4.4 PRELIMINARY DESIGN OF TRAFFIC MANAGEMENT PROGRAM

4.4.1 Bus Priority System Plan

This section discusses the bus priority system by introducing a median bus lane system, the bus priority signal light system and the improvement of bus stops and terminals.

(1) General

Buses are one of the most space-efficient and cost-efficient means of transporting large numbers of people. In Cairo, where road traffic volume is high in relation to road capacity, buses suffer from the congestion and delay caused by other road users. Priority measures are required to release buses from traffic congestion and to improve the bus system itself. Passenger demand exceeds the bus supply in the current system, especially in the peak periods. The current buses are not comfortable for travel. In order to divert car owners to public transport, it is necessary to improve the service level through concrete measures,. Therefore, it is highly recommended that the bus commercial speed and service frequency should be improved by introducing bus priority system links to decrease the waiting time at bus stops. It is also indispensable to maintain bus punctuality from the reliability point of view. The bus priority system will be proposed on Port Said St., Salah Salem St. and Ahram St., the installation of the median bus lane system on Malek Feisal St. should be avoided due to insufficient road space.

(2) Objectives and Planning Approach

Public transport requires space for many types of facilities; and a high priority for public space usage for bus facilities must be given for the new bus system. The purpose of a bus priority system is to realize punctual public transportation, improve convenience for bus users and promote car owners to use public bus transportation, giving priority to bus transportation. By implementing the system, public transportation will become more dominant, road traffic will be reduced, and the traffic flow will become more efficient. The bus priority system is comprised of the Median Bus Lane System (An example of the median bus lane system for Bogota City in the Republic of Colombia is presented in Appendix A.), the Bus Priority Signal light System (refer to the relevant section "Plan of Traffic Signal Control System") and Improvement of Bus Stops/or Terminals.

(3) Plan Locations

The plan for the bus priority system in the study area involves the five (5) following streets.

• Port Said Street: Ring Road - Yoosef El Sebaey St. (19.4km)

- <u>Qalaa Street</u>: Port Said St. Salah Salem St. (2.6km)
- Salah Salem Street: Sayeda Aisha Br. Ahram St. (5.7km)
- <u>Ahram Street</u>: Salah Salem St. Mansooreya Road (7.2km)
- <u>Malek Feisal Street</u>: Mansooreya Road Nady St. (8.0km)

(4) Facility Plan

This section deals with the main design of the bus priority system, with a review of the road conditions and the traffic flow conditions. The facility plan is comprised of the installation of median bus lanes, bus priority signal lights, and the design of bus stop stations and bus terminals.

1) Median Bus Lane System

System Functions and Concept

The median bus lane system supplies good performance as part of a Busway. The median bus lane system involves construction in central lanes where schemes should be fully segregated from other traffic by "paint and sign" and curbs or fences. Sheltered bus stops are provided on median strips located at the entrance of signalized intersections. In order to ensure the smooth operation of the median bus lane system at major intersections, bus priority signals are installed and traffic signals are provided for individual lanes of bus and other traffic, indicating direction of vehicle traffic flow. With the aim of facilitating the operation of bus services while ensuring a smooth flow of buses, traffic signal lights are synchronized using a bus priority signal light system. To ensure a smooth flow of buses, and the establishment of an average bus stop interval of 800-1,000 m like an ordinary urban railway, the average operating speed target is approximately 25km/h. The main advantages of the median bus lane system are:

- Buses will be unaffected by road congestion;
- Buses will be capable of travelling at a scheduled speed that far exceeds that of a conventional bus;
- It will only incur a small development cost as the existing road infrastructure is suitable for bus;
- The necessary construction period will be short, with a possibility of commencing operation before the completion of exclusive lanes throughout the route;
- Considerable transportation capacities can be obtained through the adoption of large capacity vehicles (e.g. articulated bus);
- A switch to other systems, which may be necessitated in the future by demand growth, will be relatively easy;
- Conventional techniques can be used as far as bus operations are concerned, and
- The loss of middle lanes to a median bus lane service will result in a reduction in the overall level of motor vehicle traffic.

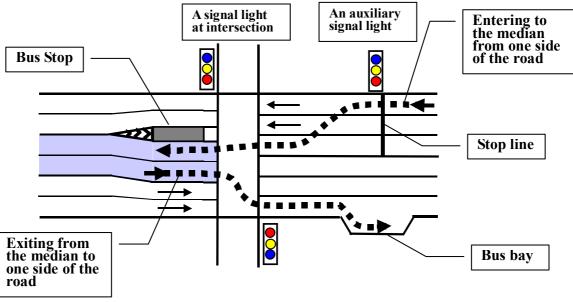
a. Bus Track System of Median Bus Lane

In the Study, the bus track for a median bus lane is located along an existing right-of-way. For an existing right-of-way, the bus track is generally planned both in the center of the road (median) and along the sides (lateral), depending on the road width. The type of bus track system was selected based on the existing road width. In determining the sections for the installation of a middle-lane traveling system, the following criteria was used:

Criteria for determining sections of middle-lane traveling system:

- 1. Possible to secure 2-lanes for median bus lane and 4-lanes for other vehicles; and
- 2. It will be unaffected by on-street parking vehicles, or on-street parking can be prohibited.

For change of lanes when buses exit from the median to one side of the road, the bus priority signal gives a phasing for buses at signalized intersection. On the other hand, when buses enter to median from one side of the road, buses change lane by controlling an auxiliary signal light at roadside. Figure 4.4.1 illustrates how buses will change lanes safely to/from the median side of the road.



Source: JICA Study Team

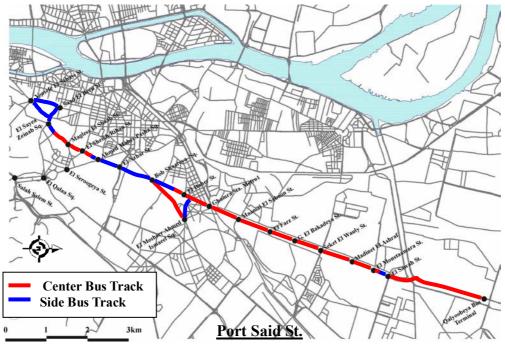
Figure 4.4.1 Illustration of Traveling System

The track system of the median bus lane is shown in Table 4.4.1 and Figure 4.4.2 (1)(2).

Name of		Туре	of Bus Tra	ick
Street	Section	Distance (km)	Center	Sides
	Ring Road-Qalyobeya B.T	4.20		0
	Qalyobeya B.T-Sawah St.	2.75	0	
	Sawah St0.11km before Monstaamara St.	0.29		0
	0.11km before Monstaamara St0.3km after Daher St.	5.51	0	
Port Said	0.30km after Daher St.–0.29km after Ahmed Maher Pasha Sq.	2.28		0
	Bab El Shaareya SqMosheer Ahmed Ismail Sq.	1.27	0	
	Mosheer Ahmed Ismail SqPort Said St.	0.63		0
	0.29km after Ahmed M Pasha Sq0.31km after Magles El Shaab St.	0.89	0	
	0.40km before Magles El Shaab StYoosef El Sebaey St.	2.57		0
	Sayeda Aisha Br0.3km before Magra El Oyoon St.	0.89	0	
	0.3km before/after Magra El Oyoon St.	0.60		0
Salah	0.3km after Magra El Oyoon St0.15km after Fostat St.	1.84	0	
Salan Salem	0.15km after Fostat St0.11km after Malek El Saleh Br.	0.47		0
Balem	0.11km after Malek El Saleh Br0.16km after Bahr El Aazam St.	1.20	0	
	0.16km after Bahr El Aazam Stentrance of Ahram St.	0.68		0
	Entrance of Ahram StTereat El Zomor El Sharqy Road	0.59		0
Ahram	Tereat El Zomor El Sharqy Road-0.29km before Maryoteya Road	5.43	0	
Ailaili	0.29km before Maryoteya Road-0.29km after Maryoteya Road	0.58		0
	0.29km after Maryoteya Road -Mansooreya Road	0.60	0	

Table 4.4.1Design Streets of Median Bus Lane by Type of Bus Track

Source: JICA Study Team



Source: JICA Study Team



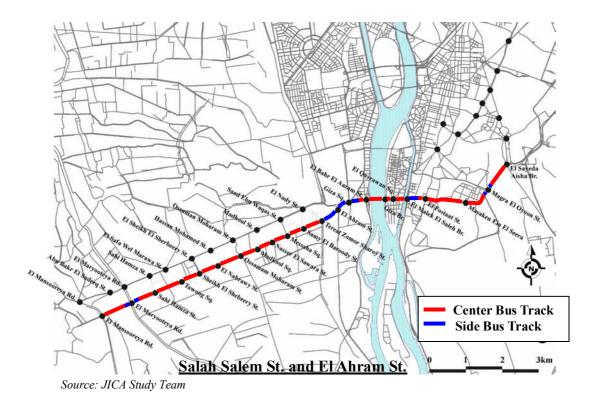


Figure 4.4.2 (2) Plan for Bus Track System of Median Bus Lane System

b. Typical Cross Section on Median Bus Lane

Usage of Bus Track and Segregation

The proposed median bus lane system physically segregates buses and other traffic by using fence curbs. As for the median lanes, bus operation speeds on such lanes are faster than for the lateral lanes. In general, a segregated bus lane decreases turbulence for both the traffic flow of buses and other vehicles (especially shared taxis). It, therefore, often increases speeds of not only buses but of other vehicles in other lanes as well.

Securing the safety of bus operations when buses stop due to engine trouble or puncture is important. The segregation by fence curbs will be provided by setting open section intervals at 500 meters on average, and these open section intervals are also segregated by a temporary fence with a length of at least 12.0m.

The width of a median bus lane depends on the design speed, vehicle width and operational characteristics. The width of a bus lane on the study roads is classified into 2 ranks, ranging between 3.25 and 3.50 meters. Table 4.4.2 gives proposed lane widths for the median bus lane system, in order to carry in excess of 60 buses per hour, according to design speeds.

	Width (m)									
Design Speed (km/h)	Bus Lane (m)	Central Separator (between bus lanes) (m)	Outer Separator (between bus lane and other vehicles lane) (m)							
70-80	3.50-3.75	0.30-0.40	0.30-0.50							
40-60	3.00-3.25	0.30-0.40	0.20-0.30							
Outer separator	Bus Lane	Central separator	_							

Table 4.4.2 Proposed Cross-Section Width for Median Bus Lane

Source: JICA Study Team

Typical Cross Section of Median Bus Lane by Study Road

Port Said Street

The existing right-of-way ranges between 17.0 and 24.0 m wide, and consists of either 4-lanes or 6-lanes. This road will be generally planned both in the center of the road and along the sides, depending on the road width.

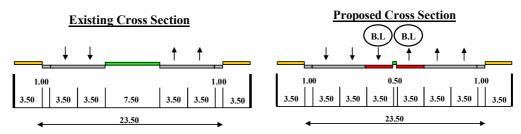
In the section of 6-lane per two directions, the bus lane is located in the center of the road, the sections are: Qalyobeya B.T-Sawah St., 0.11km before Monstaamara St.-0.3km after Daher St., Bab El Shaareya Sq.-Mosheer Ahmed Ismail Sq., and 0.29km after Ahmed M Pasha Sq.-0.31km after Magles El Shaab St.. In the section of 4-lane per two directions, buses will be used in the side lane with other vehicles (referred to as a "mixed lane"), and the bus priority system is not specified in order to avoid turbulence from parked vehicles on the sides. They are: Ring Road-Qalyobeya B.T, Sawah St.-0.11km before Monstaamara St., 0.30km after Daher St.-0.29km after Ahmed Maher Pasha Sq., Mosheer Ahmed Ismail Sq.-Port Said St., and 0.40km before Magles El Shaab St.-Yoosef El Sebaey St.. The typical cross section for the median bus lane is established as follows (See Figure 4.4.3 to Figure 4.4.5).

<u>- Section Qalyobeya B.T-entrance of Amireya bridge:</u> 1-lane median bus lane per direction in the center of the road is provided. It is necessary to use the whole median in order to provide 2-lanes for a median bus lane.

<u>- Section entrance of Amireya bridge-Magles El Shaab St.</u>: 1-lane median bus lane per direction in the center of the road is provided.

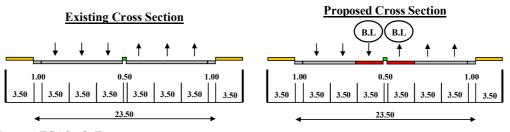
<u>- Section Daher St.-Bab El Shaareya Sq.:</u> 1-lane median bus lane in the center of the one-way road is provided.

<u>- Section Bab El Shaareya Sq.-Mosheer Ahmed Ismail Sq.:</u> 1-lane median bus lane in the enter of the one-way road is provided.

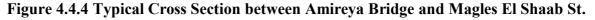


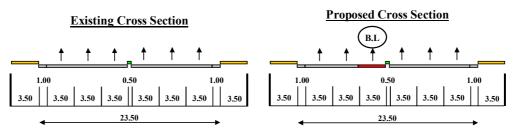
Source: JICA Study Team

Figure 4.4.3 Typical Cross Section between Qalyobeya B.T. and Amireya Bridge



Source: JICA Study Team





Source: JICA Study Team

Figure 4.4.5 Typical Cross Section between Daher St. and Bab El Shaareya Sq. & Between Bab El Shaareya Sq. and Mosheer Ahmed Ismail Sq.

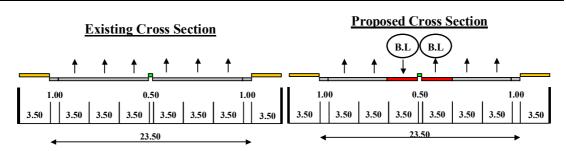
Currently, the section between Daher St. and Bab El Shaareya Sq. on Port Said St. is operated by a one-way system. The proposed track system is based on one-way regulation. The alternative of a track system for the median bus lane system can be proposed by introducing the following system.

<u>Alternative A</u>

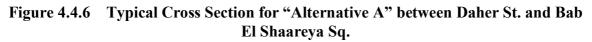
Alternative A adopts the median bus lane per direction in the center of the road, based on the current one-way traffic regulations. It is necessary to operate by using a contra-lane system. The typical cross section for a median bus lane is shown in Figure 4.4.6.

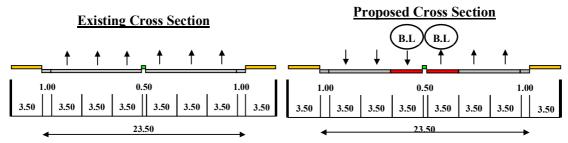
<u>Alternative B</u>

The median bus lane per direction is provided in the center of the road. It is necessary that the existing one-way system will be changed to a two-way road system. The typical cross section for the median bus lane is shown in Figure 4.4.7.



Source: JICA Study Team





Source: JICA Study Team

Figure 4.4.7 Typical Cross Section for "Alternative B" between Daher St. and Bab El Shaareya Sq.

The Study Team recommends introducing effectiveness of traffic flow conditions and equipment facilities. The alternatives were evaluated in terms of vehicle traffic, traffic facilities, and pedestrian/passenger traffic as shown in Table 4.4.3. As a result of this evaluation, it was found that the proposed track system, which scored relatively well on all the evaluation items, is the more desirable. Under the proposed track system, the median bus lane system on Port Said between Daher and Bab El Shaareya Sq. will be operated.

Table 4.4.3Evaluation for Alternatives of Track System on Port Said between
Daher St. and Bab El Shaareya Sq.

		Evaluation Item	Proposed Track system	Alternative A	Alternative B
From View	1.	Efficiency of bus operating.	Strength	Strength	Strength
of Vehicle	2.	Conflict between buses and other	Strength	Weakness	Strength
Traffic		traffic.	_		_
	3.	Effective use of traffic capacity for	Strength	Weakness	Weakness
		other traffic			
From View	1.	Maximal use of existing infrastructure.	Strength	Strength	Strength
of Traffic	2.	Connection with bus stop on the	Strength	Strength	Strength
Facilities		median.	_	_	_
From View	1.	Convenience of transferring	Strength	Strength	Strength
of	2.	Safety of pedestrian/passenger for	Strength	Weakness	Strength
Pedestrian/		crossing at intersection.	Ū		U
Passenger					

Source: JICA Study Team

Salah Salem Street

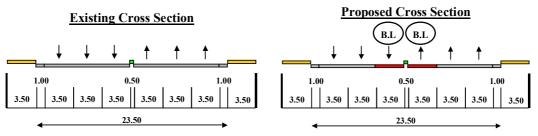
The existing right-of-way ranges between 19.0 and 22.0 meters in width, and consists of either 4-lanes or 6-lanes. This road will be generally planned both in the center of the road and along the sides, depending on the road width.

In the section of 6-lane per two directions, the bus lane is located in the center of the road, the sections are: Sayeda Aisha Br.-0.3km before Magra El Oyoon St., 0.3km after Magra El Oyoon St.-0.15km after Fostat St., and 0.11km after Malek El Saleh Br.-0.16km after Bahr El Aazam St.. In the section of 4-lane per two directions, buses will be used in a mixed lane, and a bus priority system is not specified where there is a section of flyover or underpass with 4-lanes road per two directions. They are: 0.3km before/after Magra El Oyoon St., 0.15km after Fostat St.-0.11km after Malek El Saleh Br., and 0.16km after Bahr El Aazam St.-entrance of Ahram St.. The typical cross section for the median bus lane is established as follows (See Figure 4.4.8 to Figure 4.4.10).

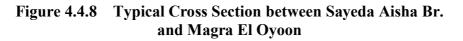
<u>- Section Sayeda Aisha Br.-Magra El Oyoon St.:</u> 1-lane median bus lane per direction in the center of the road is provided.

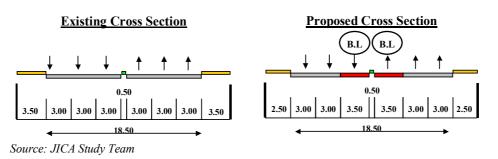
<u>- Section Magrar El Oyoon St.-Fostat St:</u> 1-lane median bus lane per direction in the center of the road is provided. It is necessary to widen 1.0m on both sides in order to provide a 3.50m-lane width per direction for the median bus lane.

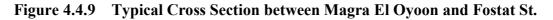
<u>- Section Malek El Saleh Br.-Bahr El Aazam St.:</u> 1-lane median bus lane per direction in the center of the road is provided.

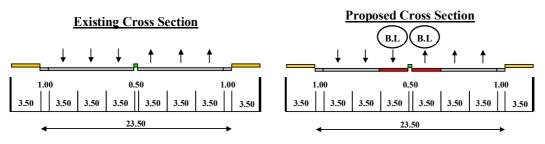


Source: JICA Study Team









Source: JICA Study Team

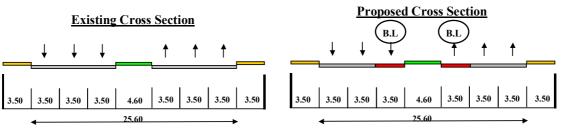
Figure 4.4.10 Typical Cross Section between Fostat St. and Ahram St.

<u>Ahram Street</u>

The existing right-of-way averages about 26.0 meters in width, and consists of 6-lanes. The median is about 4.6 meters wide. This road will be generally planned in the center of road, depending on the road width.

In the section of 6-lane per two directions, the bus lane is located in the center of the road, these sections are: Tereat El Zomor El Sharqy Road-0.29km before Maryoteya Road, and 0.29km after Maryoteya Road -Mansooreya Road. In the section on the flyover structure or underpass structure, the bus priority system is not specified, these sections are: Entrance of Ahram St.-Tereat El Zomor El Sharqy Road, and 0.29km before Maryoteya Road-0.29km after Maryoteya Road. The typical cross section for the median bus lane is as follows (See Figure 4.4.11).

- Section Tereat El Zomor El Sharqy Rd.-Mansooreya Rd.: 1-lane median bus lane per direction in the center of the road is provided.



Source: JICA Study Team

Figure 4.4.11 Typical Cross Section between Fostat St. and Ahram St.

c. Bus Stop

The locations and designs of bus stops have a major influence on operating efficiency and on passenger convenience. Planning of bus stops along a median bus lane system involves three major aspects i.e. the distance of the bus stop, location and the design of the bus stop.

Distance of Bus Stops

The distance between bus stops has a large influence on commercial speed. To ensure a smooth flow of buses, and to establish an average bus stop interval of 800-1,000 m as an ordinary urban railway, the average operating speed is targeted to be approximately 25 km/h. In addition, the locations of existing bus stop were considered in detail.

Locations of Bus Stops

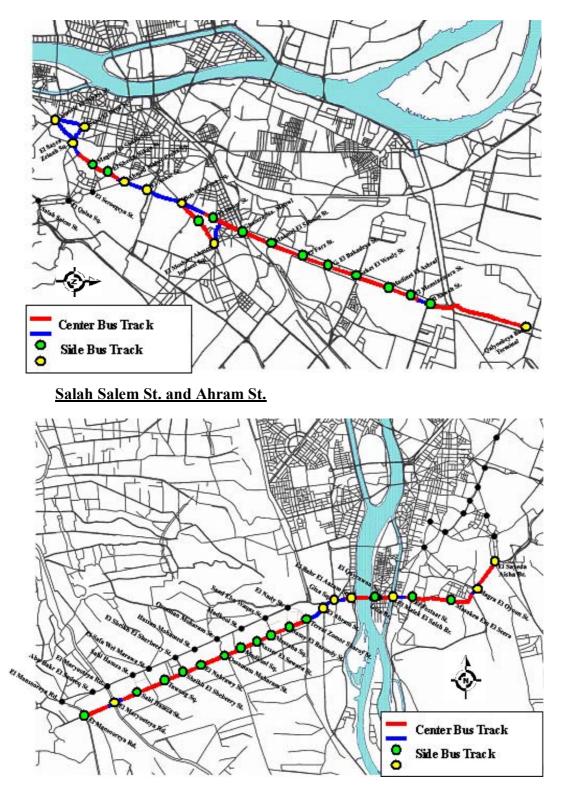
The plan of the locations of bus stop will be determined for the study roads, and for the important points with the most passengers, based on an analysis of the current situation. The locations of bus stops by road are shown in Figure 4.4.12. In determining the locations for installation of bus stops, the following criteria was used taking the current locations of bus stops into consideration:

- Average distance of bus stop ranges between 800 to 1,000 meters;
- Inter modal point between the Metro and railway;
- Heavy attraction and generation of passengers; and
- Major intersection.
- Design of Bus Stop

The basis for the design of bus stops are described below:

- Bus stops for the median bus lane system, on wide roads with 6-lanes, should be generally installed on the central part;
- On sections where road width is not sufficient, bus stops will be installed on curb lane along the roadside. In the case of such bus stops, the stopping area will be distinguished by road markings or a bus bay;
- Bus stops at signalized intersections will be located at the exit of the intersection; and
- In this context, two types of bus stops are considered for the median bus lane system, based on the conditions of road width and the parking situation.

Port Said St.

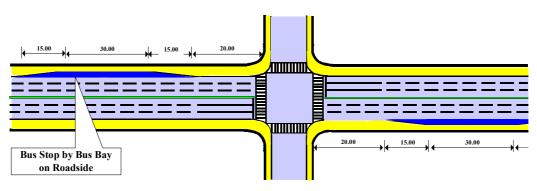


Source: JICA Study Team

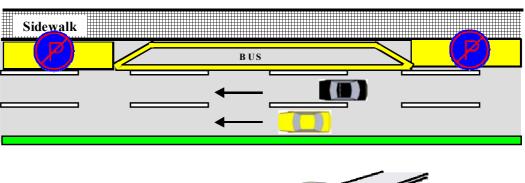
Figure 4.4.12 Proposed New Bus Stop for Median Bus Lane System

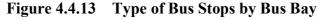
1. Type of Bus Stops by Road Marking or Bus Bay on Roadside

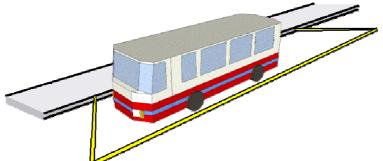
The simplest type of bus stop is where buses travel and stop in the curb lane. This type is classified into two types by introducing the segregation of a bus bay and markings. On the section where the sidewalk width is insufficient for providing a bay space, a bus stop will be separated by road markings. In addition, parking prohibition on the street in the affected area will be strongly enforced. Figure 4.4.13 and Figure 4.4.14 shows the type of bus stops on the roadside.



Source: JICA Study Team





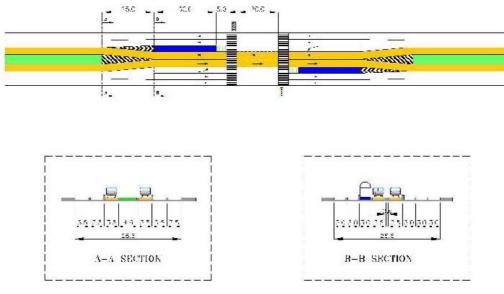


Source: JICA Study Team

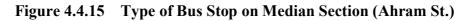


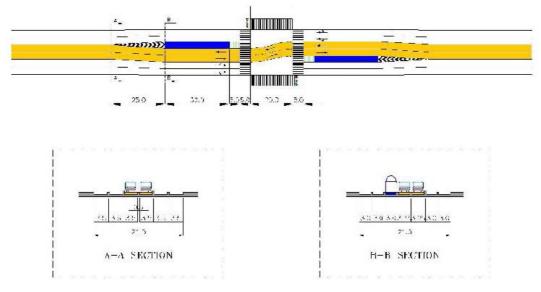
2. Type of Bus Stops in the Center of Road

In the case of bus stops for the median bus lane system on the median in a section, this type aims at separating bus traffic from other vehicle traffic. There are two types as follows: bus stop on a median section and bus stop at a signalized intersection. The type of bus stop on a median is shown in Figure 4.4.15, which covers Ghamra station on Port Said St. and most of the stations on Ahram St.. Signal light control should be installed for pedestrians crossing and U-turn vehicles. This type of bus stop at a signalized intersection is proposed on Port Said St. and Salah Salem St. (See Figure 4.4.16).



Source: JICA Study Team





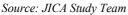
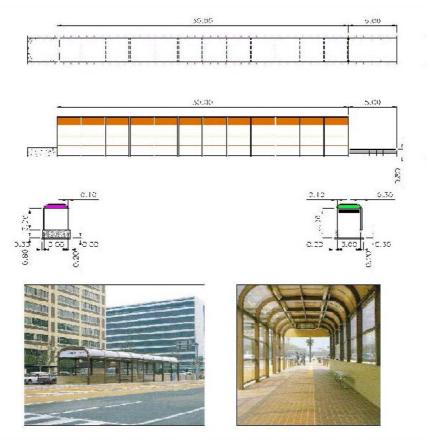


Figure 4.4.16 Type of Bus Stop at Signalized Intersection (Port Said St.)

Plan of Bus Platform

Figure 4.4.17 shows the plan of the platform on a median bus lane. The length of the platform is to be 30 meters for stopping space for two buses at the same time. The accompanying facilities include a shelter and a bench.



Source: JICA Study Team

Figure 4.4.17 Plan of Bus Platform on Median Bus Lane

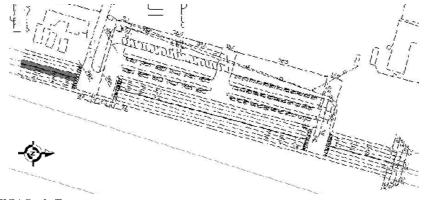
2) Improvement of Bus Stop and Terminal

As previously pointed out in the analysis of the current traffic status on Metro 4 Corridor, the most serious cause of the traffic congestion is the conflict of buses and shared taxies near a bus stop. Traffic congestion is caused by buses and shared taxies that occupy 2 lanes or 3 lanes for alighting and boarding passengers. Qalyobeya bus terminal and Ghamra station on Port Said are key bottlenecks where there is a conflict of buses and shared taxies near a bus stop. In order to mitigate the traffic congestion along Metro 4 Corridor, it is necessary to increase road traffic capacity through the improvement of bus stops and bus terminal facilities.

a. Improvement Plan for Qalyobeya Bus Terminal

At Qalyobeya bus terminal, transferring bus passengers can be seen on the street, which is a bottleneck point. Bus terminal facilities will be planned outside Port

Said St.. The number of berths and the area required was estimated, based on current conditions. The total number of berths for Qalyobeya bus terminal is 72 berths (local bus, 12 berths; shared taxi, 36 berths; taxi, 12 berths; and cars, 12 berths). The total land area required will be 9,500 square meters, the area of vehicle way and footway are: 3,500m², 6,000m² respectively. Figure 4.4.18 shows the plan of the bus terminal facility.



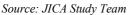
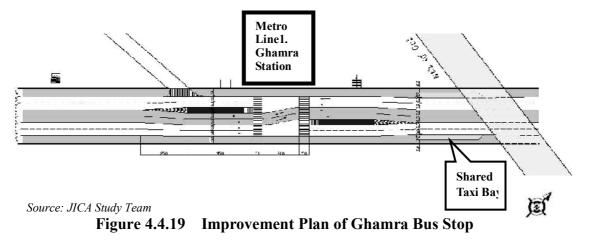


Figure 4.4.18 Plan of Qalyobeya Bus Terminal Facility

b. Improvement Plan of Ghamra Bus Stop

Ghamra bus stop, in front of Metro 1 Station, is also bottleneck point due to the conflict of buses and shared taxies near a bus stop. The conflict between buses and shared taxies near a bus stop can be improved by the installation of a bus platform on the median bus lane. The signal light control should be installed for crossing pedestrians. In addition, a shared taxi bay on the roadside will be constructed for separating the affected area at the bus stop. Figure 4.4.19 shows the improvement plan for Ghamra bus stop.



4.4.2 Plan of Traffic Signal Control System

This section discusses the improvement of the traffic signal control system by introducing the improvement of the traffic signal phase system, the installation of traffic signal lights, the bus priority signal light system, the synchronized traffic signal light system and the independent traffic-actuated control system.

(1) General

During peak periods, most major signalized intersections were manually controlled by traffic policemen. This is because the current traffic congestion may be difficult to control under the existing system due to near-saturation conditions. However, this manual control is difficult to keep to signal synchronization and leads to long cycle times. In addition, traffic to and from side roads without traffic lights disturb the main traffic flows. In particular, traffic congestion at U-turn points is caused by conflicts between through traffic and entering traffic. Thus, the technical improvement of the signal control system at these bottlenecks will be necessary.

In order to ensuring a smooth bus operation, a bus priority signal light system should considered on the major bus routes, in accordance with the plan of the median bus lane system. The purpose of the bus priority signal control system is to realize punctual public transportation, improve convenience for bus users, and give priority to bus transportation. In the study, as a low cost solution, the bus priority signal light system for Metro 4 Corridor should be introduced using the method of a synchronized control system for bus priority signals and the independent traffic-actuated control system for bus priority.

