

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION (CDR)  
REPUBLIC OF LEBANON

THE STUDY  
OF  
ENVIRONMENTAL FRIENDLY INTEGRATED  
TRANSPORTATION PLAN  
FOR  
GREATER TRIPOLI

FINAL REPORT

Appendix

DECEMBER 2001

KATAHIRA & ENGINEERS INTERNATIONAL

## **REPORT COMPOSITION**

The Final Report of the Study is structured to meet the requirements of each user-group. It contains an executive summary, two main reports and six technical reports as follows:

EXECUTIVE SUMMARY: is designed to address the decision-makers as ministers and politicians who do not need deep information in technical and engineering aspects. It contains brief information on all the aspects of the Study and concentrates on the input and output of each aspect. It has also a more concentrated summary for the main conclusions in two pages.

MAIN REPORT – 1 “Integrated Transport Plan”: is designed for planners and directors of CDR and concerned ministries and authorities, who need more technical information on the Master Plan formulation. It contains applied planning policies, development and evaluation of alternatives, main information on the plan of each sector, evaluation results of the Master Plan and the overall implementation plan.

MAIN REPORT - 2 “Short-term Improvement Plan”: integrates more detailed studies and information on the urgent projects included under the Short-term Improvement Plan. The report gives the necessity, objectives, preliminary design, cost estimate and project evaluation on the technical, environmental and economic viability of each project.

TECHNICAL REPORT - 1 “Traffic Analysis and Forecast”: is basically prepared for technology transfer purposes. It addresses transport planners and contains the forecast procedures of forecasting future transport demand. The procedure starts with traffic surveys and analysis, socioeconomic framework, trip generation and attraction and the future transport demand.

TECHNICAL REPORT - 2 “Road Network Plan”: is for the specialists in the road planning and network development. It includes the present road network pattern as well as the planning concept and strategies, which are the basis of the proposed network pattern. Projects of the developed plan are prioritized for implementation under each of the planning periods.

TECHNICAL REPORT - 3 “Public Transport Plan”: is for the specialists in the public transport sector and schemes planned under the Master Plan. It includes the estimated future demand, proposed routes, required number of buses and cost estimation in addition to the implementation plan. It includes also plans and measures for taxi service and school buses.

TECHNICAL REPORT - 4 “Traffic Management”: is for the specialists in the traffic management sector and projects included under the Master Plan. It demonstrates the problems under existing conditions and the formulated plan that includes different procedures and measures for traffic signalization, parking control as well as safety and education measures.

TECHNICAL REPORT - 5 “Environmental Assessment”: gives the environmental conditions and initial environmental examination for the Study Area. Through an environmental impact study, it highlights the environmental issue in establishing the urban transport plan in order to emphasize the importance of preserving and improving the environment.

TECHNICAL REPORT - 6 “Project Management and Financing”: is addressing the administrative issues that will affect the successful implementation of the planned projects. It includes the present legislation, organization and funding system of agencies that will implement the projects under the Study. For the successful implementation of the projects as scheduled, management and financing plans are presented.

### APPENDIX

## **APPENDIX A**

**Draft Decree for Environmental Impact Assessment  
Ministry of Environment 22 September 2000**

## **APPENDIX B**

**Traffic Flow Diagrams of Daily Traffic Volumes  
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## **APPENDIX C**

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## **APPENDIX D**

**Road Project Profile**

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## **APPENDIX G**

**Origin – Destination Tables**

## LIST OF ABBREVIATIONS

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
B/C	Benefit-Cost Ratio
BOT	Built, Operate and Transfer
CAS	Central Administration of Statistics
CBD	Central Business District
CDR	Council for Development and Reconstruction
CEGP	Council Executive des Grand's Projects
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COM	Council of Ministers
DGHB	Directorate General of Highways and Buildings
DOR	Directorate of Road
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
ERM	Environmental Resource Management
EU	European Union
FAR	Floor Area Ratio
FHWA	Federal Highway Administration
FYDP	Five Year Development Plan
GDP	Gross Domestic Products
GNP	Gross National Products
GOJ	Government of Japan
GOL	Government of Lebanon
HC	Hydrocarbon
HCM	Highway Capacity Manual
IBRD	International Bank for Reconstruction and Development
IEE	Initial Environmental Examination
ISF	Internal Security Force
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
LL	Lebanon Lira, Lebanon Pound
LOS	Level of Service
LRT	Light Railway Track
MEA	Middle East Airlines
M/P	Master Plan
MOE	Ministry of Environment
MOF	Ministry of Foreign Affairs
MOMRA	Ministry of Municipal and Ruler Affairs
MOI	Minister of Interior
MOPWT	Ministry of Public Works and Transport

MPWT	Ministry of Public Works and Transportation
NAC	Noise Abatement Criteria
NERP	National Emergency Reconstruction Program
NGOs	National Governmental Organizations
NO	Nitrogen Dioxide
NPV	Net Present Value
OD	Origin-Distention
ODA	Official Development Assistance
O & M	Operation and Management
ORRPT	Office of Rail Road & Public Transport
PCE	Passenger Car Equivalent
PCU	Passenger Car Unit
PDR	Plan Dimension Ratio
PIU	Project Implementation Unit
PMT	Project Management Team
RC	Reinforced Concrete
RER	Real Estate Registry
ROW	Right of Way
STRADA	JICA System for Traffic Demand Analysis
TCC	Technical Coordination Committee
TSP	Total Suspended Particulate
TTC	Travel Time Cost
UNICEF	United Nation Children's Fund
USEPA	United State Environmental Protection Agency
V/C	Volume-Capacity Ratio
VOC	Vehicle Operating Cost
WHO	World Health Organization
WTW	Water Treatment Works

