmental protection laws prepared by the GCEA and revised based on comments received from other ministries. The Study team has received the latest draft prepared in January 1997 by GCEA.

The law is composed of nine chapters and 23 articles. Chapter 3 describes the EIA process that may be required for the projects to be proposed under this Study. In addition to articles 9 and 10 of this chapter there are some other articles that have relevance to this study. Table 8.1.1 describes the main contents of the relevant articles.

Table 8.1.1 Relevant Articles in the Draft Decree

Article	Contents
<i>Chapter 2</i> Article 2	<i>Protection of Environmental Elements</i> Section C states that the Supreme Council for Environmental Safety will issue a decree specifying the procedure for EIA for licensing establishments that have a negative impact on the environment based on GCEA's proposal in coordination with concerned authorities.
Article 5	Covers the environmentally safe transport of construction waste.
<i>Chapter 3</i> Article 9	<i>Environmental Impact Assessment</i> States that the authority issuing the license is responsible to prepare an EIA for the establishment it will license in accordance with the procedure to be issued by SCES (Article 2 above). The establishments to be covered by this article shall be determined by the Minister of State for Environmental Affairs.
Article 10	States that the licensing authority shall notify the establishment owner of the EIA result. The owner shall be allowed to object in writing within 30 days of notification to a committee composed by the minister and including the following members; assistant to the minister, judge nominated by the minister of justice, and a representative from the licensing authority. The minister shall decide the committee's duties and working procedures, and the committee's decisions shall be final.
<i>Chapter 6</i> Article 14	<i>The Environment and Development</i> States that all relevant state agencies should include environmental consideration in their economic, social, construction, service, cultural, informational and educational activities.
<i>Chapter 7</i> Article 18	<i>Environment Protection and Development Fund</i> States the activities whose expenses may be covered by the fund. These include the necessary studies for preparing environmental programs and EIA.

The draft decree is largely aimed at establishments that may have a negative impact on the environment, such as industrial plants. Terminals and multistory parking facilities may be considered as establishments but it is difficult to do the same for a new road, flyover or an underpass. One contradiction appears in Articles 9 and 10 concerning the role of the licensing authority. In the case of transport projects, the owner is likely to be Damascus Governorate and therefore a more independent EIA would be more suitable. A draft of this law, prepared in 1994 included an additional article in Chapter 3, stating that the EIA prepared by the licensing authority should be forwarded to GCEA for their comments. This article allowed for a neutral, as well as technically suitable third party to comment on the EIA and it may have been better to keep it.

GCEA is preparing 8 manuals describing guidelines for EIA in different sectors. Transportation sector is not covered and there is no intention in the near future to prepare a separate guideline for it. However GCEA considers at this time that provisions of this decree and the decrees to be issued by SCEA will apply to projects to be proposed in this Study.

The Study team has therefore carried out environmental impact studies based on guidelines used by JICA and other international donor organizations as suitable to compliment those being prepared for Syria as necessary.

(2) Environmental Pollution Standards

1) Wastewater Standards

In 1995 the Ministry of State for Environment prepared the draft standards for wastewater. The main standards are shown in Table 8.1.2.

Table 8.1.2 Industrial Wastewater Standards (draft)

1.	Temperature	< 45°C
2.	PH	6.5 - 9.5
3.	Precipitation	after 10 minutes < 5 cm ³ /L after 30 minutes < 10 cm ³ /L TSS < 500 mg/L
4.	Solids	diameter < 1.5 cm
5.	S	< 1 mg/L
6.	SO ₄	< 1,000 mg/L
7.	NH ₃	< 150 mg/L
8.	BOD	< 1,000 mg/L (20°C, 5 days, industrial wastewater)
9.	COD	< 3,000 mg/L
10.	TDS	< 2,000 mg/L

2) Air Quality Standards

In the same year, 1995 the Ministry of Environment prepared draft air quality standards on the bases of the WHO standards. These are shown in Table 8.13.

Table 8.1. 3 Air Quality Standards (draft)

1.	CO	26.0 ppm, 1 hour
2.	O ₃	0.12 ppm, 1 hour 0.05 - 0.08 ppm, 8 hours
3.	NO _x	0.21 ppm, 1 hour (not more than two times per month) 0.079 ppm, 24 hours 0.054 ppm, average annual
4.	SO _x	0.134 ppm, 1 hour (not more than three times per month) 0.047 ppm, 24 hours 0.03 ppm, average annual
5.	TSP	150.0 μg/m ³ , 24 hours 90.0 μg/m ³ , year
6.	Pb	1.5 μg/m ³ , 3 months

8.2 Natural Environment

8.2.1 Meteorology

The Meteorological Department of the Syrian Government has classified the country into five (5) regions from humid to very dry. The country's western strips along the Mediterranean Sea and the border with Lebanon are humid and semi-humid regions. A thin strip bordering this region from north to south and along the country's northeastern tip is classified as semi dry. The larger remaining parts of Syria are roughly divided between dry and very dry regions.

Damascus City falls in the dry region.

The average total annual rainfall in Damascus city is 200 mm, and the maximum and minimum temperatures are 36°C (August) and 2°C (January). Figure 8.2.1 shows the average monthly temperatures and rainfall. Annual average relative humidity is 50%, with the maximum and minimum monthly average relative humidity being 75% (January) and 30% (June) respectively.

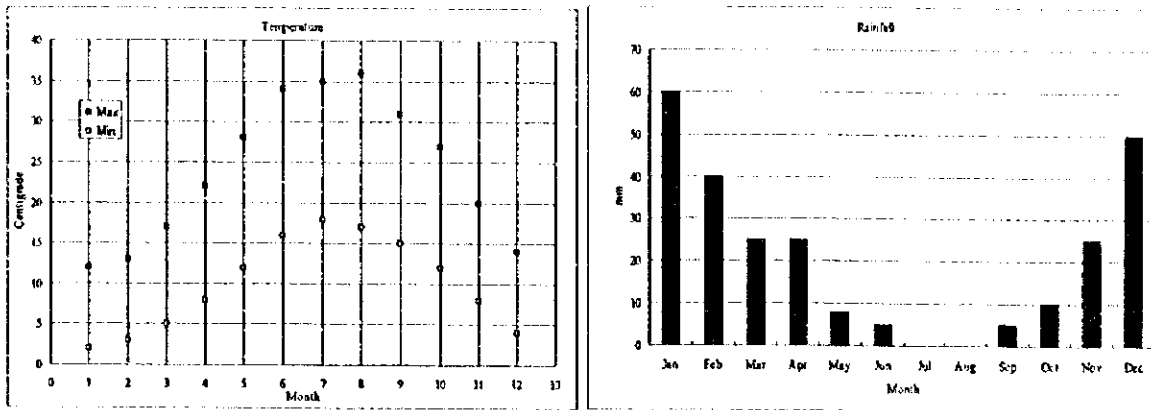


Figure 8.2.1 Temperature and Rainfall in Damascus City

8.2.2 Topography

The Study team has relied on the information prepared by the Topographic Survey Department of Damascus Governorate in understanding the general topographic features of the city.

Kassioun Mountain borders the city to the northwest, and has the highest level of 1,153 meters above sea level. The city tends to decrease in altitude from west to east as observed along the Barada river route where the level is 650 meters as the river crosses the Al Ghouta and falls to 610 meters at its outlet into the Otteiba Lake, east of the city.

8.2.3 Soil Conditions

Damascus City may be broadly divided into four regions with similar soil conditions based on past soil investigation surveys. The first region follows the Barada river route. Soil formation in the Barada valley consists of top black clay layers to depths of 2 to 7 meters, with silty clay layers below 7 meters to depth of about 25 meters. Groundwater level in that region is at about 3.5 meters below ground level.

The area falling north of Barada river valley and extending north of Baghdad Street is characterized by having top black silty clay to depths of 2 to 5 meters. At deeper depth mixtures of gravel, sands and silt are observed. Groundwater levels are deeper in this region ranging from 5 to 12 meters below ground level. Bearing capacity ranges between 3.5 and 5.0 kg/cm².

Soil conditions in the area north of Baghdad Street are similar but bearing capacity is lower, ranging between 1.5 to 2.5 kg/cm². Top layers consist of black clay to depths of 2.5 to 3.5 meters, followed by clay and silt soils to depths of 15 to 20 meters. Groundwater levels are 10 to 15 meters below the ground surface.

The fourth region lies south of Barada river valley. Thin topsoil layers here are black or red clay layers, with stiff mixtures of gravel, sand and silt to depths of 20 to 25 meters. Bearing capacity ranges from 5 to 7 kg/cm², and groundwater levels are at deep depths of 25 to 30 meters from the ground surface.

8.2.4 Land Use

Current land use in Damascus City is described considering environmental aspects, as of 1994 by district. Residential and public facilities dominate the central part while agricultural and industrial areas including mixed use of agriculture and industry are located in the outskirts. Residential and parks and open space are distributed not only in the central part but also the suburbs (Mazzeh, Jobar, Barzah-Qaboun). The city's growing axis is along Barada River due to the geographical suitability of the land there.

Considering park area, parks and open space area per person is estimated to be 3.7 m² and parks and agricultural area added to the park area per person is estimated 12.4 m². This value shows rather sufficient space. In the Kassioum mountain area, which dominates a large area in the City (28%), there seems to be no vegetation. Agricultural lands are located along Barada River and its tributaries so that those areas should be conserved in order to maintain water resources including under groundwater.

Table 8.2.1 Current Land Use in the Damascus City by Service Department

No.	Service Department	Agriculture (ha)	Parks and Open Space	Residence	Public Facilities	Industry	Special use	Mixed Agri. and Residence	Non use	Total (ha)
1.	Rukneddin	-	27.1	392.8	17.2	-	-	-	-	437.1
2.	Muhajirin	-	52.8	279.1	31.3	-	-	-	-	363.2
3.	Mazzeh	604.5	47.4	901.8	135.0	11.5	354.5	256.4	116.8	2,427.9
4.	Qanawat	-	7.7	191.6	70.0	-	-	-	-	269.3
5.	Qadam	95.4	-	465.5	24.1	11.4	-	-	-	596.4
6.	Shaghoor	89.3	21.4	544.0	33.4	27.6	-	-	-	715.7
7.	Sarouja	-	7.7	324.3	16.5	-	-	-	-	348.5
8.	Moukyam Al Yarmouk	-	-	226.5	-	-	-	-	-	226.5
9.	Jobar	107.4	24.8	318.3	16.5	50.3	-	124.4	-	641.7
10.	Barzeh-Qaboun	109.8	228.7	573.8	103.3	121.2	-	32.9	-	1,169.7
11.	Dummar	-	92.8	372.1	8.1	-	-	-	-	473.0
	Total	1,006.4	510.4	4,589.8	455.4	222.0	354.5	413.7	116.8	7,669.0
		13.1%	6.7%	59.8%	5.9%	2.9%	4.6%	5.4%	1.5%	100.0%
	Kassioum mt.									2,956.0
	Grand Total									10,625.0
		9.5%	4.8%	43.2%	4.3%	2.1%	3.3%	3.9%	28.9%	100.0%

Source: Damascus New Urban Development Plan, Report of third stage

8.3 Social Environment

8.3.1 Population distribution in the city

(1) Existing Condition

Arabs form the largest ethnic group, comprising 90% of the population followed by Kurds at 5% and the remaining population split among Armenians, Circassians and Turks. Bedouins are estimated to be 100,000.

With the entrance of Islam into Syria most of the residents converted into the new religion. Presently Islam is the predominant religion with about 86% of the Syrians as followers. Christians of various churches account for the remaining 14%. The Christian quarter of the Old City is still Christian in majority but there are many Muslims living and having businesses there now. The Jewish quarter of the Old City draws its name from the old conditions of the city and is now mainly Muslim and Christian.

(2) Relevance to Transportation Projects

Relocating residents of areas with ethnic characteristics to make way for road projects may cause social disruption. There are many Kurds living in the north, along Mt. Kassioum, Palestinians living in the south in Yarmouk and Tadamon areas, and Christians in the eastern part of the Old City extending east of the Old City. However for the last two ethnic groups there is no fear of social disruption because these groups are fully integrated in the society. In the case of Kurdish areas transport projects there that may require resettlement should be accompanied with social surveys to determine the resettlement effect and propose remedies. Two examples of projects in those areas are the new East-West road construction in Mt. Kassioum and Abdel Ghani Al Nabulsi Street widening.

8.3.2 Informal Housing Settlements

(1) Existing Condition

Houses constructed on public or private land designated for agricultural purpose, or on State owned land and having no construction permits are defined as informal housing. These housing units are constructed with no official supervision as to building safety and satisfaction of building codes. The 14 districts (Service centers) are responsible to prevent informal housing construction but often their efforts are not sufficient.

The phenomenon of informal housing started in the 1970's and increased rapidly in the 1980's as the housing shortage became serious. A 1997 study prepared for Damascus Governorate grouped the informal housing settlements in the city into 36 locations surrounding the city and having a population of about 878,200 (inside and outside Damascus Governorate borders). The total area where informal housing is sited was estimated to be 2,130 hectare (of which 1,273 hectare is inside Damascus). Population density is high averaging above 400 cap/hectare.

In the early 1990's a decision was taken by the Government to provide informal housing areas with basic services. Work has been in progress in Mezza 86, north west of the city and a brief explanation is provided here to understand the system followed there.

A survey was conducted by the Governorate's Organization and Planning Department to determine the population in that area, decide the urgently required services and prepare a formal plan for the area. In the first stage it was decided to pave the main roads in the area and provide water and sewerage. These works are carried out based on the actual conditions with no demolition work. At the same time an organized plan has been prepared for the area. The plan calls for leaving all buildings of safe structure and 5 floors or more as they are. Public services required have been considered and land will be allocated as necessary by demolishing smaller houses and introducing a land readjustment scheme. The project is being delayed because of lack of funds and consensus among the property owners.

It is worthy to note the aspects of cooperation amongst residents in informal housing areas. Securing of access roads and roads between houses is mostly through mutual agreement of neighbors to give up some part of their land for this purpose. It is safe to walk in such areas in the evenings or at night even though the streets are not lit. The privacy of families living in close and cramped areas is largely respected.

(2) Relevance to Transportation Projects

In principle transportation projects are welcome in such areas in order to serve the large populations there. Lack of sufficient infrastructure in these areas suggests the need to study transport projects within the framework of overall development plans and thereby increase the positive impact the project will have.

On the other hand the costs involved in resettling the large number of residents due to implementation of the development plans should be included in any project plan to reduce the negative impact the project may have on the social environment.

8.3.3 Appropriation and Resettlement

(1) Projects where properties may be appropriated

Appropriation is possible for two types of projects;

- Urban expansion, governed by law no. 60 for 1979
- Projects of public benefit nature, governed by law no. 20 for 1983

Transport projects, as new road construction are considered public benefit projects and are subject to provisions of law no. 20 for 1983 when property appropriation is required.

(2) Property Appropriation Method

Basically two methods are applied in Syria by which property is appropriated to construct road and highway projects. These are;

- Area Development Method (Land reorganization method)
- Project Development Method

Both methods are discussed in the following sections.

1) Area Development Method

Under this method, public benefit projects such as road, school, hospital, etc. are implemented within a scheme to develop the whole area. This method was usually implemented in informal housing areas where original development was unplanned. Owners of properties such as agricultural land, built-up land and buildings are identified and shares in the development are distributed according to the present values of the properties.