(2) Objectives and Planning Approach

The objectives and the planning approach for the improvement of the traffic signal control system are as follows:

- The technical improvement of the signal control system¹, such as the synchronized system, the improvement of the traffic signal phase system and the bus priority system, to manage the signalized bottlenecks will be necessary instead of manual operation by traffic police.
- Non-signalized intersections and U-turn points will be considered for the installation of signals, in order to control both motor vehicles and pedestrian traffic, or such type of intersection will be improved using an adequate design.
- Pedestrian safety should be secured for crossing the road and also bus passengers. In order to improve pedestrian safety, a traffic signal phase for pedestrians and bus passengers should be designed.
- For suitable bus operation, it is necessary to shorten the stopping times at the intersections in order to maintain the punctual operating speed. Traffic signal systems should be considered to prioritize bus operation along the routes of the median bus lane system.

¹ Regarding to traffic data for the design of signal control system, twenty-one (21) locations including U-turn points on Metro 4 Corridor were selected for the vehicle traffic count survey as shown in Table 4.2.2. For the traffic data at the other major intersections, the results of traffic count survey on major locations conducted in the Master Plan were used.

The saturation flow rate at 56 target intersections was checked, and currently found that all of them indicate a value of "under-saturation", based on results of saturation flow rate at each intersection. The problem of the existing traffic congestion is caused by inadequate road capacity including the lack of well-developed traffic management. For instance, there are manual signal control systems used by traffic police, pedestrians cross the street ignoring signal lights, heavy traffic congestion near bus stops, traffic conflict at non-signalized intersections, a high occupancy of on-street parking. Therefore, in the short-term, the management of over-saturation was not highlighted in this study. Given the over-saturation, traffic management measures would not be effective and another substantial solution should be employed. However, in middle/long-term, owing to increase of traffic on Metro 4 Corridor, the traffic condition of over-saturation will come soon. Therefore, an Area Traffic Signal Control System should be proposed in order to manage the problem of over-saturation; in addition, public transport system such as Metro Line should be developed in order to induce commuters to shift from private vehicles to public transportation.

(3) Plan Locations

The plan of the bus priority system in the study area involves the following five streets.

- Port Said Street: Ring Road Yoosef El Sebaey St. (19.4km)
- <u>Qalaa Street</u>: Port Said St. Salah Salem St. (2.6km)
- <u>Salah Salem Street</u>: Sayes Aisha Br. Ahram St. (5.7km)
- <u>Ahram Street</u>: Salah Salem St. Mansooreya Road (7.2km)
- <u>Malek Feisal Street</u>: Mansooreya Road Nady St. (8.0km)

(4) Facility Plan

1) Installation of Signal Lights

The installation of signal lights will be planned based on the proposed traffic management programs. The subject intersections are divided into the nine types shown in Table 4.4.4.

		Tuno		Аррі	roach	
		Туре		Major road	Minor road	
	A With bus		(1)	6 lanes	6 lanes	
	A	Without bus lane	(2)	0 lailes	0 failes	
D 1	4 1000	With bus lane	(1)	6 lanes	4 lanes	
D-1	B-1 4-legs	Without bus lane	(2)	0 lailes	4 lancs	
B-2	2 1000	With bus lane	(1)	6 lanes	4 lanes	
D-2	3-legs	Without bus lane	(2)	0 lalles	4 lanes	
		С		3-4 lanes	3-4 lanes	
	D	With bus lane	(1)	Median bus lane station points		
	D	Without bus lane	(2)	U-turn sig	gnal points	

Table 4.4.4Type of Intersection

Source: JICA Study Team

In total, traffic signal lights should be installed on fifty four intersections along the Metro 4 Corridor, based on the plan of the median bus lane system and the improvement plan for the intersection. Table 4.4.5 shows the locations for the installation of traffic signal lights.

2) System Functions and Control Concept

a. System Function

In accordance with the objectives, the improvement of the traffic signal control system requires the following functions:

- <u>Traffic signal phase system</u>: a multi-phase type system which sets one phase for one direction should be operated by a simple phase system, because the existing multi-phase type leads to a long cycle length and decreases traffic capacity.
- Installation of signal lights at non-signalized intersections and U-turn points including bus stops on the median bus lane system: based on the calculated capacity, the signal phases and splits will be designed. The plan includes the channelization system.
- <u>Bus priority signal control system</u>: an ultra sonic vehicle detector is installed on the segregated median bus lane, in order to detect buses, and the detector transfers bus information to the signal control unit at the local facilities. The signal control unit decides whether it should change the timing of the signal on the basis of preset timing and received information about the bus.
- <u>Synchronized traffic signal control system</u>: the same cycle length at neighboring intersections will enable both to operate together by setting up the offset timing. It enables vehicle to drive without stopping at the intersection in the sub area of the synchronized traffic signal system.

Streat	No	Trme	Location	Type of Sign	al Control
Street	No.	Туре	Location	Synchronized	Bus Priorty
	1 (a. b)	B2(2)	Qalyobeya Bus Terminal	0	0
	2	A(1)	Sawah St.	0	0
	3	B2(1)	Monstaamara St.	0	0
	4	B2(1)	Madinet El Ashraf	0	0
	5	A(1)	Sekket El Wayly St.	0	0
	6	B2(1)	Garag El Baladeya St.	0	0
	7	B2(1)	Farz St.	0	0
	8	B2(1)	Maamal El Saboon St.	0	0
	9	D	Ghamra Station. Metro Line 1.	0	0
Port Said St.	10	B2(1)	Daher St.	0	0
	11	A(1)	Mosheer Ahmed Ismail Sq.	0	0
	12	A(1)	Bab El Shaareya Sq.	0	
	13	С	Azhar St.	0	
	14	B1(2)	Ahmed Maher Pasha Sq.	0	0
	15	B1(1)	Sheikh Rehan St.	0	0
	16	B1(1)	Magles El Shaab St.	0	0
	17 (a, b)	B1(2)	Sayeda Zeinab Sq.	0	
	18	C	Saad El Deen St.	0	
	19	С	Yoosef El Sebaey St.	0	
	20*	B1(2)	Same location of No. 14	0	
	21*	B1(2)	Same location of No. 17	0	
Qalaa St.	22	С	Seroogeya St.	0	
	23	С	Qalaa Sq.	0	
	24	B1(2)	Salah Salem St.	0	
	25*	B1(2)	Same location of No.24	0	
	26	B1(2)	Magra El Oyoon St.	0	
	27	D	Masaken Ain El Seera St.	0	0
	28	B1(1)	Fostat St.	0	0
Salah Salem St.	29	A(2)	Malek El Saleh Br.	0	
Sului Sului St.	30	B1(1)	Qayrawan Sq.	0	0
	31	B1(1)	Giza Br.	0	0
	32	B1(1)	Bahr El Aazam St.	0	0
	33	A(2)	Giza Sq.	0	
	34	B2(2)	Entrance of Ahram St.	0	
	35	D	Tereat El Zomor El Sharqy St.	0	0
	36	D	Samy El Baroody St.	0	0
	37	D	Mesaha Sq.	0	0
	38	D	Naser El Thawra St.	0	0
	39	D	Madkoor Sq.	0	0
Ahram St.	40	D	Osman Moharam St.	0	0
i muni Ot.	41	D	Nabarawy St.	0	0
	42	D	Sheikh El Shebeeny St.	0	0
	43	D	Taawon Sq.	0	0
	44	D	Sahl Hamza St.	0	0
	45	B1(2)	Maryoteya Rd.	0	
	46	A(1)	Mansooreya Rd.	0	0
	47	B1(2)	Mansooreya Rd.	0	
	48	B2(2)	Abu Bakr El Sadeeq St.	0	
	49	A(2)	Maryoteya Rd.	0	
	50	B2(2)	Sahl Hamza St.	0	
	51	B2(2)	Safa Wel Marwa St.	0	
Malek Feisal St.	52	B2(2)	Sheikh El Sherbeeny St.	0	
	53	B2(2)	Hassan Mohamed St.	0	
	54	B2(2)	Osman Moharam St.	0	
	55	B2(2)	Madkoor St.	0	
	56	B2(2)	Saad Ebn Aby Waqqas St.	0	
	57	B2(2)	Nady St.	0	

Table 4.4.5 Locations for Installation of Traffic Signal Light

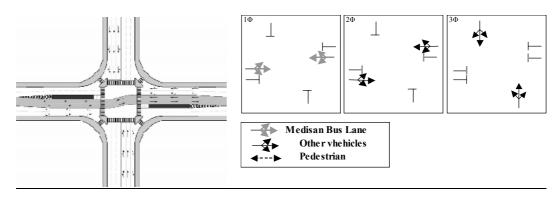
Source: JICA Study Team

b. Basic Control Concept

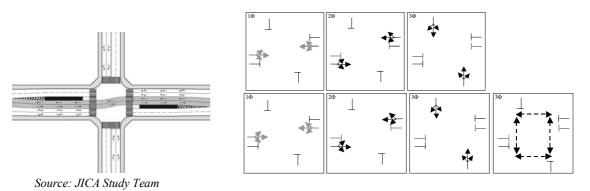
Traffic Signal Phase System

During peak periods, most major intersections were manually controlled by traffic policemen. This is because the current traffic congestion may be difficult to control with the existing system. Long cycle times of more than 4 minutes were observed in the field survey, due to the manual priority for heavy traffic directions. Thus, it is necessary to introduce a simple phase system setting one phase for two approaches. Figure 4.4.20 illustrates a sample of the proposed signal phase by typical intersections. In principle, the proposed signal phase is composed of three and four phases. A green arrow split for left-turn and the median bus lane, or all red for pedestrians. will be installed. These need to be modified according to specific traffic conditions.

Type A

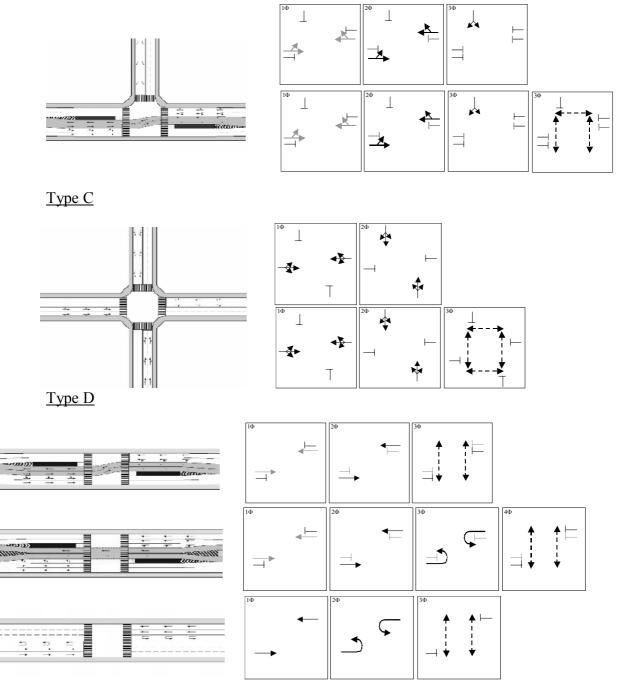


Type B 1





Type B 2



Source: JICA Study Team

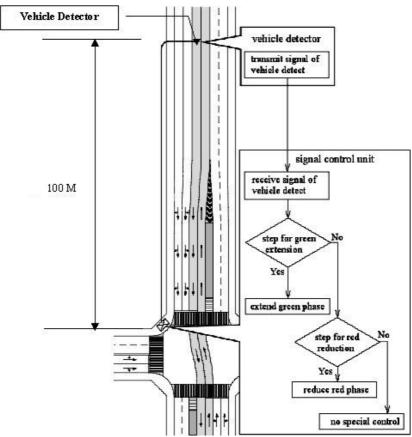
Figure 4.4.20 Proposed Signal Phase by Type of Intersection (continued)

Bus Priority Signal Control System

Figure 4.4.20 shows a basic control method for the bus priority signal control system by introducing an independent traffic-actuated control system. When a bus passes under an ultra sonic detector at the local facility, the vehicle detector transmits the signal detection to the local controller, the signal control unit sets a

step of green extension or a step of red reduction. This means that buses do not have to stop or the waiting time is shortened at intersections as much as possible.

The detectors for the bus priority signal control system will be placed at the entrance of each signalized intersection. Figure 4.4.21 shows the standard location plan of the detectors.



Source: JICA Study Team

Figure 4.4.21 Basic Control Method of Bus Priority Signal Control System

Synchronized Traffic Signal Control System

The synchronized traffic control means that the cycle time at each intersection has to be determined, depending on the signal control at adjacent intersections, and offset parameter must be established. A cycle and an offset is decided such that traffic delay (total or average) in the area of synchronized control is minimized. In the study, CREATS Program is a software application which has been designed for a traffic synchronized control system. This program creates the optimum offset pattern for a synchronized control system. A sample of the offset pattern, by introducing the through bands on Ahram St., is shown in Table 4.4.6 and Figure 4.4.22.

Key Intersection

The above-mentioned 54 intersections, subject to control by the synchronized control system, were divided into ten key intersections and 44 ordinary

intersections. A key intersection serves as the base point for determining the synchronized cycle, split and offset pattern. In principle, the key intersection will be controlled based on the type of offset pattern which is prepared in advance. Figure 4.4.23(1)(2) shows the location of key intersections.

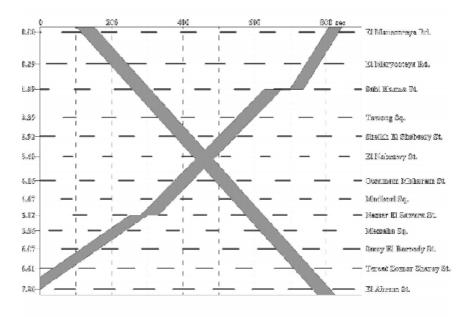
<u>Sub Area</u>

The sub area will be formulated based on the plan of the key intersection. The cycle length and offset pattern for a given sub area, which is made up of a number of signalized intersections, are selected from the control plans which are prepared in advance. All signals in the sub area thus have the same cycle length and appropriate offset pattern. In the same way, offsets at intersections which are located at the boundaries of two sub areas (included in each sub area) can be adjusted if two sub areas have the same cycle length.

No.	Intersection	Distance (km)	Offset (sec)	Bus Green Time (sec)	Red Time (sec)
1	Mansooreya Rd.	0.00	0	66	44
2	Maryoteya Rd.	0.89	80	53	57
3	Sahl Hamza St.	0.70	33	66	44
4	Taawon Sq.	0.80	105	71	39
5	Sheikh El Shebeeny St.	0.53	43	73	37
6	Nabarawy St.	0.56	93	83	27
7	Osman Moharam St.	0.68	44	69	41
8	Madkoor Sq.	0.51	90	80	30
9	Naser El Thawra St.	0.45	21	72	38
10	Mesaha Sq.	0.44	60	75	35
11	Samy El Baroody St.	0.51	106	63	47
12	Tereat El Zomor El Sharqy St.	0.54	45	64	46
13	Entrance of Ahram St.	0.59	98	51	59

Table 4.4.6 A Sample of Offset Pattern on Ahram St. during Morning Periods

Source: JICA Study Team



Source: JICA Study Team

Figure 4.4.22 A Sample of Offset Pattern and Through Bands on Ahram St. during Morning Peak Periods

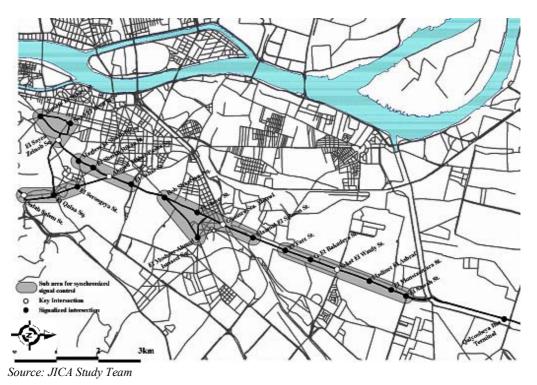


Figure 4.4.23 (1) Locations for Installation of Synchronized Traffic Signal Control System on Port Said St. and Qalaa St.

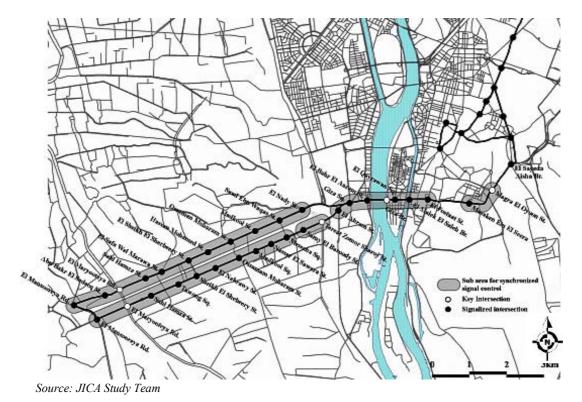
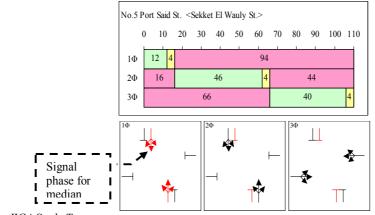


Figure 4.4.23 (2) Locations for Installation of Synchronized Traffic Signal Control System on Salah Salem St., Ahram St. and Malek Feisal St.

c. Design of Signal Cycle Time an Split Time

The calculation of the saturation flow rate and the saturation degree of the intersection was carried out, in order to formulate adequate signal splits. A sample of the saturation flow rate and the saturation degree of an intersection is shown in Table 4.4.7. Figure 4.4.24 shows a sample of the plan of signal cycle time and splits (For the results of all the proposed phasing systems, refer to Appendix B.).

A Sample of Plan of Signal Cycle Time and Splits





Source: JICA Study Team

Figure 4.4.24 A Sample of Plan of Signal Cycle Time and Splits

			Eastbound	d	Westbund			Northbound		Southbound		Bus Northbound			Bus Southbound			Í			
Approach			5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B		i i	
		T+R	Т	T+L	T+R	Т	T+L	T+R	-	Т	T+R	-	Т	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1			
2) Basic value of saturation fl	ow rate	2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000		-	2,000	-		
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00		i i	
4) Adjustment factor for righ	t	0.99	1.00	1.00	0.96	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.97	-	-	0.96	-		
5) Saturation flow rate		1,986	2,000 5,928	1,942	1,926	2,000 5,892	1,966	1,954	- 3,954	2,000	1,947	- 3,947	2,000	-	1,918 1,918	-	-	1,914 1,914	-		
7) PCU direction volume(bus)	1	33	149	43	35	140	95							50	106	16	63	99	5	İ	
.,	,		224			270			0			0			173			166			
8) PCU direction volume(othe	ers)	84	1,026	434	529	665 1,354	160	285	780 1,330	265	309	848 1.246	89	0	0	0	0	0	0		
9) PCU direction volume (tota	JD.	116	1,176	477	564	805	255	285	780	265	309	848	89	50	106	16	63	99	5	İ	
,	u)		1,769			1,624			1,330			1,246			173			166			
10) Flow rate			0.298			0.276			0.336			0.316			0.090			0.087		λί	Σλ
	1Φ														0.090			0.087		0.090	
11) Necessary phase ratio	2Φ								0.336			0.316								0.336	0.725
rij recessirj plase ratio	3 Φ		0.298			0.276														0.298	
	4Φ				(0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%	3%	0%		
14) Ratio of right turn		7%	0%	0%	35%	0%	0%	21%	0%	0%	25%	0%	0%	0%	29%	0%	0%	38%	0%		
PM Peak			Eastbound	d		Westbund	nd Northbound			Southbound Bus Northbound					ind	Bu	s Southbou	ind	I		
Approach			5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B			
		T+R	Т	T+L	T+R	Т	T+L	T+R	-	Т	T+R	-	Т	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation fl	ow rate	2,000	2,000	2,000																i i	
3) Adjustment factor for left		1.00			2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
4) Adjustment factor for righ		1.00	1.00	0.97	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-	ļ	
	t	0.99	1.00 1.00	0.97	-								-	-	-	-	-	-			
	t				1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00		0.99	-		1.00	-		
5) Saturation flow rate	t	0.99	1.00	1.00	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00	-		
5) Saturation flow rate 7) PCU direction volume(bus)		0.99	1.00 2,000 5,919 148	1.00	1.00	1.00 1.00 2,000 5,923 83	0.98	1.00	3,956	1.00	1.00		1.00	-	0.99 0.99 1,958 1,958 103		-	1.00 0.97 1,938 1,938 79			
.,		0.99 1,979 33	1.00 2,000 5,919 148 238	1.00 1,940 58	1.00 0.98 1,954 35	1.00 1.00 2,000 5,923 83 233	0.98 1.00 1,969 115	1.00 0.98 1,956	- - 3,956 0	1.00 1.00 2,000	1.00 0.97 1,948	- - 3,948 0	1.00 1.00 2,000	-	0.99 0.99 1,958 1,958	-	-	1.00 0.97 1,938 1,938	-		
.,)	0.99	1.00 2,000 5,919 148 238 903	1.00 1,940	1.00 0.98 1,954	1.00 1.00 2,000 5,923 83 233 1,025	0.98 1.00 1,969	1.00	- - 3,956 0 1,085	1.00	1.00	- - - - - - - - - - - - - - - - - - -	1.00	-	0.99 0.99 1,958 1,958 103	-	-	1.00 0.97 1,938 1,938 79			
7) PCU direction volume(bus)8) PCU direction volume(otherwork)) ers)	0.99 1,979 33	1.00 2,000 5,919 148 238 903 1,450	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 233 1,025 1,494	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000 294	1.00 0.97 1,948 286	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000	16	0.99 0.99 1,958 1,958 103 128 0	-		1.00 0.97 1,938 1,938 79 111 0			
7) PCU direction volume(bus)) ers)	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903	1.00 1,940 58	1.00 0.98 1,954 35	1.00 1.00 2,000 5,923 83 233 1,025	0.98 1.00 1,969 115	1.00 0.98 1,956	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000	1.00 0.97 1,948	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000	-	0.99 0.99 1,958 1,958 103 128	9	-	1.00 0.97 1,938 1,938 79 111	-		
7) PCU direction volume(bus)8) PCU direction volume(otherwork)) ers)	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903 1,450 1,050	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 233 1,025 1,494 1,107	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000 294	1.00 0.97 1,948 286	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000	- - 16	0.99 0.99 1,958 1,958 103 128 0 103	9	- 30	1.00 0.97 1,938 1,938 79 111 0 79	-	λί	Σλ
 PCU direction volume(bus) PCU direction volume(other section volume) PCU direction volume (total section volume)) ers)	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903 1,450 1,050 1,688	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 233 1,025 1,494 1,107 1,727	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000 294	1.00 0.97 1,948 286	3,948 0 786 1,173 786 1,173	1.00 1.00 2,000	- - 16	0.99 0.99 1,958 1,958 103 128 0 103 128 0 103 128 0.065	9	- 30	1.00 0.97 1,938 1,938 79 111 0 79 111 0.057	-		Σλ
 PCU direction volume(bus) PCU direction volume(othe PCU direction volume (tota PCU direction volume (tota Flow rate) ers) al)	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903 1,450 1,050 1,688	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 233 1,025 1,494 1,107 1,727	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000 294	1.00 0.97 1,948 286	3,948 0 786 1,173 786 1,173	1.00 1.00 2,000	- - 16	0.99 0.99 1,958 1,958 103 128 0 103 128	9	- 30	1.00 0.97 1,938 1,938 79 111 0 79 111	-	λi 0.065 0.439	
 PCU direction volume(bus) PCU direction volume(other section volume) PCU direction volume (total section volume)) ers) al) <u>10</u> 20	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903 1,450 1,050 1,688 0.285	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 233 1,025 1,494 1,107 1,727	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- 3,956 0 1,085 1,738 1,085 1,738 0,439	1.00 1.00 2,000 294	1.00 0.97 1,948 286	- 3,948 0 786 1,173 786 1,173 0.297	1.00 1.00 2,000	16	0.99 0.99 1,958 1,958 103 128 0 103 128 0 103 128 0.065	9		1.00 0.97 1,938 1,938 79 111 0 79 111 0.057	-	0.065 0.439	<u>Σλ</u> 0.796
 PCU direction volume(bus) PCU direction volume(othe PCU direction volume (tota PCU direction volume (tota Flow rate) ers) al) <u>10</u> <u>20</u> <u>30</u>	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903 1,450 1,050 1,688	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 1,025 1,494 1,107 1,727 0.292	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- 3,956 0 1,085 1,738 1,085 1,738 0,439	1.00 1.00 2,000 294	1.00 0.97 1,948 286	- 3,948 0 786 1,173 786 1,173 0.297	1.00 1.00 2,000	16	0.99 0.99 1,958 1,958 103 128 0 103 128 0 103 128 0.065	9		1.00 0.97 1,938 1,938 79 111 0 79 111 0.057	-	0.065 0.439 0.292	
 PCU direction volume(bus) PCU direction volume(othele) PCU direction volume (tot: 10) Flow rate Necessary phase ratio) ers) al) <u>10</u> 20	0.99 1,979 33 132 164	1.00 2,000 5,919 148 238 903 1,450 1,050 1,688 0.285 0.285	1.00 1,940 58 416 473	1.00 0.98 1,954 35 338 373	1.00 1.00 2,000 5,923 83 1,025 1,494 1,107 1,727 0.292 0.292	0.98 1.00 1,969 115 132 247	1.00 0.98 1,956 359 359	- - - - - - - - - - - - - - - - - - -	1.00 1.00 2,000 294 294	1.00 0.97 1,948 286 286	- 3,948 0 786 1,173 786 1,173 0,297 0,297	1.00 1.00 2,000 101	- 16	0.99 0.99 1,958 1,958 103 128 0 103 128 0.065 0.065	9	- 30 30	1.00 0.97 1,938 1,938 79 111 0 79 111 0.057 0.057	3	0.065 0.439	
 PCU direction volume(bus) PCU direction volume(othe PCU direction volume (tota PCU direction volume (tota Flow rate) ers) al) <u>10</u> <u>20</u> <u>30</u>	0.99 1,979 33 132	1.00 2,000 5,919 148 238 903 1,450 1,050 1,688 0.285	1.00 1,940 58 416	1.00 0.98 1,954 35 338	1.00 1.00 2,000 5,923 83 1,025 1,494 1,107 1,727 0.292	0.98 1.00 1,969 115 132	1.00 0.98 1,956 359	- 3,956 0 1,085 1,738 1,085 1,738 0,439	1.00 1.00 2,000 294	1.00 0.97 1,948 286	- 3,948 0 786 1,173 786 1,173 0.297	1.00 1.00 2,000	- - 16	0.99 0.99 1,958 1,958 103 128 0 103 128 0 103 128 0.065	9	- 30	1.00 0.97 1,938 1,938 79 111 0 79 111 0.057	-	0.065 0.439 0.292	

Table 4.4.7A Sample of Saturation Flow Rate and Saturation Degree of
Intersection

Source: JICA Study Team

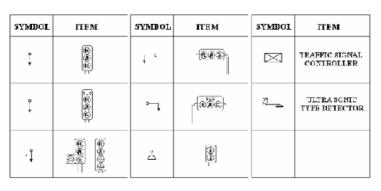
d. Standard Installation of Local Facilities

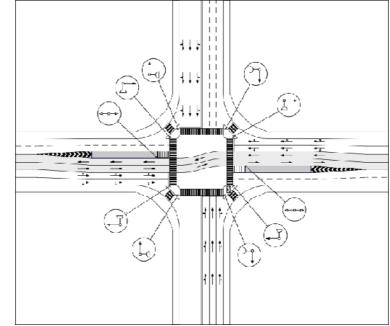
Standard local facilities near intersections are as follows: signal light, local controller, cabling and vehicle detector for buses. The standard installation of the plan for local facilities near intersections is shown by type of intersection.

Standard Installation Plan for Signal Lights

There are nine types of intersections, as given in Table 4.4.4 Type of Intersection. Of these, the standard installation plans, for major types of intersections, are shown in Figure 4.4.25 (1)-(5), based on the standard design of lights by using symbols.

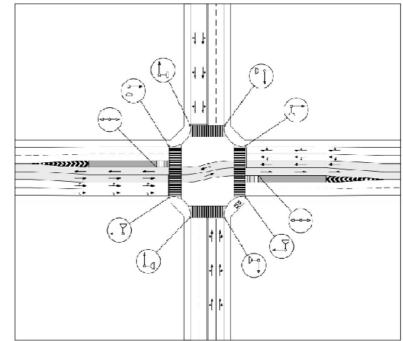
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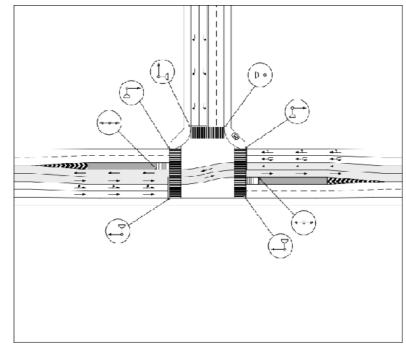
Source: JICA Study Team

Figure 4.4.25 (1) Standard Installation Plan of Traffic Signal Facility (Type A)



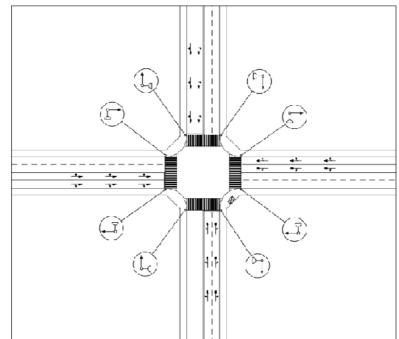
Source: JICA Study Team

Figure 4.4.25 (2) Standard Installation Plan of Traffic Signal Facility (Type B 1)



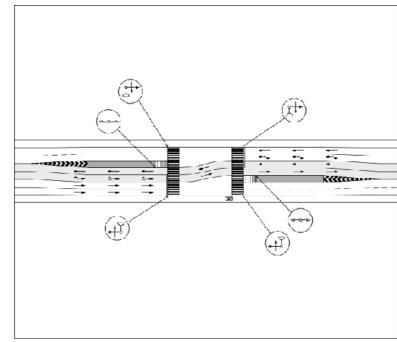
Source: JICA Study Team

Figure 4.4.25 (3) Standard Installation Plan of Traffic Signal Facility (Type B 2)



Source: JICA Study Team

Figure 4.4.25 (4) Standard Installation Plan of Traffic Signal Facility (Type C)

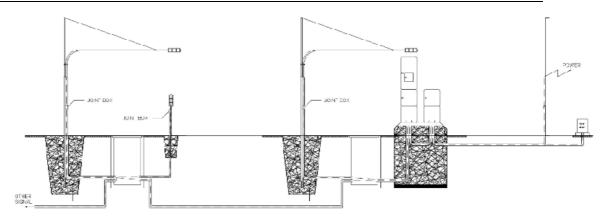


Source: JICA Study Team

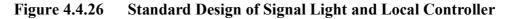
Figure 4.4.25 (5) Standard Installation Plan of Traffic Signal Facility (Type D)

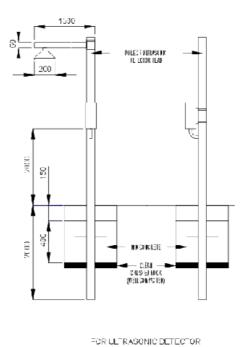
Standard Installation Plan for Signal Light Facilities

Figures 4.4.26 and Figure 4.4.27 show the standard design of a signal light, local controller and vehicle detector.