# **APPENDIX A**

**Draft Decree for Environmental Impact  
Assessment, Ministry of Environmental  
22 September 2000**

*Draft Decree for Environmental Impact Assessment*  
*Ministry of Environment*  
*22 September. 2000*

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Article: Five:	Classification of draft Decree
Article: Six:	Initial Environmental Examination (IEE)
Article: Seven:	Frame work of Environmental Impact Assessment (EIA)
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Article: Fifteen:	Illegal items
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Appendix. No.2: Projects that necessarily needing (IEE) report  
Appendix. No.3: Environmentally sensitive regions  
Appendix. No.4: Classification model  
Appendix. No.5: List of expectedly involved  
Appendix. No.6: Required information in (IEE) report  
Appendix. No.7: Required information in report concerned with specifying (EIA)  
Framework  
Appendix. No.8: Required information in (EIA) report

Chapter two.

Article: Five: Project specification

- (1) It is the responsibility of the Ministry of Environment, upon receipt of classification of request for suggested project according to adopted model along with relative document, to acknowledge its inclusion in Appendix No.1. or Appendix No.2: or its location in a region shown in Appendix.No.3: or possible important impact on said region.
- (2) It is the responsibility of Ministry of Environment to inform responsible institutions and project sponsor on classification decision during a period of twelve working days-starting day of submission.

Appendix No.1: Projects necessarily needing (EIA) report

1. Irrigation and drainage
2. Potable water
3. Waste water
4. Solid waste
5. Agriculture and Forests
6. Construction of roads and bridges and railways and tunnels
7. Construction of Airports and seaports
8. Generation and supply of energy
9. Petrol and gas
10. Mines and quarries
11. Touristic and recreational projects
12. Land development
13. Use of governmental river and sea properties
14. Fisheries



15. Zoo construction
16. Industries

Appendix.No.2: Projects necessarily needing (IEE) report

1. Irrigation and drainage
2. Potable water
3. Waste water
4. Agriculture and forests
5. Transportation; multistory parking, terminals
6. Generation and distribution of power
7. Petrol and gas
8. Hospital construction
9. Tourism and recreation projects
10. Housing construction
11. Classified plantations, 1st and 2<sup>nd</sup> class
12. Industries

Appendix.No.6. Required information in (IEE) report

1. Execution summary
2. List of contents
3. Preface
4. Policy: legal and management framework
5. Suggested project description
6. Description of surrounding environment of project
7. Possible environmental impact of project
8. Plan of environmental management
9. Appendices
  - Summary of documents related to project
  - List of information
  - List of used scientific and non-scientific references
  - List of authors of(IEE) report, individuals and institutions