A development plan is prepared for the area, which includes the required public projects. The remaining area, after deducting the area required for public projects is distributed to the identified owners in accordance with their shares. The government will finance and implement the public projects, while the owners will implement the building plots.

Road projects in Kafr Soussa and near Bab Sharki have been implemented under this method. Although such development schemes should be implemented within a fixed time period delays always occur because of difficulties share holders face in agreeing together or raising

the required financing for development. Therefore this method is not being applied at present.

2) Project development method

Under this method plans are prepared for specific public projects and ratified. Property falling within the area or route of the project is then appropriated. The procedure for appropriating property by the Governorate to implement a public benefit project is explained in Table 8.3.1.

Table 8.3.1 Property Appropriation Procedure

Step	Authority responsible
A. PROJECT PREPARATION AND SURVEYS	
Step 1 Project Plan Preparation & Ratification	<ul style="list-style-type: none"> Preparation by <u>Organization & Planning Dept.</u>, Damascus Governorate Ratification by <u>Ministry of Housing & Utilities</u>
Step 2 Site survey and mapping of scales 1/2000 or 1/500 showing proposed project borders and properties requiring appropriation.	<u>Organization & Planning Dept.</u> , Damascus Governorate
Step 3 Issue draft decree on ratification	<u>Executive Office</u> (Committee of the elected representatives in the Governorate Council)
Step 4 Ratify the decree	<u>Governorate Council</u> (as a whole)
Step 5 Prepare draft appropriations regulations, which include detailed documents as available and maps.	<u>Organization & Planning Dept.</u> , Damascus Governorate
Step 6 Check contents of draft regulation and recommend modifications as necessary	<u>Ministry of Housing & Utilities</u>
Step 7 Issue the regulation officially	<u>Cabinet of Ministers</u>
Step 8 Commence studies to determine; (1) preliminary property value evaluation (2) define properties (number and borders)	Two committees are formed, first from the governorate, second from Governorate Council (1) <u>Preliminary Evaluation Committee</u> (2) <u>Properties Committee</u>
Step 9 Investigate property ownership deeds	<u>Deeds Registration</u> (Registration records may not be available for all properties and other methods are followed to determine property owners and effected parties)
B. INVOLVEMENT OF GENERAL PUBLIC	
Step 10 Announcement made to the general public	<u>Damascus Governorate</u>
Step 11 People holding registered deeds and other effected parties are informed of the estimated values	<u>Legal Affairs Dept.</u> , Damascus Governorate
Step 12 Within a specified time (say 30 days) the public may submit objections on; (1) the preliminary evaluation (2) determined property owners and effected people	Two committees are formed from members of Ministry of Justice, Governorate, effected people's representative and specialists (as necessary); (1) <u>Re-evaluation Committee</u> (decision binding) (2) <u>Disputes Resolution Committee</u> (appeal possible in a court of law)
Step 13 Overall value broken done by individual property (agriculture, vacant land, commercial, residential)	<u>Damascus Governorate</u>
Step 14 Deposit appropriated properties values in a special bank account	<u>Financial Dept.</u> , Damascus Governorate

(Continued)

Step 15 Transfer ownership of properties to be appropriated to the Governorate	Deeds Registration
C. APPROPRIATION COMMENCEMENT	
Step 16 Social survey to determine families effected and degree of effect (in order to determine compensation category for each effected family)	Two committees are formed by the Governorate (1) <u>Actual Conditions Survey Committee</u> Surveys property use (agriculture, residential, etc.) (2) <u>Investigation Committee</u> Surveys actual family members and conditions to decide extent of compensation warranted
Step 17 Issue decree ratifying names of people to be effected by the appropriation (and therefore compensated)	Executive Office
Step 18 Serve evacuation notification to effected people (after securing alternate housing for those eligible)	Appropriations Dept., Damascus Governorate
Step 19 Provide alternate housing units as required	Housing Dept., Damascus Governorate

Projects implemented under this method usually have no fixed time limit and much time is required to prepare the compensations, whether material or provision of substitute housing. Examples of road projects implemented or under implementation by this method are;

(a) Malek Faisal street widening project :	Partial identification of properties to be appropriated. Action waiting funds for compensation and substitute housing/shops.
(b) Mt. Kassoun East-West new road construction project:	Total identification of properties to be appropriated. Action waiting funds for compensation and substitute housing/shops.
(c) Kafr Sousseh new road construction project:	Total identification of properties to be appropriated. Action waiting funds for compensation and substitute housing/shops.
(d) Southern Bypass extension project:	Total identification of properties to be appropriated. In 1985 then prime minister issued a decree suspending this project because of large extent of resettlement. Presently cancellation of this decree under review.
(e) New Southern Entrance road (Completed):	Opened in 1997. Properties appropriated under this method.

Compensation Value

The law sets the procedure and equations for evaluating compensation for the appropriated properties. These are as follows;

- Agricultural land: Compensation based on value of land value and crops production
- Vacant land: Calculation by equation that takes into consideration land area, land values, location, possible floor area to be constructed on the land and potential agriculture activity there.
- Residential property:
 - In case of Owner, not residing on the property, compensation is the present land value plus the costs of the building
 - In case of Owner residing on the property, compensation as above plus securing of alternate housing with soft payment conditions
 - In case of tenant, 5% of the property value plus securing of alternate housing with soft payment conditions
- Non-registered buildings constructed on public land:
 - In case of Owner, not residing on the property, compensation is the cost of sale of the building demolition wastes

- o In case of Owner residing on the property, compensation as above plus securing of alternate housing with soft payment conditions
- o In case of tenant, 5% of the property value plus securing of alternate housing with soft payment conditions

People qualifying for alternate housing must satisfy a number of social conditions, such as being married, above 40 years in case of bachelors, etc. Soft payment conditions include payment of 10% of the alternate housing cost upon receiving the house and payment of the remainder over a 15-year period with no interest.

(3) Relevance to Transportation Projects

Properties have recently been appropriated for implementation of the Southern Entrance Road, and appropriation is ongoing on the Southern By-pass sections still under construction. The issues derived from the experience gained in these two projects based on discussions with governorate responsible officials and interviews with the resettled (or soon to be resettled) people can briefly be summarized as follows;

- Lack of sufficient social survey to determine effect of resettlement to a distant area may have on the livelihood and daily life of the effected people.
- Lack of substitute housing units available to the Governorate to speedily implement resettlement causes delays in the project such as the case of the Southern By-pass (project completion pending resettlement of 3,400 families).
- Long gap between evaluating compensations and actual implementation of resettlement because of difficulty in securing substitute housing causes the effected people to live in an unstable state and negatively effects the social ties of the area as the people are mentally prepared to resettle at any time and lose interest in their immediate community. During the "waiting period" the effected citizens do not receive any clear official information as to the reasons for the project delay and are always hopeful that the project may be cancelled. Rumors spread and there is little official effort to keep the citizens informed of the actual situation.
- Land and dwelling values are evaluated early in the procedure but actual securing of funds and resettlement takes a long time. Re-evaluation is not done to take into consideration the effect of the passing of the years on the property value.
- In general appropriated land is evaluated as agricultural land which is of less value than built-up land, despite the actual land use which may not be agricultural.
- Poor condition of the substitute housing in terms of construction (poor finishing), distance from the city (usually in the city fringe areas), lack of services and community centers, etc.
- Lack of sufficient government support to encourage area development schemes, such as provision of soft loans for shareholders to execute the development, and tax exemptions on related projects.

In conclusion resettlement if undertaken in such a manner as to take into consideration the above issues should not be considered as a social environmental impact. However the costs for securing substitute housing in nearby areas, paying compensations and arranging easy term loans should be included in any transportation project costs where appropriation is required to decrease the negative impacts on the social environment.

Some transport projects where careful consideration should be given to resettlement impacts are Malek Faisal street widening project, and construction of new roads parallel to Al Kahira street, connecting Thalateen, Yarmuk and Palestine streets and extension of the South Bypass.

8.3.4 Cultural Resources Management

(1) Historic Background of the City

Damascus is often referred to as the oldest inhabited city on the face of this earth and archaeological evidence shows that a population center flourished here during 4000 BC. Historic records of the city date back to its seizure by the Egyptian Pharaoh Tuthmoses III in 1468 BC. Since the Egyptians over twenty different governments ruled Damascus attracted to it from different areas of the world; Egypt, Arab Peninsula, Persia, Babylon, Greece, Roman empire, Turkey and France.

While these civilizations left their mark on Damascus, it is necessary to note that because of its important location and the richness of its civilization, Damascus also contributed to the growth of many of these civilizations and became the capital or a major city in some of them. Table 8.3.2 briefly summarizes the different governments that ruled the city and the effect they may have had on the city's development.

The Table covers the period up to the end of Turkish rule. The City passed through periods of spectacular development intermingled with those of destruction. Up to the entry of Islam 1,300 years ago the Greek and Roman rulers concentrated on the Old City and their fingerprints remain there. As Islam took hold and Damascus became the capital of the empire under the Omayyad rule the development began taking cautious steps beyond the city's walls. The Mamelukes, coming into power in Damascus in 1260 continued this outer development and the Salhiyyeh district was developed into a small town in its own right.

It is not strange that the walled in Old City of Damascus was declared in its entirety as one of the sites under the UNESCO conservation program on the 26th October 1979.

The importance of cultural resources management can not be overemphasized in a city such as Damascus that is rich in antiquities and cultural sites. Any development projects in the transport field or any other field must take into consideration the conservation of the city's cultural resources. This section discusses the existing management system and the extent of the sites in a broad manner.

(2) Institutional System

1) Antiquities Law

The Antiquities Law number 222 was issued in 1963 and since amended four times, the latest amendment being in 1977. At present a new law is being discussed in the Parliament and is expected to be introduced into law shortly. The new law aims at increasing the severity of the punishments and strengthening the role of the Directorate General of Antiquities and Museums (DGAM).

Law 222/1963 is composed of 89 articles and eight chapters. The major points of interest in this law, with respect to this Study are summarized as follows;

- The Directorate General for Antiquities and Museums (DGAM) is the authority in charge of antiquities in the Syrian Government.
- Antiquities are those items that date back two hundred years or more recent items that are deemed by DGAM to have historic, artistic or national characteristics.
- Any development planning studies for a region should take into consideration conservation of antiquities, whether directly or indirectly through maintaining the

harmony of the site. All such plans must be approved by DGAM before ratification.

- DGAM should maintain registers for antiquities based on the historic value of the site and its artistic features. Registration shall be done based on a decree.
- DGAM may grant permission for use of the antiquities areas that it decides are not necessary to be registered.
- A registered site may be deleted based on a decision by the Minister of Culture.
- DGAM is responsible for maintenance and renovation of registered antiquities. Repair and renovation works stemming from site use are the responsibility of the owner or user under the supervision of DGAM.
- An owner of a registered antiquity is not allowed to demolish, transport, repair, renovate or renew it without receiving the permission of DGAM.

2) Responsible Institutions

There are three main responsible institutions for antiquities in Damascus, namely;

- **Directorate General for Antiquities and Museums (DGAM), Ministry of Culture**
This is the main organization in charge of registered antiquities. They provide other relevant organizations with technical know-how. They are represented in the other commissions activities, especially in approving any requested renovation works, and supervising these works.
- **Commission for Protection of Old Damascus, Damascus Governorate**
This commission is primarily responsible for conservation of the old city as a whole except for buildings registered in the DGAM antiquities list.
- **Department for Protection of Antiquities outside Old Damascus, Damascus Governorate**
As its name signifies this department is responsible for antiquities outside the old city walls. It is a newly established department and its establishment may have stemmed from the need to do more protection work for neglected antiquities outside the old city. They are involved in design and supervision of restoration works.

The Commission for the Protection of Old Damascus is involved in traffic management of the old city. Traffic congestion is generated by the large concentration of small businesses, wholesale markets, schools and pedestrian tourist and shopper traffic. The congestion has a negative effect on the well being of historic buildings and tourism.

Efforts include not permitting vehicle access during certain hours, restricting vehicles to certain streets according to the license plate numbers (even or odd), and limiting truck access to certain hours on designated streets. Drastic measures such as removal of schools, not allowing school buses access, designating main streets as pedestrian only, etc. have all been rejected due to the commercial nature of the area, difficulty in securing substitute buildings outside the old city for the schools.

Furthermore the Regional Commission, headed by the Governor plays an important role in assisting the Planning and Organization Department of the Governorate in approving urban and regional projects taking into consideration the protection of antiquities. DGAM is represented in this commission.

(3) Registered Antiquities

The Study Team collected a list and corresponding location map determining the registered

antiquities in Damascus City. A total of 265 antiquities are registered. The registered sites in the Old City are 95 sites.

Figure 8.3.1 shows the areas where registered sites are located, and Figure 8.3.2, Figure 8.3.3 and Figure 8.3.4 show the sites at three areas; Old City, Midan St. and Salhiyya respectively. Table 8.3.3 shows a list of 265 sites attached to the DGAM map. DGAM did not have additional data describing antiquities ages or existing conditions however it was possible to identify some construction dates. Table 8.3.4 show sites classified by category. About 64% are religious and sacred sites and therefore of high spiritual value.