Source: JICA Study Team



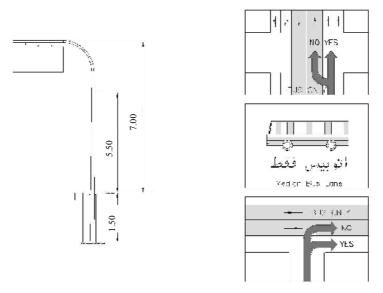


Source: JICA Study Team



Standard Installation of Traffic Sign

Guide signs required for the operation of the median bus lane system are shown in Figure 4.4.28. At the intersection, and in the area outside the median bus lane, the guide signs will be installed in order to warn drivers.



Source: JICA Study Team

Figure 4.4.28 Standard Design of Guide Sign

4.4.3 Intersection Improvement Plan

(1) General

This plan will cover the intersections which, based on the analysis of the current situation, are considered to be bottlenecks, and will have traffic signal lights installed. The traffic capacity of each intersection will be calculated. At target intersections where the traffic volume is in excess of the calculated capacity, the signal phases will be improved and/or the approach will be widened. Traffic channelization will be introduced where it is deemed particularly necessary and where the shape of the intersection will change due to the widening of the approach.

(2) Improvement of Measures by Intersections

Along with the introduction of the bus priority system, the improvement of the traffic signal control system, the pedestrian-friendly system, and the traffic circulation system, it is necessary to improve intersections to enhance the beneficial effects of each system. This section discusses the improvement of intersections that should become necessary in conjunction with the installation of the above-mentioned traffic management program. The channelization plans were reviewed for intersection improvements, based on the following factors:

- Plan of bus priority system
- Addition of exclusive median bus lanes
- Addition of a bus stop station on median lanes

- a. Installation of planned traffic signal lights
- Planned-signalized intersections (including U-turn points)
- Bus priority signal facilities
- Addition of exclusive left-turn/right-turn lanes
- Improvement of channelizing islands
- b. Plan of pedestrian-friendly system
- Pedestrian crossing facilities
- Traffic safety facilities
- c. Plan of traffic circulation system
- Traffic regulation
- Lane operation improvement for handling traffic flow

These reviews were conducting according to the existing traffic volume, the existing shape of the intersections, and existing committed plans.

1) Subject Intersections

The intersection improvement plan covers the 54 intersections that are to be planned for the traffic management program.

2) Planning Conditions

The intersection improvement plan was prepared on the basis of the following conditions:

- 1. Intersection improvement works shall be implemented without increasing the existing road width.
- 2. The planned traffic shall be used for the existing traffic volume.
- 3. Minimum lane width shall be 3.0 meters.

3) Improvement Items

In conjunction with the bus exclusive lane at existing intersections, as called for in the plan of the median bus lane system, a pavement marking plan for the intersections was prepared in order to achieve a smooth flow of traffic. In addition, in conjunction with the installation of traffic signal lights at non-signalized intersections, a channelization plan for these intersections was prepared in order to control traffic flow on major and miner approaches and to ensure the safety of pedestrians. These improvements are listed in Table 4.4.8. Salient points of the improvements are discussed below.

Improvement Measures	A. Plan of bus priority system	B. Installation of planed traffic signal lights	C. Plan of pedestrian -friendly system	D. Plan of traffic circulation system
1. Improvement of pavement markings where lane operation to be altered	0	0	Ο	0
2. Addition of exclusive left-turn/right-turn lanes		0		0
3. Installation of pedestrian crossings	0	0	0	0
4. Improvement of channelizing island	0	0	0	0
5. Improvement of median	0			
6. Improvement in conjunction with median bus lane system	0			
7. Improvement of corner cut	0	0		0

Table4.4.8Improvement Measures

Source: JICA Study Team

a. Improvement of Pavement Markings Where Lane Operation is to be Altered

Pavement markings such as arrows, stop lines, exclusive bus lanes, and center lines will be improved at intersections where the median bus lane is segregated or where the system of lane operation is to be altered due to changes in traffic demand.

b. Addition of Exclusive Left-Turn/Right-Turn Lanes

Exclusive left-turn/right-turn lanes will be established at intersections with a high volume of left-turning traffic and right-turning traffic, in order to ensure the smooth flow of straight-through traffic and to process left-turning traffic and right-turning traffic more efficiently. The plan for the addition of lanes should be designed based on the following items:

- Exclusive left-turn lanes will be provided with left-turn pockets.
- Exclusive right-turn lanes will be provided with channelizing islands.
- Left-turn pockets will be constructed either by cutting off the median and allotting the resulting space to the pocket or, where there is no median, by shifting the center line to the lane in the opposite direction.
- c. Installation of Pedestrian Crossings

In conjunction with the installation of signal lights and the median bus lanes, pedestrian crossings will be provided at intersections.

d. Improvement of Channelizing Islands

Improvements with respect to the locations and shapes of channelizing islands were reviewed for intersections which have a high volume of right-turning traffic and which require more than the current number of exclusive right-turn lanes, and for intersections where the turning movement of vehicles will be altered by the bus stop station of the median bus lane system.

e. Improvement of Median

In conjunction with the installation of bus stop stations on the median bus lane system, medians that are located where U-turn traffic or left-turning traffic pass through will be cut away.

f. Improvement in Conjunction with the Median Bus Lane System

Markings and signs will be improved as necessary for the operation of the median bus lane system.

g. Improvement of Corner Cut

The corner cut will be reviewed as necessary for the operation of the median bus lane system, and at intersections where channelizing islands are provided.

The improvements required at each intersection are listed in Table 4.4.7.

4) Standard Intersection Layout

The subject intersections are divided into the nine (9) types e.g. Type A with/without bus lane, Type B1 with/without bus lane for 4-legs, Type B2 with/without bus lane for 3-legs, Type C and Type D (refer to Table 4.4.3 Type of Intersection). Table 4.4.9 shows the improvement measures by intersection. The standard layout of each type is shown in Figure 4.4.29.

Street	Inte	rsection	N	Aain F	roject	S		Im	prove	ment l	Measu	ires	
Sileei	No.	Туре	Α	В	С	D	1	2	3	4	5	6	7
	1	B2(2)		0	0		0	0	0	0	0	0	0
	2	A(1)	0	0	0		0	0	0	0			0
	3	B2(1)	0	0	0		0	0	0	0	0	0	0
	4	B2(1)	0	0	0		0	0	0	0	0	0	0
	5	A(1)	0	0	0		0	0	0	0	0	0	0
	6	B2(1)	0	0	0		0	0	0	0	0	0	0
	7	B2(1)	0	0	0		0	0	0	0	0	0	0
	8	B2(1)	0	0	0		0	0	0	0	0	0	0
	9	D	0	0	0		0	0	0	0	0	0	0
Port Said St.	10	B2(1)	0	0	0		0	0	0	0	0	0	0
	11	A(1)	0	0	0		0	0	0	0	0	0	0
	12	A(1)	0	0	0		0	0	0	0	0	0	0
	13	С		0	0		0	0	0	0			0
	14^{*1}	B1(2)		0	0		0	0	0	0	0	0	0
	15	B1(1)	0	0	0		0	0	0	0	0	0	0
	16	B1(1)	0	0	0		0	0	0	0	0	0	0
	17^{*2}	B1(2)		0	0	0	0	0	0	0	0	0	0
	18	С		0	0		0	0	0	0	0	0	0
	19	С		0	0		0	0	0	0	0	0	0

 Table 4.4.9
 Improvement Measures by Intersection

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Cu. i	Inter	rsection	N	Aain F	Project	S		Im	prover	ment	Measu	ires	
Street	No.	Туре	Α	В	C	D	1	2	3	4	5	6	7
	20^{*1}	B1(2)	0	0	0	0	0	0	0	0	0	0	0
	21^{*2}	B1(2)	0	0	0	0	0	0	0	0	0	0	0
Qalaa St.	22	C	0	0	0	0	0	0	0	0	0	0	0
	23	С	0	0	0	0	0	0	0	0	0	0	0
	24 ^{*3}	B1(2)	0	0	0	0	0	0	0	0	0	0	0
	25^{*3}	B1(2)		0	0	0	0	0	0	0	0	0	0
	26	B1(2)		0	0		0	0	0	0	0	0	0
	27	D	0	0	0		0	0	0	0	0	0	0
	28	B1(1)	0	0	0		0	0	0	0	0	0	0
Salah Salem	29	A(2)		0	0		0	0	0	0			0
St.	30	B1(1)	0	0	0		0	0	0	0			0
	31	B1(1)	0	0	0		0	0	0	0	0	0	0
	32	B1(1)	0	0	0		0	0	0	0			0
	33	A(2)		0	0		0	0	0	0			0
	34	B2(2)		0	0		0	0	0	0			0
	35	D	0	0	0		0	0	0	0	0	0	0
	36	D	0	0	0		0	0	0	0	0	0	0
	37	D	0	0	0		0	0	0	0	0	0	0
	38	D	0	0	0		0	0	0	0	0	0	0
	39	D	0	0	0		0	0	0	0	0	0	0
Ahram	40	D	0	0	0		0	0	0	0	0	0	0
Allalli	41	D	0	0	0		0	0	0	0	0	0	0
	42	D	0	0	0		0	0	0	0	0	0	0
	43	D	0	0	0		0	0	0	0	0	0	0
	44	D	0	0	0		0	0	0	0	0	0	0
	45	B1(2)		0	0		0	0	0	0	0	0	0
	46	A(1)	0	0	0		0	0	0	0	0	0	0
	47	B1(2)		0	0		0	0	0	0			0
	48	B2(2)		0	0		0	0	0	0			0
	49	A(2)		0	0		0	0	0	0			0
	50	B2(2)		0	0		0	0	0	0			0
	51	B2(2)		0	0		0	0	0	0			0
Malek Feisal	52	B2(2)		0	0		0	0	0	0			0
	53	B2(2)		0	0		0	0	0	0			0
	54	B2(2)		0	0		0	0	0	0			0
	55	B2(2)		0	0		0	0	0	0			0
	56	B2(2)		0	0		0	0	0	0			0
	57	B2(2)		0	0		0	0	0	0			0

Note: 1) Type: Standard of typical intersection

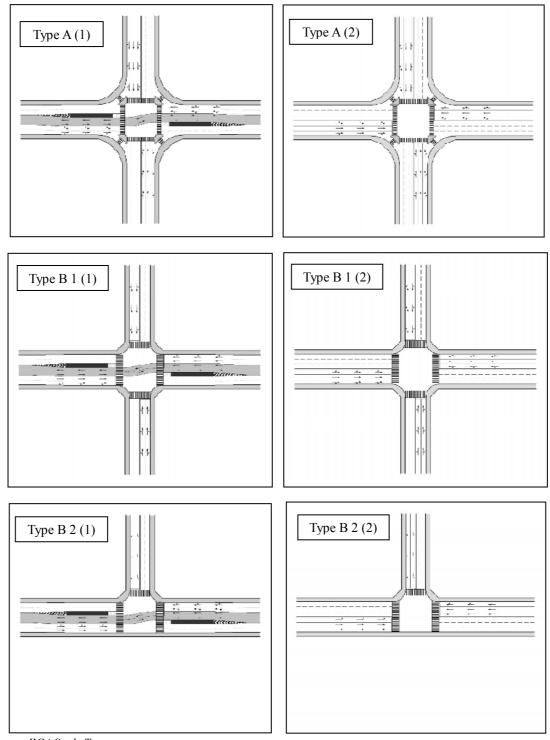
2) Main Projects: A: Plan of bus priority system, B: Improvement of planed traffic signal lights, C: Plan of pedestrian-friendly system, E: Plan of traffic circulation system.

3) Improvement Measures: 1: Improvement of pavement markings where lane operation to be

altered, 2: Addition of exclusive left-turn/right-turn lanes, 3: Installation of pedestrian crossings, 4: Improvement of channelizing island, 5: Improvement of median, 6: . Improvement in conjunction with median bus lane system, 7: Improvement of corner cut,

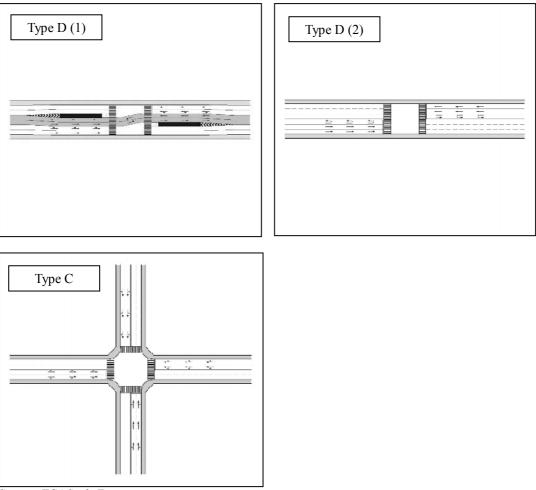
4) *: Same location, $14^{*1} = 20^{*1}$, $17^{*2} = 21^{*2}$, $24^{*3} = 25^{*3}$

Source: JICA Study Team



Source: JICA Study Team

Figure 4.4.29 Standard Typical Intersection



Source: JICA Study Team

Figure 4.4.29 Standard Typical Intersection (Continued)

5) Action Plan of intersection Improvement at Current Bottlenecks

As previously highlighted out in the analysis of current traffic congestion on Metro 4 Corridor, the serious bottlenecks will be improved by introducing several traffic measurements. Based on the above-mentioned, the plan of the bus priority system, the traffic signal control system and the channelization system, the action plans for intersection improvements at bottlenecks are shown below. The target bottlenecks are as follows:

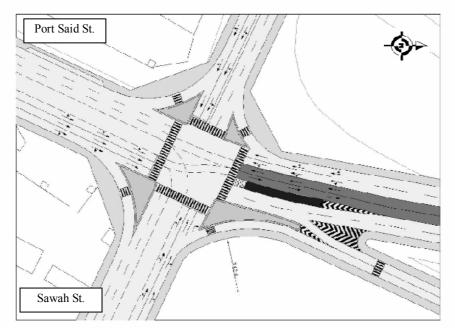
- Port Said St.-Sawah St. intersection
- Salah Salem St.-Malek El Saleh Br. intersection
- Giza Sq. intersection
- a. Action Plan for Port Said St.-Sawah St. Intersection

The current traffic issues at Port Said St.-Sawah St. intersection are as follows: the intersection will be improved by introducing a traffic signal control system and a

channelization system, in accordance with the plan of the median bus lane system. Figure 4.4.30 shows the improvement plan for the intersection.

Major Traffic Issues:

- Long traffic queues at approaches in the north and east directions due to the U-turn system;
- Complex turning movement due to multi-legs and the tram track, and
- Long cycle times due to manual priority for heavy traffic directions.



Source: JICA Study Team

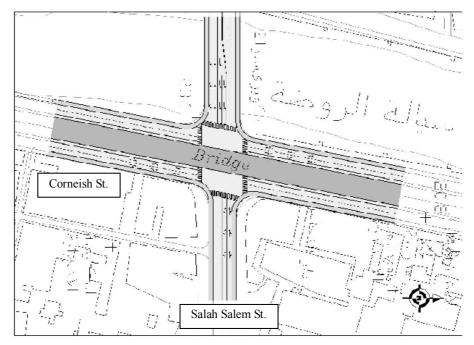
Figure 4.4.30 Improvement Plan for Port Said St.-Sawah St. Intersection

b. Action Plan of Salah Salem St.-Malek El Saleh Br. Intersection

The current traffic issues at Salah Salem St.-Malek El Saleh Br. intersection are as follows: the intersection will be improved by introducing a traffic signal control system and a channelization system, with the addition of exclusive left-turn lanes. Figure 4.4.31 shows the improvement plan for the intersection.

Major Traffic Issues:

- Long traffic queues at the approach for the west direction due to heavy right-turn vehicles, and
- Long cycle times due to the manual priority for heavy traffic directions.



Source: JICA Study Team

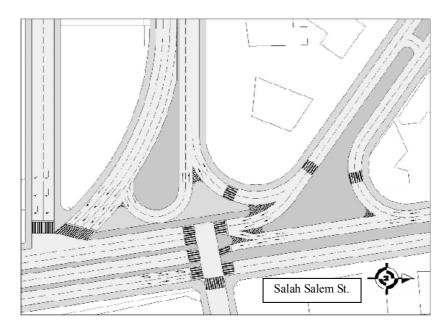
Figure 4.4.31 Improvement Plan for Salah Salem St.-Malek El Saleh Br. Intersection

c. Action Plan of Giza Sq. Intersection

The current traffic issues at Giza Sq. intersection are as follows: the intersection will be improved by introducing a traffic signal control system and a channelization system. Figure 4.4.32 shows the improvement plan for the intersection.

Major Traffic Issues:

- Long traffic queues at the approach for north and east/west directions due to the conflict with entering traffic;
- Serious conflict between U-turn traffic from a westerly direction and through traffic from an easterly direction;
- Conflict between buses and shared taxis near the intersection, and
- Complex turning movements due to multi-legs.



Source: JICA Study Team

Figure 4.4.32 Improvement Plan for Giza Sq. Intersection

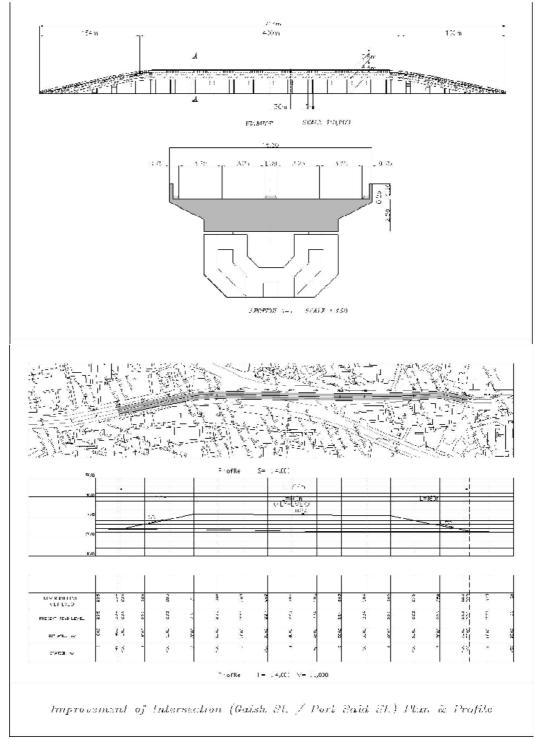
6) Grade-Separated Intersection (Viaduct)

As the results of the Master Plan, it was proposed that a grade-separated intersection (viaduct) should be constructed at Port Said St., Salah Salem St., Ahram St. and Malek Feisal St.. Proposed grade-separated intersections are as follows:

- Port Said St.: Port Said St.-Bab El Shaareya Sq.
- Salah Salem St.: Salah Salem St.- Magra El Oyoon St.
- Ahram St.: Ahram St.-Maryoteya Rd
- Malek Feisal St.: Malek Feisal St.- Maryoteya Rd

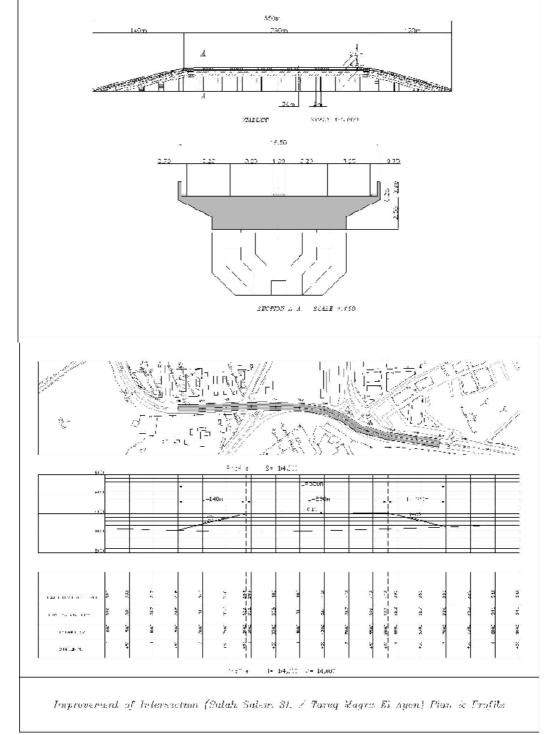
When a new road is designed, the American road design standards "A Policy on Geometric Design of Highways and streets (AASHTO)" is generally adopted. In determining the geometric design elements to be adopted in this study, it was decided to refer to two design manuals: the American standards and Japanese design standards. The major geometric design elements for Metro 4 Corridor are as follows: Minimum radius of horizontal curve, design speed 60-80km/h, 150-280m; maximum longitudinal grade, design speed 60-80km/h, 4-5%, 7-9% respectively; passing sight distance, design speed 60-80km/h, 250-400m, 350-514m respectively; design speed, 60-80km/h; vertical clearance, 5.5m.

Based on these geometric design elements and the current road situation, the general profile of four grade-separated intersection are shown in Figure 4.4.33 (1)-(4).



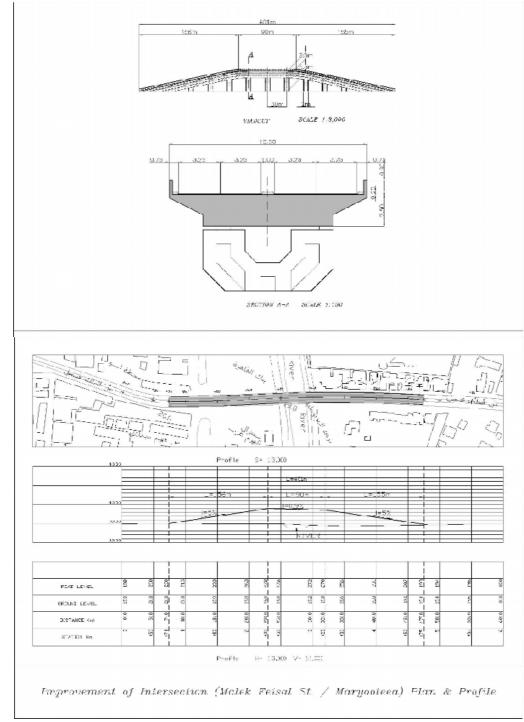
Source: JICA Study Team

Figure 4.4.33 (1) General Profile of Grade-Separated Intersection on Port Said St.-Bab El Shaareya Sq.



Source: JICA Study Team

Figure 4.4.33 (2) General Profile of Grade-Separated Intersection on Salah Salem St.- Magra El Oyoon St



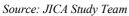
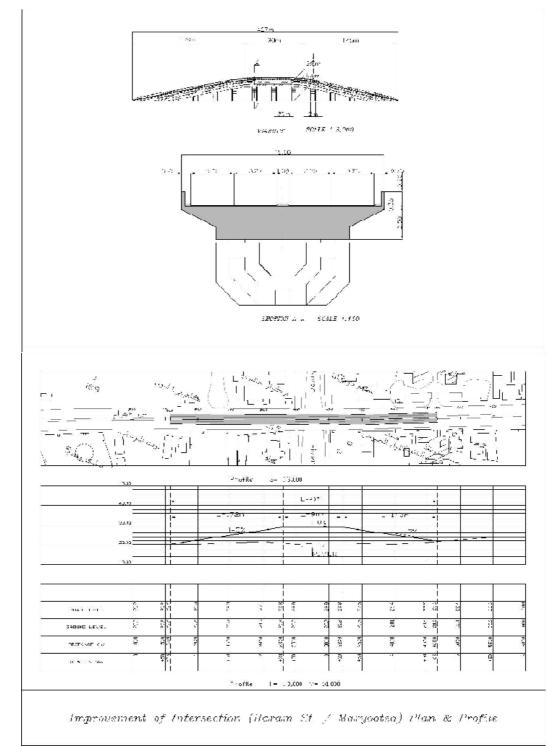


Figure 4.4.33 (3) General Profile of Grade-Separated Intersection on Ahram St.- Maryoteya Rd



Source: JICA Study Team

Figure4.4.33 (4) General Profile of Grade-Separated Intersection on Malek Feisal St.- Maryoteya Rd

APPENDIX A

AN INTRODUCTION TO THE MEDIAN BUS LANE SYSTEM FOR BOGOTA CITY IN THE REPUBLIC OF COLOMBIA (TRANSMILENIO)

APPENDIX A: AN INTRODUCTION TO THE MEDIAN BUS LANE SYSTEM FOR BOGOTA CITY IN THE REPUBLIC OF COLOMBIA (TRANSMILENIO)

This appendix presents a brief description of the introduction of the median bus lane system for Bogota City in the Republic of Colombia (Bus Rapid Transit mass transportation system called "Transmilenio"). The source of information is from project 46, "Transmilenio: a Way of Life, Colombia".

A-1 BACKGROUND, GOALS AND OBJECTIVES

TransMilenio is a mass transportation system based on buses in network-fed corridors in the city of Bogota. "TransMilenio" is based on two general objectives are to improve the citizens quality of life and to improve the productivity of the city; these are based on five principles:

- <u>Respect for life</u>: human treatment for the users and drivers, accident reduction and reducing the number of contaminating particles.
- <u>Respect for the users time</u>: reducing the travel time by 50 % so that the users can perform productive, cultural and recreational activities.
- <u>Respect for human diversity</u>: recognizing the differences between individuals giving everyone equal access without discrimination based on physical condition, age, sex and family income.
- <u>Quality and Consistency</u>: guaranteeing the service with the highest international standards for everyone, all the time.
- <u>Reasonable costs</u>: accessible to all users, profitable for the private operators and fundable by the state.

These principles attempt to solve problems such as:

- <u>Slowness</u>: the average trip of a citizen in Bogota used to last 1 hour 10 minutes. This time is 100 % higher that the world average for comparable cities.
- <u>Inefficiency</u>: Public service routes that were too long (30 kilometers on average), operating with old buses (average age 14 years) with a low occupancy.
- Lack of security.

A-2 PROJECT TEAM AND SKILLS

TransMilenio is a public-private partnership project put together by a host of local agencies and private companies. Organization of the project is as follows:

Sector	Agency or Company	Skills
	Office of the Mayor	Leadership
	TRANSMILENIO S.A.	Public company
	Institute for Urban Development	Contracting infrastructure development and oversight
Public	Secretary of Transportation and Traffic	Reorganization of existing transit routes; enforcement; regulation; signalling
	Department of Planning	Insertion of the bus rapid transit system in the comprehensive plan; approval of road, public space and urban design
	Secretary of Finance	Budgeting and allocation of resources for infrastructure capital investments
	City Council (Local Elected Body)	Approval of plans, TRANSMILENIO S.A. creation and city budget
	Trunk Operation Concessionaries: SI99 S.A.; Expres del Futuro S.A.; SITM S.A.; Metrobus S.A.	Companies created out of existing transit operators for bus acquisition, drivers and maintenance personnel retention, operation and maintenance of buses
	Feeder Buses operation contractors: SIDAUTO, CODATERMIL; URIBE-URIBE; ALCON; ALNORTE	Existing transit operators, transformed to be able to operate feeder buses
Private	Fare Collection Concessionary: ANGELCOM S.A.	In charge of the billeting system, fare collection and money administration, using cutting edge technology
	Control centre provider: Electronic Traffic ETRA	Contractor of the installation and customisation of the largest real time control system for buses in Latin America and Spain
	Design, construction and supervision contractors	Companies providing their knowledge and capacity to design, build and supervise the system set up in 48 months

A-3 TECHNOLOGY/INNOVATIONS COMPONENTS

The control of the system is made through a satellite control centre that supervises in real time and permanently the operation of the buses and the number of passengers

that go in and out of the stations. Each vehicle that belongs to the network service has a GPS receiver that reports the location of the bus and a voice and data communication system through which information is sent and received to and from the Control Centre.

The entrance and departure gates in the stations are connected by radio and fiber-optic communication systems, so that it is possible to know the number of passengers that go in and out of the system. From the control centre changes are made to the services according to the operating conditions and the demand observed in real time.

The system has a combination of services (normal and express) that considerably increase the ability of the system to mobilize passengers. The express service serves specific origin-destination pairs in long trips and the normal service serves short routes since they stop at all the stations.

The achievements, capacity and mobility for "TransMilenio" are as follows:

- 401 network buses and 138 feeders in operation;
- Integrated ticket price \$900 Pesos (US \$ 0.40);
- 38 kilometers in operation;
- 60 stations in operation;
- 8 express routes, 2 normal and 19 feeder routes;
- 11 localities and more than 35 neighbourhoods under the influence of the system;
- 560.000 passengers mobilized daily. 10% of whom used to drive;
- Total number of passengers mobilized: 100.000.000, and
- Average speed for each trip: 26.7 Km/hr.

A-4 PROBLEMS ADDRESSED/OVERCOME

Taking into account the fact that public transportation in the city has always been provided with no controls, organization and without business parameters, in the beginning of the process there was opposition on behalf of the transportation businessmen, and the vehicle drivers and owners. This was more evident when the decision was made to physically dispose of 70 passenger buses to allow the entrance of an articulated bus in order to reduce the excess supply of transportation that existed in the city. The transportation businessmen made all the efforts to allow the vehicles to be disposed of using resources from the Capital District. However, after a lot of hours of negotiation, they were convinced that they were the ones who should provide the money and dispose of the vehicles. This resistance changed as the transportation businessmen and drivers participated in the design of the project.

A-5 VERIFIABLE INDICATORS

Comparing the years 1999 and 2001, there can be seen a reduction in 100 % of the fatalities and 54 % of the injured resulting from car accidents; this is the result of a

reduction of 86.4 % in simple crashes and 97.6 % in reported run-over accidents. Additionally, there has been an observed reduction of 47.2 % in reported theft. Reduction in the travel time by 50 % for the trips made within the system. The infrastructure work generated 7,300 direct jobs and 10,000 indirect jobs. 3,000 direct jobs have been generated in the operation. International alliances have been set up to make buses in Colombia, and this has been a beneficial result for the domestic automotive industry. Access for the handicapped: it will be estimated that 1 % of the users of the system (5,200 people per day) has some kind of handicap. To date 1,232 old buses have been retired from service with an average capacity of 60 passengers each. These vehicles had high contamination levels, physical deterioration, and an average use of 20 years. The noise and particle contamination has been reduced by 30 % in the corridors used by the system.