Appendix No.8: Information required in (EIA) report

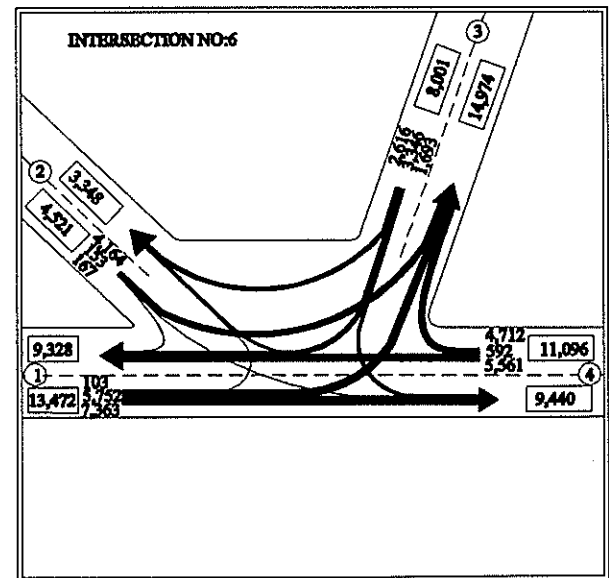
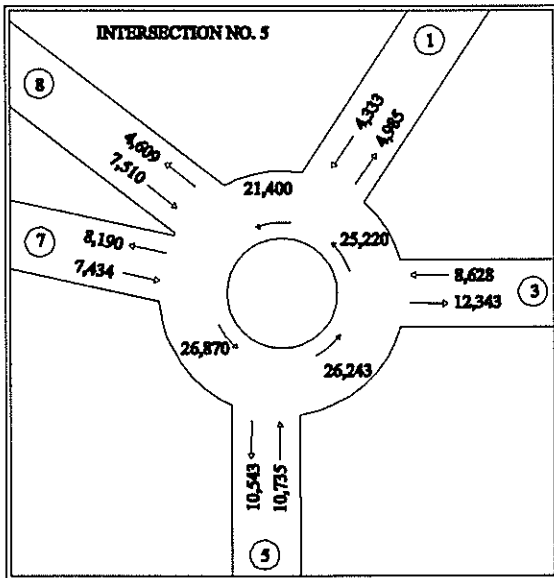
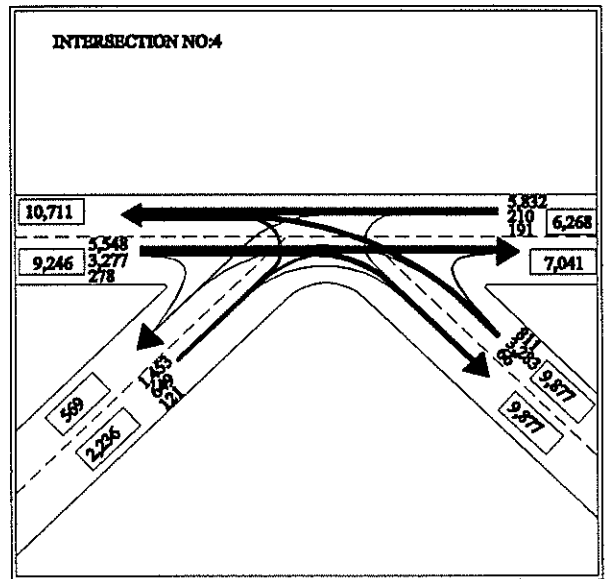
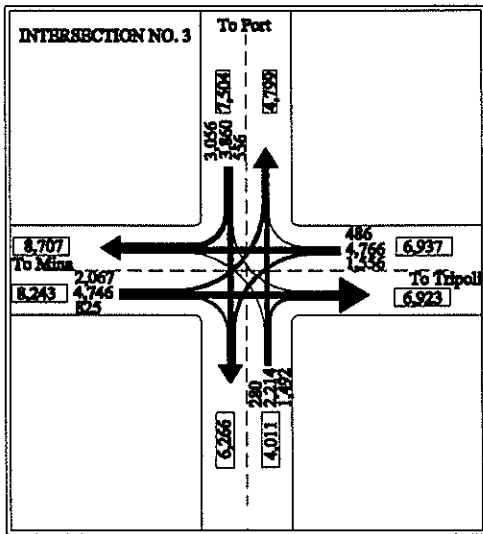
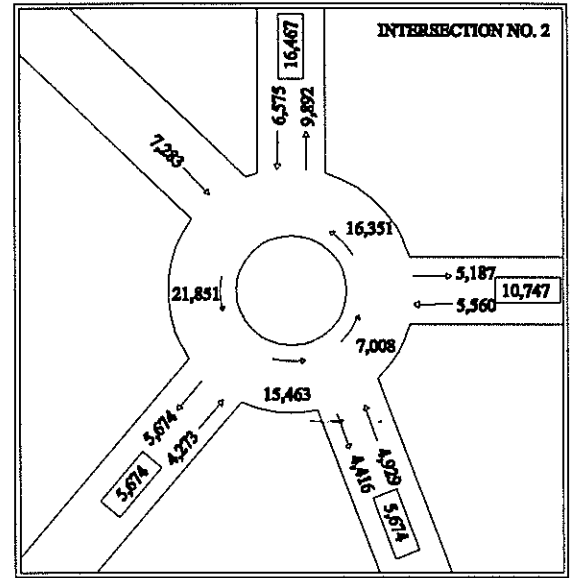
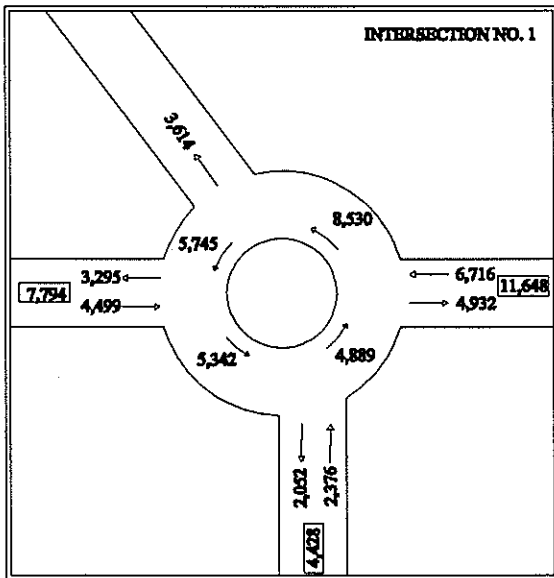
1. Executive summary
2. List of contents
3. Preface
  - Goal and reason of project
  - Framework of (EIA) study, including individuals and institution concerned with the preparation of study