Table 8.3.2 Chronology of Damascus

Year	Historic Event	City development
4000 BC	Chalcolithic settlement flourishing at Tell es Salhiye	
1468 BC	ANCIENT EGYPT RULE Tuthmoses III seizes city of "Dimashqa" for Egypt	
1370 BC	AMORITE Amorites capture city from Egyptians	
1100 BC	ARAMAEAN (ARAB PENINSULA) Damascus the Aramaean capital	The temple to Hadad was constructed on the site now occupied by the Umayyad Mosque. The remains of a Royal Palace are thought to lie under a mound at the southern end of the Old City.
732 BC	ASSYRIAN (FROM THE EAST) Assyrians capture the city.	Orchards desecrated and people deported.
717 BC	Two Hittite tribes settled in depopulated city.	
572 BC	BABYLONIAN (FROM THE EAST) Damascus falls to the Babylonians under King Nebuchadnezzar.	
538 BC	PERSIAN Damascus under the Archaemenian Persians	Capital and military headquarters of Persian province of Syria.
333 BC	MACEDONIAN (GREECE) City falls to Alexander's general Parmenion	End of Persian influence on art and architecture in the city and beginning of Hellenisation.
312 BC	SELEUCID Capital of Seleucid empire	Introduction of Hellenistic town planning to Damascus. Damascus loses its prominent position in Syria to Aleppo. Little remains of the effect of Greek rule on the city because of the extensive rebuilding carried out by the Romans.
85 BC	NABATAENS (ARAB) Damascus places herself under the Nabateans.	
64 BC	ROMAN EMPIRE (ROME) Four hundred and fifty years of Roman domination begin.	<ul style="list-style-type: none"> • Under Roman rule Damascus flourished and became an important trading hub. Population increased and the city expanded. Both the Aramaean and Greek sectors of the city were incorporated into a uniform city plan and surrounded by a broad wall with seven gates. • The most ancient monument in the city, the 3rd century AD Roman Gate of the sun, now called Bab Sharqi was built at that time. An aqueduct was also built to supply the city with water from the River Barada. • City was given status of Metropolis, Roman Colony and by the end of Roman rule was one of the largest ten cities in the empire.
34 AD	St. Paul arrives to Damascus	
395 AD	BYZANTINE EMPIRE Syria becomes part of Byzantine empire	<ul style="list-style-type: none"> • Christianity adopted throughout the Roman empire and the Temple of Jupiter was converted into the Church of St. John. Sixteen other churches constructed throughout the city but few remain. • City turned into military headquarters.
612 AD	City occupied by Persians	
635 AD	ISLAMIC OPENING The Arabs capture Damascus	

(continued)

661 AD	OMAYYAD Muawiyah proclaims himself Caliph.	<ul style="list-style-type: none">• Damascus the capital of the Islamic empire.• Splendid palaces constructed (over 100) but no remains.• Suburbs outside the walled city as Ash-Shagour, Midan, Qanawat, and An-Neiral were extended to accommodate growing population.• Old city became crowded losing its grid pattern to narrow and maze like alleys. A water canal was constructed to serve the city.• The Qaysariyyeh, structures that housed workshops of members of the same craft were built.• Three large cemeteries lay outside the city walls; Al Faradis, Bab Touma and Bab As Saghir.• Green areas surrounded the city's populated areas.
705-715 AD	Caliphate of Walid I.	Construction of the Great Mosque on the site of the Church of St. Peter.
750 AD	ABBASSID (EASTERN IRAN, IRAQ) Abbasids sack Damascus and Omayyads overthrown.	<ul style="list-style-type: none">• Most of city burnt, including interior of Omayyad mosque and Omayyad buildings torn down• Islamic empire transferred to Baghdad, Damascus loses its political importance and population declines.
878 AD	TULUNID (EGYPT) City under the Turkish ruler Ibn Tulun, governor of Egypt.	Damascus suffers general instability, violence and shortages.
968 AD	FATIMIDS (EGYPT) Under the Fatimids of Cairo.	<ul style="list-style-type: none">• Trade, political stability and population decline in Damascus, and grouping of the inhabitants by religion and ethnicity for security reasons.
1069 AD	Riots between Damascenes and Fatimids. Great Mosques gutted by fire.	<ul style="list-style-type: none">• Population falls from 50,000 to 3,000 as reported by writers of that time.
1076 AD	SEIJKS (TURKEY) Damascus ruled by Turkoman chief Aisiz.	<ul style="list-style-type: none">• Artistic and architectural revival.• Monumental Citadel (predecessor to the present Citadel) was constructed in 1078.• Madrassas built to teach Sunni doctrine.
1113 AD	Crusaders under Baldwin I attack the city.	
1129 AD	Second Crusader attack.	
1139 AD	Crusaders under Louis VII and Conrad attack.	
1154 AD	AYYUBID (KURD) Nureddine rises in Aleppo, captures Damascus and sets about rebuilding its walls.	<ul style="list-style-type: none">• Construction of Nureddine Maristan, Hammam and Madrasa.
1157 AD		Earthquake damages city.
1176 AD	Saladin, nephew of Nureddin rules.	The city undergoes a great rebuilding program.
1237 AD		Fire destroys part of city.
1260 AD	MAMELUK (EGYPT) Mongols under Hulagu capture Damascus and end Ayyoubid dynasty. The Mameluks defeat the Mongols at Goliath Springs, and occupy Damascus.	<ul style="list-style-type: none">• Second most important military and economic city in the empire.• Most Mameluk buildings constructed outside walled city because of lack of space.• Salhiyyeh district developed into a town of its own with 500 mosques and many markets.
1260-1277 AD	Rule of Baybars.	Commercial area of Al Marjeh grew around the palace built by Baybars in that area.
1299 AD	Mongols under Gazan take Damascus.	Salhiyyeh sacked.
1400 AD	The devastation of Tamerlane.	Damascus suffers terribly.
1468-1495 AD	Rule of the Mameluke Kaitbey brings tranquility.	
1516 AD	OTTOMAN (TURK) Ottoman Turks under Sultan Selim I take Damascus.	Fortunes of Damascus decline and it is reduced to the status of small provincial capital in a large empire.
1520 AD	Damascene revolt fails. One third of the city razed by the Turks.	Most Ottoman building takes place during this century while the empire was still strong.
1555 AD	Rule of Suleiman the Magnificent	Tekkiyeh of Suleiman built
1574 AD	Rule of Darwish Pasha	Construction of Silk Souk inside Old City
1654 AD		City burnt and flooded
1749 AD		Asaad Pasha builds his palace.
1832 AD	Ibrahim Pasha of Egypt occupies Damascus. Improved conditions.	
1840 AD	Ottomans retake the city.	
1860 AD	The Christian massacres.	
1878 AD	Midhat Pasha governor.	<ul style="list-style-type: none">• By 1878 the city's population had grown to 150,000 and great improvements had been• Damascus area doubles and new avenues and markets constructed to serve new residential areas.

(continued)

1918 AD	KINGDOM OF SYRIA Damascus liberated from the Turks	
1920 AD	FRENCH OCCUPATION French occupation begins	
1925 AD	Riots. French shell the city.	
1941 AD	Damascus falls to the Allies.	
1916 AD	INDEPENDENCE Syria independent, with Damascus as capital.	

References:

- (1) A Guide to DAMASCUS, E. Claire Grimes, 1997 revision
- (2) Syria & Lebanon, Michael Haag, 1995
- (3) Jordan and Syria, The Lonely Planet, 1997
- (4) Damascus Al Sham, Jean Souvget, 1936

Table 8.3.3 Classification of Registered Antiquity Sites

Religious and Sacred sites				Citadel, wall & doors	Houses & dormitories	Bath houses (hammam)	Govt. bldgs.	Others
Mosque	School	Church	Graves					
25%	13%	1%	25%	11%	10%	6%	5%	4%