Central Lane System



Segregated from the General Traffic



Pedestrian Bridge linking to Bus Stop



Car Interior of Articulated Bus

A-6 PROJECT OGANIZATION, BACKING & ECONOMICS

(1) Owner and Collaborators

TRANSMILENIO S.A. is a stock based enterprise that performs, organizes and plans the massive urban passenger public transportation service in the city of Bogot • and its area of influence. The company is made up of the fund for education and road safety of the Secretary of Transit and Transportation of Bogot • (FONDATT) with 66.67 % of the stock, the Institute for Urban Development with 33.23 % of the stock, the District Institute of Culture & Tourism (DICT), the Capital District, and Metrovivienda, each one with 0.0333% of the stock. All stockholders are public institutions from the District.

(2) Scale and Facilities

Number of technical devices in use: 401 articulated buses with a capacity for 160 passengers, 138 conventional buses with a capacity for 70 passengers, 53 single stations, 4 head stations, 4 intermediate stations 4 parking lots and shops, 26 pedestrian bridges, 1 fleet satellite control center.

(3) Operating Network

The size of operating network is 38 kilometers of network corridors that serve 11 localities and more than 35 neighborhoods. Number of persons concerned is 11,000 commuters and 550,000 residents

(4) Start and/or Duration of Project

- Start-up date of the project: 6 January 2001.
- Start-up date of the pilot project: 18 December 2000

A-7 LESSONS OF THE PAST AND LOOKING TO THE FUTURE

In 15 years TransMilenio plans to operate 388 kilometers of new routes in Bogota carrying 5 million people per day.

(1) Potential for Reliability

Bogota experience is recent and it lacks enough published materials. Nevertheless, it has been studied for implementation in other Colombian cities, and some other Latin American cities. Ibagua Bucaramanga and Pereira, medium size cities for Colombia (500,000 to 1 million inhabitants) are currently preparing projects to set-up bus systems, using bus ways and economic incentives for operations similar to those applied in Bogota. Valencia, Venezuela, Panama City and Lima, are looking into TransMilenio's experience to start up projects. TransMilenio's novel experience was also shared with 16 countries that visited Bogota in November 2001, for a seminar about the experience in Bogota.

The principles for TransMilenio's mobility strategy are universal in developing countries and could be considered, of course with an adaptation, to other conditions. The main recommendations for other cities are:

- Follow a continuous process with cooperative work among local, regional and national institutions, in which the objectives and strategies are clear from the very beginning.
- Create project task forces to provide coordination of the activities, especially if a complex institutional environment is in place.

- Assign important technical and financial resources for project preparation and implementation, with a clear goal to make them happen rather than making studies to decide what to do.
- Make an effort to involve stakeholders that may oppose project implementation to minimize political risks.
- Think in the long term, with specific actions that have immediate effects to show the potential of the initiatives.
- Seek financial sustainability of each initiative, using measures that also support the basic principles, such as fuel taxes, property value capture, tolls, privatisations, even if these measures are not popular.
- Leave in hands of the private sector the provision of services, but give the right incentives and improve the regulatory framework. Bogota has had private provision of public transportation for many years (beginning 1932), nevertheless, operations are not adequate, as a result wrong economic incentives, inappropriate regulation and lack of effective control. It is expected that the success of TransMilenio will result in a gradual transformation of this situation.

Some important lessons of the system implementation are:

- Information campaigns are essential. It is necessary to create awareness on which is the transportation system the city deserves for existing and upcoming generations. This is a way for the project became owned by the community, increasing its participation in the benefits and making them politically, social and financially feasible. For instance, the system initiated operations without charge for three weeks, allowing more than 1 million users the get acquainted with TransMilenio.
- Participation of stakeholders that may feel that they would be affected is critical. For example, the participation of existing bus operators, enriched the way TransMilenio system was structured and helped avoid large traumas.
- Set up of task forces to allow for institutional coordination and fast execution of processes. These task forces helped in contracting and following up preparation studies, some of them with well-recognized international firms associated with local firms. These mechanisms achieved fast transfer of knowledge and technology; increased the quality and credibility, and facilitated the participation of local and international investors.
- Study previous experiences. Among lessons learned from other cities, it is worth to mention examples of organized bus systems in Curitiba, Sao Paulo, Santiago de Chile and Quito, which helped in planning TransMilenio.

The main recommendations of what not to do, are:

• Do not ask consultants what to do, ask them how. The transportation planning history of the city is full of studies and proposals that were never accomplished. Most of them were the result of comprehensive studies trying to indicate what should be done, without the adequate resources to make the projects happen. This time, it was clear for the city administration, what was possible and doable, and consultants helped shaping these ideas into feasible activities.

- Do not make one turnkey contract; be your own manager. Big contracts with everything inside have been disastrous in the Colombian experience. Usually they end up in endless court disputes. The city decided to have many contracts of specific pieces, with proper management and supervision from the Institute for Urban Development. This helped the local construction industry to have wider participation, and to have the best possible providers in each type of infrastructure (roads, metallic overpasses, stations, etc.). This is what usually a turnkey contractor does, at a very high administrative cost and overhead.
- Do not try to get everything done at the same time. TransMilenio was implemented gradually as the infrastructure and buses became available. This allowed for fast learning and made possible to make adjustments on the rest of the infrastructure and operations.

APPENDIX B

PROPOSED SIGNAL SYSTEM FOR SIGNALIZED INTERSECTION

APPENDIX B: PROPOSED SIGNAL SYSTEM FOR SIGNALIZED INTERSECTION

This appendix presents the results of proposed signal system along Metro 4 Corridor. The calculation of the saturation flow rate and the saturation degree of the intersection was carried out, in order to formulate adequate signal splits. All the saturation flow rate, the saturation degree of the intersection and the proposed signal phasing system are shown as follows:

B-1 SATURATION FLOW RATE AND SATURATION DEGREE BY TARGET INTERSECTIONS

The saturation flow rate and the saturation degree by the target intersections are shown in Table B.1.

B-2 PROPOSED SIGNAL PAHSING SYSTEM FOR KEY SIGNALIZED INTERSECTION

The proposed signal phasing system for key intersections is shown in Figure B.1.

Table B.1 Saturation Flow Rate and Saturation Degree by Target Intersections

Intersection No.1: Port Said St., Qalyoobeya Bus Terminal

		E	Castbour	nd		Westbur	d	N	orthbou	nd	S	outhbou	nd	Bus	Northb	ound	Bus	Southb	ound		
Approach			1 - 1			1 - 2			1 - 3			1 - 4			1 - 3B						
									Т	L	T+R	Т		1	T+L		-	T+R	-		
) No. of lanes									1	1	1	1		-	1		-	1	-		
) Basic value of saturation fl	ow rate								2,000	1,800	2,000	2,000		-	2,000	-		2,000	-		
) Adjustment factor for left									1.00	1.00	1.00	1.00		-	1.00		-	1.00			
) Adjustment factor for righ	t								1.00	1.00	0.98	1.00		-	1.00	-	-	1.00	-	1	
) Saturation flow rate									2,000	1,800	1,968	2,000		-	1,996		-	1,997	-]	
) Saturation now rate									2,000	1,800	3,9	968			1,996			1,997			
) PCU direction volume(bus	`													0	204	4	2	136			
) i ce un certon voranne(bus	,		-												208			138	-		
) PCU direction volume(oth	ers)								906	160	118	671		0	0	0	0	0	0		
				_		-			906	160		89			0			0			
) PCU direction volume (tot	aD								906	160	118	671		0	204	4	2	136	0		
, , ,	,								906	160		89			208			138			
0) Flow rate	-			_		-			0.453	0.089	0.	199			0.104			0.069		λί	Σλ
	1Φ														0.104			0.069		0.104	4
1) Necessary phase ratio	20	I							0.453			0.199								0.453	0.64
,	3 Φ	L							(411.17	0.089	1	<u> </u>								0.089	-
	4 Φ										edestria	/								0.000	1
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	1%	0%		

РМ	Peak	

		E	astbou	ıd	v	Vestbun	d	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southb	ound		
Approach			1 - 1			1 - 2			1 - 3			1 - 4			1 - 3B						
									Т	L	T+R	Т			T+L			T+R			
1) No. of lanes									1	1	1	1			1			1			
2) Basic value of saturation flo	w rate								2,000	1,800	2,000	2,000			2,000			2,000			
3) Adjustment factor for left									1.00	1.00	1.00	1.00			0.98			1.00			
4) Adjustment factor for right									1.00	1.00	0.98	1.00			1.00			0.98			
5) Saturation flow rate									2,000	1,800	1,968	2,000			1,968			1,965			
5) Saturation now rate									2,000	1,800	3,9	968			1,968			1,965			
7) PCU direction volume(bus)														0	12	2	3	15			
() I CO uli ection volume(bus)															14			18			
8) PCU direction volume(othe)								982	173	147	836		0	0	0	0	0	0		
b) I CO dil ection volume(otne)	15)								982	173	9	83			0			0			
9) PCU direction volume (tota	n								982	173	147	836		0	12	2	3	15	0		
, , ,	.,								982	173		83			14			18			
10) Flow rate									0.491	0.096	0.2	248			0.007			0.009		λί	Σλ
	1Φ														0.007			0.009		0.009	
11) Necessary phase ratio	2 Φ								0.491			0.248								0.491	0.596
rij recessary plase ratio	3 Φ									0.096										0.096	
	4 Φ									ll Red fo										0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	16%	0%		

Intersection No.2: Port Said St., Sawah St.

		E	lastbou	nd	W	estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	Southbo	ound		
Approach			2 - 1			2 - 2			2 - 3			2 - 4			2 - 4			
		R	Т	T+L	R	Т	T+L	R	Т	T+L	R	Т	T+L		T+L			
) No. of lanes		1	1	1	1	1	1	1	2	1	1	1	1		1			
) Basic value of saturation flo	w rate	1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000		2,000			
6) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98		0.97			
) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00			
) Saturation flow rate		1,800	2,000	1,930	1,800	2,000	1,943	1,800	4,000	1,956	1,800	2,000	1,969		1,937			
) Saturation now rate		1,800	-).	930	1,800	- 7	943	1,800		956	1,800	3,9	969		1,937			
) PCU direction volume(bus)		246	354	265	194	341	132	33	329	66					113	48		
, ree an ección volume(bus)		246		19	194		73	33		95					160			
B) PCU direction volume(other	(<i>r</i>	324	732	266	305	534	188	- 91	642	182	407	1,161	196					
) i ce un cetton (otame(otae	5)	324		98	305		22	91	÷	23	407	,,	357					
) PCU direction volume (total	D	570	1,086		498	875	320	124	970	248	407	1,161	196		113	48		
· · · · ·	, 	570		617	498	,	195	124		219	407		357		160			
0) Flow rate	1	0.317	0.4	412	0.277	0.3	303	0.069	0.2	205	0.226	0	342		0.083		λί	Σ
	1Φ							0.070							0.083		0.083	
1) Necessary phase ratio	2 Φ							0.069	0.205		0.226	0.342					0.342	0.83
, .	3Ф 4Ф	0.317	0.412		0.277	0.303											0.412	
3) Ratio of left turn	4Ψ	0%	0%	33%	0%	0%	27%	0%	0%	20%	0%	0%	14%	0%	0%	30%	0.000	
14) Ratio of right turn		0%	0%	0%	0%	0%	27%	0%	0%	20%	0%	0%	0%	0%	0%	30% 0%		
(4) Ratio of Fight turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
PM Peak																		
		E	astbou	nd	W	estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	Southbo	ound		
Approach			2 - 1			2 - 2			2 - 3	_		2 - 4			2 - 4			
		R	Т	T+L	R	Т	T+L	R	Т	T+L	R	Т	T+L		T+L			
No. of lanes		1	1	1	1	1	1	1	2	1	1	1	1		1			
) Basic value of saturation flo	w rate	1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000		2,000			
) Adjustment factor for left			1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98		0.98			

3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98		0.98			
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00			
5) Saturation flow rate		1,800	2,000	1,939	1,800	2,000	1,939	1,800	4,000	1,960	1,800	2,000	1,960		1,960			
5) Saturation now rate		1,800	3,	939	1,800	3,9	939	1,800	5,9	960	1,800	3,9	960		1,960			
7) PCU direction volume(bus)		135	225	- 90	213	354	142	85	277	64					120	28		
() I CO un ection volume(bus)		135	3	16	213	4	96	85	34	41					148			
8) PCU direction volume(other	re)	481	801	320	592	987	395	280	912	210	317	959	221					
a) i co un ection volume(other	(3)	481	1,	122	592	1,3	382	280	1,1	122	317	1,	181					
9) PCU direction volume (tota	n	616	1,027	411	805	1,341	536	366	1,189	274	317	959	221		120	28		
· · · · ·	1)	616	1,4	437	805	1,8	378	366	1,4	463	317	1,	181		148			
10) Flow rate		0.342	0.	365	0.447	0.4	177	0.203	0.2	245	0.176	0.2	298		0.075		λί	Σλ
	1Φ														0.075		0.075	
11) Necessary phase ratio	2Φ							0.203	0.245		0.176	0.298					0.298	0.850
11) Necessary phase ratio	3Φ	0.342	0.365		0.447	0.477											0.477	0.850
	4 Φ																0.000	
13) Ratio of left turn		0%	0%	29%	0%	0%	29%	0%	0%	19%	0%	0%	19%	0%	0%	19%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

		E	astbou	ıd	W	estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southbo	ound		
Approach			3 - 1			3 - 2			3 - 3			3 - 4			3 - 3B			3 - 4B			
		R	-	L	-	-	-	-	Т	T+L	T+R	Т	-	-	T+L	-	-	T+R	-		
) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
) Basic value of saturation flo	w rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	1.00	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00		1	
) Adjustment factor for right		1.00	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
s) Saturation now rate			3,600	-		-			3,978			3,978			1,978			1,978			
) PCU direction volume(bus)		36	-	37	-	-	-	-	-	-	1	-	1		161	18	19	166	-		
) FCU direction volume(bus)			72			-			-			-			178			184			
3) PCU direction volume(othe	re)	93		168	-			-	999	111	187	1,676			-		-	-			
of the an ection volume(office	. 3)		261			-			1,111			1,863			-			-			
) PCU direction volume (tota	n	129	-	205	-	-	-	-	999	111	187	1,676	-	-	161	18	19	166	-		
	.,		333			-			1,111			1,863			178			184			
0) Flow rate			0.093			-			0.279			0.468			0.090			0.093		λi	
	1Φ														0.090			0.093		0.093	
	2 Φ								0.279			0.468								0.468	0.
,	3 Φ		0.093																	0.093	Ľ.
4 Φ									· · · ·		or Pedest									0.000	
3) Ratio of left turn		0%	0%	0%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-	I I	
14) Ratio of right turn		0%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

PM Peak

PM Peak		F	astbou	nd	v	Vestbu	hd	N	orthbou	nd	Se	outhbou	nd	Rus	Northb	hund	Rue	Southbo	hund	ĩ	
Approach			3 - 1	ilu		3 - 2	iu –		3 - 3	nu	50	3 - 4	nu	Dus	3 - 3B	Junu	Dus	3 - 4B	Junu	•	
		T+R	-	T+L	T+R	-	T+L	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-	1	
2) Basic value of saturation flo	w rate	1,800	-	1,800	-	-	-		2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	1.00	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00		1	
4) Adjustment factor for right		1.00	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	1		
5) Saturation flow rate		1,800	-	1,800	-	-	-		2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	1		
5) Saturation now rate			3,600			-			3,978			3,978			1,978			1,978			
7) PCU direction volume(bus)		44	0	35	-	-	-	-	-	-	-	-	-	-	196	22	18	159	-		
() I CO un cetton volume(bus)			79			-			-			-			218			176			
8) PCU direction volume(other	rs)	143	0	141	-	-	-	-	1,483	165	159	1,429	-	-	-	-	-	-	-		
o) i ee ui tetion volume(otne	,		284			-			1,649			1,588			-			-		Ļ	
9) PCU direction volume (total	D	187	-	176	-	-	-	-	1,483	165	159	1,429	-	-	196	22	18	159	-		
, , , , , , , , , , , , , , , , , , , ,	-,		363			-			1,649			1,588			218			176			_
10) Flow rate			0.101			-			0.414			0.399	-		0.110	-		0.089		λί	Σλ
	1Φ														0.110			0.089		0.110	
11) Necessary phase ratio	2 Φ								0.414			0.399								0.414	0.625
	3 Φ		0.101																	0.101	
	4 Φ										Pedestri									0.000	
13) Ratio of left turn		0%	0%	0%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		0%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

Intersection No.4: Port Said St., Madinet El Ashraf

AM Peak

		E	astbour	nd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southbo	ound		
Approach			4 - 1			4 - 2			4 - 3			4 - 4			4 - 3B			4 - 4B			
		R	-	L		-	-	-	Т	T+L	T+R	Т	1	-	T+L		-	T+R			
1) No. of lanes		1	-	1	-	-		-	1	1	1	1	-	-	1			1	-		
2) Basic value of saturation flow	v rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.94		-	-	-	1.00	0.99	1.00	1.00	-	-	0.99			1.00			
4) Adjustment factor for right		0.96	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00		-	0.99	-		
5) Saturation flow rate		1,727	-	1,686		-	-	-	2,000	1,978	1,978	2,000		-	1,978		-	1,978			
5) Satur ation now rate			3,413			-			3,978			3,978			1,978			1,978			
7) PCU direction volume(bus)		36	-	37		-		-		-	-	-			155	17	17	150			
() Tee un cetton volume(bus)			72			-			-			-			173			166			
8) PCU direction volume(others	0	93	1	168		-			1,197	133	125	1,121		-	1			1			
o) i e e un cetton volume(ourers	'		261			-			1,330			1,246			-			-			
9) PCU direction volume (total)		129	-	205	-	-	-	-	1,197	133	125	1,121	-	-	155	17	17	150	-		
, , ,			333			-			1,330			1,246			173			166			
10) Flow rate			0.098			-			0.334			0.313			0.087			0.084		λi	Σλ
	1Φ														0.087			0.084		0.087	
11) Necessary phase ratio	2 Φ								0.334			0.313								0.334	0.519
rij i weessarij pilase ratio	3 Φ		0.098																	0.098	0.519
	4 0								(A	ll Red fo	or Pedest	trian)								0.000	
13) Ratio of left turn		0%	0%	61%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		39%	0%	0%	-	-	-	1	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

PM Peak

PM Peak						V. a		N			6				N			C		T	
		r	astbour	ia	,	Vestbur	10	IN	orthbou	na	5	outhbou	na	Bus	Northb	ouna	Bus	Southbo	ouna		
Approach			4 - 1			4 - 2			4 - 3			4 - 4			4 - 3B			4 - 4B			
		T+R	-	T+L	T+R	-	T+L	-	Т	T+L	T+R	Т	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.94	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		0.96	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,723	-	1,690	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
5) Saturation now rate			3,413			-			3,978			3,978			1,978			1,978		1	
7) PCU direction volume(bus)		22	-	26	-	-	-	-	-	-	-	-	-	-	115	13	11	100	-		
7) FCU direction volume(bus)			48			-			-			-			128			111			
8) PCU direction volume(other	m)	106	-	161	-	-	-	-	1,564	174	117	1,055	-	-	-		-	-	-		
a) i co un ection volume(outer	3)		267			-			1,738			1,172			-			-			
9) PCU direction volume (total	`	128	-	187	-	-	-	-	1,564	174	117	1,055	-	-	115	13	11	100	-		
, , , , , , , , , , , , , , , , , , , ,)		315			-			1,738			1,172			128			111			
10) Flow rate			0.092			-			0.437			0.295			0.064			0.056		λί	Σλ
	1Φ														0.064			0.056		0.064	
11) Necessary phase ratio	2 0								0.437			0.295								0.437	0.594
11) Necessary phase ratio	3 0		0.092																	0.092	0.394
	4 0								(A	Il Red f	or Pedes	trian)								0.000	
13) Ratio of left turn		0% 0% 59%		-	-		-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-			
14) Ratio of right turn		41%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-	1	

AM Peak										5	5										
		E	astbour	nd	v	Vestbun	ıd	Ne	orthbou	nd	So	outhbou	nd	Bus	Northbo	ound	Bus	Southbo	ound		
Approach			5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B			
Approach		T+R	Т	T+L	T+R	Т	T+L	T+R	-	Т	T+R	-	Т	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
flow rate	auon	2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00			
4) Adjustment factor for	or right	0177	1.00	1.00	0.96	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.97	-	-	0.96	-		
5) Saturation flow rate		1,986	2,000	1,942	1,926	2,000	1,966	1,954	-	2,000	1,947	-	2,000	-	1,918	-	-	1,914	-		
5) Saturation now rate			5,928			5,892			3,954			3,947			1,918			1,914			
7) PCU direction volur	ne(bus)	33	149	43	35	140	95							50	106	16	63	99	5		
·			224			270			0			0			173			166			
8) PCU direction		84	1,026	434	529	665 1.354	160	285	780	265	309	848 1.246	89	0	0	0	0	0	0		
volume(others) 9) PCU direction volur	ne	116	1,544	477	564	805	255	285	780	265	309	848	89	50	106	16	63	99	5		
(total)	ne	110	1.769	4//	504	1.624	233	285	1,330	205	509	1.246	- 67	50	173	10	05	166	5		
10) Flow rate			0.298			0.276			0.336			0.316			0.090			0.087		λί	Σλ
	1Φ														0.090			0.087		0.090	
11) Necessary phase	2Φ								0.336			0.316								0.336	0.725
ratio	3Φ		0.298			0.276														0.298	0.725
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%	3%	0%		
14) Ratio of right turn		7%	0%	0%	35%	0%	0%	21%	0%	0%	25%	0%	0%	0%	29%	0%	0%	38%	0%		

Intersection No.5: Port Said St., Sekket El Wayly St.

PM Peak

PM Peak																				_	
		E	astbour	ıd	v	Vestbun	ıd	N	orthbou	nd	So	outhbou	nd	Bus	Northbo	ound	Bus	Southb	ound		
Approach			5 - 1			5 - 2			5-3			5 - 4			5 - 3B			5 - 4B			
Арргоаси		T+R	Т	T+L	T+R	Т	T+L	T+R	-	Т	T+R	-	Т	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
flow rate	iion	2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	1	1.00	-	0.99		-	1.00			
4) Adjustment factor for	or right	0.99	1.00	1.00	0.98	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.99	-	-	0.97	-		
5) Saturation flow rate		1,979	2,000	1,940	1,954	2,000	1,969	1,956	-	2,000	1,948	-	2,000	-	1,958	-	-	1,938	-		
5) Saturation now rate			5,919			5,923			3,956			3,948			1,958			1,938			
7) PCU direction volun	ne(hus)	33	148	58	35	83	115							16	103	9	30	79	3		
,	ic(bus)		238			233			0			0			128			111			
8) PCU direction		132	903	416	338	1,025	132	359	1,085	294	286	786	101								
volume(others)			1,450			1,494			1,738			1,173			0			0			
9) PCU direction volun	ne	164	1.050	473	373	1.107	247	359	1.085	294	286	786	101	16	103	9	30	79 111	3		
(total)									1			,									N 10
10) Flow rate	4.4		0.285	-		0.292			0.439			0.297	r		0.065			0.057		λi	Σλ
	10														0.065			0.057		0.065	
11) Necessary phase	2 Φ								0.439			0.297								0.439	0.796
ratio	3Φ		0.285			0.292														0.292	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	28%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	2%	0%		
14) Ratio of right turn		10%	0%	0%	22%	0%	0%	21%	0%	0%	24%	0%	0%	0%	13%	0%	0%	27%	0%		

Intersection No.6: Port Said St., Garag El Baladeya St.

		F	astbour	nd	v	estbou	nd	N	orthbou	nd	S.	outhbou	nd	Due	Northb	aund	Due	Southbo	annd	1	
Approach		E	6 - 1	lu	v	6 - 2	iiu	14	6 - 3	liu		6 - 4	nu	Dus	6 - 3B	Junu	Dus	6 - 4B	Junu		
Approach		R	-	L	-	-	-	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
) No. of lanes		1		1	-	-	-	-	1	1	1	1	-		1	-	-	1	-		
) Basic value of saturation flo	w rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00		1	
) Adjustment factor for right		0.95	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
i) Saturation flow rate		1,709		1,703	-	-	-	-	2,000	1,978	1,978	2,000	1		1,978	-	-	1,978	-		
) Saturation now rate			3,412			-			3,978			3,978			1,978			1,978			
) PCU direction volume(bus)		33	-	35	-	-	-	-	-	-	-	-	-		161	18	19	166	-		
) FCU direction volume(bus)			68			-			-			-			178			184			
) PCU direction volume(othe	re)	108	1	116	-	-	-	-	999	111	187	1,676	1	1	-	-	-	-	1		
) I CO unection volume(other	3)		224			-			1,111			1,863			-			-			
) PCU direction volume (tota	n	141		150	-	-	-	-	999	111	187	1,676	1		161	18	19	166	1		
	1)		291			-			1,111			1,863			178			184			
0) Flow rate			0.085			-			0.279			0.468			0.090			0.093		λί	Ι
	1Φ														0.090			0.093		0.093	T
1) Necessary phase ratio	2Φ								0.279			0.468								0.468	
i) necessary phase ratio	3 0		0.085																	0.085	
	4 Φ								(A	l Red fo	r Pedest	rian)								0.000	1
3) Ratio of left turn		0%	0%	52%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		48%	0%	0%	-	-	-		0%	0%	10%	0%		0%	0%	0%	0%	10%	-	1	

		E	Castbour	ıd	v	Vestbu	ıd	N	orthbou	nd	S	outhbou	nd	Bus	Northb	ound	Bus	Southbo	ound		
Approach			6 - 1			6 - 2			6 - 3			6 - 4			6 - 3B			6 - 4B		1	
		T+R	-	T+L	T+R	-	T+L	-	Т	T+L	T+R	Т	-	-	T+L	-	-	T+R	-	1	
) No. of lanes		1	-	1		•		•	1	1	1	1	-	-	1		-	1	-		
) Basic value of saturation flo	w rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		0.95	-	1.00	-	-	-		1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,704	-	1,709	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
s) saturation now rate			3,412	•		-	-		3,978	-		3,978			1,978			1,978			
7) PCU direction volume(bus)		44	0	35	-	-	-	-	-	-	-		-	-	196	22	18	159	-		
() I CO un ecuon volume(bus)			79			-			-			-			218			176			
8) PCU direction volume(other	(ar	143	0	141	-	-	-	-	1,483	165	159	1,429	-	-	-	-	-	-	-		
s) i co urecuon volume(otner	s)		284			-			1,649			1,588			-			-			
9) PCU direction volume (total		187	-	176	-				1,483	165	159	1,429	-	-	196	22	18	159	-		
· · · ·)		363			-			1,649			1,588			218			176			
0) Flow rate			0.106			-			0.414			0.399			0.110			0.089		λί	Σλ
	1Φ														0.110			0.089		0.110	
11) Necessary phase ratio	2 Φ								0.414			0.399								0.414	0.63
rij necessary plase ratio	3 0		0.106																	0.106	
	4 0								(All Red	for Pede	strian)								0.000	
13) Ratio of left turn		0%	0%	49%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		51%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-	1	