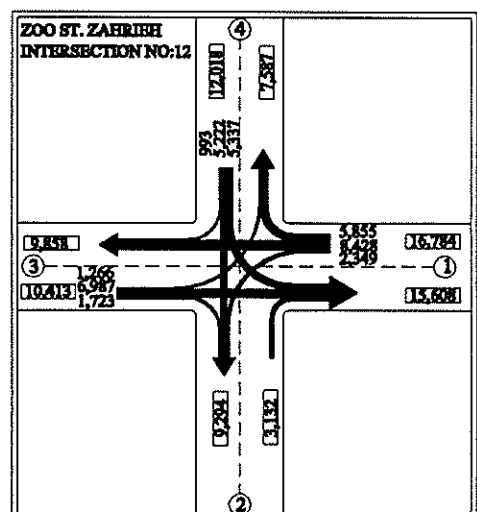
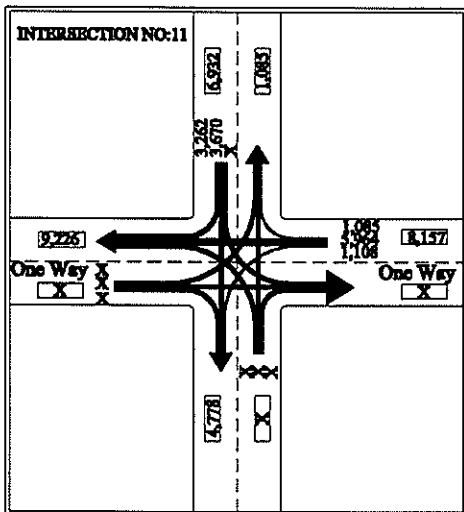
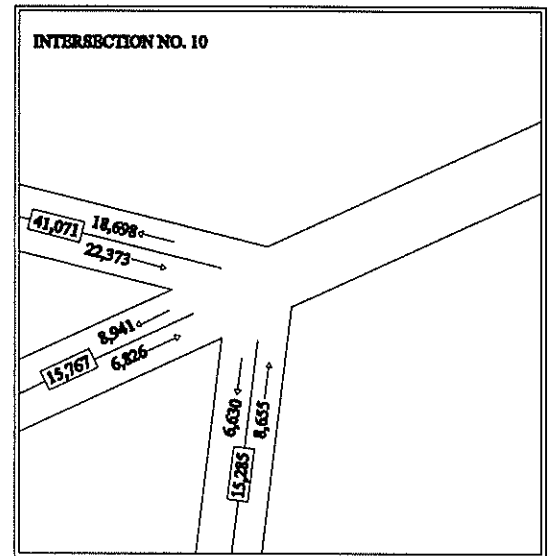
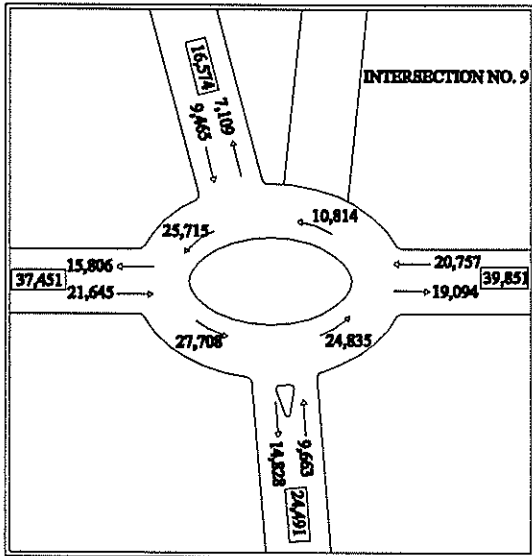
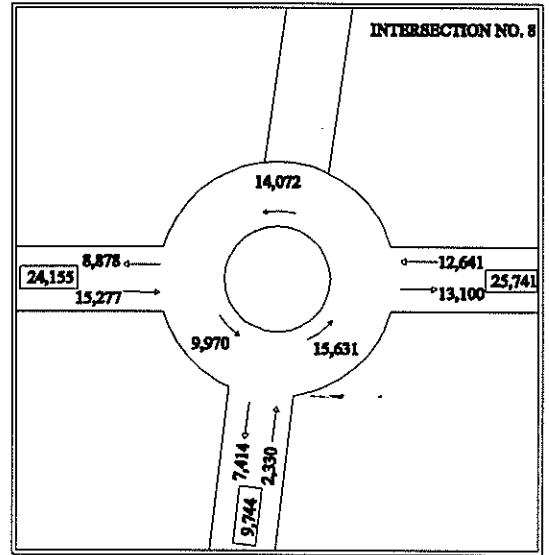
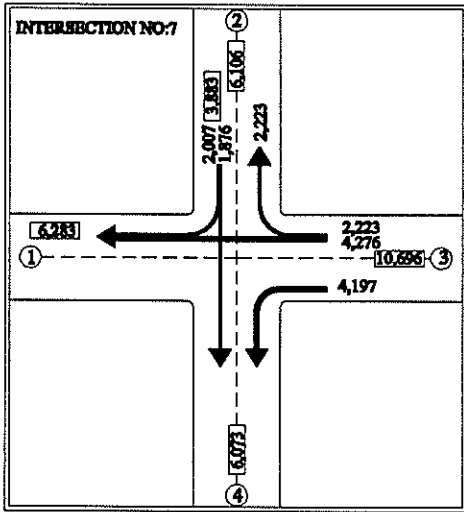
4. Policy, legal and administrative framework
5. General participation
6. Suggested project description
7. Description of environment, surrounding project
  - Physical and chemical environment
  - Biological environment
  - Social and economical environment
8. Possible environmental impact of project
9. Analyses of alternatives to project
10. Plan of environmental project
  - 10-1 Mitigation program of negative impact
  - 10-2 Monitoring and inspection program
  - 10-3 Program for improving institutional potential
11. Summary
12. Appendices.