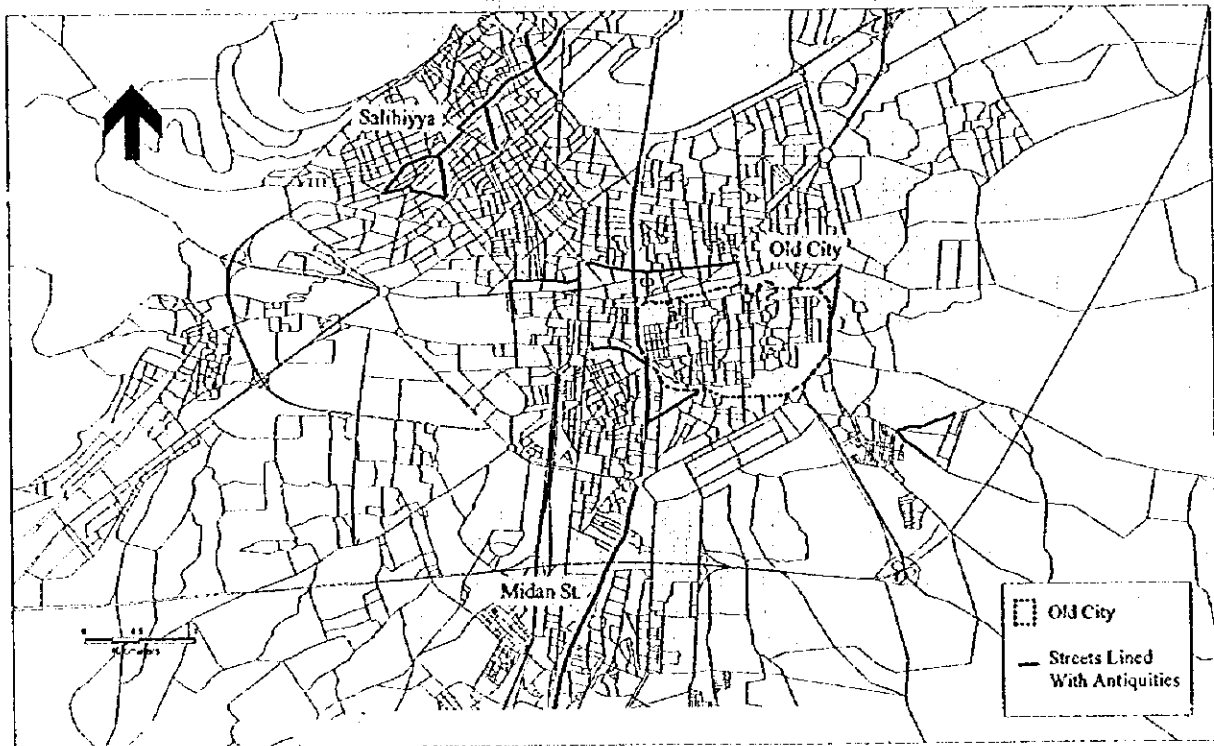


Figure 8.3.1 Cultural Resources Areas in Damascus

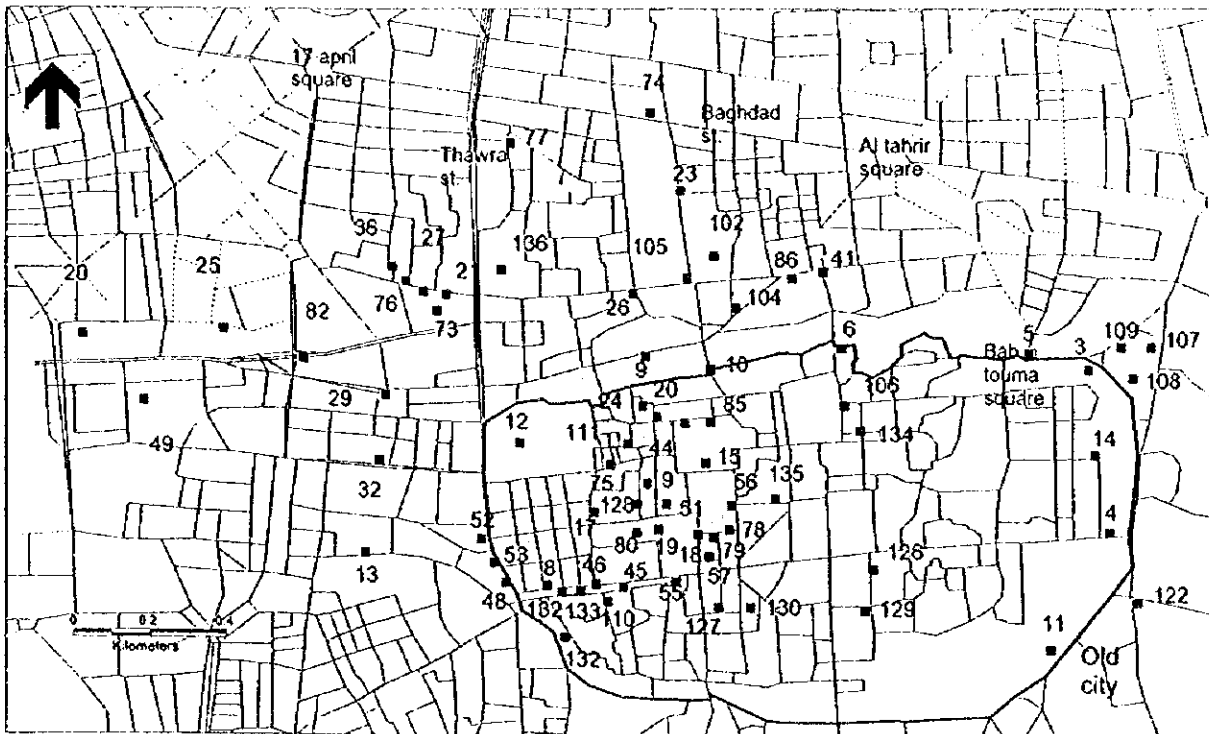


Figure 8.3.2 Old City and Surrounding Area Antiquities Sites



Figure 8.3.3 Midan St. Antiquities Sites

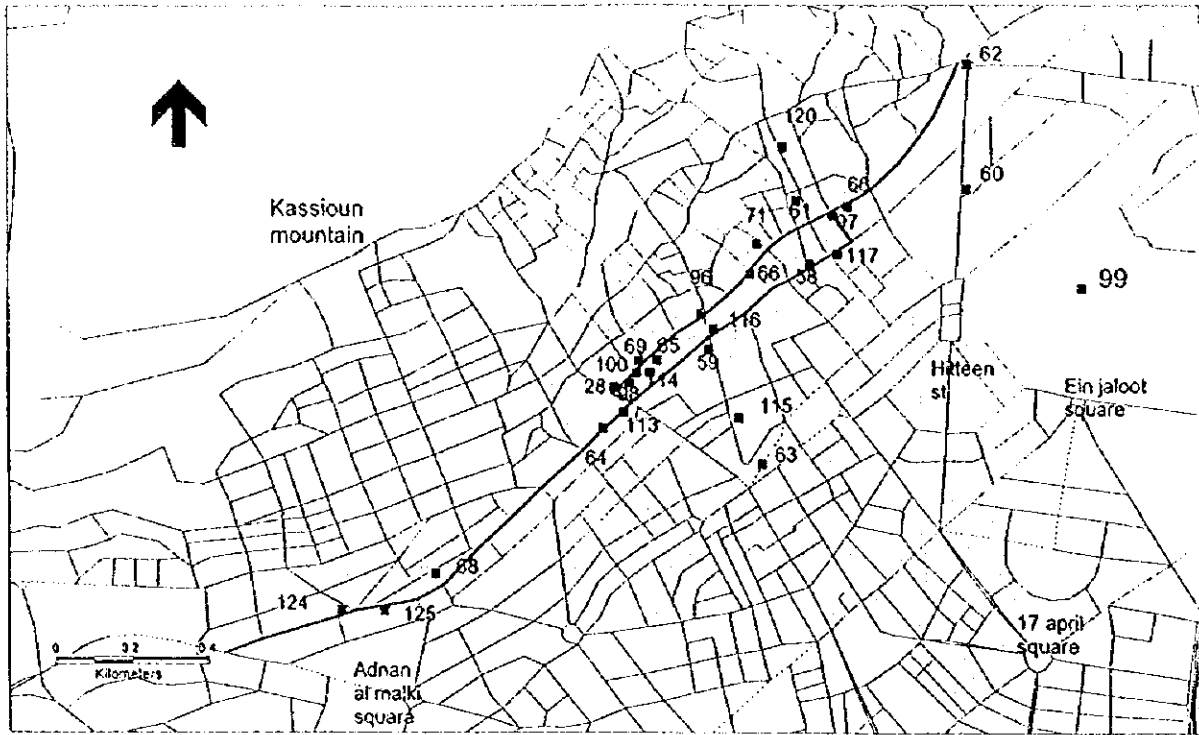


Figure 8.3.4 Salihiya Area Antiquities Sites

Table 8.3.4 List of Registered Antiquities

Antiquity site	Year	Antiquity site	Year	Antiquity site	Year
1. El Sour (city wall)		2. Nour El Dine Tower		3. Saleh Ayoub Tower	c1200
4. Bab Sharki Gate	c300	5. Bab Touma Gate	c1200	6. Bab El Salam Gate	1243
7. Bab El Saghir Gate		8. Bab El Gabayah Gate		9. Bab El Farag Gate	
10. Bab El Faradis Gate	1241	11. Bab Kisan Gate		12. Citadel	1218
13. Roman Canal		14. St. Jean excavations	c100	15. Umayyad Mosque	
16. Safvet el Molk Grave		17. Nouri Pimarastan Hospital	1154	18. Hammam Nour El Din	c1100
19. Al Nouria Al Koubra school		20. Al Feroukhousahiya school		21. Al Shamiya school	
22. Salah El Dine mausoleum	1196	23. Ibn El Mokadam Mausoleum		24. Al Adeliya school	1218
25. Al Aziya school		26. El Toubah Mosque	632h	27. El Jawza hammam	
28. Al Nabi Younis grave		29. Yelbogha Mosque		30. Al Zaheria school	1277
31. El Baridi Water Fountain		32. Tenkez Mosque		33. Wali El Shibanney tomb	
34. Afridounia Cemetery	h749	35. Arak Mausoleum		36. Hammam Al Wared	
37. Monjek Mosque		38. El Taynabiya Mosque		39. Rashidiya Mosque	
40. El Khezanah Water Fountain		41. Al Sadat Mosque		42. At Tayrouzi Mosque	
43. Hammam Al Tayrouzi		44. Al Jaqmaqiya school	1421	45. Hisban Mosque Minaret	
46. El Qal'i Mosque Minaret		47. Kaimarreyah Mausoleum		48. Al Sibaeya School	1515
49. Suleymanniyah Mosque	1560	50. Saad El Din Mastaba		51. Khan Al Harir dormitory	
52. Darwish Pasha Mosque	c1500	53. Darwish Pasha Mausoleum	c1500	54. Sennan Pasha Mosque	1590
55. Khan Suleyman Pasha dorm.	1732	56. El Azem Palace	1749	57. Khan Assad Pasha dorm.	1749
58. Al Umariya school		59. Al Khatouniya grave		60. Al Badriya grave	
61. Al Hanabila Mosque		62. Rohn El Dine Mosque		63. Al Mardaniya Mosque	
64. Amatu Al Latif grave		65. Al Atabikiya School		66. Al Sahibiya school	
67. Al Maristan Al Qaymari	c1200	68. Al Adlia Al Barraniya graves		69. Al Takritiya graves	
70. Qubat Sayyar		71. Mohi El Dine Mosque	1518	72. Al Takkiya Al Salimiya	
73. Sett Al Sham grave		74. Ad Dehdah Mausoleum		75. Dar El Hadeeth Al Nouriyah	
76. Sultan Hassan Mosque		77. Mawdood Bin Zanki grave		78. Al Kalijiya School	
79. Dar Al Quran		80. Al Kawkabiya graves		81. Al Qinshliya School	
82. El Tawousseya Mosque		83. As Sanjakdar Mosque		84. El Rifaii Hammam	
85. Al Ikhaeya grave		86. Sultan Hammam		87. Sheikh Hassan Mosque	c1450
88. Al Sabouniya School	c1400	89. Moaalek Mosque		90. Sennan Pasha office	h999
91. Fathi Hammam		92. Khan Al Jumrok dorm.	1609	93. Kadam Mosque	
94. Az Zine Hammam		95. Serrougi Hammam		96. Al Jaharkasiyya School	
97. Ibn Salama graves		98. Al Farantiya Mausoleum		99. Al Hafiziya graves	
100. Al Nasseriya School		101. Al Nakishabendi School		102. Al Nasseriya School	
103. Al Badracyia School		104. El Jawza Mosque		105. Al Nahhassein Mosque	
106. Siti Rabaa Mosque		107. Sheikh Raslan Mosque		108. Ibn Al Walid Mosque	
109. Al Badriya graves		110. Al Khaidariya School		111. Al Adelia School	
112. Jarrah Mosque		113. Al Kajkouriya graves		114. Dar Al Hadeeth school	
115. Dar Al Quran Dulamiya		116. Mithqal grave		117. Al Nabulsi mosque	1146h
118. Al Sayeda Fatma grave		119. Al Sayeda Sekina grave		120. Al Amir Ghorlu grave	
121. Al Kari Mosque minaret		122. Ubai Ibn Kaab grave		123. Mu'awiya grave	
124. Al Khawarizmiya grave		125. Al Qawamiya grave		126. Roman Arch	
127. El Sebaiya House	c1700	128. Al Khatib house		129. Farhey House	
130. Nizam house		131. Sheikh Amini house		132. Howranya house	
133. Zeinab Fawaz School		134. Sawaf House		135. Jabri House	
136. El Azem House		137. Al Amediya grave		138. Felous Mosque	
139. Senan Agha Mosque		140. Al Messgat grave		141. Hammam Darwish Pasha	c1500
142. El Mogaled House		143. Al Shabliqiya school		144. Sabil Al Sheikh Raslan	
145. Al Taibi house		146. Al Khayateen market		147. Abdalla Al Azm school	
148. Shaz Bek school		149. Al Saweya grave		150. Al Tashtadar Mosque	
151. Al Diyaiyah school		152. Al Kangisah grave		153. Bin Nagd grave	
154. Ayanbik graves		155. Unknown Ayyubid grave		156. Al Nathifah grave	
157. Bousaka Mosque		158. Al Qahiriya School		159. Al Assadiya grave	
160. Rihan grave		161. Bikhas Al Soudouli grave		162. Unknown Ayyubid grave	
163. Linado house		164. Dar Anbar House		165. Al Fatihya School	
166. Siyaghous Mosque		167. Khan Al Sadraneya dorm.		168. Al Teten dormitory	
169. Khan Al Zeit dormitory	c1500	170. Assem Mosque		171. Soliman Al Azem school	
172. Unknown Mamluk grave		173. Al Sarameya grave		174. Old Damascus city	

(Continued)

Antiquity site	Year	Antiquity site	Year	Antiquity site	Year
175. Al Amir Al Din grave		176. Al Minshar rock		177. Ministry of Interior bldg.	
178. Ain Al Fijah water bldg.		179. Al A'bed bldg.		180. Al Hijaz Station bldg.	1913
181. Al Assali Mosque		182. Bab El Saghir graves		183. Al Qaymariya school	
184. Al Hiyoutiya Mosque		185. Hammam Dummar		186. Khazan Al Afif	
187. Al Ras Mosque		188. Unknown Ayyubid grave		189. Dar Al Moallemin bldg.	
190. Bab Al Salam mill		191. I. Isbona house		192. Al Bizouri Mosque	
193. National Museum bldg.		194. Jubar Jewish Temple		195. Al Quwately House	
196. Wall west of Bab Kissan		197. Wall (Bab Kissan - round tower)		198. Wall (round tower - Zaouia tower)	
199. Zaouia tower		200. Wall (Zaouia tower - Bab Sharki)		201. Wall (Bab Sharki - round tower)	
202. Round tower		203. Wall (round tower - Al Saleh Ayoub tower)		204. Wall (Al Saleh tower - Bab Touma)	
205. Wall (Bab Al Salam - Bab Al Faradis)		206. Wall (Bab Al Faradis - Bab Al Farag)		207. Wall (Bab Al Gabayia - Nour El Dine tower)	
208. Wall (Nour El Dine tower - Bab Al Saghir)		209. Wall (Bab Al Saghir - Kayssan)		210. Sheikh Al Nakshabandy Mosque	
211. Al Zeinabiya grave		212. Unknown grave		213. Unknown grave	
214. Baitnah Mosque		215. Al Sit Yasmin grave		216. Unknown Ayyubid grave	
217. Unknown Mamluk grave		218. Al Harireya grave		219. Ain Al Molk grave	
220. Zaouia Arroudek		221. Hammam Al Makkadem		222. Al Shohadda Mosque	
223. Hammam Al Khangey		224. Al Hageb Mosque		225. Al Aaglouney Mosque	
226. Al Bashoura Mosque		227. Al Ameriya Mosque		228. Al Baridi Mosque	
229. Al Baydaa Minaret		230. Al Zaouia Al Samadeyya		231. Al Basrawey Mosque	
232. Ghazi house		233. Temple of Jupiter		234. Hammam Malaka	
235. Bahret Meriden house		236. Nour El Din waterwheel		237. Al Mossaly Mosque	
238. Al Shahem Minaret		239. Bahadur grave		240. Al Karimi Mosque	
241. Al Rahbiya tomb		242. Al Migahedeya school		243. Al Saqifa Mosque	
244. Al Dam Cave		245. Hassan Mosque		246. Al Kamaliya grave	
247. Al Zoizyaniya graves		248. Al Qaa Al Dimashkeya		249. Parliament bldg.	
250. Damascus University bldg.		251. Al Doubaghiya graves		252. Al Sinhalya Al Osmaniya grave	
253. Al Yehyaweya grave		254. Al Annany Mosque		255. Al Safargalaley Mosque	
256. Al Khawarzamiya grave		257. Mostafa Lala grave		258. Khan Gakmak dormitory	1420
259. Al Zaouia Al Mouloliya		260. Al Tarkaniya grave		261. Hammam Al Malek Zaher	
262. Hammam Al Karmani		263. Al Adli Justice Palace		264. Al Nagari Mosque	
265. National Hospital					

Source: DGAM list

Note: Year c(1200) : circa 1200, h999: 999 Islamic Hijrah year

8.4 Environmental Pollution

8.4.1 Ambient Air Quality in Damascus City

Air pollution is not as large a problem as is the water quality issue. However, considering the economic growth based on industrial development, increasing number of vehicles and higher consumption of sulfur and lead contained fuel, it is predicted that air pollution issue will be raised in urban and industrial areas in the near future.

In addition, a cement factory located northeast of Damascus urban area causes fine particles scattering to a housing area developed close to the factory due to insufficient maintenance of equipment and outdated equipment.

Major sources of air pollution in Damascus City are emissions from vehicles, which expected to increase in number and emission from boilers for heating which use coal and fossil fuels.

In order to identify concentration ratio of substances in commercial and residential areas, air pollution monitoring survey were carried out in 1989 and 1994. The results show that it was

not so serious compared to other nations which have air pollution problems, however, Nitrogen Oxide (NOx) and Sulfur Oxide (SOx) exceeded WHO's standard. In this regard, it is predicted that higher sulfur contained fuels and vehicle emission will be major source of air pollution in Damascus City.

Results of the air pollution survey of Damascus City are summarized as follows:

- Lower fuel consumption rate of vehicles eases air pollution
- Emission of nitrogen dioxide (NOx) by vehicle is main source of air pollution
- Concentration of pollutant substances exceed WHO's air standard in traffic congestion area such as central part of the city
- Especially TPM concentration exceeds the standard ($120\mu\text{g}/\text{m}^3$) along the roads
- Concentration of CO, SO₂ and NOx in the city exceed WHO's standards

Table 8.4.1 Air pollution Measurements - 1989

Location	CO (PPM) within 8 hr.	Allowable limit (ppm)	NOx (ppm) within 24 hr.	NO ₂ (ppm) within 24 hr.	Allowable limit (ppm)	SO ₂ (ppm)	Allowable limit (ppm)	O ₃ (ppm)	Allowable limit (ppm)
Damascus castle	7.25	9	0.17	-	0.06	0.028	0.048	0.039	0.085
Mezzeh	3.2	9	0.1	0.05	0.06	0.032	0.048	0.067	0.085
Attijarah	3.63	9	0.08	0.052	0.06	0.058	0.048	0.04	0.085
Kaboun Bus Terminal	11	9	0.28	0.054	0.06	0.09	0.048	0.014	0.085
Governorate Building	8.2	9	0.25	0.17	0.06	0.048	0.048	0.04	0.085
Zahira	2.6	9	0.1	0.05	0.06	0.035	0.048	0.067	0.085
Zuqaq Al-jin	6	9	0.1	0.035	0.06	0.035	0.048	0.058	0.085

Note: Allowable Limits according to WHO (1987)

Source: Ministry of environment

Table 8.4.2 Total Amount of Suspended Particles in the Air - 1990

Location	TSP ($\mu\text{g}/\text{m}^3$)	OCCC	COCC	So4--	No3-	No2-	Cu	Fe	Pb	Cd	Zn	NI	Mn
Damascus castle	657	0.88	-	20.5	1.61	0.011	0.072	0.162	-	-	-	-	-
Governorate Building	494	3	0.023	24.8	0.51	0.025	0.64	0.254	0.764	-	-	0.01	0.001
Kaboun Bus Terminal	6.8	2.35	0.005	30.4	0.96	0.017	-	-	-	-	-	-	-
Attijarah	568	1.02	0.009	25.8	0.435	0.03	0.072	0.61	0.492	0.002	0.068	0.013	-
Zuqaq Al-jin	642	0.645	0.005	47	1.84	0.03	0.76	1.62	1.3	0.003	0.194	0.016	0.002
Refirance Area	221	0.92	0.014	11	2.31	0.073	0.03	0.07	0.23	-	1.41	0.023	-

Note: Allowable limit of all suspended particles = 150 Micro g/m³, OCCC: Open Organic Carbon Chains, COCC; Closed Organic Carbon Chains

Source: Scientific Research and Studies Center, Ministry of Environment

8.4.2 Roadside Air Quality

The Study Team carried out roadside air quality monitoring in order to identify current situation of roadside air quality. Air sampler for NO_x and NO₂ were installed for 34 locations in the city and 27 samplers were collected safely.