0.110

0.08

0.414

.63

	E	astbour	nd	V	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southb	ound		
Approach		7 - 1			7 - 2			7 - 3			7 - 4			7 - 3B			7 - 4B		1	
	R	-	L	-	-	-	-	Т	T+L	T+R	Т	-	-	T+L	-	-	T+R	-	1	
) No. of lanes	1	-	1	-	-	-	-	1	1	1	1		-	1	-	1	1	-	Ι	
?) Basic value of saturation flow rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-	1	
Adjustment factor for left	1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00		1	
) Adjustment factor for right	0.95	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-	T	
) Saturation flow rate	1,709	-	1,703	-	-	-	-	2,000	1,978	1,978	2,000	1		1,978	-	-	1,978	-		
s) Saturation now rate		3,412			-			3,978			3,978			1,978			1,978		I	
) PCU direction volume(bus)	33	-	35	-	-	-	-	-	-	1	-	1		161	18	19	166	-	1	
, ree un cetton volume(bus)		68		-	-			-			-	_		178			184			
3) PCU direction volume(others)	108	-	116	-	-	-	-	999	111	187	1,676	-	-	-	-	-	-	-	1	
,, i ce un cetton (ouncis)		224			-	-		1,111	-		1,863			-			-	-	1	
)) PCU direction volume (total)	141	-	150	-	-	-	-	999	111	187	1,676	-	-	161	18	19	166	-	1	
, , , ,		291			-			1,111			1,863			178			184			_
0) Flow rate		0.085			-			0.279			0.468			0.090			0.093		λί	Σ
1Φ														0.090			0.093		0.093	
11) Necessary phase ratio								0.279			0.468								0.468	0.6
30		0.085																	0.085	
4Φ [3] Ratio of left turn								(A	l Red fo	r Pedesti	rian)								0.000	
	0%	0%	52%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-	1	
	48%	0%	52% 0%	-	-	-	-	0% 0%	10% 0%	0% 10%	0% 0%	-	0% 0%	10% 0%	0% 0%	0% 0%	0% 10%	-	ł	
(4) Ratio of right turn					-													-	ł	
(4) Ratio of right turn	48%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-	}	
14) Ratio of right turn PM Peak	48%	0% astbour	0%	-	- Vestbou	-	-	0% orthbou	0%	10%	0% outhbou	-	0%	0%	0%	0%	10% Southb	-	ł	
(4) Ratio of right turn	48%	0% astbour 7 - 1	0%	- V	- Vestbou 7 - 2	-	- N	0% orthbou 7 - 3	0%	10%	0% outhbou 7 - 4	- nd	0%	0% Northb 7 - 3B	0%	0% Bus	10% Southb 7 - 4B	-]	
14) Ratio of right turn PM Peak Approach	48%	0% astbour 7 - 1 -	0% nd L	- V	- Vestbou 7 - 2 -	- nd	- N	0% orthbou 7 - 3 T	0% nd T+L	10% Sc T+R	0% outhbou 7 - 4 T	- nd -	0% Bus -	0% Northb 7 - 3B T+L	0% ound	0% Bus -	10% Southb 7 - 4B T+R	- ound		
14) Ratio of right turn PM Peak	48%	0% astbour 7 - 1	0%	- V	- Vestbou 7 - 2	-	- N	0% orthbou 7 - 3 T 1	0% nd T+L 1	10% So T+R 1	0% outhbou 7 - 4 T 1	- nd	0%	0% Northb 7 - 3B T+L 1	0%	0% Bus	10% Southb 7 - 4B T+R 1	-		
(4) Ratio of right turn PM Peak Approach 1) No. of lanes	48%	0% astbour 7 - 1 -	0% nd L	- V	- Vestbou 7 - 2 -	- nd	- N	0% orthbou 7 - 3 T	0% nd T+L	10% Sc T+R	0% outhbou 7 - 4 T	- nd -	0% Bus -	0% Northb 7 - 3B T+L	0% ound	0% Bus -	10% Southb 7 - 4B T+R	- ound		
(4) Ratio of right turn PM Peak Approach)) No. of lanes 2) Basic value of saturation flow rate	48%	0% astbour 7 - 1 - - -	0% nd L 1,800	- - - -	- Vestbou 7 - 2 - -	- nd -	- N	0% 07-3 T 1 2,000	0% nd T+L 1 2,000	10% Sc T+R 1 2,000	0% 0 uthbou 7 - 4 T 1 2,000	- nd - - -	0% Bus -	0% 7 - 3B T+L 1 2,000	0% ound - -	0% Bus - -	10% Southb 7 - 4B T+R 1 2,000	- ound - -		
(4) Ratio of right turn PM Peak Approach 1) No. of lanes 2) Basic value of saturation flow rate 3) Adjustment factor for keft	48%	0% astbour 7 - 1 - - -	0% nd L 1,800 0.95	- - -	- Vestbou 7 - 2 - -	- nd -	- N	0% 7 - 3 T 1 2,000 1.00	0% nd T+L 1 2,000 0.99	10% Sc T+R 1 2,000 1.00	0% 0 uthbou 7 - 4 T 1 2,000 1.00	- nd -	0% Bus -	0% Northb 7 - 3B T+L 1 2,000 0.99	0% ound - -	0% Bus - - -	10% Southb 7 - 4B T+R 1 2,000 1.00	- ound - -		
(4) Ratio of right turn PM Peak Approach () No. of lanes () Basic value of saturation flow rate () Adjustment factor for left () Adjustment factor for right	48% E R 1 1,800 1.00 0.95	0% astbour 7 - 1 - - - -	0% nd 1 1,800 0.95 1.00	- - - -	- Vestbou 7 - 2 - - - - -	- nd - - -	- - - -	0% 7 - 3 T 1 2,000 1.00	0% nd T+L 1 2,000 0.99 1.00	10% Set T+R 1 2,000 1.00 0.99	0% outhbou 7 - 4 T 1 2,000 1.00	- nd - - -	0% Bus - - - -	0% 7 - 3B T+L 1 2,000 0.99 1.00	0% ound - - -	0% Bus - - - -	10% Southb 7 - 4B T+R 1 2,000 1.00 0.99	- ound - - -		
(4) Ratio of right turn PM Peak Approach () No. of lanes () Basic value of saturation flow rate () Adjustment factor for left () Adjustment factor for right	48%	0% astbour 7 - 1 - - - - -	0% nd L 1,800 0.95	- - - -	- Vestbou 7 - 2 - - -	- nd - - -	- - - -	0% 7 - 3 T 1 2,000 1.00 1.00 2,000	0% nd T+L 1 2,000 0.99	10% Sc T+R 1 2,000 1.00	0% 5000 Hbou 7 - 4 T 1,00 1,00 2,000	- nd - - -	0% Bus - - -	0% 7 - 3B T+L 1 2,000 0.99 1.00 1,978	0% ound - -	0% Bus - - -	10% Southb 7 - 4B T+R 1 2,000 1.00 0.99 1,978	- ound - -		
(4) Ratio of right turn PM Peak Approach) No. of lanes 2) Basic value of saturation flow rate b) Adjustment factor for left b) Adjustment factor for right b) Saturation flow rate	48% E R 1 1,800 1.00 0.95	0% astbour 7 - 1 - - - -	0% nd 1 1,800 0.95 1.00	- - - -	- Vestbou 7 - 2 - - - - - -	- nd - - -	- - - -	0% 7 - 3 T 1 2,000 1.00	0% nd T+L 1 2,000 0.99 1.00	10% Set T+R 1 2,000 1.00 0.99	0% outhbou 7 - 4 T 1 2,000 1.00	- nd - - -	0% Bus - - - -	0% Northb 7 - 3B T+L 1 2,000 0.99 1.00 1,978 1,978	0% ound - - -	0% Bus - - - -	10% Southb 7 - 4B T+R 1 2,000 1.00 0.99 1,978 1,978	- ound - - -		
(4) Ratio of right turn PM Peak Approach) No. of lanes 2) Basic value of saturation flow rate b) Adjustment factor for left b) Adjustment factor for right b) Saturation flow rate	E R 1 1,800 0.95 1,704	0% astbour 7 - 1 - - - - 3,412	0% nd 1 1,800 0.95 1.00 1,709	- - - - -	- Vestbou 7 - 2 	- nd - - -	- - - -	0% 7 - 3 T 1,00 1,00 2,000 3,978	0% nd T+L 1 2,000 0.99 1.00 1,978	10% Set T+R 1 2,000 1.00 0.99 1,978	0% Duthbou 7 - 4 T 1 2,000 1.00 2,000 3,978	- nd - - - -	0% Bus - - - -	0% 7 - 3B T+L 1 2,000 0.99 1.00 1,978	0% ound - - -	0% Bus - - - - -	10% Southb 7 - 4B T+R 1 2,000 1.00 0.99 1,978	- ound - - -		
(4) Ratio of right turn PM Peak Approach () No. of lanes () Basic value of saturation flow rate () Adjustment factor for right () Adjustment factor for right () Saturation flow rate () PCU direction volume(bus)	48%	0% astbour 7 - 1 - - - - - - - - - - - - -	0% L 1,800 0.95 1.00 1,709 35	- - - - -	- Vestbou 7 - 2 	- nd - - -	- - - -	0% orthbou 7 - 3 T 1 2,000 1.00 1.00 2,000 3,978 -	0% nd T+L 1 2,000 0.99 1.00 1,978 -	10% S T+R 1 2,000 1.00 0.99 1,978 -	0% outhbou 7 - 4 T 1 2,000 1.00 2,000 3,978 -	- nd - - - -	0% Bus - - - -	0% Northbo 7 - 3B T+L 1 2,000 0.99 1.00 1,978 1,978 196	0% ound - - -	0% Bus - - - - -	10% Southb 7 - 4B T+R 1 2,000 1.00 0.99 1,978 1,978 1,978	- ound - - -		
(4) Ratio of right turn PM Peak Approach (1) No. of lanes 2) Basic value of saturation flow rate 3) Adjustment factor for reft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)	E R 1 1,800 0.95 1,704	0% astbour 7 - 1 - - - - - - - - - - - - - - - - - -	0% nd 1 1,800 0.95 1.00 1,709	- - - - -	- Vestbou 7 - 2 	- nd - - - - -		0% 7 - 3 T 2,000 1.00 2,000 3,978 -	0% nd T+L 1 2,000 0.99 1.00 1,978	10% Set T+R 1 2,000 1.00 0.99 1,978	0% outhbou 7 - 4 T 1 2,000 1.00 2,000 3,978 -	- nd - - - - -	0% Bus	0% Northbo 7 - 3B T+L 1 2,000 0.99 1.00 1,978 1,978 196 218	0% ound - - - - 22	0% Bus - - - - - - - - -	10% Southb 7 - 4B T+R 1 2,000 1.00 0.99 1,978 1,978 1,978 159 176	- ound - - - -		
14) Ratio of right turn PM Peak Approach	48%	0% astbour 7 - 1 - - - - - - - - - - - - -	0% L 1,800 0.95 1.00 1,709 35	- - - - -	- Vestbou 7 - 2 	- nd - - - - -		0% orthbou 7 - 3 T 1 2,000 1.00 2,000 3,978 - 1,483	0% nd T+L 1 2,000 0.99 1.00 1,978 -	10% S T+R 1 2,000 1.00 0.99 1,978 -	0% 0% 7 - 4 T 1 2,000 1.00 1.00 2,000 3,978 - 1,429	- nd - - - - -	0% Bus	0% 7 - 3B T+L 1 2,000 0.99 1.00 1.978 1,978 196 218 -	0% ound - - - - 22	0% Bus - - - - - - - - -	10% 7 - 4B 7 - 4B 1 2,000 1.00 0.99 1,978 1,978 159 176	- ound - - - -		

0.414

0.414

0.399

0.399

Intersection No.7: Port Said St., Farz St.

Intersection No.8: Port Said St., Maamal El Saboon St.

0.10

0.106

1Φ 2Φ 3Φ 4Φ

13) Ratio of left turn 14) Ratio of right turn

1) Necessary phase ratio

13) Ratio of left turn 14) Ratio of right tur

10) Flow rate

		E	astbou	nd	v	/estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southb	ound		
Approach			8 - 1			8 - 2			8 - 3			8 - 4			8 - 3B			8 - 4B			
		-	-	-	-	-	-	-	Т	T+U		Т	T+U	-	Т	-	-	Т	-		
1) No. of lanes		-	-	-	-	-	-	-	1	1		1	1	-	1	-	-	1	-		
2) Basic value of saturation flow	v rate	-	-	-	-	-	-	-	2,000	2,000		2,000	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	-	-	-		-	1	1.00	0.99		1.00	0.99	-	1.00		-	1.00			
4) Adjustment factor for right		-	-	-	-	-	-	-	1.00	1.00		1.00	1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-		-	-	-	-	-	2,000	1,982		2,000	1,980 980	-	2,000	-	-	2,000	-		
7) PCU direction volume(bus)		-	-	-	-	-	-	-	-	-	-	-	-		179			184	-		
		-	-	-	-	-	-	-	- 1,017	93		- 1,694	168	-	179	-	-	184	-		
8) PCU direction volume(other	5)		-			-			1,1			. ,.	362		-			-		1	
9) PCU direction volume (total		-	-	-	-	-	-	-	1,017			1,694	168 362	-	179 179			184 184	-		
10) Flow rate			-			-			0.2				168		0.089			0.092		λί	Σ7
.,	10			I											0.089	1		0.092		0.092	
	20			L					0.279			0.468			5.007	1	1	5.672		0.468	
11) Necessary phase ratio	30								01-17			000								0.000	0.5
	4Φ								0	All Red	for Pede	strian)								0.000	
13) Ratio of left turn	1	-	-	-	-	-	-	-	0%	8%	0%	0%	9%	0%	0%	0%	0%	0%	-		
14) Ratio of right turn									0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
PM Peak		Е	astbou	nd	· ·	Vestbur	ıd	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southb	ound	1	
Approach			8 - 1			8 - 2			8 - 3			8 - 4			8 - 3B			8 - 4B		1	
		-	-	-	T+R	-	T+L	-	Т	U		Т	U	-	Т	-	-	Т	-		
1) No. of lanes		-	-	-	-	-	-	-	1	1		1	1	-	1	-	-	1	-		
2) Basic value of saturation flow	v rate	-	-	-	-	-	-	-	2,000	1,800		2,000	1,800	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	-	-	-	-	-	-	1.00	0.99		1.00	0.99	-	1.00		-	1.00			
4) Adjustment factor for right		-	-	-	-	-	-	-	1.00	1.00		1.00	1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate			-	-	-	-	-	-	2,000	1,783		2,000	1,783	-	2,000	-	-	2,000	-		
			-			-	-		3,7	- 185		- 3,7		-	2,000	-	-	2,000		-	
7) PCU direction volume(bus)		-	-	-	-	-	-	-	-	-	-	-	-	-	218	-	-	177	-		
	a	-	-	-	-	-	-	-	1,505	143 549		1,447	141	-	-	-	-	· ·	-	1	
8) PCU direction volume(other	<i>y</i>		-			-			1,505			1,447	141		218					-	
8) PCU direction volume(other	"										1	1.44/	141								
· · · · ·	,	-		-	-	-	-	-		549			88		218			177 177	-		
9) PCU direction volume (total	,	-		-	-	-	-	-	1,6			1,5	588 120						-	λi	Σ
9) PCU direction volume (total	,	-		-	-	-	-	-	1,6	549		1,5			218			177	-	λi 0.109	Σ
9) PCU direction volume (total 10) Flow rate		-		-	-	-	-	-	1,6	549		1,5			218 0.109			177 0.088	-		
9) PCU direction volume (total	10	-		-	-	-	-	-	1,6	549		1,5			218 0.109			177 0.088	-	0.109	
9) PCU direction volume (total 10) Flow rate	1Φ 2Φ	-		-	-	-	-	-	1,6 0.4 0.436	549	r Pedest	1,5 0.4 0.420			218 0.109			177 0.088	-	0.109 0.436	Σ) 0.54

Intersection No.9: Port Said St., Ghamra Station. Metro Line 1

AM Peak					. .						6							<u> </u>			
		E	astbour 9 - 1	ıd	,	Vestbun 9 - 2	d	N	orthbou 9 - 3	ind	50	outhbour 9 - 4	nd	Bus	Northb 9 - 3B	ound	Bus	Southbo 9 - 4B	ound		
Approach			9-1			9-2	-		9-3			9-4			9-3B	-		9 - 4B T+L+			
									Т			Т		-	R	-	-	R	-		
1) No. of lanes									2			2		-	1	-	-	1	-		
2) Basic value of saturation flo	ow rate								2,000			2,000		-	2,000	-	-	2,000	-		
3) Adjustment factor for left									1.00			1.00			1.00		-	1.00			
4) Adjustment factor for right									1.00			1.00		-	1.00	-	-	1.00	-		
5) Saturation flow rate									4,000			4,000		•	2,000 2,000		-	2,000 2,000	-		
7) PCU direction volume(bus)															144 144			116 116			
8) PCU direction volume(othe	rs)								1,608 1,608			2,582		0	0	0	0	0	0		
9) PCU direction volume (tota	n								1,608			2,582		0	144	0	0	116	0		
	.,								1,608			2,582			144			116			
10) Flow rate									0.402			0.645			0.072			0.058		λί	Σλ
	1Φ								0.402			0.645			0.072			0.058		0.645	
11) Necessary phase ratio	20								(A	ll Red fo	or Pedest	rian)								0.000	0.645
, .	3Φ 4Φ																			0.000	
13) Ratio of left turn	4Ψ	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0/	0.000	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
		E	astbour 9 - 1	nd	,	Vestbun 9 - 2	d	N	orthbou 9 - 3	ind	Se	outhbour 9 - 4	nd	Bus	Northb 9 - 3B	ound	Bus	Southbo 9 - 4B	ound		
Approach									Т			т		-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes									2			2		-	1	-	-	1	-		
2) Basic value of saturation flo	ow rate								2,000			2,000		-	2,000	÷	-	2,000	-		
3) Adjustment factor for left									1.00			1.00		-	1.00		-	1.00			
4) Adjustment factor for right									1.00			1.00		-	1.00	-	-	1.00	-		
5) Saturation flow rate									4,000			4,000		-	2,000		-	2,000	-		
		-							4,000			4,000			134	1		159			
7) PCU direction volume(bus)		-													134			159			
8) PCU direction volume(othe	rs)							0	2,033	0	0	2,080 2,080	0	0	0	0	0	0	0		
9) PCU direction volume (tota	I)								2,033			2,080		0	134 134	0	0	159 159	0		
10) Flow rate		1							0.508			0.520			0.067			0.080		λί	Σλ
	1Φ	1							0.508			0.520			0.067			0.080		0.520	
11) Neessann nhaas no **-	2 Φ									All Red	for Pede		·				İ			0.000	0.520
11) Necessary phase ratio	3 Φ																			0.000	0.520
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.10: Port Said St., Daher St. AM Peak

		E	astbour	nd	W	/estbou	nd	Ne	orthbou	nd	Se	outhbou	nd	Bus	Northbo	Bus	Southbo			
Approach			10 - 1			10 - 2			10 - 3			10 - 4			10 - 3B		10 - 4B			
		R					L				T+R	Т	T+L			-	T+R	-		
1) No. of lanes		2					2				1	2	1			-	1	-		
2) Basic value of saturation flo	w rate	1,800					1,800				2,000	2,000	2,000			1	2,000	-		
3) Adjustment factor for left		1.00					1.00				1.00	1.00	1.00			-	0.98			
4) Adjustment factor for right		1.00					1.00				0.97	1.00	1.00			-	0.98	-		
5) Saturation flow rate		3,600					3,600				1,936	4,000	2,000			-	1,936	-		
5) Saturation now rate			3,600			3,600						7,936					1,936			
7) PCU direction volume(bus)		110					110									23	106	23		
7) FCO direction volume(bus)			110			110						0					152			
8) PCU direction volume(other	e)	823					823				548	1,279								
a) i co urection volume(other	3)		823			823						1,827					0			
9) PCU direction volume (total	\ \	933	0	0	0	0	933				548	1,279	0			23	106	23		
	,		933			933						1,827					152			
10) Flow rate			0.259			0.259						0.230					0.079		λί	Σλ
	1Φ																0.079		0.079	
11) Necessary phase ratio	2 Φ											0.230							0.230	0.568
11) recessary pliase ratio	3 Φ		0.259			0.259													0.259	0.508
	4 Φ									(All R	ed for P	edestria	1)						0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	100%				0%	0%	0%			0%	15%	0%		
14) Ratio of right turn		100%	0%	0%	0%	0%	0%				30%	0%	0%			0%	15%	0%		

	E	astbour	ıd
Approach		10 - 1	
	R		
1) No. of lanes	2		
2) Basic value of saturation flow rate	1,800		
3) Adjustment factor for left	1.00		
4) Adjustment factor for right	1.00		

		R					L				T+R	Т	T+L			-	T+R	-		
1) No. of lanes		2					2				1	2	1			-	1			
2) Basic value of saturation flo	w rate	1,800					1,800				2,000	2,000	2,000				2,000	-		
3) Adjustment factor for left		1.00					1.00				1.00	1.00	0.98			-	0.98			
4) Adjustment factor for right		1.00					1.00				0.98	1.00	1.00			-	0.98			
5) Saturation flow rate		3,600					3,600				1,968		1,968			-	1,936	1		
5) Saturation now rate			3,600			3,600						7,935					1,936			
7) PCU direction volume(bus)		98					98									18	85	18		
() i co urecuon volume(bus)			98			98						0					122			
8) PCU direction volume(other	·e)	839					839	285	1,329	285	219	1,020	219							
o) i ee unteenon volume(otnei	3)		839									1,457	-				0			
9) PCU direction volume (total)	937	0	0	0	0	937				219	1,020	219			18	85	18		
<i>,</i>)		937			937						1,457	-		-		122			
10) Flow rate			0.260			0.260						0.184					0.063		λί	Σλ
	1Φ																0.063		0.063	1
11) Necessary phase ratio	2 Φ											0.184							0.184	0.507
(1) Necessary phase ratio	3 Φ		0.260			0.260													0.260	
	4 Φ									(All]	Red for I	Pedestria	an)						0.000	1
13) Ratio of left turn		0%	0%	0%	0%	0%	100%				0%	0%	15%			0%	15%	0%		
14) Ratio of right turn		100%	0%	0%	0%	0%	0%				15%	0%	0%			0%	15%	0%		

North

Southbound 10 - 4

Bus North

Bus Southb

nd 10 - 4B

Westbund 10 - 2

Intersection No.11: Port Said St., Mosheer Ahmed Ismail Sq.

AM Peak						-															
		F	Castbour	ıd	W	/estbou	nd	N	orthbou	nd	Se	uthbou	nd	Bus	Northbe	ound	Bus	Southb	ound		
Approach			11 - 1			11 - 2			11 - 3			11 - 4			11 - 3B						
Арргоаси					T+R	Т		T+R	Т	T+L	R	-	L	-	T+L+ R	-					
1) No. of lanes					1	2		1	1	1	2	-	1	-	1	-					
2) Basic value of saturation flo	w rate				2,000	2,000		2,000	2,000	2,000	1,800	-	1,800	-	2,000	-					
3) Adjustment factor for left					1.00	1.00		1.00	1.00	0.94	1.00	1	1.00	-	0.99						
4) Adjustment factor for right					0.95	1.00		0.98	1.00	1.00	1.00	-	1.00	-	0.99	-					
5) Saturation flow rate					1,896			1,957	2,000	1,876	3,600	-	1,800	-	1,957	-					
.,			-			5,896			5,833	101		5,400			1,957						
7) PCU direction volume(bus)					55	55		65	65	194	218	212	94	19	150	19					
, ,				_	402	110		200	324	1.165	527	312	220		187						
8) PCU direction volume(othe	rs)				403	403 806		388	388 1.942	1,165	536	765	230		0						
	-		r –	-	458	458		453	453	1,360	754	0	323	19	150	19					
9) PCU direction volume (tota	I)				438	916		435	2,266	1,500	/34	1,077	323	19	130	19					
10) Flow rate						0.155			0.333			0.142			0.096					λi	Σλ
,	1Φ								0.333			0.142			0.096					0.333	
	2 Φ					0.155														0.155	0.488
11) Necessary phase ratio	3 Φ																			0.000	0.488
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	10%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	50%	0%	0%	20%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%		

PM Peak

PM Feak		F	astbour	ıd	W	/estbou	nd	N	orthbou	nd	Se	uthbou	ind	Bus	Northb	ound	Bus	Southbo	ound	1	
Ammooch			11 - 1			11 - 2			11 - 3			11 - 4			11 - 3B						
Approach					T+R	Т		T+R	Т	T+L	R	-	L	-	T+L+ R	-				1	
1) No. of lanes					1	2		1	1	1	2	-	1	-	1	-					
2) Basic value of saturation flo	w rate				2,000	2,000		2,000	2,000	2,000	1,800	-	1,800	-	2,000	-					
3) Adjustment factor for left					1.00	1.00		1.00	1.00	0.94	1.00		1.00	-	0.99						
4) Adjustment factor for right					0.95	1.00		0.98	1.00	1.00	1.00	-	1.00	-	0.99	-					
5) Saturation flow rate					1,896			1,957	2,000	1,876	3,600	-	1,800	-	1,957	-				Į.	
o) Suturution no « Tute						5,896			5,833			5,400			1,957					l.	
7) PCU direction volume(bus)					49	49		128	128	384	151		65	13	103	13					
,,				_		98	-		640			215			129						
8) PCU direction volume(other	rs)				403	403		250	250	751	832	1 100	356								
.,	.,				450	806	0	270	1,251	1 1 2 5	000	1,188	(0)	10	0	10					
9) PCU direction volume (total	I)				452	452 904	0	378	378 1,892	1,135	982	0	421	13	103	13				-	
10) Flow rate						0.153			0.215			0.220			0.066					λί	Σλ
10) Flow fate	1Φ		-	_		0.155			0.215			0.220	_		0.066	-				0.220	21
	2Φ					0.153			0.215			0.220			0.000					0.153	
11) Necessary phase ratio	20 30					0.155														0.000	0.373
	4Φ				l															0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	10%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	50%	0%	0%	20%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	1	

Intersection No.12: Port Said St., Bab El Shaareya Sq.

AM Peak

		E	astbou	nd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd	Í	
Approach			12 - 1			12 - 2			12 - 3			12 - 4			
		R		L						L+U	R	Т	L+U		
1) No. of lanes		1	-	1						2	2		1		
2) Basic value of saturation flo	w rate	1,800		1,800						1,800	1,800		1,800		
3) Adjustment factor for left		1.00	-	1.00						1.00	1.00		1.00		
4) Adjustment factor for right		1.00	-	1.00						1.00	1.00		1.00		
5) Saturation flow rate		1,800	-	1,800						3,600	3,600		1,800		
5) Saturation now rate			3,600							3,600	3,6	500	1,800		
7) PCU direction volume(bus)		0		195						15	205		20		
() ree un cenon voiume(bus)			195				•			15		05	20		
8) PCU direction volume(othe	re)	35		993						175	1,436		577		
a) i ee o un ee tion vorunne(orme	(5)		1,027							175		136	577		
9) PCU direction volume (tota	n	35	0	1,188						190	. ,.	641	597		
· · · · ·	,		1,222							190		641	597		
10) Flow rate			0.340							0.053	0.4	156	0.332	λi	Σλ
	1Φ		0.340									0.456	0.332	0.456	
11) Necessary phase ratio	2 Φ									0.053				0.053	0.508
Try recessary phase ratio	3Φ					(All Red	for Pede	estrian)					0.000	0.500
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

		E	Castbour	nd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			12 - 1			12 - 2			12 - 3			12 - 4			
		R		L						L+U	R		L+U		
1) No. of lanes		1	-	1						2	2		1		
2) Basic value of saturation f	low rate	1,800	-	1,800						1,800	1,800		1,800		
3) Adjustment factor for left		1.00	-	1.00						1.00	1.00		1.00		
4) Adjustment factor for righ	ıt	1.00	-	1.00						1.00	1.00		1.00		
5) 6- t f f t-		1,800	-	1,800						3,600	3,600		1,800		
5) Saturation flow rate			3,600							3,600	3,6	500	1,800		
7) PCU direction volume(bus	۵	0		143						5	165		20		
7) FCU direction volume(bus)		143							5	10	55	20		
8) PCU direction volume(oth	ore)	75		1,157						329	1,068		932		
s) i co un ection volume(otn	eis)		1,232							329		68	932		
9) PCU direction volume (tot	aD	75	0	1,300						334		233	952		
, , ,	aij		1,374							334		233	952		
10) Flow rate			0.382							0.093	0.3	342	0.529	λi	Σλ
	1Φ		0.382									0.342	0.529	0.529	
11) Necessary phase ratio	2Φ									0.093				0.093	0.622
11) necessary phase ratio	3Ф				-		(All Red	for Ped	estrian)					0.000	0.022
	4 Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.13: Port Said St., Azhar St.

		E	Castbour	nd	W	estbou	nd	No	orthbou	nd	Se	outhbou	nd		
Approach			13 - 1			13 - 2			13 - 3			13 - 4			
		T+R	-	T+L	T+R	-	T+L	T+R	-	L	T+R	-	T+L		
1) No. of lanes		1	-	1	1		1	2	-	2	1	-	1		
2) Basic value of saturation fl	ow rate	2,000	-	2,000	2,000	-	2,000	2,000	-	1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00	-	0.97	1.00	-	0.97	1.00	-	1.00	1.00		0.96		
4) Adjustment factor for right	t	0.99	-	1.00	0.99	-	1.00	0.96	-	1.00	0.99	-	1.00		
5) 6- t f f t-		1,972	-	1,942	1,972	-	1,939	3,859	-	3,600	1,978	-	1,916		
5) Saturation flow rate			3,914			3,912			359	3,600	1,9	978	1,916		
7) PCU direction volume(bus)		15	5	10	5	15	0	148	305	53	0	0	0		
) recourrection volume(bus)			30			20			505			0			
3) PCU direction volume(othe		57	328	142	71	338	171	657	703	555	14	68	54		
s) i co un eccióli volume(otne	15)		527			580			1,915			136			
) PCU direction volume (tota	'n	72	333	152	76	353	171	805	1,008	608	14	68	54		
, (,		557			600			2,420			136			
0) Flow rate			0.142			0.153			0.496			0.069		λί	Σλ
	1Φ								0.496			0.069		0.496	
1) Necessary phase ratio	2Φ		0.142			0.153								0.153	0.64
(1) Necessary phase ratio	3Φ					(All	Red for	Pedestri	an)					0.000	0.04
	4Φ													0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	29%	0%	0%	25%	0%	0%	40%		
14) Ratio of right turn		13%	0%	0%	13%	0%	0%	33%	0%	0%	10%	0%	0%		
PM Peak															
		F	astbour	nd	v	Vestbur	ıd	No	orthbou	nd	Se	outhbou	nd		
Approach			13 - 1			13 - 2			13 - 3			13 - 4			
		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes	_	1	-	1	1	-	1	2	-	1	1	-	1		
2) Basic value of saturation fl	ow rate	2,000	-	2,000	2,000	-	2,000	2,000	-	1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00		0.08	1.00		0.05	1.00		1.00	1.00		0.07		

Approach			13 - 1			13 - 2			13 - 3			13 - 4			
		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	-	1	1	-	1	2		1	1	-	1		
2) Basic value of saturation f	low rate	2,000	-	2,000	2,000	-	2,000	2,000	-	1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00	-	0.98	1.00	-	0.95	1.00	-	1.00	1.00	-	0.97		
4) Adjustment factor for righ	t	0.98	-	1.00	0.98	-	1.00	0.97	-	1.00	0.93	-	1.00		
5) Saturation flow rate		1,963	-	1,952	1,959	-	1,904	3,880	-	1,800	1,852	-	1,942		
5) Saturation now rate			3,915			3,863			5,680			3,794			
7) PCU direction volume(bus	`	10	8	5	0	0	3	110	315	5	0	0	0		
7) FCU direction volume(bus)		23			3			430			0			
8) PCU direction volume(oth	ome)	172	642	234	109	202	261	668	1,006	672	13	0	5		
8) FCU direction volume(oth	ers)		1,048			572			2,346			18			
9) PCU direction volume (tot	aD	182	649	239	109	202	264	778	1,321	677	13	0	5		
9) FCU direction volume (tot	ai)		1,071			575			2,776			18			
10) Flow rate			0.273			0.149			0.413			0.005		λί	Σλ
	1Φ								0.413			0.005		0.413	
11) Necessary phase ratio	2 Φ		0.273			0.149								0.273	0.686
11) Necessary phase ratio	3 Φ					(All I	Red for I	Pedestria	n)					0.000	0.080
	4Φ													0.000	
13) Ratio of left turn		0%	0%	22%	0%	0%	46%	0%	0%	24%	0%	0%	27%		
14) Ratio of right turn		17%	0%	0%	19%	0%	0%	28%	0%	0%	73%	0%	0%		

Intersection No.14: Port Said St., Ahmed Maher Pasha Sq.