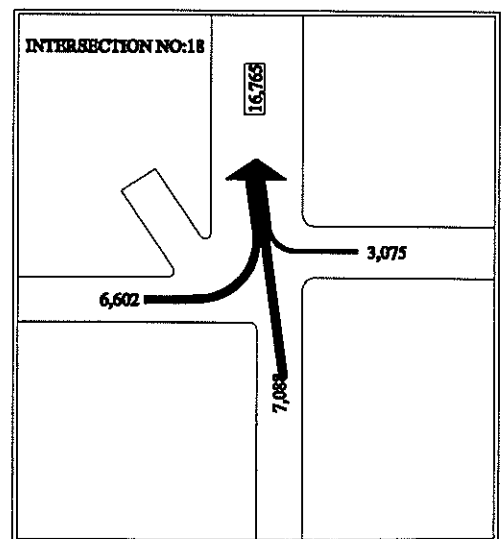
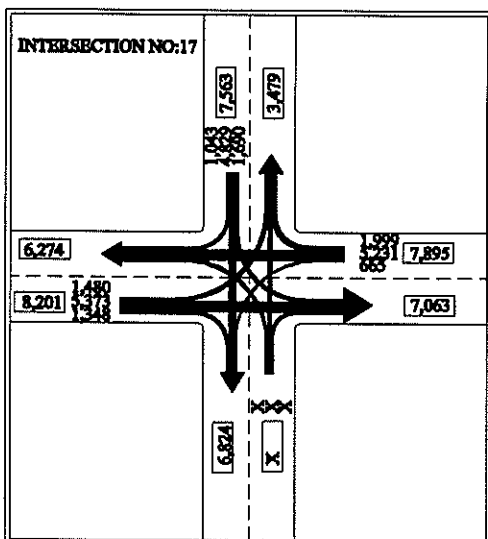
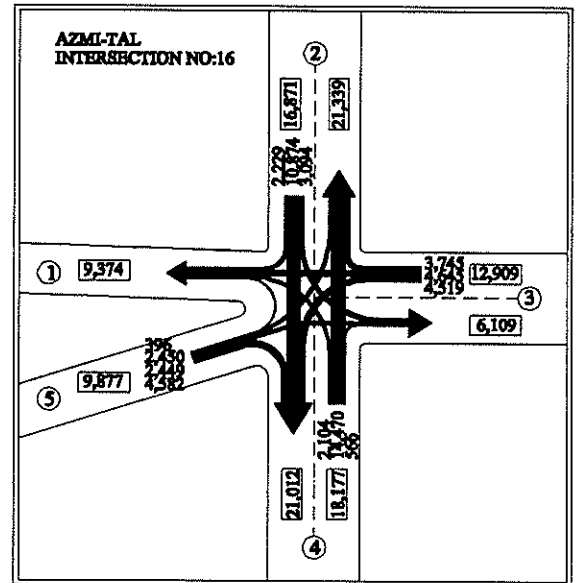
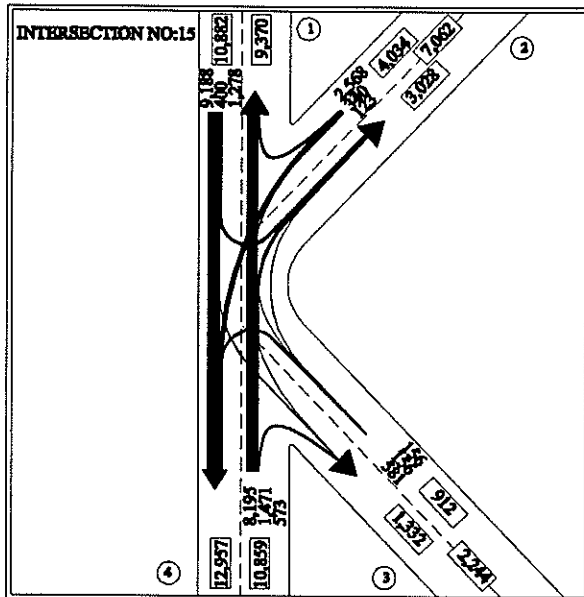
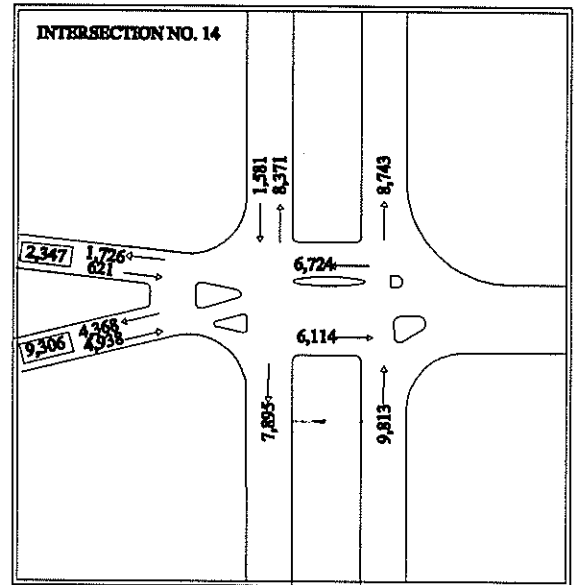
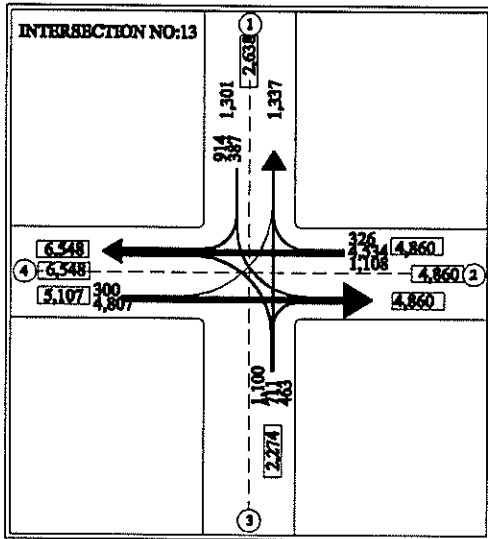
## **APPENDIX B**