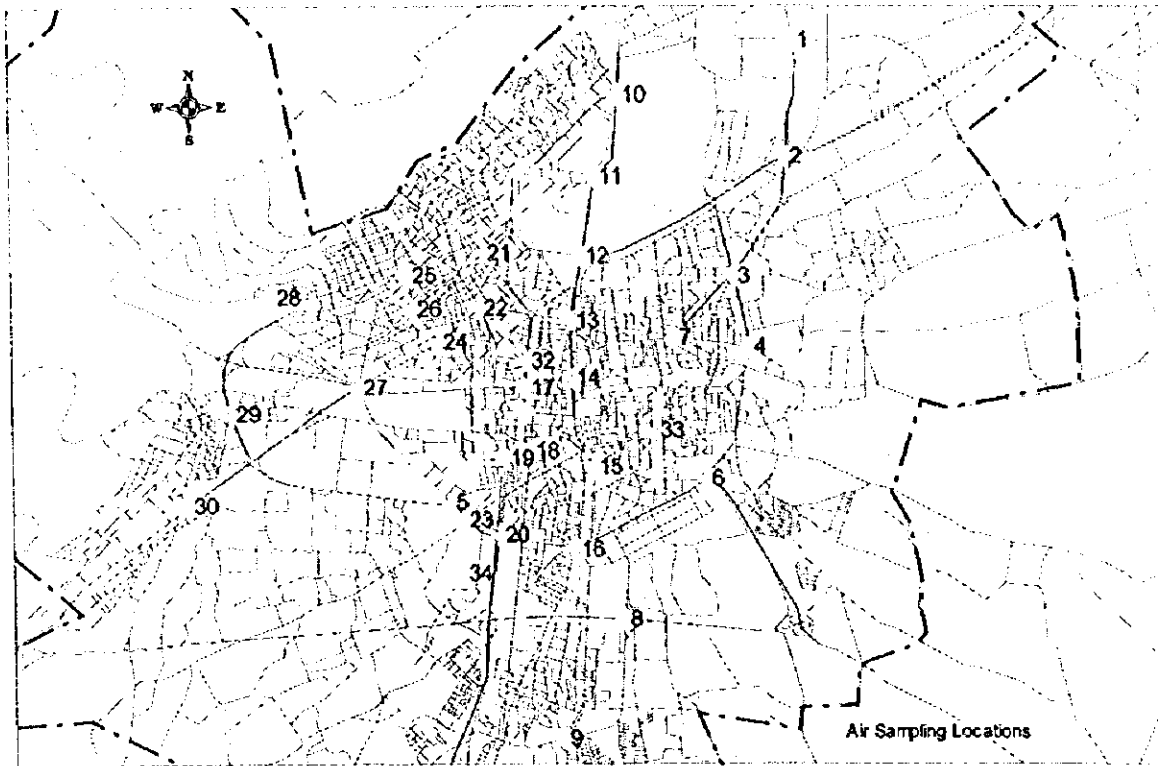


Figure 8.4.1 Air Sampling Locations

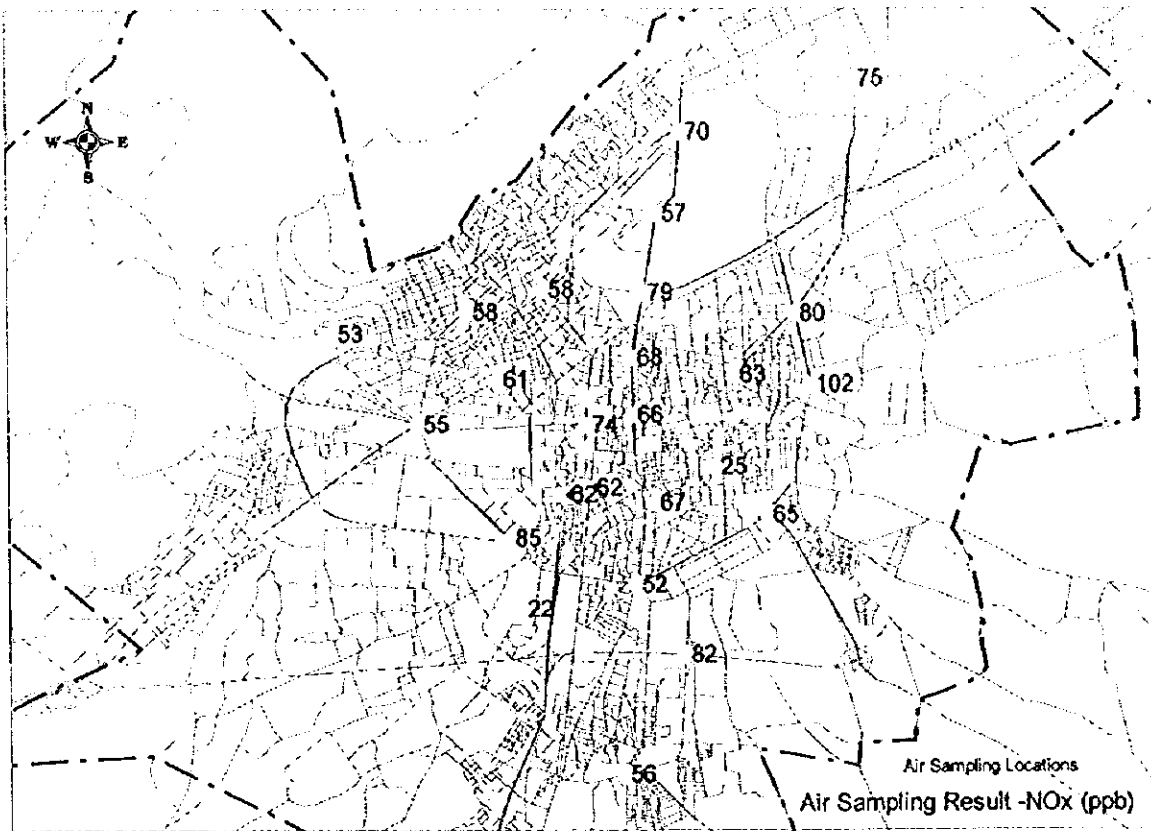


Figure 8.4.2 Air Sampling Results -NOx

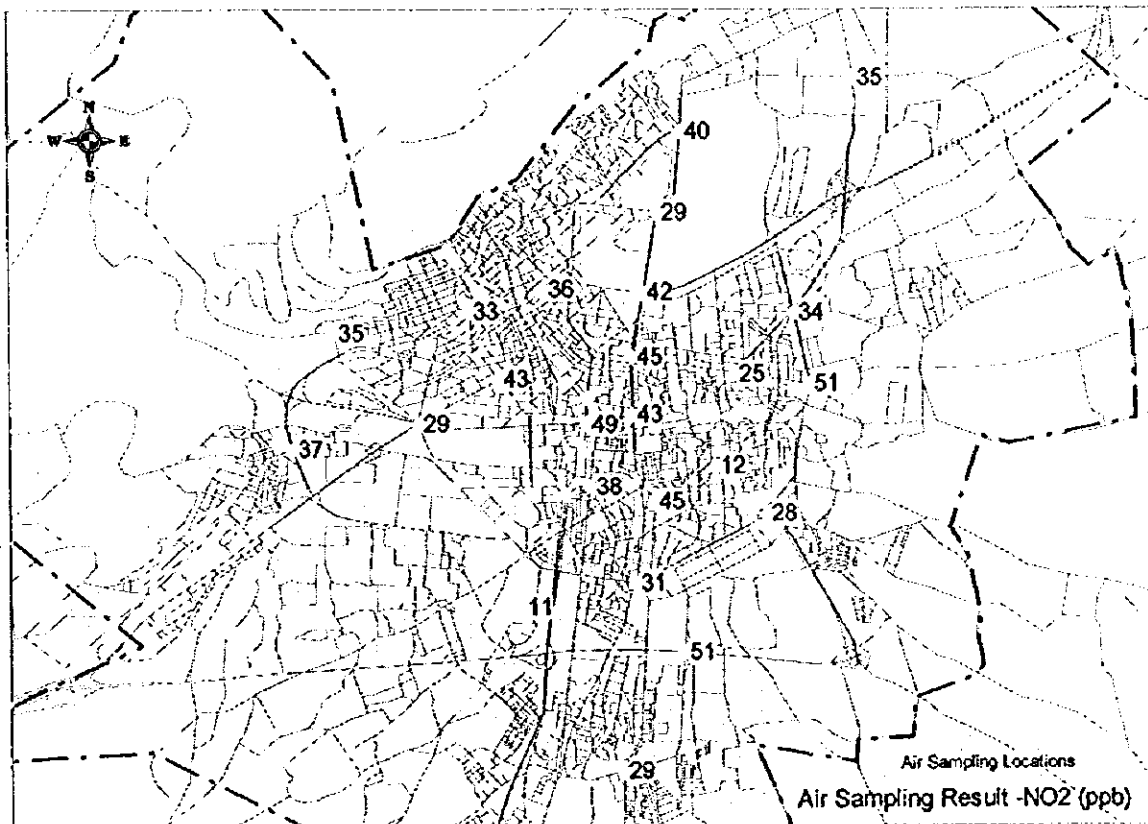


Figure 8.4.3 Air Sampling Results -NO2

Table 8.4.3 Results of Roadside Air Quality Monitoring

No.	Location	NO ₂ (ppb)	NO ₂ (mg/m ³)	NO _x (ppb)	NO _x (mg/m ³)
1	Uhod - Shihab Ad Din Bn Malek/Maqqkissi-Muthanna Bin Haritha	35	0.07	75	0.25
2	6 October - Damascus-Aleppo Road/Al Muthanna Bin Haritha-Fares Al Khuri	Lost	Lost	Lost	Lost
3	Abbassiyeen Square	34	0.07	80	0.27
4	Bilal Square	51	0.11	102	0.35
5	Abu Baker - 17 April	Lost	Lost	Lost	Lost
6	Hassan Al Kharat Square	28	0.06	85	0.29
7	Al Tahrir	25	0.05	65	0.22
8	Hafez Assad/Al Jerusalem	51	0.11	63	0.21
9	Fawzi Al Qawiqli/Ash Shathli - Ath Thaltheen	29	0.06	82	0.28
10	Ath Thawra/Ibn An Nafis	40	0.08	56	0.19
11	Ath Thawra/Khawlah Bnt Al Azouar	29	0.06	70	0.24
12	Omar bn Al Khattab - 6 October/ Ath Thawra	42	0.09	57	0.19
13	Ath Thawra/Baghdad	45	0.09	79	0.27
14	Ath Thawra/An Nasser	43	0.09	68	0.23
15	Sa'ad Zaghloul - Al Badawi - Aal Al Beil/	45	0.09	66	0.22
16	Yarmouk Square	31	0.06	67	0.23
17	Sa'dallah Al Jabiri - Port Said/Shukri Al Quwatli - Jumhooriyeh Street- Itihad	49	0.10	52	0.18
18	Khalid Bn Al Walid/Al Abbass	38	0.08	74	0.25
19	Jihad Square	42	0.09	62	0.21
20	Abu Bakr Al Siddiq/Othman Bn Afan	Lost	Lost	Lost	Lost
21	Bader Addin Al Ghazali Square	36	0.07	62	0.21
22	Amous Square	Lost	Lost	Lost	Lost
23	Al Qadisicyeh Square	Lost	Lost	Lost	Lost
24	Mahdi Bn Baraka - Omer Bn Abdul Aziz/ Al Jala'a	43	0.09	58	0.20
25	Shora Intersection	33	0.07	61	0.21
26	Abu Al Ala'a	Lost	Lost	Lost	Lost
27	Al Umawiyeen Square	29	0.06	58	0.20
28	Ibrahim Hanano Square	35	0.07	55	0.19
29	Al Muwasat - 23 July/Palestine - Walid Bin Abdul Malek	37	0.08	53	0.18
30	Fayez Mansour	Lost	Lost	Lost	Lost
31	Yousef Al Azmeh Squire (Damascus Governorate)	49	0.10	74	0.25
32	Hijaz Square	41	0.09	63	0.21
33	BG1 - Anbar (Old Damascus)	12	0.03	25	0.08
34	BG2 - JICA Study Office	11	0.02	22	0.07

Source: JICA Study Team

8.4.3 Water Pollution

Water is easily polluted due to rapid urbanization, limited water resources and nature of natural environmental conditions in this region. Insufficient integrated development plan encourages disorderly urbanization. Housing development has been growing adjacent of industrial areas. In addition, industrial areas have also invaded agricultural lands located in the outskirts of the City due to the expansion of the urban area.

Sewerage system has not been provided in the entire City so that discharged water including industrial wastewater drains to rivers. Mixed land use area, agriculture and industry, in the City south is considered the source of this pollution. As a result groundwater and soil are polluted by these discharges especially downstream of the rivers

Ministry of Irrigation has been carrying out water quality monitoring for major rivers. Along Barada River which crosses Damascus City, 36 monitoring points have been set in a total 60

km length. Four major sampling results in 1992 including Damascus City (annual average results) are shown in the following table. It is reported that in comparison between sampling point No.6 located just adjacent to the urbanized area of Damascus City and sampling point No.12 located in just after the urbanized area of Damascus City. It is apparent that water quality after the Damascus City worsens dramatically due to discharge water from domestic waste waters in the City.

Table 8.4.4 Water Quality Monitoring Results of Barada River in Major Points

Point	No.1	No.6	No.12	No.14
Temperature C	13.98	13.95	15.14	14.89
PH	8.01	7.92	7.85	7.98
DO (m/g)	7.22	7.41	2.53	4.25
DO (%)	70.86	74.59	36.27	34.13
SS (mm/l)	26.25	141.73	242.18	97.67
BOD (mg/l)	5.56	25.18	95.36	76.56
Conductivity (mmhos/cm)	290	430	618	600
NH3	0.53	3	9.3	7.36
Cl	15.13	28.33	83.58	59.8
Volume (m3/sec)	4.53	8.73	7.17	0.5

Source: Ministry of Irrigation

PART II
TRAFFIC DEMAND FORECAST

Chapter 9. FUTURE SOCIOECONOMIC FRAMEWORK

9.1 Land Use

At present, Damascus City is preparing an urban development plan for the year 2020. According to the Municipal Authority, the preparation work is now at the fourth stage of which written documents are not available. The following land use plan for Damascus City and development policies for the suburbs of the Study Area are made through discussions with the planning authority and the state consultant responsible for the preparation work. The third stage report (Study on land use of Damascus City) and the first stage report (Study on development of Damascus Region) were also referred to for the acquisition of basic information on the urban development of Damascus.

9.1.1 Land Use Plan for Damascus City

The main points of land use plan for Damascus City used in this Study are as follows:

- Planned population for 2020 is 2 million persons, which is the "Maximum Case" of population forecast (based on the letter dated June 28, 1998 addressed to the Study Team from the Vice Governor)
- Agricultural lands left within the city, except for those in Zone 53 (Qasser Al Ibad), are to be built up according to the development plan. Green space in Zone 53 is expected to correspond to future planting demand by expanding its function of growing plants for parks, streets and afforestation.
- In the central part of the city, commercial and service functions will be expanded remarkably, as an extension of present transition trend from residential to commercial areas.
- New residential development will be made mainly in Zone 14 (Dummer), Zone 23 (Kafer Sussar), Zone 24 (Lowan) and Zone 47 (Bab Sharqi).
- The existing informal residential areas will be organized by improving housing and infrastructures in addition to road construction.
- Local commercial and service centers are to be developed in residential areas.
- The mountainous bare land in Zone 14 shall be subject to afforestation.

Figure 9.1.1 shows the plan of future land use of Damascus City.

9.1.2 Development Policies for the Suburbs of the Study Area

The followings are basic development policies for the suburban areas:

- Planned population of the Study Area, as a whole is 7.1 million persons for 2020, of which 5.1 million persons will live in the suburbs (the above-mentioned letter).
- The present agricultural land called "Ghouta" should be conserved as much as possible.
- Future urbanization should be made on unused hill area and low-ranked flatland. Several new cities should be created within the Study Area by providing job opportunities through industrial development as a leading economic sector

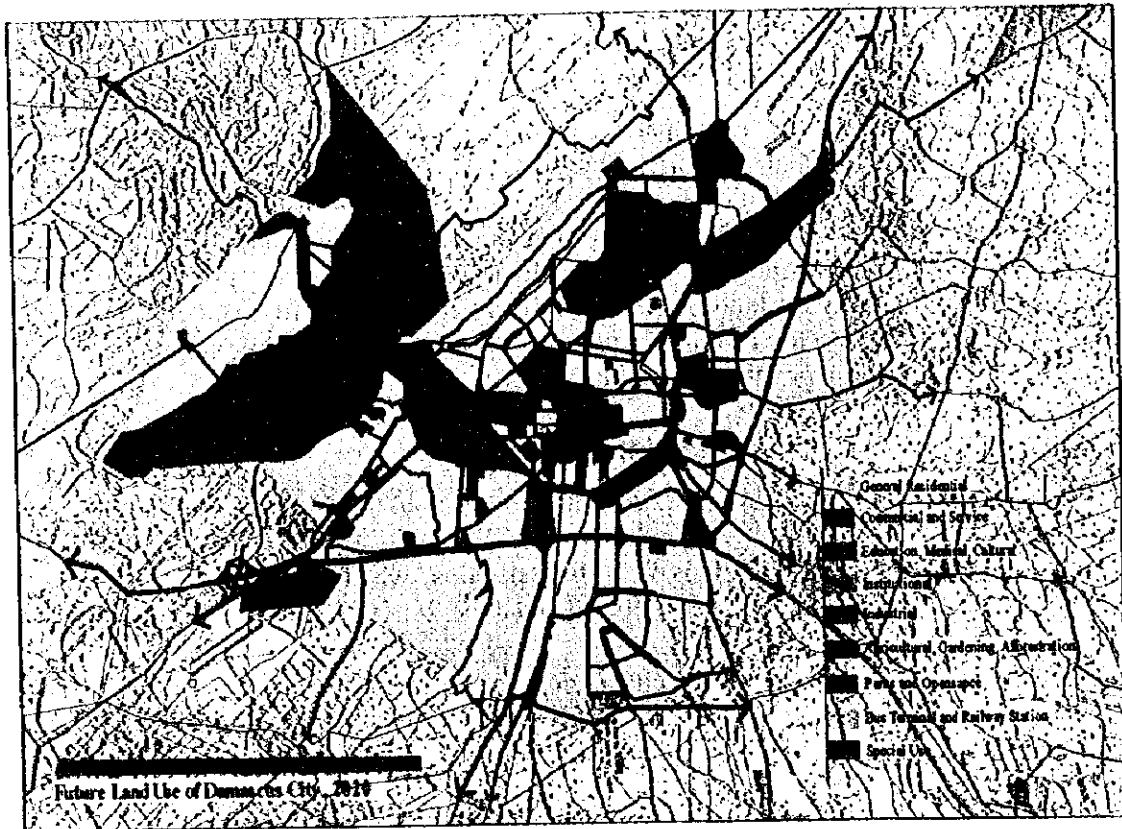


Figure 9.1.1 Future Land Use in Damascus City, 2020

- For the industrial development, in addition to expansion of the existing industrial areas along Darra Road and Aleppo Road, new industrial bases are planned as follows:

Zone 69 (Qatana)	500 ha
Zone 72 (Kusweh)	500 ha
Zone 77 (Nashabyah)	500 ha at Wadean Al-Rabcaa
Zone 82 (Douma)	1,000 ha
Zone 83 (Dumair)	500 ha

- New residential areas are planned on developable land in the following zones:

Zone 63 (Tall)	250 thousand persons
Zone 68 (Qudsaya)	100 thousand persons
Zone 69 (Qatana)	700 thousand persons
Zone 70 (Daraya)	100 thousand persons
Zone 71 (Suhnaya)	100 thousand persons
Zone 72 (Kusweh)	200 thousand persons
Zone 78 (Al-Auameed)	200 thousand persons
Zone 81 (Harasta)	50 thousand persons
Zone 82 (Douma)	200 thousand persons
Zone 83 (Dumair)	50 thousand persons

The summary of the above-mentioned is presented graphically in Figure 9.1.2.