		E	astbour	ıd	V	estbou	nd	N	orthbou	nd	Se	outhbou	nd	Į	
Approach			14 - 1	-		14 - 2	-		14 - 3			14 - 4	-	L .	
		R				T+R		T+R	Т	L+U	R	Т			
1) No. of lanes		3	-			1		1	2	2	1	2		Ι	
2) Basic value of saturation fl	ow rate	1,800	-			2,000		1,800	2,000	1,800	1,800	2,000		Ĩ	
3) Adjustment factor for left		1.00	-			1.00		1.00	1.00	1.00	1.00	1.00		Ι	
4) Adjustment factor for righ	1	1.00	1			0.94		0.99	1.00	1.00	1.00	1.00		Ι	
5) Saturation flow rate		5,400				1,890		1,782	4,000	3,600	1,800	4,000		Ι	
5) Saturation now rate			5,400			1,890		5,	782	3,600	5,8	800		Ι	
7) PCU direction volume(bus)		73			0	0			188	68	103	175		Ι	
/) I CO un ection volume(bus)			73			0		1	88	68	2	78		Ι	
8) PCU direction volume(othe		700			108	96		185	1,648	940	1,039	1,145		Ι	
s) i co un ection volume(otne	15)		700			204		,	833	940	,	184		I	
9) PCU direction volume (tot:	n	773	0	0	108	96	0		1,836			462			
5) I CO un ection volume (tota	u)		773			204		2,0	021	1,008	2,4	462			
10) Flow rate			0.143			0.108		0.1	350	0.280	0.4	424		λί	Σλ
	1Φ								0.350			0.424		0.424	
11) Necessary phase ratio	2Φ									0.280				0.280	0.847
11) Necessary phase ratio	3 Φ		0.143			0.108								0.143	0.647
	4Φ					(A	l Red fo	r Pedest	rian)					0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	53%	0%	9%	0%	0%	0%	0%	0%	Ī	

		E	astbour	ıd	v	estbou	ıd	N	orthbou	nd	Se	outhbou	nd	Ι	
Approach			14 - 1			14 - 2			14 - 3			14 - 4		Ι	
		R				T+R		T+R	Т	L+U	R	Т		Ι	
1) No. of lanes		3	1			1		1	2	2	1	2		I	
2) Basic value of saturation f	ow rate	1,800	-			2,000		1,800	2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-			1.00		1.00	1.00	1.00	1.00	1.00		Î.	
4) Adjustment factor for righ	t	1.00	-			0.95		0.98	1.00	1.00	1.00	1.00		Î	
5) C. t		5,400	-			1,909		1,765	4,000	3,600	1,800	4,000		Î.	
5) Saturation flow rate			5,400			1,909		5,	765	3,600	5,8	300		1	
7) PCU direction volume(bus	`	15			0	0			208	63	53	150		Ι	
7) FCU direction volume(bus	,		15			0		2	08	63	2	03		Ι	
8) PCU direction volume(oth		677			120	157		287	1,077	862	675	1,113		Ι	
a) i co un ection volume(oti	(15)		677	-		277		1,1	364	862		113			
9) PCU direction volume (tot	aD.	692	0	0	120	157	0	287	1,285	925		315			
, , ,	ai)		692	-		277			572	925		315			
10) Flow rate			0.128			0.145		0.2	273	0.257	0.2	227		λί	Σλ
	1Φ								0.273			0.227		0.273	
11) Necessary phase ratio	2 Φ									0.257				0.257	0.67
11) Necessary phase ratio	3Φ		0.128			0.145								0.145	0.07
	4Φ					,		or Pedes						0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	43%	0%	18%	0%	0%	0%	0%	0%		

		E	astbou	ıd	W	/estbou	ıd	Ne	orthbou	nd	Se	outhbou	nd	Bus	Northbo	ound	Bus	Southb	ound		
Approach			15 - 1			15 - 2			15 - 3			15-4			15 - 3B			15 - 4B			
Approach		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
) No. of lanes		1	-	1	1	-	1	1	•	1	1	-	1	-	1	-	-	1	-	1	
) Basic value of saturation flo	w rate	2,000	-	2,000	2,000	-	2,000	2,000		2,000	2,000	1	2,000	-	2,000	-	-	2,000	÷		
) Adjustment factor for left		1.00	-	0.97	1.00	-	0.97	1.00	-	0.99	1.00	-	0.99	-	0.99		-	0.99		1	
) Adjustment factor for right		0.97	-	1.00	0.97	-	1.00	0.99	1	1.00	0.99	-	1.00	-	0.99	-	-	0.99	-		
) Saturation flow rate		1,946	-	1,942	1,940	-	1,944	1,989	1	1,989	1,988	-	1,988	-	1,978	-	1	1,978	-		
) Saturation now rate			3,889			3,884			3,978			3,975			1,978			1,978]	
) PCU direction volume(bus)		9	37	13	13	18	9							9	170	9	13	224	13]	
) i co ul ection volume(bus)			58	-		40				-		0			189			249	-		
) PCU direction volume(othe	re)	92	156	96	96	156	92	92	1,649	92	108	1,699	108]	
of the end of the control of the control of the	(3)		344	-		344			1,833			1,916			0			0			
) PCU direction volume (tota	n	101	193	108	108	175	101	92	1,649	92	108	1,699	108	9	170	9	13	224	13		
, ,	1)		402			384			1,833			1,916			189			249			
0) Flow rate			0.103			0.099			0.461			0.482			0.095			0.126		λί	
	1Φ														0.095			0.126		0.126	1
1) Necessary phase ratio	2 Φ								0.461			0.482								0.482	0
1) Necessary phase ratio	3 Φ		0.103			0.099														0.103	ľ
	4 0								(All	Red for	r Pedestr	ian)								0.000	
3) Ratio of left turn		0%	0%	27%	0%	0%	26%	0%	0%	5%	0%	0%	6%	0%	5%	0%	0%	5%	0%		
4) Ratio of right turn		25%	0%	0%	28%	0%	0%	5%	0%	0%	6%	0%	0%	0%	5%	0%	0%	5%	0%	1	

Intersection No.15: Port Said St., Sheikh Rehan St.

PM Peak		E	astbom	nd	· · ·	Vestbur	ıd	Ne	orthbou	nd	Se	wthbou	nd	Bus	Northb	ound	Bus	Southbo	ound	1	
4			15 - 1			15 - 2			15 - 3			15-4			15 - 3B			15 - 4B			
Approach		T+R	-	T+L	T+R	-	T+L	T+R	-	Т	T+R	-	Т	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1	-	1	1	-	1	1	-	1	-	1	-	-	1		1	
2) Basic value of saturation flo	w rate	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000		2,000	-	2,000	-		2,000	-		
3) Adjustment factor for left		1.00	-	0.98	1.00	-	0.97	1.00	-	0.99	1.00	-	0.99	-	0.99		-	0.99		1	
4) Adjustment factor for right		0.98	-	1.00	0.97	-	1.00	0.99	-	1.00	0.99	-	1.00	-	0.99	1	-	0.99	-		
5) Saturation flow rate		1,965	-	1,954	1,934	-	1,950	1,987	-	1,987	1,988	-	1,988	-	1,978	-	-	1,978	-	1	
5) Satur attoir now rate			3,919			3,884	-		3,975			3,976			1,978			1,978			
7) PCU direction volume(bus)		10	34	10	10	17	10							10	188	10	10	178	10		
.,			54			37			0			0			209			198		ļ	
8) PCU direction volume(other	s)	68	270	93	93	135	68	79	1,207	79	103	1,662	103							Ļ	
.,	-,	70	431	1.02	102	296	70	70	1,364	70	102	1,869	102	10	0	10	10	0	10		
9) PCU direction volume (total)	79	304 485	103	103	152 334	79	79	1,207	79	103	1,662	103	10	188	10	10	178	10		
10) Flow rate	,		0.124			0.086			0.343			0.470			0.106			0.100		λί	Σλ
10) Flow Fate	1Φ		0.124			0.000			0.545			0.470			0.100			0.100		0.106	21.
	20								0.343			0.470			0.100			0.100		0.470	1
11) Necessary phase ratio	30		0.124			0.086			0.545			0.170								0.124	0.699
	4 Φ					2.500			(Al	Red for	Pedestr	ian)								0.000	1
13) Ratio of left turn		0%	0%	21%	0%	0%	24%	0%	0%	6%	0%	0%	6%	0%	5%	0%	0%	5%	0%	0.000	
14) Ratio of right turn		16%	0%	0%	31%	0%	0%	6%	0%	0%	6%	0%	0%	0%	5%	0%	0%	5%	0%	1	

Intersection No.16: Port Said St., Magles El Shaab St.

AM Peak																		~			
		E	astbour	ıd		estbou	nd	NO	orthbou	nd	Se	uthbou	nd	Bus	Northbo		Bus	Southbo			
Approach			16 - 1			16 - 2	_		16 - 3			16 - 4			16 - 3B			16 - 4B			
		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1	-	1	1		1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	2,000	1	2,000	2,000	-	2,000	2,000		2,000	2,000	1	2,000	-	2,000			2,000	-		
3) Adjustment factor for left		1.00	1	0.98	1.00	-	0.98	1.00	-	0.99	1.00	1	0.99	-	1.00		-	1.00			
4) Adjustment factor for right		0.99		1.00	0.98	-	1.00	0.99		1.00	0.99		1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate		1,981	-	1,969	1,950	-	1,969	1,978	-	1,978	1,978	-	1,978	-	1,980	-	-	1,980	-		
5) Satur allon now rate			3,950			3,919			3,956			3,956			1,980			1,980			
7) PCU direction volume(bus)		10	67	10	10	34	10							10	207	10	10	196	10		
() i co un cettori (otame(ous)			87			54						0			228			216			
8) PCU direction volume(other	(s)	41	384	74	74	192	41	91	724	91	163	1,303	163								
o) i co un tettori volume(otnei	<i>s</i>)		499			307			905			1,629			0			0			
9) PCU direction volume (total	n	52	451	84	84	226	52	91	724	91	163	1,303	163	10	207	10	10	196	10		
·	,		587			361			905			1,629			228			216			
10) Flow rate			0.148			0.092	_		0.229	_		0.412			0.115			0.109		λi	Σλ
	1 Φ														0.115			0.109		0.115	
11) Necessary phase ratio	2 Φ								0.229			0.412								0.412	0.675
,	3Φ		0.148			0.092						I 、 _								0.148	
12. 0. 4 61.6.	4 Φ									Red for	_									0.000	
13) Ratio of left turn		0%	0%	14%	0%	0%	14%	0%	0%	10%	0%	0%	10%	0%	5%	0%	0%	5%	0%		
14) Ratio of right turn		9%	0%	0%	23%	0%	0%	10%	0%	0%	10%	0%	0%	0%	5%	0%	0%	5%	0%		

PM Peak																					
		E	astbou	nd	1	Vestbun	d	No	orthbou	nd	Se	outhbou	nd	Bus	Northb		Bus	Southbo			
Approach			16 - 1			16 - 2			16 - 3			16 - 4			16 - 3B			16 - 4B			
Арргоаси		T+R	-	T+L	T+R	1	T+L	T+R	1	Т	T+R		Т	•	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1	-	1	1	-	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	ow rate	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.98	1.00	1	0.98	1.00	1	0.99	1.00	-	0.99	-	1.00		-	1.00			
4) Adjustment factor for right		0.99	-	1.00	0.98		1.00	0.99		1.00	0.99		1.00		1.00	-	-	1.00	-		
5) Saturation flow rate		1,981	-	1,969	1,951	-	1,969	1,978	-	1,978	1,978	-	1,978	-	1,980	-	-	1,980	-		
o) Sutur ation non rute			3,950			3,919			3,956			3,956			1,980			1,980			
7) PCU direction volume(bus)		10	61	8	8	31	10							10	200	10	8	167	8		
() i ce un cetton (oranie(ous)			80			49			0			0			220			184			
8) PCU direction volume(othe	rs)	44	400	76	76	200	44	118	942	118	187	1,492	187								
o) i ce un tetion (orane(orane	,		520			320			1,177			1,866			0			0			
9) PCU direction volume (tota	n	54	461	85	85	231	54	118	942	118	187	1,492	187	10	200	10	8	167	8		
~	,		599			369			1,177			1,866			220			184			
10) Flow rate			0.152			0.094			0.297			0.472			0.111			0.093		λί	Σλ
	1Φ														0.111			0.093		0.111	
11) Necessary phase ratio	2 Φ								0.297			0.472								0.472	0.734
rij recessurj pinise runo	3 Φ		0.152			0.094														0.152	0.751
	4 Φ								(or Pedes									0.000	
13) Ratio of left turn		0%	0%	14%	0%	0%	15%	0%	0%	10%	0%	0%	10%	0%	5%	0%	0%	5%	0%		
14) Ratio of right turn	-	9%	0%	0%	23%	0%	0%	10%	0%	0%	10%	0%	0%	0%	5%	0%	0%	5%	0%		

AM Peak					from Qa	alaa Sq					from Pr	t Said			
		E	astbour	ıd	W	estbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			17 - 1			17 - 2			17 - 3			17 - 4		[
		R	Т		R	-	1					Т	L+U	I	
l) No. of lanes		1	1		1	•	-					2	1		
) Basic value of saturation fl	ow rate	1,800	2,000		1,800	-	-					2,000	1,800		
3) Adjustment factor for left		1.00	1.00		1.00	-	-					1.00	1.00		
4) Adjustment factor for righ	t	1.00	1.00		1.00	-	-					1.00	1.00		
		1,800	2,000		1,800	-	-					4,000	1,800		
5) Saturation flow rate			3,800			1,800						4,000	1,800		
) PCU direction volume(bus)		113	278		0	0	0					325	26	[
) i co unection volume(bus			391		()	0					325	26	[
) PCU direction volume(othe	me)	216	1,301		39	0	0					1,663	223	[
y recounterion volume(our			1,517			39						1,663	223	l	
)) PCU direction volume (tot:	n.	329	1,579		39	0	0					1,988	249	l	
, .	,		1,908			39						1,988	249		
10) Flow rate			0.502			0.022						0.497	0.138	λi	Σλ
	1Φ	_				0.022						0.107	0.138	0.138	
11) Necessary phase ratio	2 Φ		0.502				C D I					0.390		0.502	0.640
,, phase ratio	3 Φ	-			(.	AII Red	for Pede	strian)						0.000	0.070
(2) D - 4 61- 6 +	4 Φ													0.000	
13) Ratio of left turn 14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	ļ	
Approach		E	astbour	ıd	W	estbou	nd	N	orthbou	nd	Se	uthbou	nd	ļ	
Approach			17 - 1	nd		/estbour 17 - 2		N	orthbou 17 - 3	nd	Se	17 - 4			
••		R		nd	R		nd - -	N		nd	Se		nd L+U 1		
Approach 1) No. of lanes 2) Basic value of saturation fl	ow rate	R	17 - 1 T	nd	R	17 - 2 -	-	N		nd	Se	17 - 4 T	L+U	[.	
) No. of lanes 2) Basic value of saturation fl	ow rate	R 1 1,800	17 - 1 T 1 2,000		R 1 1,800	17 - 2 -	-	N		nd	S	17 - 4 T 2,000	L+U 1 1,800		
1) No. of lanes		R 1 1,800 1.00	17 - 1 T 1 2,000 1.00		R 1 1,800 1.00	17 - 2 - - -	-	N		nd	Se	17 - 4 T 2,000 1.00	L+U 1 1,800		
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ		R 1 1,800 1.00 1.00	17 - 1 T 2,000 1.00 0.98		R 1 1,800	17 - 2 - - -	-			nd	Se	17 - 4 T 2,000	L+U 1 1,800 1.00 1.00		
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ		R 1 1,800 1.00	17 - 1 T 1 2,000 1.00		R 1 1,800 1.00 1.00	17 - 2 - - -	-			nd	Se	17 - 4 T 2,000 1.00 1.00	L+U 1 1,800		
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate	t	R 1 1,800 1.00 1.00	17 - 1 T 2,000 1.00 0.98 1,957 3,757		R 1 1,800 1.00 1.00	17 - 2 - - - - - -	-				Se	17 - 4 T 2,000 1.00 1.00 4,000 4,000	L+U 1 1,800 1.00 1.800 1,800	· · ·	
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left	t	R 1 1,800 1.00 1.00 1,800	17 - 1 T 2,000 1.00 0.98 1,957		R 1 1,800 1.00 1,800 0	17 - 2 - - - - 1,800	-				Se	17 - 4 T 2,000 1.00 4,000	L+U 1 1,800 1.00 1,800	· · · ·	
 No. of lanes Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 	t	R 1 1,800 1.00 1.00 1,800	17 - 1 T 1 2,000 1.00 0.98 1,957 3,757 165		R 1 1,800 1.00 1,800 0	17 - 2 - - - 1,800 0	- - - - -				S	17 - 4 T 2,000 1.00 1.00 4,000 4,000 278	L+U 1 1,800 1.00 1.800 1,800 13		
 No. of lanes Basic value of saturation fl 3) Adjustment factor for left Adjustment factor for righ JAdjustment factor for righ Saturation flow rate PCU direction volume(bus) 	t	R 1 1,800 1.00 1.00 1.800 90	17 - 1 T 1 2,000 1.00 0.98 1,957 3,757 165 255		R 1 1,800 1.00 1.00 1,800	17 - 2 - - - 1,800 0	- - - - -					17 - 4 T 2,000 1.00 1.00 4,000 278 278	L+U 1 1,800 1.00 1.00 1,800 1,800 13 13	· · · · ·	
 No. of lanes Dasic value of saturation fl 3) Adjustment factor for left Adjustment factor for righ Saturation flow rate PCU direction volume(bus) PCU direction volume(other set of the se	t) :rs)	R 1 1,800 1.00 1.00 1.800 90	17 - 1 T 1 2,000 1.00 0.98 1,957 3,757 165 255 1,294 1,566 1,459		R 1 1,800 1.00 1.00 1,800	17 - 2 - - - - 1,800 0 - - 0 99 0	- - - - -			nd	Se	17 - 4 T 2 2,000 1.00 4,000 4,000 278 278 1,793	L+U 1 1,800 1.00 1.800 1,800 13 13 228	· · · · ·	
 No. of lanes Dasic value of saturation fl 3) Adjustment factor for left Adjustment factor for righ Saturation flow rate PCU direction volume(bus) PCU direction volume(other volume) PCU direction volume (tota) 	t) :rs)	R 1 1,800 1.00 1.00 1,800 90 272	17 - 1 T 1 2,000 1.00 0.98 1,957 3,757 165 255 1,294 1,566 1,459 1,821		R 1 1,800 1.00 1,800 0 0 99	17 - 2 - - - 1,800 0 99 0 99	- - - - -			nd	Se	17 - 4 T 2 2,000 1.00 1.00 4,000 4,000 278 278 1,793 2,071 2,071	L+U 1 1,800 1.00 1.800 1.800 13 13 228 228 241 241		
 No. of lanes Dasic value of saturation fl 3) Adjustment factor for left Adjustment factor for righ Saturation flow rate PCU direction volume(bus) PCU direction volume(other volume) PCU direction volume (tota) 	t ers) al)	R 1 1,800 1.00 1.00 1,800 90 272	17 - 1 T 1 2,000 1.00 0.98 1,957 3,757 165 255 1,294 1,566 1,459		R 1 1,800 1.00 1,800 0 0 99	17 - 2 - - - - - - - - - - - - - - - - - -	- - - - -			nd	Se	17 - 4 T 2 2,000 1.00 1.00 4,000 278 278 1,793 2,071 2,071 2,071	L+U 1 1,800 1.00 1.800 1,800 13 13 228 228 241 241 0.134	X	Σλ
 No. of lanes Dasic value of saturation fl 3) Adjustment factor for left Adjustment factor for righ Saturation flow rate PCU direction volume(bus) PCU direction volume(other volume) PCU direction volume (tota) 	t ers) il)	R 1 1,800 1.00 1.00 1,800 90 272	17 - 1 T 1 2,000 1.00 0.98 1.957 3,757 165 255 1,294 1,566 1,459 1,821 0.485		R 1 1,800 1.00 1,800 0 0 99	17 - 2 - - - 1,800 0 99 0 99	- - - - -				Se	17 - 4 T 2 2,000 1.00 1.00 4,000 4,000 278 278 1,793 2,071 2,071 0.518 0.112	L+U 1 1,800 1.00 1.800 1.800 13 13 228 228 241 241	0.134	Σλ
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate	t ers) il) <u>10</u> 20	R 1 1,800 1.00 1.00 1,800 90 272	17 - 1 T 1 2,000 1.00 0.98 1,957 3,757 165 255 1,294 1,566 1,459 1,821		R 1 1,800 1.00 1.00 1.800 	17 - 2 - - - - 1,800 0 99 0 0 99 0.055 0.055	- - - - 0 0				So	17 - 4 T 2 2,000 1.00 4,000 4,000 278 278 1,793 2,071 2,071 2,071	L+U 1 1,800 1.00 1.800 1,800 13 13 228 228 241 241 0.134	0.134 0.485	
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate	t ers) al) <u>10</u> <u>20</u> <u>30</u>	R 1 1,800 1.00 1.00 1,800 90 272	17 - 1 T 1 2,000 1.00 0.98 1.957 3,757 165 255 1,294 1,566 1,459 1,821 0.485		R 1 1,800 1.00 1.00 1.800 	17 - 2 - - - - 1,800 0 99 0 0 99 0.055 0.055	- - - - -				So	17 - 4 T 2 2,000 1.00 1.00 4,000 4,000 278 278 1,793 2,071 2,071 0.518 0.112	L+U 1 1,800 1.00 1.800 1,800 13 13 228 228 241 241 0.134	0.134 0.485 0.000	<u>Σλ</u> 0.619
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 3) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate 11) Necessary phase ratio	t ers) il) <u>10</u> 20	R 1 1,800 1.00 1.00 1.800 272 362	17 - 1 T 2,000 1.00 0.98 1,957 3,757 165 255 1,294 1,566 1,459 1,821 0.485 0.485		R 1 1,800 1.00 1.800 0 99 99 99	17 - 2 - - - - - - - - - - - - - - - - - -	- - - - 0 0 0	rian)				17 - 4 T 2,000 1.00 4,000 4,000 278 278 1,793 2,071 2,071 0,518 0.112 0.406	L+U 1 1,800 1.00 1,800 1,800 13 13 13 228 228 241 241 0.134 0.134	0.134 0.485	
1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate	t ers) al) <u>10</u> <u>20</u> <u>30</u>	R 1 1,800 1.00 1.00 1,800 90 272	17 - 1 T 1 2,000 1.00 0.98 1.957 3,757 165 255 1,294 1,566 1,459 1,821 0.485	nd	R 1 1,800 1.00 1.00 1.800 	17 - 2 - - - - 1,800 0 99 0 0 99 0.055 0.055	- - - - 0 0			nd	Se	17 - 4 T 2 2,000 1.00 1.00 4,000 4,000 278 278 1,793 2,071 2,071 0.518 0.112	L+U 1 1,800 1.00 1.800 1,800 13 13 228 228 241 241 0.134	0.134 0.485 0.000	

Intersection No.17-a: Port Said St., Sayeda Zeinab Sq.

Intersection No.17-b: Port Said St., Sayeda Zeinab Sq.

		F	astbou	nd	W	/estbou	nd	No	orthbou	nd	Se	outhbou	nd	I	
Approach			17 - 1			17 - 2			17 - 3			17 - 4		Ι	
		R	Т	L	R	Т	L	T+R	Т	-	-	-	-	T .	
) No. of lanes		-	2	1	2	1	-	1	1				-	Ι	
2) Basic value of saturation f	ow rate	-	2,000	1,800	1,800	-	-	2,000	2,000	-	-	-	-		
3) Adjustment factor for left		-	1.00	1.00	1.00	1	1	1.00	1.00		-		-	I	
4) Adjustment factor for righ	t	-	1.00	1.00	1.00		-	0.91	1.00	-	-	-	-		
5) Saturation flow rate		-	4,000	1,800	3,600	-	-	1,829	2,000	-	-	-	-		
s) Saturation now rate		-	4,000	1,800	3,600				3,829		-		-	Ι	
7) PCU direction volume(bus		-	103	3	325	-	-	111	20	0	-	-	-		
() i co unection volume(bus		-	103	3	325	-	-		130		-	-	-		
8) PCU direction volume(oth		-	452	118	1,663	-	-	484	85	0	-	-	-		
s) i ce unceuon volume(our	.13)	-	452	118	1,663	-	-		569		-	-	-	Į –	
9) PCU direction volume (tot	an.	-	554	121	1,988	-	-	594	105	0	-	-	-	ļ	
, .	,	-	554	121	1,988	-	-		699		-	-	-		
10) Flow rate		-	0.139	0.067	0.552	-	-		0.183		-	-	-	λί	Σλ
	1Φ		0.139	0.067	0.238									0.238	
11) Necessary phase ratio	2Φ				0.314				0.183					0.314	0.55
) Necessary phase ratio	3Φ				(A	ll Red fo	or Pedes	trian)						0.000	0.55
	4Φ													0.000	
Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	ļ	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	85%	0%	0%	0%	0%	0%		

PM Peak											-			-	
		ŀ	astbou	nd	W	estbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			17 - 1			17 - 2			17 - 3			17 - 4		Ι	
		R	Т	L	R	Т	L	T+R	Т	-	-	-	-	Ι	
1) No. of lanes		-	2	1	2	-	-	1	1	-	-		-	Ι	
2) Basic value of saturation flo	w rate	-	2,000	1,800	1,800	-	-	2,000	2,000	-	-	-	-		
3) Adjustment factor for left		-	1.00	1.00	1.00	-	-	1.00	1.00	-	-	-	-	Ι	
4) Adjustment factor for right		-	1.00	1.00	1.00	-	-	0.91	1.00	-	-	-	-	Ι	
5) Saturation flow rate		-	4,000	1,800	3,600	-	-	1,829	2,000	-	-	-	-	Ι	
5) Saturation now rate		-	4,000	1,800	3,600	-	-		3,829		-	-	-	Ι	
7) PCU direction volume(bus)		-	63	8	278	-	-	85	15	0	-		-	Ι	
7) Teo urecuon volume(bus)		-	63	8	278	-	-		100		-	-	-	Ι	
8) PCU direction volume(othe	·••)	-	632	133	2,070	-	-	566	100	0	-	-	-	I	
o) i co uncetton volume(otne	3)	-	632	133	2,070	-	-		666		-	-	-	ļ	
9) PCU direction volume (tota	n	-	694	140	2,348	-	-	651	115	0	-	-	-	ļ	
,	9	-	694	140	2,348	-	-		766		-	-	-		
10) Flow rate		-	0.174	0.078	0.652	-	-		0.200		-	-	-	λi	Σλ
	1Φ		0.174	0.078	0.303									0.303	
11) Necessary phase ratio	2 Φ				0.349				0.200					0.349	0.652
ri) recessiry phase ratio	3Φ				(A	dl Red fo	or Pedest	trian)						0.000	0.052
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	l .	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	85%	0%	0%	0%	0%	0%	l	

		E	astbou	ıd	W	estbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			18 - 1			18 - 2			18 - 3			18 - 4			
		R		L	T+R		T+L				R	Т			
1) No. of lanes		1		1	1		1				1	1			
2) Basic value of saturation fl	ow rate	1,800		1,800	2,000		2,000				1,800	2,000			
3) Adjustment factor for left		1.00		1.00	1.00		0.94				1.00	1.00			
4) Adjustment factor for righ	t	1.00		1.00	1.00		1.00				1.00	1.00			
5) Saturation flow rate		1,800		1,800	2,000		1,870					2,000			
5) Saturation now rate		1,800		1,800		3,870					3,8	300			
7) PCU direction volume(bus		49		39	29	67	164				14	- 96			
/) I CO un ceuon volume(bus		49		39		260						10			
8) PCU direction volume(oth	re)	251		201	167	325	838				74	492			
s) i ce ul ceusii volunie(oui	.1.3)	251		201		1,330						66			
9) PCU direction volume (tot:	'n	301		240	196	392	1,002				88	588			
, , , , , , , , , , , , , , , , , , , ,	,	301		240		1,590						76			
10) Flow rate		0.167		0.134		0.411					0.1	78		λί	-Σ
	1Φ	0.167		0.134		0.411								0.411	
11) Necessary phase ratio	2Φ											0.178		0.178	0.5
ri) recessiry phase racio	3 Φ					(Al	Red for	Pedestr	rian)					0.000	0.5
	4 Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	63%	0%	0%	0%	0%	0%	0%	1	
14) Ratio of right turn		0%	0%	0%	12%	0%	0%	0%	0%	0%	13%	0%	0%		

PM Peak

		E	Castbou	ıd	W	/estbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			18 - 1			18 - 2			18 - 3			18 - 4			
		R		L	T+R		T+L				R	Т		1	
1) No. of lanes		1		1	1		1				1	1			
2) Basic value of saturation fl	ow rate	1,800		1,800	2,000		2,000				1,800	2,000			
3) Adjustment factor for left		1.00		1.00	1.00		0.94				1.00	1.00			
4) Adjustment factor for right	t	1.00		1.00	1.00		1.00				1.00	1.00			
5) Saturation flow rate		1,800		1,800	2,000		1,870				1,800	2,000			
3) Saturation now rate		1,800		1,800		3,870					3,8	800			
7) PCU direction volume(bus)		42		34	25	57	140				5	30			
7) Teo direction volume(bus)		42		34		222					3	35			
8) PCU direction volume(othe	re)	271		217	193	337	904				29	194			
o) i co ul ccuoli volume(oute	.1.3)	271		217		1,434						23			
9) PCU direction volume (tota	n.	313		251	218	394	1,044				34	224			
	u)	313		251		1,656						57			
10) Flow rate		0.174		0.139		0.428					0.0	068		λi	Σλ
	1Φ	0.174		0.139		0.428								0.428	
11) Necessary phase ratio	2 Φ											0.068		0.068	0.496
11) Necessary phase ratio	3 Φ					(All	Red for	Pedestri	an) _					0.000	0.490
	4 Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	63%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	13%	0%	0%	0%	0%	0%	13%	0%	0%		

Intersection No.19: Port Said St., Yoosef El Sebaey St.

		E	astbou	nd	W	/estbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			19 - 1			19 - 2			19 - 3			19 - 4			
		T+R		L				T+R	Т	T+L	T+R	Т	L		
1) No. of lanes		1		1				1	-	1	1	1	1		
2) Basic value of saturation flo	w rate	2,000		1,800				2,000	-	2,000	2,000	2,000	2,000		
3) Adjustment factor for left		1.00		1.00				1.00	-	0.95	1.00	1.00	0.90		
4) Adjustment factor for right		0.98		1.00				0.94	-	1.00	0.97	1.00	1.00		
5) Saturation flow rate		1,962		1,800				1,882	-	1,910	1,936	2,000	1,802		
s) saturation now rate			3,762					1,8	382	1,910	3,9	936	1,802		
7) PCU direction volume(bus)		18	24	18				14	11	11	29	- 69	98		
() I CO un ceuon volunie(bus)			59					2	25	11	9	98	98		
8) PCU direction volume(othe	re)	42	197	42				34	25	25	141	329	470		
b) I CO un ecuon volume(oure	(3)		282						9	25		70	470		
)) PCU direction volume (tota	n	60	221	60				48	36	36	170	398	568		
,	9		341						4	36		68	568		
10) Flow rate			0.091					0.0	031	0.019	0.1	119	0.261	λί	Σ
	1Φ								0.031			0.119		0.119	
11) Necessary phase ratio	2Φ									0.019			0.261	0.261	0.4
ry necessary phase ratio	30		0.091											0.091	J
	4 0					<u> </u>		edestrian						0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	43%	0%	0%	100%		
14) Ratio of right turn		18%	0%	0%	0%	0%	0%	57%	0%	0%	30%	0%	0%		

PM Peak

		E	astbou	ıd	W	/estbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			19 - 1			19 - 2			19 - 3			19 - 4			
		T+R		L	T+R		L	T+R	Т	T+L	T+R	Т	L		
1) No. of lanes		1		1				1	-	1	1	1	1		
2) Basic value of saturation fle	ow rate	2,000		1,800				2,000	-	2,000	2,000	2,000	2,000		
3) Adjustment factor for left		1.00		1.00				1.00	-	0.95	1.00	1.00	0.90		
4) Adjustment factor for right		0.98		1.00				0.94	-	1.00	0.97	1.00	1.00		
5) Saturation flow rate		1,962		1,800				1,882	-	1,910	1,936	2,000	1,802		
5) Saturation now rate			3,762					1,8	382	1,910	3,9	936	1,802		
7) PCU direction volume(bus)		13	18	13				11	8	8	22	51	74		
7) I CO ul ection volume(bus)			44					1	.9	8	7	4	74		
8) PCU direction volume(othe	re)	31	144	31				25	18	18	103	240	343		
a) i co ul ection volume(otne	13)		206					4	3	18	3	43	343		
9) PCU direction volume (tota	n	44	161	44				35	26	26	125	291	416		
	1)		250					6	52	26	4	16	416		
10) Flow rate			0.066					0.0)23	0.014	0.0)87	0.190	λi	Σλ
	1Φ								0.023			0.087		0.087	
11) Necessary phase ratio	2Φ									0.014			0.190	0.190	0.343
11) Necessary phase ratio	3Φ		0.066											0.066	0.545
	4 Φ					(All	Red for	Pedestri	an)					0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	43%	0%	0%	100%		
14) Ratio of right turn		18%	0%	0%	0%	0%	0%	57%	0%	0%	30%	0%	0%		

Intersection No.22: Qalaa St., Seroogeya St.