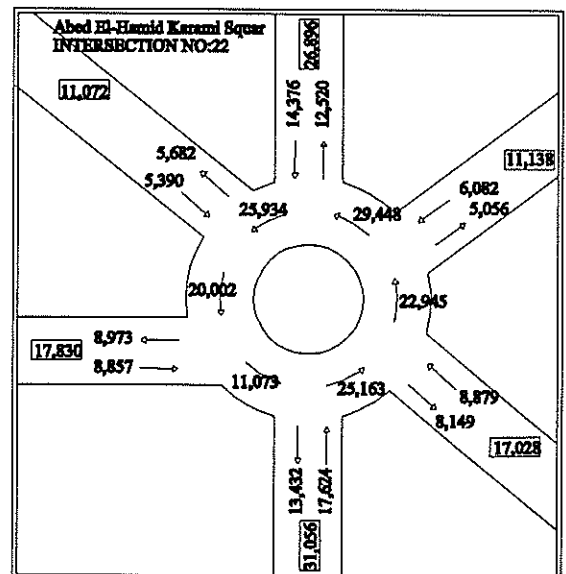
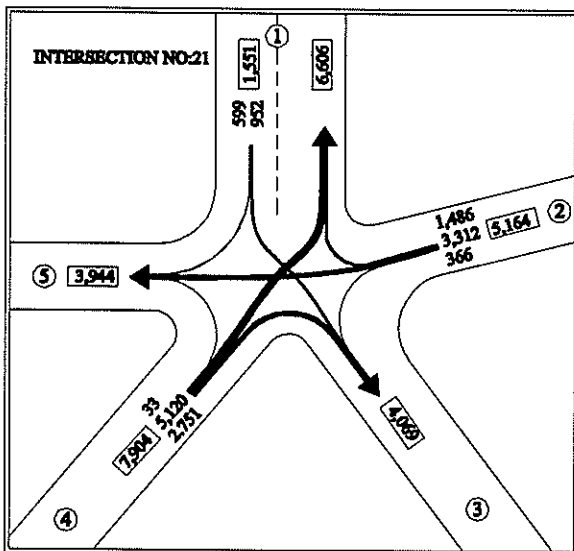
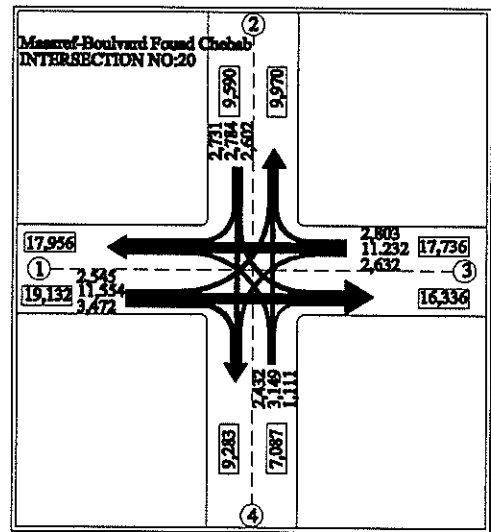
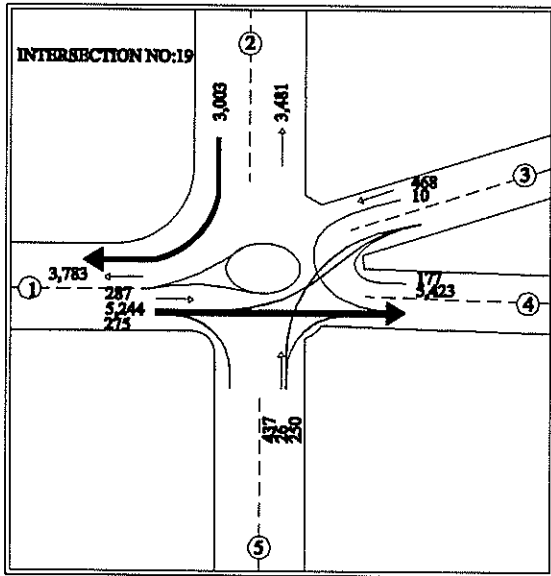
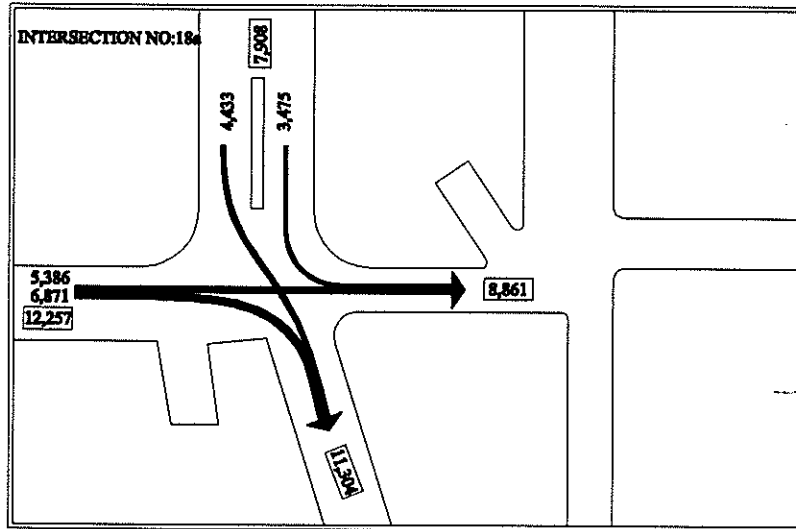
### **Traffic Flow Diagrams of Daily Traffic Volumes at Intersections**