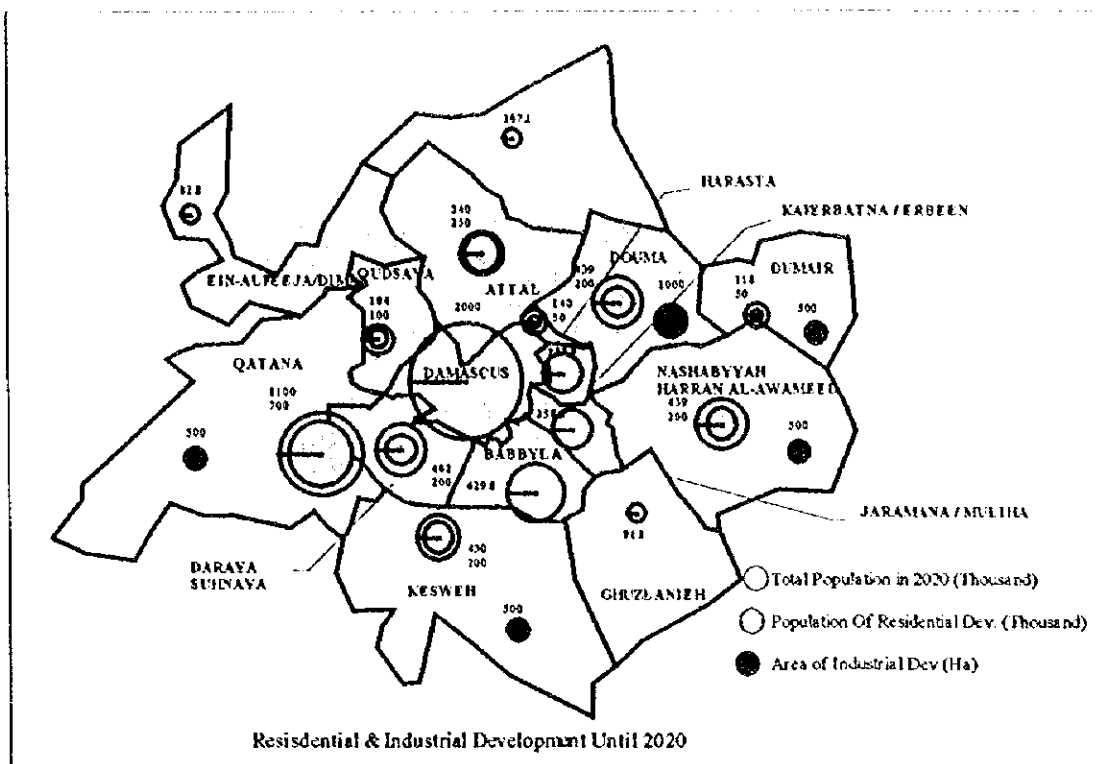


Figure 9.1.2 Residential and Industrial Development until 2020

9.2 Population

9.2.1 Syria

The population of Syria is projected to reach 30 million in 2020. The present population increase rate of 3.3% per annum will gradually decline to 2.7% per annum in future.

Table 9.2.1 Future Population of Syria

Year	Population ('000)	Growth Rate (%)
1998	15,597	
2000	16,640	3.29
2005	19,510	3.23
2010	22,740	3.11
2015	26,270	2.93
2020	30,000	2.69

Source: Study Team Estimates

9.2.2 Study Area

The present percentage share of total national population captured by the Damascus Capital Region (Damascus City and Damascus Countryside Governorate) is 22% and the Study Area occupies 90% of it. These percentages are not to decline in future, for no large-scale development projects are expected outside the Study Area. However, it is not easy to determine the future percentages.

It can be considered that the population of the Study Area in 2020 will be between the following two cases:

- a. Maximum Case (C.A./Syria=25% and S.A./C.A.=95%)
Damascus Capital Area (C.A.): 7.5 million, Study Area (S.A.): 7.1 million
- b. Minimum Case (C.A./Syria=22% and S.A./C.A.=90%)
Damascus Capital Area: 6.6 million, Study Area: 5.9 million

In discussions with the counterpart agency, it was decided that the maximum case should be adopted for this Study on urban transportation planning lest future traffic demand might be underestimated.

For Damascus City, there are several projections of the future population between 1.6 million and 2.1 million (for a proposed expanded administrative boundary of the city). For this Study, 2 million (for the present administrative boundary) is adopted as the population of the city in 2020.

The future population by zone for Damascus City was determined as follows:

- Planned population densities by zone were fixed, considering the present population densities and the trends of population increase/decrease by zone.
- The population density of new residential development was assumed as 200 persons /ha. For Zone 14 (Dummer), however, the planned number of houses of the existing development projects and population increase of the existing residential areas were considered.
- The total population was adjusted to 2 million.

The future population distribution of the suburban areas of the Study Area was determined considering the followings:

- The recent urbanization trend is towards the southwest direction for Qatana and developable lands are left abundant there.
- The regional studies by the consultant for a new urban development plan of Damascus City shows that industrial and related residential development should be executed around Douma – Dumair - Wadean Al Rabeaa area.
- The total population will be 5.1 million in 2020.

The results are shown in Table 9.2.2.

Table 9.2.2 Planned Population by Zone in 2020

Damascus City					
Zone No.	Zone Name	Area (ha)	Population (person)	Density (person/ha)	Remarks
1	Assad Addin	116	48,720	420	
2	Naqsh Bandi	76	31,920	420	
3	Ayubia	38	19,380	510	
4	Abu Jaash	43	27,500	640	
5	Saliheah	66	22,440	340	
6	Shoura	58	21,680	374	
7	Masstaba	49	11,480	234	
8	Mrabutt	62	9,450	152	
9	West Malki	132	2,980	23	
10	Kiwan	144	5,760	40	
11	Rabwa	135	8,400	62	
12	Mazeh	607	125,640	207	
13	Old Mazeh	174	36,800	211	
14	Dummar	2,260	140,100	62	About 2 times of the present population
15	Mazraa	137	14,900	109	Commercial & Touristic
16	Rawda	145	14,750	102	Ditto
17	Sarouja	62	7,000	113	Ditto
18	Hijaz	107	4,280	40	
19	Kanawat	43	5,500	128	Commercial & Touristic
20	Bab Sryja	18	5,900	328	Ditto
21	Anssari	12	7,800	650	
22	Baramka	69	19,620	284	
23	Kafer Sussab	342	80,400	235	+24,830 (Suspended Project) and Urbanization
24	Lowan	816	177,200	217	
25	Qadam	233	81,000	348	
26	Zahira	67	24,620	367	
27	Ka'ah	35	13,500	386	
28	Daqaq Mosq	21	10,810	515	
29	Haqra	45	10,550	234	
30	Bab Massr	48	9,220	192	
31	Midan Wastani	102	32,500	319	
32	Bab Mussalla	24	5,200	217	Commercial & Touristic
33	Bilal	399	91,500	229	
34	Dawanina	57	6,990	123	
35	Amin	21	2,400	114	Commercial & Touristic
36	Souroji	20	6,450	323	Ditto
37	Shaghour	35	4,000	114	Ditto
38	Bab Aljabi	15	4,950	330	Ditto
39	Soweqa	9	3,050	339	Ditto
40	Tejari	26	600	23	Ditto
41	Ashahem Mosq	12	2,700	225	Ditto
42	Qaynarya	16	1,900	119	Ditto
43	Aaqayba	34	8,210	241	
44	Aqssar Mosq	27	11,710	434	
45	Aamara	36	9,500	264	Commercial & Touristic
46	Bab Touma	56	11,800	211	Ditto
47	Bab Sharqi	158	40,000	253	+9,700 (Planned Project) and urbanization
48	Jourr	604	135,000	224	Const. of South Bypass & Formalization.
49	Dewania	77	19,550	254	
50	Qussor	77	20,320	264	
51	Ma'monaya	144	27,700	192	
52	Fars Khuri	50	10,700	214	
53	Qasser Al Ibad	405	21,400	53	Green Area. Residential Zone about 100 ha.
54	Zeinabia	51	8,550	168	Commercial & Touristic
55	Aboun	335	80,500	240	
56	Barzeh Town	528	118,660	225	
57	Falouja	17	26,800	1576	
58	Karmil	56	68,000	1214	
59	Hatteen	121	44,000	364	
60	Tadamann	146	88,020	603	
61	Wahda	101	28,000	277	
62	Dowelaa	221	60,040	272	
	Total	10,140	2,000,000	197	

(Continued)

Study Area

Zone No.	Zone Name	Area (ha)	Population (person)	Density (person/ha)	Remarks
1-62	Damascus City	10,140	2,000,000	197	
63	Fall	19,447	340,000	17	New dev. 250000 psns
64	Sednaya	13,176	63,900	5	Density 5 psns/ha
65	Rankous	9,035	43,200	5	Density 5 psns/ha
66	Ein Al-Feejeh	5,563	50,600	9	Density 10 psns/ha
67	Dimas	11,394	32,200	3	Density 3 psns/ha
68	Qudsaya	7,075	184,000	26	New dev. 100000 psns
69	Qatana	39,922	1,100,000	28	New dev. 700000 psns
70	Daraya	5,814	339,000	58	New dev. 100000 psns
71	Suhnaya	3,179	143,000	45	New dev. 100000 psns
72	Kusweh	32,197	430,000	13	New dev. 200000 psns
73	Ghuzlanieh	18,810	91,100	5	Density 5 psns/ha
74	Babbyla	8,182	629,600	77	Density 80 psns/ha
75	Jaramana	873	125,000	143	Density 150 psns/ha
76	Muleiha	2,875	133,500	46	Density 50 psns/ha
77	Nashabyah	14,501	142,000	10	Density 10 psns/ha
78	Al-Auameed	14,714	297,000	20	New dev. 200000 psns
79	Kafar Batna	1,594	151,400	95	Density 100 psns/ha
80	Arbeen	710	101,500	143	Density 150 psns/ha
81	Harasta	774	140,000	181	New dev. 50000 psns
82	Douma	15,840	445,000	28	New dev. 200000 psns
83	Dumair	12,377	118,000	10	New dev. 50000 psns
63-83	Suburbs Total	238,052	5,100,000	21	
	Study Area	248,192	7,100,000	29	

9.3 Employment

Future employment distribution was determined as follows:

- Considering the ratio of employed persons to the total population and the present sectoral composition, the number of employed persons in the Study Area by economic sector in 2020 is projected as shown below:

Primary Sector	40 thousand persons
Secondary Sector	1,040 thousand persons
Tertiary Sector	1,900 thousand persons
Total	2,980 thousand persons

- It is assumed that no employed persons in the primary sector will be found in Damascus City in 2020.
- Employment distribution in Damascus City on work place basis is determined by setting employment densities by zone, considering future changes from the present residential areas to commercial/service areas.
- Employment distribution in the suburban areas on work place basis is determined by the location of the planned industrial areas (for the secondary sector and the business services included in the tertiary sector) and by the population distribution (for the neighborhood type of the tertiary sector).

The results are shown in Table 9.3.1.

Table 9.3.1 Employed Persons by Sector by Zone (Work Place Basis), 2020

Damascus City						
Zone		Number of Employed Persons by Economic Sector				Employment
No.	Name	Primary	Secondary	Tertiary	Total	Density (psn/ha)
1	Assad Addin	0	3,540	13,860	17,400	150
2	Naqsh Bandi	0	780	5,300	6,080	80
3	Ayubia	0	780	3,020	3,800	100
4	Abu Jaash	0	1,240	5,640	6,880	160
5	Sahheah	0	1,910	24,490	26,400	400
6	Shoura	0	800	7,900	8,700	150
7	Masstaba	0	440	3,480	3,920	80
8	Mrabutt	0	340	3,380	3,720	60
9	West Malki	0	500	7,420	7,920	60
10	Kiwan	0	290	6,910	7,200	50
11	Rabwa	0	460	1,570	2,030	15
12	Mazeh	0	7,540	83,510	91,050	150
13	Old Mazeh	0	2,100	10,080	12,180	70
14	Dummar	0	15,670	29,530	45,200	20
15	Mazraa	0	2,470	31,780	34,250	250
16	Rawda	0	2,380	33,870	36,250	250
17	Sarouja	0	2,580	25,320	27,900	450
18	Hijaz	0	3,430	50,070	53,500	500
19	Kanawat	0	15,120	45,080	60,200	1400
20	Bab Sryja	0	800	8,200	9,000	500
21	Anssari	0	250	2,750	3,000	250
22	Baramrka	0	1,660	22,490	24,150	350
23	Kafer Sussah	0	3,030	31,170	34,200	100
24	Lowan	0	3,780	12,540	16,320	20
25	Qadam	0	20,610	14,340	34,950	150
26	Zahira	0	2,680	9,380	12,060	180
27	Ka'ah	0	470	1,280	1,750	50
28	Daqaq Mosq	0	290	760	1,050	50
29	Haqra	0	250	1,100	1,350	30
30	Bab Massr	0	490	950	1,440	30
31	Midan Wastani	0	3,190	12,110	15,300	150
32	Bab Mussalla	0	2,260	21,740	24,000	1000
33	Bilat	0	6,370	9,590	15,960	40
34	Dawanina	0	830	1,450	2,280	40
35	Armin	0	1,060	9,440	10,500	500
36	Souroji	0	360	1,240	1,600	80
37	Shaghour	0	590	6,410	7,000	200
38	Bab Aljabi	0	780	6,720	7,500	500
39	Soweqa	0	420	1,830	2,250	250
40	Tejari	0	7,390	31,610	39,000	1500
41	Ashahem Mosq	0	0	1,560	1,560	130
42	Qaynarya	0	720	4,080	4,800	300
43	Aaqayba	0	110	1,930	2,040	60
44	Aqssar Mosq	0	280	2,150	2,430	90
45	Aamara	0	980	8,020	9,000	250
46	Bab Touma	0	2,200	20,200	22,400	400
47	Bab Sharqi	0	1,960	13,840	15,800	100
48	Jourr	0	10,330	19,870	30,200	50
49	Dewania	0	1,780	9,770	11,550	150
50	Qussor	0	1,610	9,940	11,550	150
51	Ma'monaya	0	3,070	15,650	18,720	130
52	Fars Khuri	0	770	4,230	5,000	100
53	Qasser Al Ibad	0	860	7,240	8,100	20
54	Zeinabia	0	380	7,270	7,650	150
55	Aboun	0	25,130	18,420	43,550	130
56	Barzeh Town	0	6,570	30,390	36,960	70
57	Falouja	0	3,400	5,100	8,500	500
58	Karnil	0	5,150	6,050	11,200	200
59	Hatteen	0	3,770	8,330	12,100	100
60	Tadamann	0	8,110	13,790	21,900	150
61	Wahda	0	2,190	4,880	7,070	70
62	Dowetaa	0	7,100	8,370	15,470	70
	Total	0	206,400	820,390	1,026,790	101