		Nort	thEastb	ound	Sout	hEastb	ound	Ne	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southb	ound	1	
Approach			22 - 1			22 - 2			22 - 3			22 - 4						22 - 4B			
		R		L	R		L		Т	T+L											
1) No. of lanes		1		1	1		1		2	1											
2) Basic value of saturation flo	w rate	1,800		1,800	1,800		1,800		2,000	2,000											
3) Adjustment factor for left		1.00		1.00	1.00		1.00		1.00	1.00											
4) Adjustment factor for right		1.00		1.00	1.00		1.00		1.00	1.00											
5) Saturation flow rate		1,800		1,800	1,800		1,800		4,000	2,000											
5) Saturation now rate			3,600	-		3,600				000								-	-		
7) PCU direction volume(bus)		1	4	2	26	34	8		105	26											
8) PCU direction volume(other	rs)	30	90	60	668	868	200		1,011	434 145											
9) PCU direction volume (total	I)	31	94	62	694	902	208		1,116	434											
10) Flow rate			0.026			0.251				258										λί	Σλ
10,110100	10		0.020	r –		0.201			0.258											0.258	~~
	20					0.251			5.250											0.250	
11) Necessary phase ratio	30		0.026			0.201														0.026	0.535
	40		0.020		(All R	ed for P	edestriar													0.020	
13) Ratio of left turn	1	0%	0%	0%	0%	0%	0%	0%	0%	28%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.000	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
											0.10										
PM Peak		Nort	thEastb	ound	Sout	hEastb	ound	N	orthbou	nd		outhbou	nd	Bus	Northb	ound	Bus	Southb]	
PM Peak Approach			thEastb 22 - 1			hEastb 22 - 2	-	N	22 - 3	-			nd	Bus	Northbo 22 - 3B	ound	Bus	Southb 22 - 4B			
Approach		R		L	R		L	N	22 - 3 T	T+L		outhbou	nd	Bus		ound	Bus				
							-	No	22 - 3	-		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo	w rate	R 1 1,800		L 1 1,800	R 1 1,800		L 1 1,800	Ne	22 - 3 T	T+L 1 2,000		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	w rate	R 1 1,800 1.00		L 1 1,800 1.00	R 1 1,800 1.00		L 1 1,800 1.00	No	22 - 3 T 2,000 1.00	T+L 1 2,000 1.00		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo	w rate	R 1 1,800 1.00 1.00		L 1 1,800 1.00 1.00	R 1 1,800 1.00 1.00		L 1 1,800 1.00 1.00	Ne	22 - 3 T 2,000 1.00 1.00	T+L 1 2,000 1.00 1.00		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right	w rate	R 1 1,800 1.00	22 - 1	L 1 1,800 1.00	R 1 1,800 1.00	22 - 2	L 1 1,800 1.00	No	22 - 3 T 2,000 1.00 1.00 4,000	T+L 1 2,000 1.00 2,000		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	w rate	R 1 1,800 1.00 1.00 1,800		L 1 1,800 1.00 1,800	R 1 1,800 1.00 1,800		L 1,800 1.00 1,800		22 - 3 T 2,000 1.00 4,000 6,0	T+L 1 2,000 1.00 2,000 000		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right	w rate	R 1 1,800 1.00 1.00	22 - 1 3,600	L 1 1,800 1.00 1.00	R 1 1,800 1.00 1.00	22-2	L 1 1,800 1.00 1.00		22 - 3 T 2,000 1.00 1.00 4,000	T+L 1 2,000 1.00 2,000		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate	w rate	R 1 1,800 1.00 1,00 1,800 2	22 - 1	L 1,800 1.00 1,800 3	R 1 1,800 1.00 1.00 1,800 38	22 - 2	L 1,800 1.00 1.00 1,800		22 - 3 T 2,000 1.00 4,000 6,0 123	T+L 1 2,000 1.00 2,000 2,000 31		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate		R 1 1,800 1.00 1.00 1,800	22 - 1 3,600 5	L 1 1,800 1.00 1,800	R 1 1,800 1.00 1,800	22 - 2 3,600 49	L 1,800 1.00 1,800		22 - 3 T 2,000 1.00 4,000 6,0 123 890	T+L 1 2,000 1.00 2,000 000 31 381		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)		R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1,00 1,800 38 1,015	22-2	L 1 1,800 1.00 1,800 11 305		22 - 3 T 2,000 1.00 1.00 4,000 6,0 123 890 1,2	T+L 1 2,000 1.00 2,000 000 31 381 271		outhbou	nd	Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)	rs)	R 1 1,800 1.00 1,00 1,800 2	22 - 1 3,600 5 137	L 1,800 1.00 1,800 3	R 1 1,800 1.00 1.00 1,800 38	22 - 2 3,600 49 1,320	L 1,800 1.00 1.00 1,800		22 - 3 T 2,000 1.00 1.00 4,000 6,(123 890 1,; 890	T+L 1 2,000 1.00 2,000 000 31 381 271 381		outhbou		Bus		ound	Bus				
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other 9) PCU direction volume (total	rs)	R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600 5 137 142	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1,00 1,800 38 1,015	22 - 2 3,600 49 1,320	L 1 1,800 1.00 1,800 11 305		22 - 3 T 2,000 1.00 4,000 6,0 123 890 1,2 890 1,2	T+L 1 2,000 1.00 2,000 000 31 381 271 381 271		outhbou	nd	Bus		ound	Bus				<u>v</u>
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other	rs) [)	R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600 5 137	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1,00 1,800 38 1,015	22 - 2 3,600 49 1,320	L 1 1,800 1.00 1,800 11 305		22 - 3 T 2,000 1.00 4,000 6,0 123 890 1,2 890 1,2 0,2 890	T+L 1 2,000 1.00 2,000 000 31 381 271 381		outhbou		Bus		ound	Bus			<u>λi</u> 0212	Σλ
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other 9) PCU direction volume (total	rs) I) [1Φ	R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600 5 137 142	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1,00 1,800 38 1,015	22 - 2 3,600 49 1,320 1,369 0.380	L 1 1,800 1.00 1,800 11 305		22 - 3 T 2,000 1.00 4,000 6,0 123 890 1,2 890 1,2	T+L 1 2,000 1.00 2,000 000 31 381 271 381 271		outhbou	nd	Bus		bund	Bus			0.212	
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other 9) PCU direction volume (total	rs) I) 20	R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600 5 137 142 0.039	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1,00 1,800 38 1,015	22 - 2 3,600 49 1,320	L 1 1,800 1.00 1,800 11 305		22 - 3 T 2,000 1.00 4,000 6,0 123 890 1,2 890 1,2 0,2 890	T+L 1 2,000 1.00 2,000 000 31 381 271 381 271		outhbou	nd	Bus		ound	Bus			0.212 0.380	<u>Σλ</u> 0.632
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(total 10) Flow rate	rs)	R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600 5 137 142	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1.00 1.800 38 1,015 1,053	22 - 2 3,600 49 1,320 1,369 0.380 0.380	L 1 1,800 1.00 1.00 1,800 11 305 316		22 - 3 T 2,000 1.00 4,000 6,0 123 890 1,2 890 1,2 0,2 890	T+L 1 2,000 1.00 2,000 000 31 381 271 381 271		outhbou	nd	Bus						0.212 0.380 0.039	
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(total 10) Flow rate	rs) I) 20	R 1 1,800 1.00 1,00 1.00 1,800 2 46 46	22 - 1 3,600 5 137 142 0.039	L 1 1,800 1.00 1,800 3 91	R 1 1,800 1.00 1.00 1.800 38 1,015 1,053	22 - 2 3,600 49 1,320 1,369 0.380 0.380	L 1 1,800 1.00 1,800 11 305		22 - 3 T 2,000 1.00 4,000 6,0 123 890 1,2 890 1,2 0,2 890	T+L 1 2,000 1.00 2,000 000 31 381 271 381 271		outhbou	nd	Bus		0%	Bus			0.212 0.380	

Intersection No.23: Qalaa St., Qalaa Sq.

		F	astbou	nd	V	estbou	nd	N	orthbou	nd	Se	outhbou	nd	1	
Approach			23 - 1	-		23 - 2	_		23 - 3	-		23 - 4	-	1	
		T+R	-	T+L					Т	L	R	Т			
1) No. of lanes		1	-	1					2	1	1	2			
2) Basic value of saturation fl	ow rate	2,000	-	2,000					2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-	0.95					1.00	1.00	1.00	1.00		I	
4) Adjustment factor for righ	t	0.95	-	1.00					1.00	1.00	1.00	1.00		Ι	
5) Saturation flow rate		1,896	-	1,896					4,000	1,800	1,800	4,000		Ι	
5) Saturation now rate			3,791						4,000	1,800	1,800	4,000		Î	
7) PCU direction volume(bus		63		63					68	3	3	23		Ī	
7) FCU difection volume(bus	,		126						68	3	3	23		Ι	
8) PCU direction volume(oth		194		194					1,251	22	23	672		Ι	
8) FCU direction volume(out	:rs)		388						1,251	22	23	672		Ι	
9) PCU direction volume (tot	-n	257	0	257					1,319	25	26	695		Ι	
9) FCU direction volume (tot	a)		514						1,319	25	26	695		Ī	
10) Flow rate			0.136						0.330	0.014	0.014	0.174		λί	Σλ
	1Φ								0.330		0.014	0.014		0.330	
11) Necessary phase ratio	2 Φ									0.014				0.014	0 479
ii) necessary plase ratio	3 Φ		0.136											0.136	0.479
	4Φ													0.000	
13) Ratio of left turn		0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		50%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	Ī	

		F	astbou	nd	W	/estbou	nd	N	orthbou	nd	Se	outhbou	nd	l	
Approach			23 - 1			23 - 2			23 - 3			23 - 4		Ι	
		T+R	-	T+L					Т	L	R	Т		Ι	
1) No. of lanes		1	-	1					2	1	1	2		Ι	
2) Basic value of saturation flo	ow rate	2,000	-	2,000					2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-	0.95					1.00	1.00	1.00	1.00		Ι	
4) Adjustment factor for right		0.95	-	1.00					1.00	1.00	1.00	1.00		Ι	
5) Saturation flow rate		1,896	-	1,896					4,000	1,800	1,800	4,000		Ι	
5) Saturation now rate			3,791						4,000	1,800	1,800	4,000			
7) PCU direction volume(bus)		78		78					73	3	3	35		ļ	
() Tee unceuon (online(ous)			156	-		-			73	3	3	35		ļ	
8) PCU direction volume(othe	rs)	237		237					999	35	35	1,018		L	
.,)		474						999	35	35	1,018		Ļ	
9) PCU direction volume (tota	D	315	0	315					1,072	38	38	1,053		Ļ	
	,		630						1,072	38	38	1,053			-
10) Flow rate			0.166	-		-			0.268	0.021	0.021	0.263		λί	Σλ
	1Φ								0.268		0.021	0.021		0.268	
11) Necessary phase ratio	2Φ									0.021				0.021	0.45
rij recessary plase racio	3 Φ		0.166											0.166	0.45
	4Φ													0.000	
13) Ratio of left turn		0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		50%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	I	

AM Peak		~			·					· ·	, ,				·		-	
		E	astbou	nd	W	/estbou	nd	N	orthbou	nd	Sout	hWestb	ound	Sou	hEastb	ound	1	
Approach			25 - 1	-		25 - 2	-		25 - 3	-		25 - 4			25 - 5	-		
ripprouen		T+R		T+L+ U	T+R		T+L+ U	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	1	-	1	l .	
2) Basic value of saturation flow	v rate	2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.97	1.00	-	0.96	1.00	-	0.96		
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.97	-	1.00	0.96	-	1.00	0.96	-	1.00	ļ.	
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,936	-	1,936	1,916	-	1,916	1,916	-	1,916	l.	
5) Satur atton now rate			3,935			3,935			3,872			3,831			3,831	-	l.	
7) PCU direction volume(bus)		18	83	18	20	91	20	37	49	37	47	24	47	0	0	0		
() I CO un ceuon (orune(ous)			118			130			123			-			-		ļ	
8) PCU direction volume(other	s)	144	671	144	155	725	155	151	202	151	418	209	418	79	- 39	79		
	•)		958			1,036	-		504			1,045	_		197	-		
9) PCU direction volume (total)		161	753	161	175	816	175	188	251	188	465	233	465	79	- 39	79		
, , , ,	·		1,076			1,166			627			1,163			197			
10) Flow rate			0.273			0.296			0.162			0.304			0.051		λί	Σλ
	1Φ		0.273			0.296											0.296	
11) Necessary phase ratio	2 Φ											0.304					0.304	0.76
ri) recessiry phase rulo	3Φ								0.162						0.051		0.162	0.70
	4 0							l Red fo									0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%	0%	0%		

Intersection No.24: Qalaa St., Salah Salem St. (Sayeda Aisha Br.)

PM Peak

		E	astbou	nd	W	estbou	nd	N	orthbou 25 - 3	nd	Sout	hWesth	ound	Sou	thEastb	ound		
Approach		T+R	25 - 1	T+L+ U	T+R	25 - 2	T+L+ U	T+R	-	T+L	T+R	- 25 - 4	T+L	T+R	- 25 - 5	T+L		
1) No. of lanes		1		1	1		1	1		1	1	-	1	1	-	1		
2) Basic value of saturation flo	w rate	2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.97	1.00	-	0.96	1.00	-	0.96		
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.97	-	1.00	0.96	-	1.00	0.96	-	1.00		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,936	-	1,936	1,916	-	1,916	1,916	-	1,916		
5) Satur ation now rate			3,935			3,935			3,872			3,831			3,831			
7) PCU direction volume(bus)		13	62	13	27	125	27	29	38	29	35	18	35	1	1	1		
/) I CO un ection volume(bus)			88	-		178			95			-			-			
8) PCU direction volume(other	e)	157	734	157	151	705	151	167	223	167	469	234	469	100	50	100		
a) i co un ection volume(other	3)		1,049	-		1,007	-		557	-		1,172			251	-		
9) PCU direction volume (total	`	171	796	171	178	830	178	196	261	196	504	252	504	102	51	102		
,	,		1,137			1,185			652			1,260			254			
10) Flow rate			0.289			0.301			0.168			0.329			0.066		λί	Σλ
	1Φ		0.289			0.301											0.301	
11) Necessary phase ratio	2 Φ											0.329					0.329	0.798
ity necessary phase ratio	3 Φ								0.168						0.066		0.168	
	4 Φ						,	All Red f									0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%	0%	0%		

Intersection No.26: Salah Salem St., Magra El Oyoon St.

|--|

	Nor	thEastb	ound	Sou	thEastb	ound	N	orthbou	nd	S	outhbou	ınd	Bus	Northb	ound	Bus	Southb	ound		
Approach		26 - 1			26 - 2			26 - 3			26 - 4			26 - 3			26 - 4			
	R		L+U	R		L	•	Т	-	R	-									
1) No. of lanes	2		2	1		1		2	-	2	-									
2) Basic value of saturation flow rate	1,800		1,800	1,800		1,800	-	2,000	-	1,800	-									
3) Adjustment factor for left	1.00		1.00	1.00		1.00		1.00		1.00	-									
4) Adjustment factor for right	1.00		1.00	1.00		1.00	-	1.00	-	1.00	-									
5) Saturation flow rate	3,600		3,600	1,800		1,800	-	4,000	-	3,600	-									
5) Saturation now rate	3,600		3,600		3,600			4,000			3,600									
7) PCU direction volume(bus)	38		280	23		25		113		98	73									
() i ee un ection volume(bus)	38		280		48			113			170									
8) PCU direction volume(others)	322		886	53		25				1,271										
a) i co un ection volume(others)	322		886		78				-		1,271	-						-		
9) PCU direction volume (total)	360		1,166	76		50	0	113	0	1,368	73	0								
, , ,	360		1,166		126			113			1,441			-	-					
10) Flow rate	0.100		0.324		0.035			0.028			0.353								λί	Σλ
1Φ								0.028											0.028	
11) Necessary phase ratio	0.100		0.324								0.353								0.353	0.416
34					0.035														0.035	
4 Φ										Pedestri									0.000	
13) Ratio of left turn	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

		Nor	thEastb	ound	Sout	hEastb	ound	N	orthbou	nd	Se	outhbou	nd	Bus	Northb	ound	Bus	Southbo	ound		
Approach			26 - 1			26 - 2			26 - 3			26 - 4			26 - 3			26 - 4			
		R		L+U	R		L	-	Т	-	R	-									
l) No. of lanes		2		2	1		1		2	-	2										
e) Basic value of saturation flo	w rate	1,800		1,800	1,800		1,800	-	2,000	-	1,800	-									
3) Adjustment factor for left		1.00		1.00	1.00		1.00		1.00		1.00										
 Adjustment factor for right 		1.00		1.00	1.00		1.00	1	1.00	-	1.00										
5) Saturation flow rate		3,600		3,600	1,800		1,800	-	4,000	-	3,600	-									
y satur allon now rate		3,600		3,600		3,600			4,000			3,600									
7) PCU direction volume(bus)		30		233	15		15		98		156	124									
,		30		233		30			98			280				-			-		
3) PCU direction volume(other	rs)	412		1,346	119		39				833		0								
.))	412		1,346		158						833				_					
9) PCU direction volume (tota	D	442		1,579	134		54	0	98	0	989	124	0								
· · · · · ·	-)	442		1,579		188			98			1,113									
10) Flow rate	_	0.123		0.439		0.052			0.024			0.231	-						-	λί	Σλ
	1Φ								0.024											0.024	
11) Necessary phase ratio	2 Φ	0.123		0.439								0.231								0.439	0.515
ry necessary phase ratio	3 0					0.052														0.052	0.010
	4 Φ										or Pedest									0.000	
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.27: Salah Salem St., Masaken Ain El Seera St.

		F	Castbour	ıd	V	Vestboui	nd	Ne	orthbou	nd	Se	uthbou	nd	Bu	s Eatbo	und	Bus	Westbo	ound		
Approach			27 - 1			27 - 2			27 - 3			27 - 4			27 - 1B			27 - 2B			
		-	Т	U	-	Т	U	1	1	1	-	-	-	1	Т	1		Т	-		
) No. of lanes			2	1	-	2	1					-	-		1	-	-	1	-		
) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	1		1	1	-	-	1	1.00		-	1.00			
) Adjustment factor for right		1	1.00	1.00	-	1.00	1.00			1	1	-	-		1.00	1	-	1.00	-		
) Saturation flow rate		-		1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
) Suturation non Fute		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)															225			185			
,		-	-	-	-	-	-		-			-			225			185			
) PCU direction volume(other	·s)	-	2,581	287	-	2,213	246								0						
,	,	-	2,581 2,581	287 287	-	2,213	246 246		-			-			0 225			0 185			
) PCU direction volume (tota	D	-	2,581	287	-	2,213	246	-	-	-	-	-	-	-	225	-	-	185	-		
0) Flow rate		-	0.645	0.159	-	0.553	0.137		-		-				0.113			0.093		λί	Т
() 1 low 1 luc	1Φ	_	0.045	0.157	-	0.229	0.157		-			-			0.113			0.093	1	0.267	┢
	20		0.378	0.159		0.324	0.137								0.115			0.075		0.378	1.
1) Necessary phase ratio	30		0.07.0						(A	ll Red fo	or Pedes	rian)								0.000	(
	4 Φ																			0.000	1
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		-
4) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
PM Peak																					
		F	Castbour	ıd	W	Vestboui	nd	Ne	orthbou	nd	Se	outhbou	nd		s Eatbo		Bus	Westbo			
Approach			27 - 1			27 - 2			27 - 3			27 - 4			27 - 1B			27 - 2B			
N		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	Т	-	1	
) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-	4	
) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
6) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00 2,000	-		

5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
5) Saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															195			278			
7) PCU direction volume(bus)		-	-	-	-	-			-			-			195			278			
8) PCU direction volume(other	·••)	-	1,958	218	-	2,377	264														
8) FCU direction volume(other	:5)	-	1,958	218	-	2,377	264		-			-			0			0			
9) PCU direction volume (tota	n	-	1,958	218	-	2,377	264	-	-	-	-	-	-	-	195	-	-	278	-		
,	9	-	1,958	218	-	2,377	264		-			-			195			278			
10) Flow rate		-	0.489	0.121	-	0.594	0.147		-			-			0.098			0.139		λί	Σλ
	1Φ		0.219			0.265									0.098			0.139		0.265	
11) Necessary phase ratio	2 Φ		0.271	0.121		0.329	0.147													0.329	0.594
11) Necessary phase ratio	3 0								(All Red	for Pede	strian)								0.000	0.394
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1	

Intersection No.28: Salah Salem St., Fostat St.

		E	astbou	nd	V	Vestbou	nd	No	orthbou	nd	Se	outhbou	Ind		Eastbo		Bus	Westbo			
Approach			28 - 1			28 - 2			28 - 3	_		28 - 4			28 - 1B			28 - 2B			
Арргоаси		T+R		T+L+ U	T+R		T+L+ U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-		2,000	-		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.96	1.00	-	0.96	-	0.98		-	0.98			
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.96	-	1.00	0.96	-	1.00	-	0.98		-	0.98	-		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,926		1,919	1,918	-	1,926	-	1,936	-	-	1,936	-		
5) Satur ation now rate			3,935			3,935			3,845			3,844			1,936			1,936			
7) PCU direction volume(bus)								11	34	11	9	28	9	52	244	52	41	193	41		
() I CO uncertain (olume(bus)			0			0			56			46			348			275			
8) PCU direction volume(other	·e)	213	992	213	192	895	192	192	121	213	213	121	192								
o) i ee uireetion volume(otnei	3)		1,417			1,279			526			526			0			0			
9) PCU direction volume (total	n	213	992	213	192	895	192	203	155	224	222	149	201	52	244	52	41	193	41		
, ,	·)		1,417			1,279			582			572			348			275			
10) Flow rate		0.3	360			0.325			0.137			0.137			0.180			0.142		λi	Σλ
	1Φ														0.180			0.142		0.180	
11) Necessary phase ratio	2Φ		0.360			0.325														0.360	0.677
rij necessary pliase ratio	3Φ								0.137			0.137								0.137	0.577
	4 Φ								(All	Red for	Pedestr	ian)							-	0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	38%	0%	0%	35%	0%	15%	0%	0%	15%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	35%	0%	0%	39%	0%	0%	0%	15%	0%	0%	15%	0%		

		E	astbour	nd	V	Vestbur	ıd	N	orthbou	nd	Se	uthbou	nd	Bu	s Eastbo	und	Bus	Westbo	ound	I	
Ammussah			28 - 1			28 - 2			28 - 3			28 - 4			28 - 1B			28 - 2B			
Approach		T+R		T+L+ U	T+R		T+L+ U	T+R		T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	-	2,000		-	2,000			
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.96	1.00	-	0.96	-	0.98		-	0.98			
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.96	-	1.00	0.96	-	1.00	-	0.98		-	0.98	-		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,925	-	1,920	1,919	-	1,924	-	1,936	-	-	1,936	-		
5) Saturation now rate			3,935			3,935			3,845			3,843			1,936			1,936			
7) PCU direction volume(bus)								11	34	11	9	28	9	25	116	25	27	125	27		
7) FCU direction volume(bus)			0			0			56			46			165			178			
8) PCU direction volume(other	(a)	222	1,035	222	205	958	205	205	128	222	222	128	205								
8) FCU direction volume(other	-5)		1,478			1,369			555			555			0			0			
9) PCU direction volume (total	n	222	1,035	222	205	958	205	217	162	233	231	156	215	25	116	25	27	125	27		
5) I CO unection volume (total	9		1,478			1,369			611			601			165			178			
10) Flow rate		0.3	376			0.348			0.144			0.144			0.085			0.092		λί	Σλ
	1Φ														0.085			0.092		0.092	
11) Nanagang phaga natio	2 Φ		0.376			0.348														0.376	0.612
11) Necessary phase ratio	3 0								0.144			0.144								0.144	0.012
	4 Φ								(All	Red for	Pedestri	an)								0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	38%	0%	0%	36%	0%	15%	0%	0%	15%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	35%	0%	0%	38%	0%	0%	0%	15%	0%	0%	15%	0%		

Intersection No.29: Salah Salem St., Malek El Saleh Br.

		ŀ	astbou	ıd	W	/estbou	nd	Ne	orthbou	nd	Se	outhbou	nd		
Approach			29 - 1			29 - 2			29 - 3			29 - 4			
		T+R	Т	L	T+R		T+L	T+R		L	T+R	Т	T+L		
1) No. of lanes		1	1	2	1		1	1		2	1	1	1		
2) Basic value of saturation fl	ow rate	2,000	2,000	1,800	2,000		2,000	2,000		1,800	2,000	2,000	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00		
4) Adjustment factor for righ	t	0.97	1.00	1.00	0.98		1.00	0.99		1.00	0.90	1.00	1.00		
5) Saturation flow rate		1,932	2,000	3,600	1,962		2,000	1,983		3,600	1,802	2,000	2,000		
s) saturation now rate		3,	932	3,600		3,962			5,583			5,802	-		
7) PCU direction volume(bus)		195	335	223	83	193		13	0	233	148	0	0		
() I CO un ecuon volume(bus)		5	30	223		276			246			-			
3) PCU direction volume(othe	ers)	574	1,283	481	190	1,089		67	0	696	375	0	0		
s) i co un ecuon volume(otne	:15)		856	481		1,279			763			375	-		
9) PCU direction volume (tot:	n	769	1,618	704	273	1,282	0	80	0	929	523	0	0		
· · · · ·	,	2,	386	704		1,555			1,009			523			
10) Flow rate		0.4	472	0.195		0.392			0.181			0.090		λί	Σ
	1Φ		0.315			0.392								0.392	
1) Necessary phase ratio	2 Φ		0.157	0.195										0.195	0.7
rij necessary plase ratio	3Φ								0.181			0.090		0.181	0.7
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		32%	0%	0%	18%	0%	0%	8%	0%	0%	100%	0%	0%		

PM Peak

		E	astbour	ıd	v	Vestbun	d	N	orthbou	nd	Se	outhbou	nd		
Approach			29 - 1			29 - 2			29 - 3			29 - 4			
		T+R	Т	L	T+R		T+L	T+R		L	T+R		T+L		
1) No. of lanes		1	1	2	1		1	1		2	1	-	1		
2) Basic value of saturation flow	v rate	2,000	2,000	1,800	2,000		2,000	2,000		1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	-	1.00		
4) Adjustment factor for right		0.96	1.00	1.00	0.98		1.00	0.98		1.00	0.90		1.00		
5) Saturation flow rate		1,917	2,000	3,600	1,952		2,000	1,962		3,600	1,802		2,000		
5) Saturation now rate		3,9	917	3,600		3,952			5,562			3,802			
7) PCU direction volume(bus)		163	160	175	50	128		5		123	115	0	0		
7) I CO ulrecuoli volulle(bus)		32	23	175		178			128			-			
8) PCU direction volume(other	a	718	1,184	536	298	1,071		163		674	622	0	0		
8) I CO ul ecuoli volume(otner	,	1,9	902	536		1,369			837			622			
9) PCU direction volume (total		881	1,344	711	348	1,199	0	168	0	797	737	0	0		
, , ,			225	711		1,547			965			737			
10) Flow rate		0.4	186	0.197		0.391			0.150			0.164		λί	Σλ
	1Φ		0.323			0.391								0.391	
11) Necessary phase ratio	2 Φ		0.163	0.197										0.197	0.752
rij recessary plase rado	3Φ								0.150			0.164		0.164	0.752
	4 Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		40%	0%	0%	22%	0%	0%	17%	0%	0%	100%	0%	0%		

Intersection No.30: Salah Salem St., Qayrawan Sq.

AM Peak

	F	astbou	ıd	W	estbou	nd	N	orthbou	ınd	Se	uthbou	nd	Bus	s Eastbo	und	Bus	Westbo	und		
Approach		30 - 1			30 - 2			30 - 3			30 - 4			30 - 1B			30 - 2B			
Арргоаси	T+R		T+L	T+R		T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes	1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate	2,000		2,000	2,000		2,000	2,000		2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left	1.00		0.99	1.00		0.99	1.00	-	0.98	1.00	-	0.98		0.99		-	0.99			
4) Adjustment factor for right	0.99		1.00	0.99		1.00	0.98	1	1.00	0.98	-	1.00		0.99		-	0.99	-		
5) Saturation flow rate	1,982		1,982	1,982		1,982	1,960	-	1,968	1,968	-	1,960	-	1,964	-	-	1,964	-		
3) Satur atom now rate		3,964			3,964			3,928			3,928			1,964			1,964			
7) PCU direction volume(bus)							13	56	15	15	56	13	22	220	22	20	195	20		
.)		0			0			84			84			264			234			
8) PCU direction volume(others)	141	1,406	141	186	1,861	186	107	373	79	79	373	107								
.,		1,688			2,233			560			560			0			0			
9) PCU direction volume (total)	141	1,406	141	186	1,861	186	120	429	94	94	429	120	22	220	22	20	195	20		
10) Flow rate		1,688			2,233			644 0.143			644 0.143			264 0.134			234 0.119			Σλ
10) Flow rate	-	0.420	-		0.303			0.145	-		0.145			0.134	-		0.119		λi 0.134	21
1Ψ 2Φ	-	0.426			0.563									0.134			0.119		0.134	
11) Necessary phase ratio 3Φ	-	0.420			0.505			0.143			0.143								0.143	0.840
<u>3</u> ↓ 40	-									Pedestria									0.000	
13) Ratio of left turn	0%	0%	8%	0%	0%	8%	0%	0%	15%	0%	0%	19%	0%	8%	0%	0%	8%	0%	0.000	
14) Ratio of right turn	8%	0%	0%	8%	0%	0%	19%	0%	0%	15%	0%	0%	0%	8%	0%	0%	8%	0%		

		E	astbour	ıd	V	Vestbun	d	Ne	orthbou	nd	Se	outhbou	nd	Bus	s Eastbo	und	Bus	Westbo	und		
Approach			30 - 1			30 - 2			30 - 3			30 - 4			30 - 1B			30 - 2B			
Арргоаси		T+R		T+L	T+R		T+L	T+R	-	T+L	T+R		T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	2,000		2,000	2,000		2,000	2,000	-	2,000	2,000		2,000	-	2,000	1		2,000			
3) Adjustment factor for left		1.00		0.99	1.00		0.99	1.00	-	0.98	1.00		0.98	-	0.99		-	0.99			
4) Adjustment factor for right		0.99		1.00	0.99		1.00	0.98	-	1.00	0.98	-	1.00	-	0.99	-	-	0.99	-		
5) Saturation flow rate		1,980		1,980	1,982		1,982	1,961	-	1,967	1,967		1,961	-	1,964		-	1,964	-		
5) Satur auon now rate			3,960			3,964			3,928			3,928			1,964			1,964			
7) PCU direction volume(bus)								16	63	15	15	63	16	22	220	22	24	243	24		
() i co un ection volume(bus)			0			0			94			94			264			292			
8) PCU direction volume(other	6)	156	1,556	156	187	1,867	187	94	344	78	78	344	94								
o) i ce un cetton volume(other	3)		1,868			2,240			516			516			0			0			
9) PCU direction volume (total)	156	1,556	156	187	1,867	187	110	406	93	93	406	110	22	220	22	24	243	24		
	,		1,712			2,240			610	-		610			264			292			
10) Flow rate			0.432			0.565			0.131			0.131			0.134			0.149		λi	Σλ
	1Φ														0.134			0.149		0.149	
11) Necessary phase ratio	2 Φ		0.432			0.565														0.565	0.845
rij recessary phase ratio	3 Φ								0.131			0.131								0.131	0.010
	4 Φ									Red fo										0.000	
13) Ratio of left turn		0%	0%	9%	0%	0%	8%	0%	0%	15%	0%	0%	18%	0%	8%	0%	0%	8%	0%		
14) Ratio of right turn		9%	0%	0%	8%	0%	0%	18%	0%	0%	15%	0%	0%	0%	8%	0%	0%	8%	0%		

Intersection No.31: Salah Salem St., Giza Br.