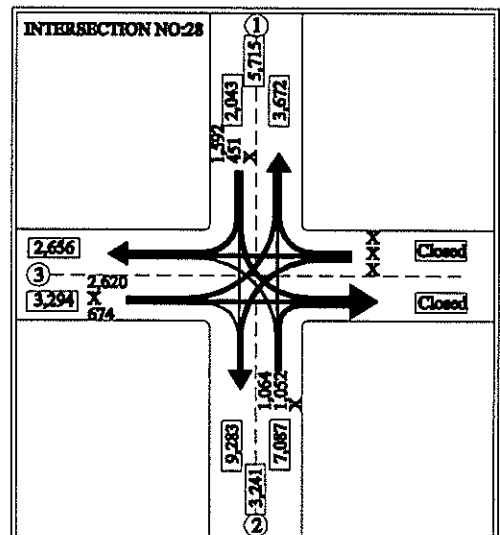
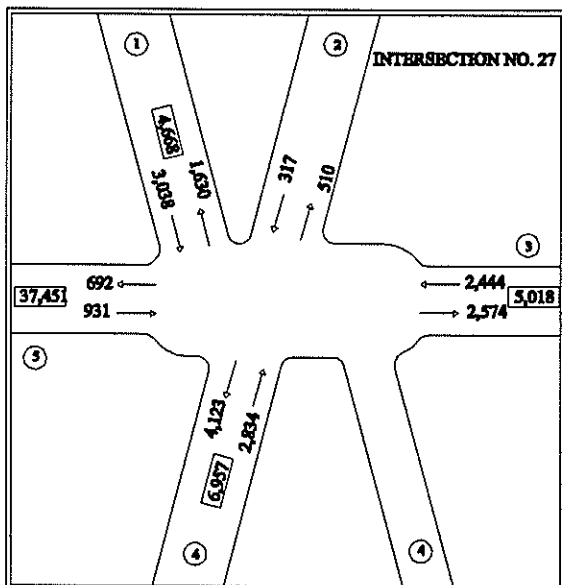
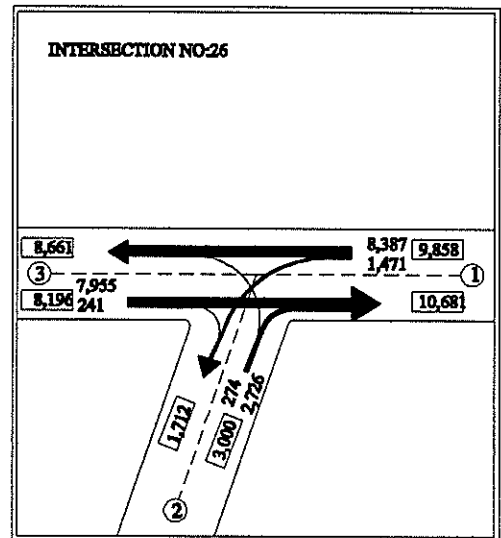
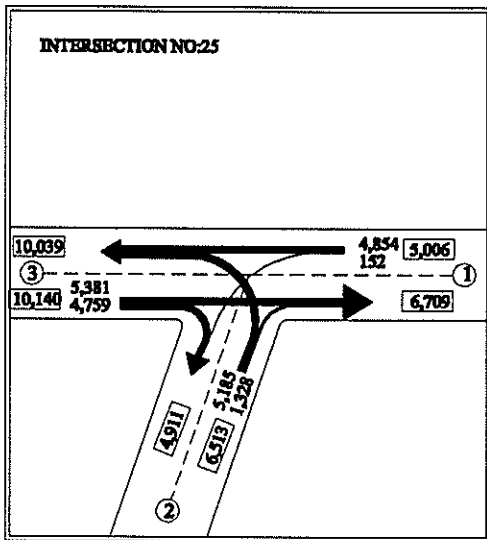
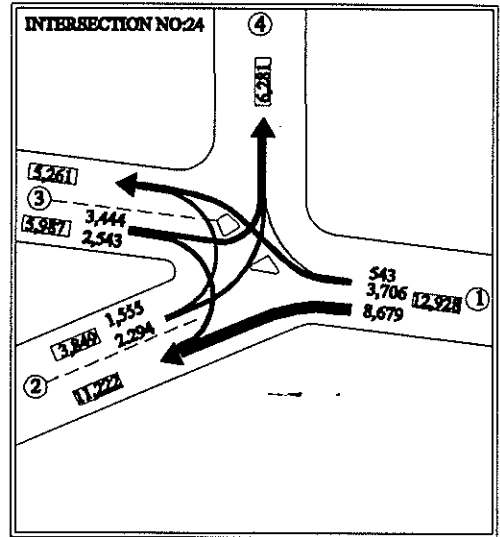
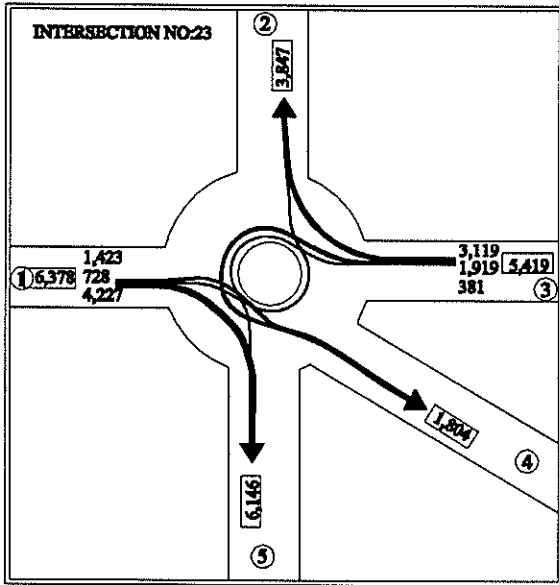
# Appendix 9.1 Traffic Flow Diagrams of Daily Traffic Volumes at Intersections