(Continued)

Study Area		Number of Employed Persons by Economic Sector				Employment
No.	Zone	Primary	Secondary	Tertiary	Total	Density (psn/ha)
1-62	Damascus City	0	206,400	820,390	1,026,790	101
63	Tall	590	34,210	63,830	98,630	5
64	Sednaya	330	4,120	11,130	15,580	1
65	Rankous	1,470	2,020	7,240	10,730	1
66	Ein Al-Feejeh	160	4,420	9,250	13,830	2
67	Dimas	1,420	16,110	10,870	28,400	2
68	Qudsaya	130	26,010	37,350	63,490	9
69	Qatana	1,740	121,610	210,600	333,950	8
70	Daraya	1,730	49,320	69,340	120,390	21
71	Suhnaya	870	23,380	29,470	51,720	16
72	Kusweh	1,970	89,110	97,910	188,990	6
73	Ghuzlanieh	2,240	14,210	18,990	35,440	2
74	Babbyla	3,770	48,540	112,640	164,950	20
75	Jaramana	150	27,360	29,010	56,520	65
76	Mulciha	6,010	34,160	32,830	73,000	25
77	Nashabyyah	670	61,150	44,230	106,050	7
78	Al-Auameed	5,930	3,050	45,690	54,670	4
79	Kafar Batna	2,540	10,360	26,590	39,490	25
80	Arbeen	320	33,220	27,680	61,220	86
81	Harasta	1,340	35,790	34,420	71,550	92
82	Douma	5,840	150,680	123,250	279,770	18
83	Dumair	780	51,170	36,890	88,840	7
63-83	Suburbs Total	40,000	838,000	1,079,210	1,957,210	8
	Study Area	40,000	1,044,400	1,899,600	2,984,000	12

Table 9.3.2 Employed Persons by Sector by Zone (on Residence Place), 2020

Damascus City		Number of Employed Persons by Economic Sector			
No.	Zone Name	Number of Employed Persons by Economic Sector			Total
		Primary	Secondary	Tertiary	
1	Assad Addin	0	3,178	19,306	22,484
2	Naqsh Bandi	0	3,888	11,994	15,882
3	Ayubia	0	4,227	5,694	9,921
4	Abu Jaash	0	2,149	9,362	11,511
5	Saltcheah	0	1,565	8,963	10,529
6	Shoura	0	972	7,559	8,531
7	Masstaba	0	438	4,794	5,232
8	Mrabutt	0	674	3,204	3,878
9	West Malki	0	251	985	1,236
10	Kiwan	0	328	2,411	2,740
11	Rabwa	0	1,102	2,668	3,770
12	Mazeh	0	10,495	51,887	62,382
13	Old Mazeh	0	3,327	16,267	19,594
14	Dumar	0	29,002	52,825	81,827
15	Mazraa	0	574	5,308	5,882
16	Rawda	0	957	6,073	7,029
17	Sarouja	0	143	2,024	2,168
18	Hijaz	0	299	1,375	1,674
19	Kanawat	0	29	1,581	1,610
20	Bab Sryja	0	158	2,120	2,279
21	Anssari	0	68	3,081	3,150
22	Baramrka	0	2,055	6,696	8,751
23	Kafer Sussah	0	3,572	20,629	24,202
24	Lowan	0	15,425	48,214	63,639
25	Qadam	0	13,918	15,525	29,443
26	Zahira	0	946	8,849	9,795
27	Ka'ah	0	976	3,795	4,771
28	Daqaq Mosq	0	349	3,711	4,060
29	Haqra	0	59	4,146	4,205
30	Bab Massr	0	536	3,024	3,560
31	Midan Wastani	0	2,435	10,295	12,731
32	Bab Mussalla	0	407	1,271	1,677
33	Bilal	0	12,304	19,788	32,092
34	Dawanina Qarawana	0	304	2,158	2,462
35	Arnin	0	88	885	973
36	Souroji	0	397	2,063	2,460
37	Shaghour	0	127	1,293	1,421
38	Bab Aljabi	0	30	1,759	1,789
39	Soweqa	0	349	753	1,102
40	Tejari	0	51	152	203
41	Ashahem Mosq	0	0	840	840
42	Qaynarya	0	55	550	605
43	Aaqayba	0	1,277	6,330	7,607
44	Aqssar Mosq	0	589	4,651	5,240
45	Aamara	0	620	2,922	3,542
46	Bab Fouma	0	1,596	4,224	5,820
47	Bab Sarqi	0	1,576	15,151	16,727
48	Jourr	0	20,794	25,013	45,807
49	Dewania	0	1,590	7,196	8,787
50	Qussor	0	1,281	8,433	9,715
51	Ma'monaya	0	2,060	13,086	15,146
52	Fars Khuri	0	995	3,887	4,883
53	Qasser Al Ibad	0	738	8,100	8,838
54	Zeinabia	0	64	3,496	3,560
55	Aboun	0	9,089	16,779	25,868
56	Barzeh Town	0	8,969	43,166	52,135
57	Falouja	0	2,721	6,634	9,355
58	Karmil	0	5,777	13,534	19,311
59	Hatteen	0	3,978	9,380	13,359
60	Tadamann	0	11,971	25,310	37,282
61	Wahda	0	3,182	8,077	11,258
62	Dowelaa	0	8,180	18,207	26,386
	Total	0	205,254	619,455	824,709

Table 9.3.3 Employed Persons by Sector by Zone (on Residence Place) 2020 (Cont.)

Study Area		Number of Employed Persons by Economic Sector			
Zone No.	Name	Primary	Secondary	Tertiary	Total
1-62	Damascus City	0	205,254	619,455	824,709
63	Tall	667	38,008	90,050	128,726
64	Sednaya	275	4,116	23,758	28,149
65	Rankous	1,515	3,143	10,618	15,276
66	Ein Al-Feejeh	149	5,947	14,914	21,009
67	Dimas	2,279	9,906	8,965	21,150
68	Qudsaya	259	26,738	42,004	69,001
69	Qatana	1,131	155,550	384,181	540,863
70	Daraya	2,209	48,912	66,345	117,467
71	Suhnaya	794	16,604	45,794	63,193
72	Kusweh	2,171	72,702	66,087	140,960
73	Ghuzlanieh	2,551	9,455	16,042	28,048
74	Babbyla	3,322	58,516	159,394	221,232
75	Jaramana	2,102	18,292	37,561	57,955
76	Muleiha	6,087	43,788	23,546	73,421
77	Nashabyyah	3,717	14,707	35,856	54,280
78	Harran Al-Auameed	6,673	13,035	121,816	141,523
79	Kafar Batna	2,121	5,773	51,590	59,483
80	Arbeen	1,116	18,406	22,720	42,242
81	Harasta	1,078	14,913	38,753	54,743
82	Douma	8,940	77,372	79,502	165,814
83	Dumair	843	10,864	25,048	36,754
63-83	Suburbs Total	50,000	666,747	1,364,544	2,081,291
	Study Area	50,000	872,000	1,984,000	2,906,000

9.4 Summary of Future Change of Population and Employment Distribution

Figure 9.4.1, Figure 9.4.2, Table 9.4.1, and Table 9.4.2 show the comparison of population and employment distribution between 1998 and 2020.

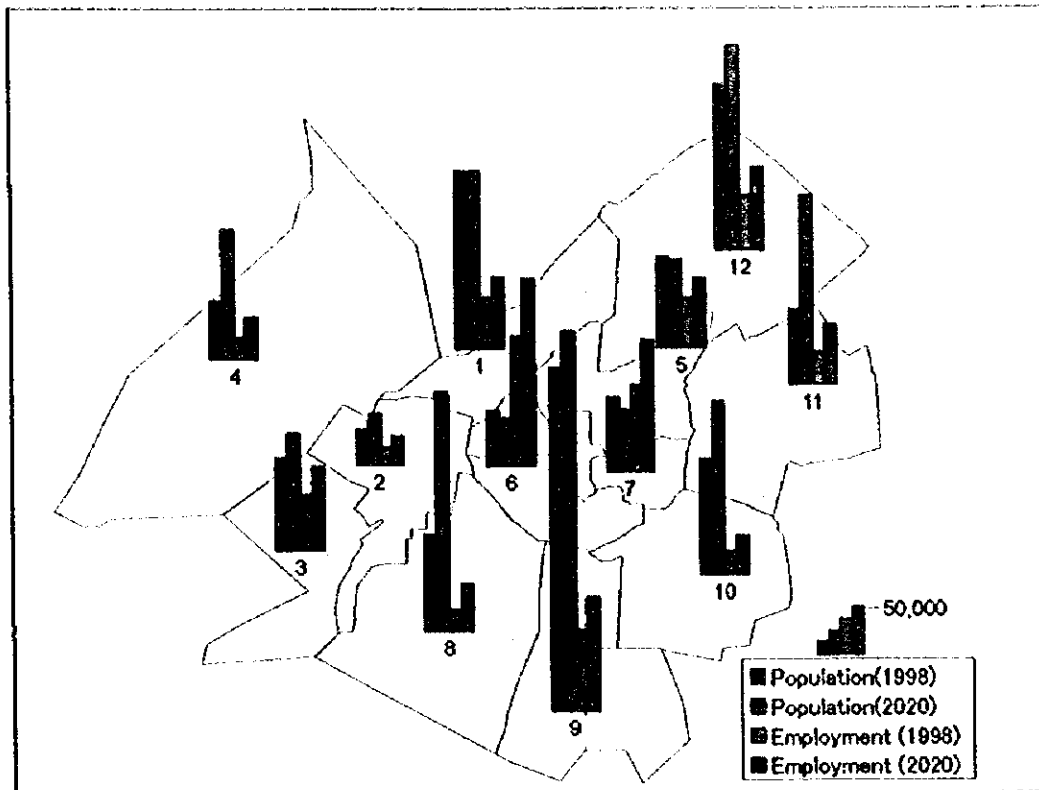


Figure 9.4.1 Projection of Population and Employment in Damascus City, 1998 – 2020

Table 9.4.1 Projection of Population and Employment in Damascus City Area 1998-2020

ZONE_NO	Population (1998)	Population (2020)	Employment (1998)	Employment (2020)
1	191,600	192,600	55,000	76,900
2	38,300	53,900	19,100	29,300
3	100,300	125,600	59,500	91,100
4	62,600	140,100	22,600	45,200
5	98,500	93,900	54,600	74,500
6	58,100	51,200	139,800	201,700
7	79,800	66,300	91,400	141,600
8	104,300	257,600	22,500	50,500
9	369,600	409,000	87,000	121,600
10	123,800	186,500	25,200	40,800
11	81,400	202,700	33,000	64,700
12	179,800	220,600	58,600	88,600
Total	1,488,100	2,000,000	668,300	1,026,500

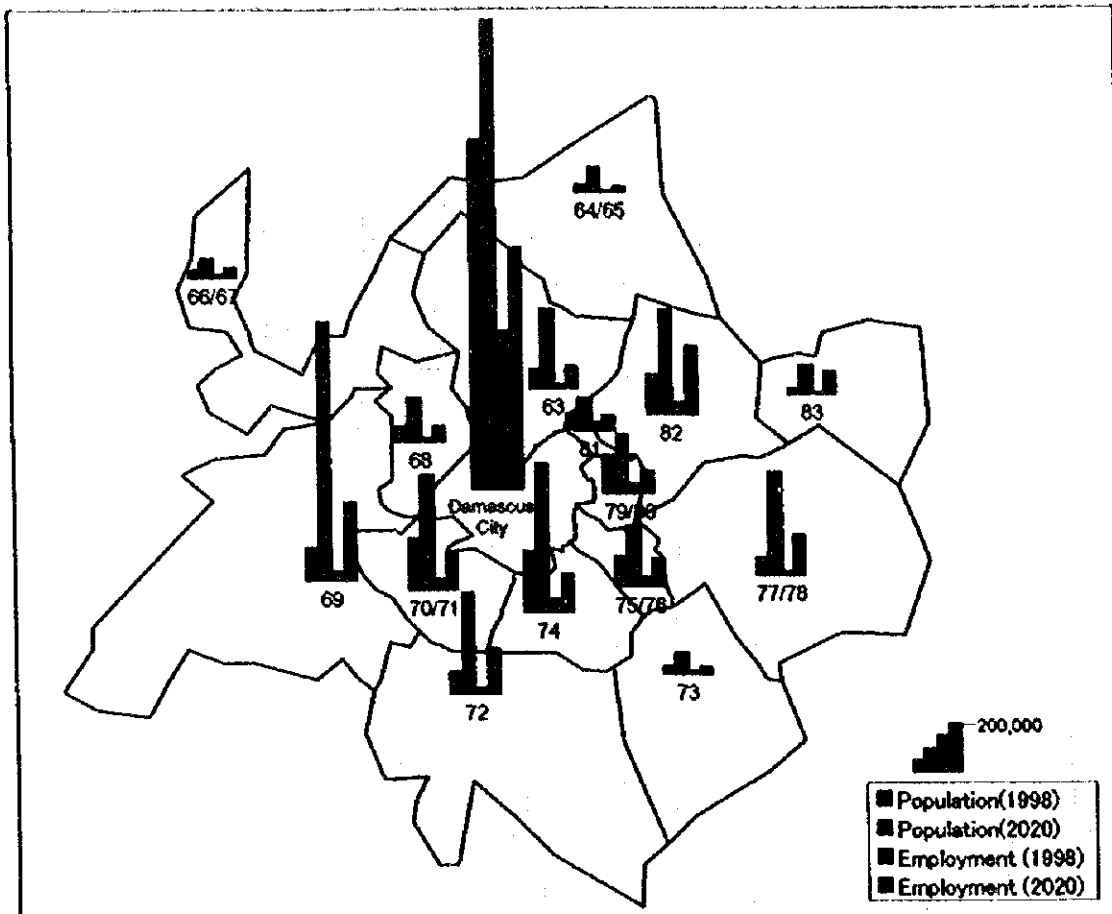


Figure 9.4.2 Projection of Population and Employment in Study Area, 1998 – 2020

Table 9.4.2 Projection of Population and Employment in the Study Area

ZONE_NO	Population (1998)	Population (2020)	Employment (1998)	Employment (2020)
Damascus City	1,488,100	2,000,000	668,300	1,026,500
63	81,700	340,000	18,900	96,100
64/65	32,000	107,100	9,200	26,100
66/67	30,800	82,800	14,300	40,500
68	61,200	184,000	12,200	62,200
69	133,700	1,100,000	42,800	331,200
70/71	215,400	482,000	48,600	165,000
72	97,300	430,000	27,100	192,400
73	30,800	91,100	14,100	34,000
74	261,000	629,600	57,900	162,100
75/76	128,900	258,500	38,900	123,600
77/78	76,600	439,000	18,800	172,100
79/80	164,200	252,900	41,200	96,700
81	76,100	140,000	32,500	68,100
82	172,400	445,000	49,800	291,400
83	28,000	118,000	7,500	96,300
Total	3,078,200	7,100,000	1,102,100	2,984,300

9.5 Students

Number of Students in 2020 is estimated based on residence place population applying ratio of students to the said population derived from the Home Interview Survey of 1997.

Table 9.5.1 Number of Students, 2020

Planning Area (Damascus City)			
No.	Zone	No. of Students (Home Base)	No. of Students (School Base)
1	Assad Addin	13,030	14,300
2	Naqsh Bandi	7,750	6,840
3	Ayubia	4,860	4,890
4	Abu Jaash	5,100	5,290
5	Saltiheah	5,410	6,060
6	Shoura	6,270	3,440
7	Masstaba	2,930	3,000
8	Mrabuff	2,290	2,440
9	West Malki	630	970
10	Kiwan	1,500	1,510
11	Rabwa	1,970	1,410
12	Mazeh	32,120	35,670
13	Old Mazeh	7,520	4,960
14	Dumar	39,780	34,720
15	Mazraa	3,360	4,950
16	Rawda	508	782
16	Rawda	1,262	1,941
16	Rawda	960	1,477
17	Sarouja	655	694
17	Sarouja	505	536
18	Hijaz	700	31,000
19	Kanawat	1,380	1,460
20	Bab Sryja	1,550	1,600
21	Anssari	1,880	1,770
22	Baramrka	5,350	7,000
23	Kafer Sussah	22,700	20,120
24	Lowan	57,410	60,460
25	Qadam	21,170	21,730
26	Zahira	4,930	5,060
27	Ka'ah	3,960	4,180
28	Daqaq Mosq	2,450	2,290
29	Haqra	3,120	3,180
30	Bab Massr	2,630	2,450
31	Midan Wastani	8,650	9,180
32	Bab Mussalla	1,320	1,380
33	Bilal	24,840	25,700
34	Dawanina	1,990	2,030
35	Amin	470	700
36	Souroji	1,350	1,360
37	Shaghour	710	790
38	Bab Aljabi	1,250	1,280
39	Soweqa	820	840
40	Tejari	110	320
41	Ashabcm Mosq	670	680
42	Qaynarya	530	590
43	Aaqayba	810	760
44	Aqssar Mosq	2,410	2,460
45	Aamara	2,340	2,460
46	Bab Touma	2,010	3,150
47	Bab Sarqi	8,910	9,640
48	Jourr	39,430	40,270
49	Dewania	4,700	5,070
50	Qussor	3,910	4,320
51	Ma'monaya	6,090	5,780
52	Fars Khuri	3,010	3,140
53	Qasser Al Ibad	5,280	6,360
54	Zeinabia	1,490	1,380
55	Aboun	27,930	29,420
56	Barzeh Town	16,853	12,126
56	Barzeh Town	19,617	14,114
57	Falouja	6,990	7,270
58	Karmil	23,610	24,870
59	Hatteen	13,850	14,590
60	Fadamann	24,310	23,220
61	Wahda	6,070	5,670
62	Dowelaa	13,730	14,000
1-62	Total	543,700	573,109

Study Area			
No.	Zone	No. of Students (Home Base)	No. of Students (School Base)
1-62	Total	543,700	573,109
63	Tall	104,310	99,490
64	Sednaya	15,020	15,320
65	Rankous	12,350	12,600
66	Ein Al-Feejeh	9,960	10,160
67	Dimas	7,100	7,240
68	Qudsaya	52,910	48,540
69	Qatana	278,910	265,170
70	Daraya	94,110	90,250
71	Suhnaya	44,980	45,880
72	Kusweh	112,780	105,710
73	Ghuzlanich	21,990	22,530
74	Babbyla	146,080	153,850
75	Jaramana	29,610	27,800
76	Muleiha	43,420	44,380
77	Nashabyyah	45,120	46,080
78	Harran Al-Auameed	94,030	88,560
79	Kafar Batna	44,840	42,420
80	Arbeen	23,520	24,130
81	Harasta	39,920	38,150
82	Douma	134,920	137,610
83	Dumair	29,750	30,360
63-	Suburbs Total	1,385,630	1,356,230
83			
	Total	3,016,730	3,075,530

9.6 Average Household Income, Car Ownership of Household and Car Driving License Holders

Modal choice models need estimates of average household income, car ownership of household and number of car driving license holders by zone. Basic information was the Home Interview Survey and estimates were obtained in the following manners:

Average Income by Zone (AIZ):

$$AIZ (2020) = AIZ (1998) \times GDP/Cap (2020) / GDP/Cap (1998)$$

The estimate method of GDP/Capita of 2020 is explained in section 11.3.

Car Ownership of Household by Zone (COHZ):

There is an empirical study by Hayashi, Nagoya University, Japan, which shows that car ownership is explained by linear equation of GDP/Capita in current price in case of under 4,000 US dollars/Capita. Syria at present has strong import control of vehicles, so that it may not be appropriate to apply that empirical formula. The Study team adopted Hayashi's idea of linear correlation between car ownership and GDP/Capita, and estimated car ownership in 2020 will be 91 units per 1,000 persons. Using this figure and car ownership at present (51 per 1,000 persons), the formula to estimate household car ownership is obtained as follows:

$$COHZ (2020) = COHZ (1998) \times 91/51 \times Population (1998) \text{ of zone} / Population (2020) \text{ of zone}$$

Car Driving License Holders by Zone (DLHZ)

Ratio of increase of car driver license holders after adjusting by increase of population was 2 % in the 1990s. This means that the number of car driving license holders is a function of car ownership.

$$DLHZ (2020) = [(DLHZ (1998) \times COHZ (2020) / COHZ (1998))] \times (1.02)^n$$

where, n = 2020 - 1998

Results are summarized in Table 9.6.1.

In the same manner, the variables (AIZ, COHZ, DLHZ) of 2005 and 2010 were also projected and utilized in the modal choice models.

Table 9.6.1 Average Income, Car Ownership and Driving License Holders in 2020

Zone Code	Name	Population (unit: person)	Average Income(SP)	Car Own III-Member	Driving License holders
1	Assad Addin	48,720	20,469	5,463	3,438
2	Naqsh Bandi	31,920	18,691	3,344	2,269
3	Ayubia	19,380	15,439	2,010	2,569
4	Abu Jaash	27,500	15,144	2,041	1,613
5	Saliheah	22,440	12,297	2,021	1,207
6	Shoura	21,680	13,341	2,081	2,307
7	Masstaba	11,480	16,690	1,878	1,628
8	Mrabutt	9,450	17,509	2,450	1,634
9	West Malki	2,980	25,224	1,174	1,027
10	Kiwan	5,760	35,080	1,163	909
11	Rabwa	8,400	28,259	1,792	615
12	Mazeh	125,640	23,796	27,976	18,630
13	Old Mazeh	36,800	21,764	5,730	5,962
14	Dumar	140,100	22,359	22,353	19,739
15	Mazraa	14,900	19,202	3,228	3,485
16	Rawda	14,750	74,346	3,294	2,246
17	Sarouja	7,000	17,765	1,064	423
18	Hijaz	4,280	6,846	776	461
19	Kanawat	5,500	14,988	881	547
20	Bab Sryja	5,900	24,242	556	544
21	Anssari	7,800	10,532	403	668
22	Baramrka	19,620	27,804	4,333	2,727
23	Kafer Sussah	80,400	12,684	10,231	8,011
24	Lowan	177,200	14,212	5,922	8,230
25	Qadam	81,000	15,710	5,219	3,841
26	Zahira	24,620	21,144	4,215	1,662
27	Ka'ah	13,500	12,659	1,257	714
28	Daqaq Mosq	10,810	12,238	1,233	637
29	Haqra	10,550	16,937	1,478	843
30	Bab Massr	9,220	27,403	2,482	1,192
31	Midan Wastani	32,500	25,984	5,772	1,958
32	Bab Mussalla	5,200	15,230	454	545
33	Bilal	91,500	26,654	11,286	6,325
34	Dawanina Qarawana	6,990	33,760	1,155	451
35	Amin	2,400	22,535	53	173
36	Souroji	6,450	25,701	503	266
37	Shaghour	4,000	14,044	424	370
38	Bab Aljabi	4,950	14,762	385	158
39	Soweqa	3,050	26,048	331	234
40	Tejari	600	18,469	35	48
41	Ashahem Mosq	2,700	9,804	86	385
42	Qaynarya	1,900	9,356	200	165
43	Aaqayba	8,210	19,044	1,152	788
44	Aqssar Mosq	11,710	27,114	2,006	1,129
45	Aamara	9,500	19,069	685	453
46	Bab Touma	11,800	19,044	1,606	1,188
47	Bab Sarqi	40,000	29,365	1,695	2,608
48	Jourr	135,000	19,080	15,645	8,349
49	Dewanina	19,550	20,073	4,218	3,141
50	Qussor	20,320	29,659	4,705	3,143
51	Ma'monaya	27,700	15,325	4,481	3,652
52	Fars Khuri	10,700	15,214	1,883	1,309
53	Qasser Al Ibad	21,400	15,937	2,564	2,401
54	Zeinabia	8,550	13,397	1,798	1,820
55	Aboun	80,500	18,030	5,522	5,027
56	Barzeh Town	118,660	31,368	13,019	12,835
57	Falouja	26,800	12,064	2,507	1,566
58	Karmil	68,000	17,946	2,962	3,523
59	Hatteen	44,000	18,054	1,611	815
60	Tadamann	88,020	12,696	4,600	2,315
61	Wahda	28,000	12,895	1,381	1,258
62	Dowelaa	60,040	13,558	4,176	2,199
1-62	Damascus City	2,000,000	1,236,053	226,948	170,375

(Continued)

Zone Code	Name	Population (unit: person)	Average Income(SP)	Car Own III-Member	Driving License holders
63	Tall	340,000	26,260	34,576	23,043
64	Sednaya	63,900	26,706	10,905	8,287
65	Rankous	43,200	16,876	2,817	1,080
66	Ein Al-Feejeh	50,600	9,211	2,544	3,996
67	Dimas	32,200	8,615	1,232	941
68	Qudsaya	184,000	15,036	13,797	14,220
69	Qatana	1,100,000	14,479	86,470	28,704
70	Daraya	339,000	14,812	29,553	9,413
71	Suhnaya	143,000	10,915	7,251	9,409
72	Kusweh	430,000	10,145	9,596	18,293
73	Ghuzlanieh	91,100	9,577	4,052	2,019
74	Babbyla	629,600	14,558	30,270	18,597
75	Jaramana	125,000	14,004	13,352	4,684
76	Muteiha	133,500	14,375	14,469	6,142
77	Nashabyyah	142,000	22,841	11,439	5,524
78	Harran Al-Auameed	297,000	9,482	3,285	5,852
79	Kafar Batna	151,400	14,716	6,686	5,462
80	Arbeen	101,500	13,490	10,975	3,922
81	Harasta	140,000	17,242	11,725	4,507
82	Douma	445,000	17,258	29,656	15,650
83	Dumair	118,000	8,753	5,891	10,597
63-83	Outside of the City	5,100,000	309,351	340,541	200,342
	Total	7,100,000	1,545,404	567,489	370,717

9.7 GDP and GDP per Capita

(1) GDP

GDP figures at fixed value of 1990 till 1996 were used as basic information. Annual growth rate was obtained as 6.6% from these data. Also, the average annual growth rates of the last two years were calculated (Table 9.7.1). These rates show decrease in GDP growth rates with an average acceleration rate of 0.98977 a year.

Table 9.7.1 Rates of Changes of GDP Growth Rate

Year	GDP (Fixed Price)	GDP Growth Rate of the past Two Year	Acceleration Rate of GDP Growth Rate
1990	89,485		
1991	95,883		
1992	106,031	1.0885	
1993	112,031	1.0809	
1994	119,828	1.0631	
1995	127,904	1.0685	
1996	130,770	1.0447	0.989768

Thus, the Formula to estimate GDP (at fixed 1996 market price) in future is developed as:

$$\text{GDP of } n \text{ year} = \text{GDP of 1996} \times 1.066 \times 0.989768^{(n-1997)}$$

where, n = the year in Anno Domini

(2) GDP/Capita

GDP of each year was obtained as explained above. Population of Syria of each year was also obtained in section 9.2.1. From those data, GDP/Capita of each year was obtained. GDP and GDP/Capita are summarized as shown in Table 9.7.2.

Table 9.7.2 GDP of Syria 1990-2020

Year	Population (person)	GDP in million S. P.		GDP per Capita	
		('85 constant)	(current)*	('96 SP)	('96 US\$)
1990	12,116	89,485	268,328	22,147	527
1991	12,529	95,883	311,564	24,867	592
1992	12,958	106,031	371,630	28,680	683
1993	13,393	112,031	413,755	30,893	736
1994	13,812	119,828	506,101	36,642	872
1995	14,186	127,904	569,262	40,128	955
1996	14,619	130,770	655,124	44,813	1,067
1997	15,100	139,313	669,380	44,330	1,055
1998	15,597	148,320	712,657	45,692	1,088
1999	16,110	157,812	758,265	47,068	1,121
2000	16,630	167,808	806,295	48,484	1,154
2001	17,167	178,328	856,842	49,912	1,188
2002	17,721	189,393	910,008	51,352	1,223
2003	18,293	201,025	965,898	52,802	1,257
2004	18,884	213,245	1,024,613	54,258	1,292
2005	19,471	226,075	1,086,260	55,789	1,328
2006	20,077	239,538	1,150,948	57,327	1,365
2007	20,701	253,656	1,218,783	58,876	1,402
2008	21,345	268,454	1,289,885	60,430	1,439
2009	22,009	283,955	1,364,365	61,991	1,476
2010	22,654	300,183	1,442,339	63,668	1,516
2011	23,318	317,163	1,523,925	65,354	1,556
2012	24,001	334,920	1,609,245	67,049	1,596
2013	24,704	353,479	1,698,419	68,751	1,637
2014	25,428	372,866	1,791,570	70,457	1,678
2015	26,112	393,107	1,888,826	72,336	1,722
2016	26,814	414,228	1,990,309	74,226	1,767
2017	27,535	436,256	2,096,151	76,127	1,813
2018	28,276	459,219	2,206,485	78,034	1,858
2019	29,037	483,143	2,321,436	79,948	1,904
2020	29,818	508,056	2,441,140	81,868	1,949

Note: * after 1997, fixed in constant price of 1996