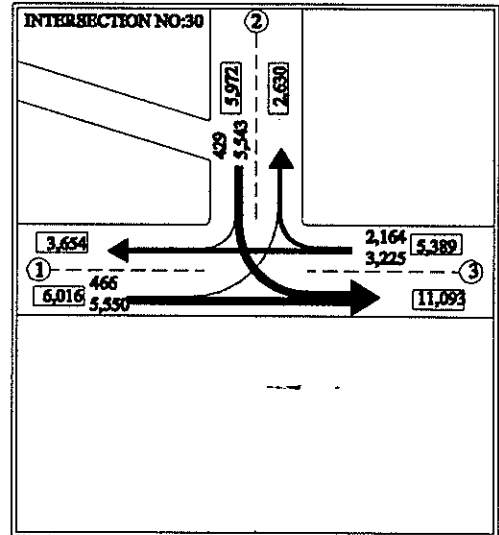
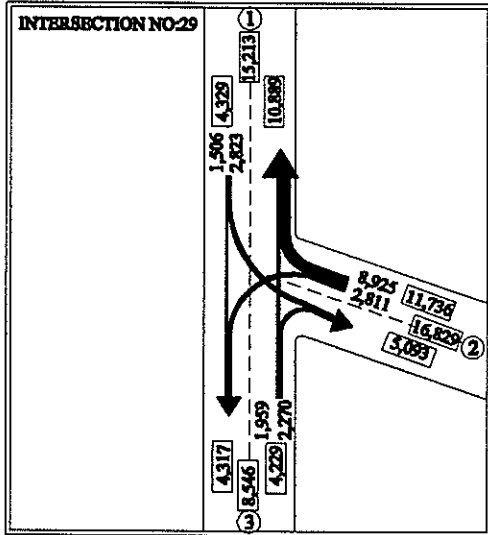












# **APPENDIX C**

## **Traffic Flow Characteristics of Travel Speed on Surveyed Routes**

<p>Location</p>									
<p>Schematic Diagram</p>									
<p>Section Length (km)</p>	4.30	4,800m	0.50	0.20	0.80	0.40	0.07	0.23	0.5
<p>No. of Lane</p>	2-lane	2-lane	2-lane	2-lane	2-lane	2-lane	2-lane	2-lane / 2-lane	2-lane / 2-lane
<p>Intersection / Signal</p>	3-legs None	3-legs None	3-legs None	3-legs None	3-legs None	3-legs None	4-legs None	Roundabout	Roundabout
<p>Travel Speed (km/h)</p>									
<p>Flow Characteristics</p>	B	C	D	E	F	G	H	I	J

Traffic Flow Characteristics of Route 2

Location										
Schematic Diagram										
Section Length (km)	2.00	1.80	0.60	0.50	0.15	0.25	0.10	0.30	0.50	0.50
No. of Lane	2-lane	4-lane	2-lane	2-lane	4-lane	4-lane	4-lane	4-lane	6-lane	6-lane
Intersection / Signal		Roundabout	3-legs None	3-legs None		4-legs None	4-legs None	4-legs None	4-legs None	Roundabout
Travel Speed (km/h)	70	60	50	40	30	20	10			
Flow Characteristics		B		D					E	

Traffic Flow Characteristics of Route 3

Location				
Section Length (km)	5.00	0.30	0.40	0.80
No. of Lane	2-lane	2-lane	2-lane	2-lane
Intersection / Signal	Roundabout	4-legs None	3-legs None	3-legs None
Travel Speed (km/h)				
Flow Characteristics	B	E	F	D

Traffic Flow Characteristics of Route 4

<p>Location</p>		
<p>Schematic Diagram</p>		
<p>Section Length (km)</p>	<p>3.00</p>	<p>0.35   0.15   0.60   1.80</p>
<p>No. of Lane</p>	<p>4-lane</p>	<p>2-lane   2-lane   2-lane   4-lane</p>
<p>Intersection / Signal</p>	<p>Roundabout   3-legs Roundabout   3-legs Roundabout   None</p>	
<p>Travel Speed (km/h)</p>		
<p>Flow Characteristics</p>	<p>A   D   B</p>	

Traffic Flow Characteristics of Route 5

Location	El Mina					Primary Arterial					To Tripoli Port					To Parestina Camp					To El Beddaoui																			
Schematic Diagram																																								
Section Length (km)	0.35					0.76					0.52					0.30					0.93					0.18					0.34									
No. of Lane	2-lane					2-lane					2-lane					2-lane					2-lane					2-lane					2-lane									
Intersection / Signal	3-legs None					Roundabout					Roundabout					Roundabout					4-legs None					3-legs None					5-legs None					Roundabout				
Travel Speed (km/h)	70 60 50 40 30 20 10					North Bound South Bound					North Bound South Bound					North Bound South Bound					North Bound South Bound					North Bound South Bound					North Bound South Bound									
Flow Characteristics	C					F					E					C					E					F					E									

Traffic Flow Characteristics of Route 6

Location	To El Mina To Abou-Alli River			Secondary Arterial	About Ali River	To Fly Over	
Schematic Diagram							
Section Length (km)	0.24	0.12	0.32 0.30	0.11 0.16	0.48	0.14 0.13	0.98
No. of Lane	2-lane		2-lane		2-lane		2-lane
Intersection / Signal	4-legs Roundabout		None				
Travel Speed (km/h)	70 60		50 40 30		20 10		
Flow Characteristics	E/F	F	D/E	E/F	E	F	

Traffic Flow Characteristics of Route 7



Location	Collector					
Schematic Diagram						
Section Length (km)	0.08	0.24	0.22	0.66		
No. of Lane	1-lane One-Way	2-lane	1-lane One-Way	2-lane One-Way		
Intersection / Signal	3-legs None	6-legs None	Roundabout			
Travel Speed (km/h)	70	60	50	40	30	20
Flow Characteristics	E	F	B			

Traffic Flow Characteristics of Route 8