		E	astbou	nd	v	/estbou	nd	Ne	orthbou	nd	Se	uthbou	nd	Bus	Eastbo	und	Bus	Westbo	und		
Approach			31 - 1			31 - 2			31 - 3			31 - 4			31 - 1B			31 - 2B			
		T+R	Т		T+R	Т		T+R		T+L	R	-			T+R	-	-	T+R	-		
l) No. of lanes		1	1		1	1		1		1	2	-		•	1	1	1	1	-		
2) Basic value of saturation flo	w rate	2,000	2,000		2,000	2,000		2,000	-	2,000	1,800	-		-	2,000	-	-	2,000	-		
Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-	0.98	1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.98	1.00		0.98	1.00		0.99	1	1.00	1.00	-			0.99	1	-	1.00	-		
5) Saturation flow rate		1,968	2,000			2,000		1,988	-	1,958	3,600	-			1,989	-	-	1,997	-		
5) Satur ation now rate			3,968	-	3,9	968	-		3,945			3,600			1,989			1,997			
7) PCU direction volume(bus)								0	6	1	2	8		11	205		3	188			
() i ee uireettöii (ötäime(ötä)			0			0			7	-		10			216			191			
8) PCU direction volume(othe	rs)	363	2,056		328	1,861		21	265	70	71	285									
,,(,		2,419			89			356			356	_		0			0			
9) PCU direction volume (tota	D	363	2,056		328	1,861		21	271	71	73	293		11	205		3	188			
· · · · ·	,		2,419			89			363			366			216			191			
10) Flow rate			0.610		0.5	52			0.090			0.099	_		0.108			0.096		λί	Σλ
	1Φ 0.*											0.099			0.108			0.096		0.108	-
11) Necessary phase ratio	2 Φ		0.610			0.552			0.000											0.610	0.808
	30 10								0.090	d for Pe	destrion									0.090	4
13) Ratio of left turn	4Φ	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.000	
											0,0	0.10									
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	6%	0%	0%	0%	0%	0%	0%	5%	0%	0%	2%	0%		

		E	astbour	nd	W	/estbou	nd	No	rthbou	nd	Se	outhbou	nd	Bus	Eastbo			Westbo		[
Approach			31 - 1			31 - 2			31 - 3			31 - 4			31 - 1B			31 - 2B			
		T+R	Т		T+R	Т		T+R	-	T+L	R	-		-	T+R	-	-	T+R	-		
1) No. of lanes		1	1		1	1		1	-	1	2	-		-	1	-	-	1	-		
2) Basic value of saturation flow	rate	2,000	2,000		2,000	2,000		2,000	-	2,000	1,800	-		-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-	0.97	1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.98	1.00		0.98	1.00		1.00	-	1.00	1.00	-		-	0.99	-	-	1.00	-		
5) S-tt 8t-		1,968	2,000		1,968	2,000		1,991	-	1,932	3,600	-		-	1,989	-	-	1,992	-		
5) Saturation flow rate			3,968		3,9	68			3,923			3,600			1,989			1,992			
7) DCU Handler (handler)								0	22	16	38	80		11	210		9	249		ĺ	
7) PCU direction volume(bus)		(Ó			Ó			38			118			221			258			
8) PCU direction volume(others)	358	2,028		333	1,885		19	268	129	140	296									
s) i co unection volume(others	,		2,386		2,2	218			416			436			0			0			
9) PCU direction volume (total)		358	2,028		333	1,885		19	290	145	177	376		11	210		9	249			
5) FCU direction volume (total)			2,386		2,2	218			454			553			221			258			
10) Flow rate			0.601		0.5	559			0.106			0.121			0.111			0.129		λi	Σλ
	1Φ											0.121			0.111			0.129		0.129	
11) Necessary phase ratio	2Φ		0.601			0.559														0.601	0.837
11) Necessary phase ratio	3Φ								0.106											0.106	0.857
	4 Φ								(All	Red for	Pedestria	an)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	4%	0%	0%	0%	0%	0%	0%	5%	0%	0%	3%	0%	l l	

Intersection No.32: Salah Salem St., Bahr El Aazam St.

Approach		E	astbour 32 - 1	ıd	v	vestbour 32 - 2	nd	No	orthbou 32 - 3	nd	Se	outhbou 32 - 4	nd	Bu	s Eatbou 32 - 1B			Westbo 32 - 2B			
11		-	T	U	-	T	U	-	-	-	-	-	-	-	Т	-	-	Т	-	í i	
) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-	í –	
) Basic value of saturation fl	ow rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00		1	
) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-	1	
i) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-	1	
s) saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)															208			155			
) i ce un ceuon volume(bus)		-	-	-	-	-	-		-			-			208			155		i i	
3) PCU direction volume(othe	rs)		2,616	309		1,775	197														
	,	-	2,616	309	-	1,775	197		-			-			0			0			
)) PCU direction volume (tota	n	-	2,616	309	-	1,775	197	-	-		-		-	-	208	-	-	155	-		
, .	.,	-	2,616	309	-	1,775	197	<u> </u>	-			-			208			155			
10) Flow rate		-	0.654	0.172	-	0.444	0.110	L	-			-			0.104			0.078		λi	Σλ
	1Φ		0.247			0.167									0.104			0.078		0.247	
11) Necessary phase ratio	2 Φ		0.407	0.172		0.276	0.110													0.407	0.65
,	3 Φ	I							(All	Red for	Pedestri	an)								0.000	
(2) Dette effetter	4 Φ																			0.000	<u> </u>
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1	

		F	Castbour	nd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo	und	Bus	Westbo	und		
Approach			32 - 1			32 - 2			32 - 3			32 - 4			32 - 1B			32 - 2B			
		-	Т	U	-	Т	U	1	-	1	1		-	-	Т	1	-	Т	1		
) No. of lanes		-	2	1	-	2	1		-	1	1		-	-	1		-	1	-		
2) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
b) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00		-	-	-		-		1.00			1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00						-		1.00			1.00			
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
) Saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															170			293			
,		-		-	-	-	-		-			-			170			293			
3) PCU direction volume(other	s)		2,254	250		2,677	313														
,	-7	-	2,254	250	-	2,677	313		-			-	-		0			0			
) PCU direction volume (total	D	-	2,254	250	-	2,677	313	-	-	-	-	-	-	-	170	-	-	293	-		
· · · · ·	,		2,254	250	-	2,677	313		-			-			170			293			
10) Flow rate	1.2	-	0.563	0.139	-	0.669	0.174		-			-			0.085			0.147		λί	Σλ
	1Φ 0.*		0.258	0.120		0.306	0.174								0.085			0.147		0.306	
Necessary phase ratio 20		0.306	0.139		0.363	0.174													0.363	0.66	
,	3Φ 4Φ								(A	I Red to	r Pedest	rian)								0.000	
13) Ratio of left turn	4Ψ	0.0/	0%	08/	0%	00/	0%	0%	0%	0%	0%	0.04/	0%	0%	00/	00/	0%	0%	0%	0.000	<u> </u>
(4) Ratio of right turn		0%	0%	0%	0,0	0%	0%	0%	0%	0%	0,0	0%	0,0	0,0	0%	0%		0,0	0%		
(4) Katio of Fight turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.33: Salah Salem St., Giza Sq.

		F	Eastbour	ıd	W	/estbou	nd	N	orthbou	nd	Se	outhbou	nd	Sou	ıthboun	d-2	Su	thbound	1-3		
Approach			33 - 1			33 - 2			33 - 3			33 - 4			33 - 3			33 - 4			
		-		U		Т					R				Т		R				
) No. of lanes		-		2		3					2				3		2				
) Basic value of saturation flo	w rate	-		1,800		2,000					1,800				2,000		1,800				
) Adjustment factor for left		-		1.00		1.00					1.00				1.00		1.00			1	
) Adjustment factor for right		-		1.00		1.00					1.00				1.00		1.00				
) Saturation flow rate		-		3,600		6,000					3,600				6,000		3,600				
) Saturation now rate		-	3,6	500		6,000			-			3,600			6,000			3,600			
) PCU direction volume(bus)	on volume(bus)			45		133							58		1,622		93				
) i ce ul ceuoli volune(bus)	J direction volume(bus)		4	5		133						58			1,622			93			
) PCU direction volume(other	rs)	-		835		1,507							1,129		1,398		710			Į.	
) i ee uii eeuon vorunie(ouie)	-		35		1,507						1,129			1,398			710			
) PCU direction volume (tota	D	-	0	880		1,640							1,187		3,020		803				
	-,	-		80		1,640						1,187			3,020			803			
0) Flow rate		-		244		0.273						0.330			0.503			0.223	-	λί	Σ
	1Φ		0.244									0.330			0.503					0.503	
1) Necessary phase ratio	20					0.273												0.223		0.273	0.7
,	3 0	_						(1	All Red	for Pede	strian)									0.000	
	4 Φ																			0.000	
3) Ratio of left turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
4) Ratio of right turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1	

		F	Eastbou	ıd	W	/estbou	nd	N	orthbou	nd	Se	outhbou	nd	Sou	athboun	nd-2	Su	thboun	d-3		
Approach			33 - 1			33 - 2			33 - 3			33 - 4			33 - 3			33 - 4			
		-		U		Т					R				Т		R				
1) No. of lanes		-		2		3					2				3		2				
2) Basic value of saturation flo	w rate			1,800		2,000					1,800				2,000		1,800				
3) Adjustment factor for left		-		1.00		1.00					1.00				1.00		1.00				
4) Adjustment factor for right		-		1.00		1.00					1.00				1.00		1.00				
5) Saturation flow rate		-	0	3,600		6,000					3,600				6,000		3,600				
5) Saturation now fate		-	3,0	500		6,000						3,600			6,000			3,600			
7) PCU direction volume(bus)		-		45		120							75		275		93				
7) FCU direction volume(bus)		-	4	15		120						75			275			93			
8) PCU direction volume(other	~)	-		1,005		1,664							1,491		1,168		765				
8) FCU direction volume(other	8)	-	1,0)05		1,664						1,491			1,168			765			
9) PCU direction volume (total	`	-	0	1,050		1,784							1,566		1,443		858				
· · · ·	,	-	1,0)50		1,784						1,566			1,443			858			
10) Flow rate		-	0.2	292		0.297						0.435			0.241			0.238		λi	Σλ
	1Φ		0.292									0.435			0.241					0.435	
11) Necessary phase ratio	2 0					0.297												0.238		0.297	0.732
11) Necessary phase ratio	3Φ								(All Red	d for Pec	destrian)									0.000	0.752
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.34: Salah Salem St., Entrance of Ahram St.

		F	astbou	nd	v	/estbou	nd	N	orthbou	nd	Se	outhbou	nd]	
Approach			34 - 1			34 - 2			34 - 3			34 - 4			
		R+T	Т			Т	L	R	-	-	-	-	-		
1) No. of lanes		1	1			2	2	2	-	-	-	-	-		
2) Basic value of saturation flo	ow rate	2,000	2,000			2,000	1,800	1,800	-	-	-	-	-		
3) Adjustment factor for left		1.00	1.00			1.00	1.00	1.00	-	-	-	-	-		
4) Adjustment factor for right		0.95	1.00			1.00	1.00	1.00	-	-	-	-	-		
5) Saturation flow rate		1,906	2,000			4,000	3,600	3,600			-	-	-		
5) Saturation now rate		3,9	906		4,0	000	3,600		3,600			-			
7) BCU dimention volume(hus)	PCU direction volume(bus)				213	305	265		50						
7) FCU direction volume(bus)		9	i8		5	18	265		50						
8) PCU direction volume(othe	rre)	526	607		1,587	2,099	1,141		1,246						
s) i ce un ection volume(otne	15)	1,1	133		3,0	586	1,141		1,246			-			
9) PCU direction volume (tota	n	551	680		1,800	2,404	1,406					-			
5) I CO un ection volume (tota	u)	1,2	231		4,2	204	1,406		1,246			-			
10) Flow rate		0.3	315		1.0)51	0.391		0.346			-		λί	Σλ
	1Φ		0.315											0.315	
11) Necessary phase ratio	2 Φ						0.391		0.346			-		0.391	0.706
11) Necessary plase ratio	3Φ					(All Re	d for Pe	destrian)					0.000	0.700
	4 Φ													0.000	1
13) Ratio of left turn				0%	0%	0%	33%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		45%	0%	0%	43%	0%	0%	0%	0%	0%	0%	0%	0%	Ĩ	

PM Peak

		E	astbou	nd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd]	
Approach			34 - 1			34 - 2			34 - 3			34 - 4			
		R+T	Т			Т	L	R	-	-	-	-	-		
1) No. of lanes		1	1			2	2	2	-	-	-	-	-	ļ	
2) Basic value of saturation flo	w rate	2,000	2,000			2,000	1,800	1,800	-	-	-	-	-		
3) Adjustment factor for left		1.00	1.00			1.00	1.00	1.00	-	-		-	-		
4) Adjustment factor for right		0.95	1.00			1.00	1.00	1.00		1		-	-		
5) Saturation flow rate		1,908	2,000			4,000	3,600	3,600		1		-	-		
5) Saturation now rate	saturation now rate				4,	000	3,600		3,600			-			
7) PCU direction volume(bus)	CU direction volume(bus)				288	483	225		60						
() I CO un ection volume(bus)		9	7		7	71	225		60						
8) PCU direction volume(othe	re)	444	573		2,078	2,659	1,064		791						
s) i ce un cenon voianne(orne	(3)	1,0)16		4,	737	1,064		791			-			
9) PCU direction volume (tota	n	486	627		2,365		1,289		-		-	-	-		
· · · · · ·	,		113			507	1,289		791			-			
10) Flow rate		0.2	285		1.	377	0.358		0.220			-		λί	Σλ
	1Φ 2Φ		0.285											0.285	
11) Necessary phase ratio						0.358		0.220			-		0.358	0.643	
rij necessary plase ratio	3 Φ					(All Rec	for Pec	lestrian)						0.000	0.045
	4Φ			0%										0.000	
13) Ratio of left turn					0%	0%	23%	0%	0%	0%	0%	0%	0%	ļ	
14) Ratio of right turn		44%	0%	0%	43%	0%	0%	0%	0%	0%	0%	0%	0%		

AM Peak																					
		ŀ	lastbour	ıd	v	estbour	nd	No	orthbou	nd	Se	outhbou	nd	Bu	s Eastbo		Bus	Westbo			
Approach			35 - 1			35 - 2			35 - 3			35 - 4			35 - 1B			35 - 2B			
. ippi ouch		T+R	т		T+R	т		R	-		R	-		-	T+L+ R	-	-	T+L+ R	-		
) No. of lanes		1	2		1	2		2	-		2	-		-	1			1			
2) Basic value of saturation flo	ow rate	2,000	2,000		2,000	2,000		1,800	-		1,800	-		-	2,000		-	2,000	-		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-		1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.99	1.00		0.99	1.00		1.00	-		1.00	-		-	0.99	-	-	1.00			
5) Saturation flow rate			4,000			4,000		3,600	-		3,600	-		-	1,974	-	-	1,997	-		
s) saturation now rate		5,9	979		5,	989			3,600			3,600			1,974			1,997			
7) PCU direction volume(bus)								130	0		40	0		15	114		2	127			
.,			0			0			130			40			129			129			
8) PCU direction volume(othe	rs)	341	3,183		109	2,045		937	0		417	0									
o) i ce un ceuon (otanic(otale	,		524			154			937			417			0			0			
9) PCU direction volume (tota	n	341	3,183		109	2,045		1,067	0	0	457	0	0	15	114	0	2	127	0		
· · · · · ·	.,		524			154			1,067			457			129			129			
10) Flow rate		0.	589		0.	360			0.260			0.127			0.065			0.065		λί	Σλ
	1Φ								0.026			0.013			0.065			0.065		0.065	
11) Necessary phase ratio	2 Φ		0.589			0.360			0.234			0.114	-							0.589	0.65
11) Necessary phase ratio	3 Φ								_ (All	Red for	Pedestr	rian)								0.000	0.05
	4 0																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		10%	0%	0%	5%	0%	0%	100%	0%	0%	0%	0%	0%	0%	12%	0%	0%	1%	0%		

Intersection No.35: Ahram St., Tereat El Zomor El Sharqy St.

		E	astbour	d	W	estbou	nd	No	rthbou	nd	Se	outhbou	nd	Bu	s Eastbo	und	Bus	Westbo	ound	l I	
Approach			35 - 1			35 - 2			35 - 3			35 - 4			35 - 1B			35 - 2B			
Арргоасн		T+R	Т		T+R	Т		R	-		R	-		-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1	2		1	2		2	-		2	-		-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	2,000	2,000		2,000	2,000		1,800	-		1,800	-			2,000	-	-	2,000	÷		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-		1.00	-		-	1.00			1.00			
4) Adjustment factor for right		0.98	1.00		0.99	1.00		1.00	-		1.00	-		-	0.98	-		1.00	-		
5) Saturation flow rate			4,000		1,983	4,000		3,600	-		3,600	-		-	1,958	-	-	1,996	-		
of Suturation flow fute		5,9	956		5,9	983			3,600	-		3,600			1,958			1,996			
7) PCU direction volume(bus)								73	0		68	0		25	104		3	126			
() i ee ui eeuoii (oluiie(olus)			0			0			73			68			129			129			
8) PCU direction volume(other	s)	577	2,270		282	3,284		833	0		356	0									
.,	~		347			566			833			356			0			0			
9) PCU direction volume (total	n	577	2,270		282	3,284		906	0	0	424	0	0	25	104	0	3	126	0		
	,		347			566			906			424			129			129			
10) Flow rate		0.4	478		0.5	596			0.252			0.118			0.066			0.065		λί	Σλ
	1Φ								0.030			0.014			0.066			0.065		0.066	
11) Necessary phase ratio	20		0.478			0.596			0.221			0.104								0.596	0.662
,, , ,		I							(All	Red for	Pedestr	ian)								0.000	
13) Ratio of left turn	4Φ	08/	08/	00/	00/	08/	00/	08/	00/	00/	0.04/	00/	00/	00/	00/	08/	08/	00/	08/	0.000	
-,		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		20%	0%	0%	8%	0%	0%	100%	0%	0%	0%	0%	0%	0%	19%	0%	0%	2%	0%		

Intersection No.36: Ahram St., Samy El Baroody St.

Approach		F	astbour 36 - 1	nd	V	/estbou 36 - 2	nd	N	orthbou 36 - 3	ind	Se	outhbou 36 - 4	nd	Bu	s Eatbo 36 - 1B		Bus	Westb 36 - 2E		Į	
Арргоаси		-	30 - 1 T	U	-	36 - 2 T	U	-		-		- 30 - 4	-	-	30 - 1B	-	-	30 - 2E	-	•	
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-	t	
2) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-			-				2,000	-		2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-		1.00		-	1.00		Ι	
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-	Ι	
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
of Sutur ation now rate		-	4,000	1,800	-	4,000	1,800		-	-		-			2,000			2,000		ļ	
7) PCU direction volume(bus)															129			129			
() Tee unection (oranic(ous)		-	-	-	-	-	-		-			-			129			129		ļ	
8) PCU direction volume(other	(er	-	2,550	356		1,810	210													Ļ	
o) i ee uireettöii rotuine(otite		-	2,550	356	-	1,810	210		-			-			0			0			
9) PCU direction volume (tota	n	-	2,550	356	-	1,810	210	-	-	-	-	-	-	-	129	-	-	129	-	Ļ	
, , , , , , , , , , , , , , , , , , , ,	.,	-	2,550	356	-	1,810	210		-			-			129			129			
10) Flow rate		-		0.198	-	0.453	0.117		-			-			0.065			0.065		λi	Σλ
	1Φ		0.157			0.111									0.065			0.065		0.157	
11) Necessary phase ratio	2Φ		0.481	0.198		0.341	0.117													0.481	0.638
rij necessary pliase ratio	3Φ							(Al	l Red fo	r Pedesti	rian)									0.000	
	4 Φ							-												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak																				_	
		E	Castbour	ıd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo	und	Bus	Westbo	ound		
Approach			36 - 1			36 - 2			36 - 3			36 - 4			36 - 1B			36 - 2B			
		-	Т	U	1	Т	U		1	1	1		-	1	Т		-	Т			
1) No. of lanes		-	2	1	-	2	1		-	1	1	1	-	1	1	1	-	1	1	[
2) Basic value of saturation flor	w rate	-	2,000	1,800	-	2,000	1,800	-		-	-	-	-		2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00		-	-			-		1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	1	1.00	1.00		1	1	1		-		1.00		-	1.00			
5) Saturation flow rate			4,000	1,800	-	4,000	1,800		1	1	1		-		2,000		-	2,000			
5) Saturation now rate		-	4,000	1,800	-	4,000	1,800		-	-		-			2,000	-		2,000	-	l	
7) PCU direction volume(bus)															129			129		[
() i ce un cetton volume(bus)		-	-	-	-		-		-			-	-		129	-		129	-		
8) PCU direction volume(other	5)		2,583	339		2,591	318														
o) i co uncetton volume(otnei	<i>.</i> ,	-	2,583	339	-	2,591	318		-			-			0			0			
9) PCU direction volume (total	`	-	2,583	339	-	2,591	318	-	-	-	-	-	-	-	129	-	-	129			
, , ,	,	-	2,583	339	-	2,591	318		-			-			129			129			
10) Flow rate		-		0.188	-	0.648	0.177		-			-	-		0.065			0.065		λi	Σλ
	1Φ		0.165			0.165									0.065			0.065		0.165	1
11) Necessary phase ratio	2 Φ		0.481	0.188		0.483	0.177													0.483	0.648
ri)ricecoom y pinise runo	Necessary phase ratio 30							(Al	Red fo	r Pedestr	ian)									0.000	0.010
	4 0																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	l	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.37: Ahram St., Mesaha Sq.

		F	astbour	ıd	v	/estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo	ınd	Bus	Westbo	ound		
Approach			37 - 1			37 - 2			37 - 3			37 - 4			37 - 1B			37 - 2B		1	
		-	Т	U		Т	U	-	-	-	1	-	-	-	Т	-	-	Т	-		
) No. of lanes		-	2	1		2	1	-		1	1	-	-	-	1	-	-	1	-		
Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-			-	-	-	-	2,000		-	2,000	-		
) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
) Saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)														-	129	-	-	129	-		
) i co unection volume(bus)		-	-			-	-		-			-			129			129			
) PCU direction volume(othe	re)	-	2,834	231		2,327	207														
) i co urection volume(otne	13)	-	2,834	231		2,327	207		-			-			0			0			
) PCU direction volume (tota	n	-	2,834	231	-	2,327	207	-	-	-	-	-	-	-	129	-	-	129	-		
	1)	-	2,834	231		2,327	207		-			-			129			129			
0) Flow rate		-	0.709	0.128	-	0.582	0.115		-			-			0.065			0.065		λi	2
	1Φ		0.237			0.195		_							0.065			0.065		0.237	1
1) Necessary phase ratio	2 Φ		0.472	0.128		0.387	0.115													0.472	0.
ry recessing phase ratio	3Φ								(All Re	1 for Pee	lestrian)									0.000	
	4 Φ																			0.000	
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
4) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

		F	Castbou	nd	v	Vestbou	nd	N	orthbou	nd	So	uthbou	nd	Bu	s Eatbo	und	Bus	Westbo	ound		
Approach			37 - 1			37 - 2			37 - 3			37 - 4			37 - 1B			37 - 2B			
		-	Т	U	-	Т	U	-	-	-	-	-	-	-	Т	-	-	Т	-		
) No. of lanes			2	1	-	2	1	-		-	1	-	-	-	1	-	-	1	-		
) Basic value of saturation flo	ow rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000		-	2,000			
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-		-	-	-	-	-	2,000	-	-	2,000	-		
5) Saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)														-	129	-	-	109	20		
) I CO ullection volume(bus)		-	-	-	-	-	-		-			-			129			129			
B) PCU direction volume(othe	re)	-	2,258	244	0	2,376	424														
s) i ee uireenon voianie(onie	13)	-	2,258	244	-	2,376	424		-			-			0			0			
)) PCU direction volume (tota	n	-	2,258	244	-	2,376	424	-	-	-	-	-	-	-	129	-	-	109	-		
· · · · · · · · · · · · · · · · · · ·	1)	-	2,258	244		2,376	424		-			-			129			109			
10) Flow rate		-	0.565	0.136	-	0.594	0.236		-			-			0.065			0.055		λί	- Σ
	1Φ		0.182			0.192									0.065			0.055		0.192	1
1) Necessary phase ratio	2 Φ		0.383	0.136		0.403	0.236													0.403	0.5
ry necessary phase ratio	3 Φ								(All Re	d for Pe	destrian)									0.000	0.5
	4 Φ																			0.000	
Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.38: Ahram St., Naser El Thawra St.

		F	Castbour	ıd	v	estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo	und	Bus	Westbo	ound	1	
Approach			38 - 1			38 - 2			38 - 3			38 - 4			38 - 1B			38 - 2B			
		-	Т	U	-	Т	U	-	-	1	1			-	Т			Т	-		
) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-	l	
) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
b) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00		1	
) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
i) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-				1	-	2,000			2,000	1		
s) saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)															129			129			
) i eo uncedon volume(bus)		-	-	-	-										129			129			
3) PCU direction volume(othe	re)		2,730	292		2,484	96														
o) i co unection volume(oule)	(5)	-	2,730	292	-	2,484	96		-			-			0			0			
) PCU direction volume (tota	n	-	2,730	292	-	2,484	- 96	-	-	-	-	-	-	-	129	-	-	129	-		
, , , , , , , , , , , , , , , , , , , ,	.,	-	2,730	292	-	2,484	96		-			-			129			129			
10) Flow rate		-		0.162	-	0.621	0.053		-			-			0.065			0.065		λί	Σλ
	1Φ		0.194			0.177									0.065			0.065		0.194	
11) Necessary phase ratio	2 Φ		0.488	0.162		0.444	0.053													0.488	0.683
rij recessary phase ratio	3 Φ								All Red	for Pede	estrian)									0.000	0.005
	4 Φ																			0.000	
Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

		F	astbou	ıd	V	estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo			Westbo		1	
Approach			38 - 1			38 - 2			38 - 3			38 - 4			38 - 1B			38 - 2B			
		-	Т	U	-	Т	U	-	-	-	-	-	-	-	Т	-	-	Т	-		
) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	1	-	-	-	-		2,000	-	-	2,000	-		
) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-		-	-	-	-	-	1.00		-	1.00			
Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
i) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
s) saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)															129			129			
) i co unection volume(bus)		-	-	-	-	-	-		-			-			129			129			
) PCU direction volume(other	~)		2,722	278		2,563	166														
) i co unection volume(other	(5)	-	2,722	278	-	2,563	166		-			-			0			0			
) PCU direction volume (total	n	-	2,722	278	-	2,563	166	-		-	-	-	-	-	129	-	-	129	-		
,	0	-	2,722	278		2,563	166		-			-			129			129			
0) Flow rate		-	0.681	0.155	-	0.641	0.092		-			-			0.065			0.065		λί	Σλ
	1Φ		0.200			0.189									0.065			0.065		0.200	
1) Necessary phase ratio	2 Φ		0.480	0.155		0.452	0.092													0.480	0.681
i) necessary pliase ratio	3 0								(All Re	ed for Pe	destrian)								0.000	0.081
	4 Φ																			0.000	
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1	

Intersection No.39: Ahram St., Madkoor Sq.

		F	Castbour	nd	v	estbou	nd	Ne	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo	und	Bus	Westbo	und	1	
Approach			39 - 1			39 - 2			39 - 3			39 - 4			39 - 1B			39 - 2B			
		-	Т	U	-	Т	U	-	-	-	-	-	-	-	Т	-	-	Т	-		
l) No. of lanes		-	2	1		2	1	-	-	-	-	-	-	-	1			1	-		
2) Basic value of saturation flo	ow rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00			1.00			
4) Adjustment factor for right		-	1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00	-		
5) Saturation flow rate		-	4,000	1,800		4,000	1,800	-	-	-	-	-	-	-	2,000	1	1	2,000	-		
y saturation now rate		-	4,000	1,800		4,000	1,800		-			-			2,000			2,000			
) PCU direction volume(bus)														-	129	-	-	129	-		
			3,059	186		2,131	115														
B) PCU direction volume(other states)	rs)		3.059	186	-	2,131	115		-			-			0			0			
		-	3.059	186	-	2,131	115	-	-	-	-	-	-	-	129	-	-	129	-		
PCU direction volume (tota)	I)	-	3.059	186	-	2,131	115		-			-			129			129	1		
10) Flow rate		-	0.765	0.103	-	0.533	0.064		-			-			0.065			0.065		λί	
-,	1Φ	1	0.294			0.205	5.501								0.065			0.065		0.294	-
	20	1	0.471	0.103		0.328	0.064								5.005			5.005		0.471	
1) Necessary phase ratio	30					0.010		(A	ll Red f	or Pedes	trian)									0.000	0.
	4 Φ							· · ·												0.000	
3) Ratio of left turn	1.2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.000	
4) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
PM Peak					.,.	070	070	078	078	076	070	078	070	070	078	0,0					
			astbour			estbou			orthbou			outhbou			s Eatbo	und		Westbo			
PM Peak Approach			Castbour 39 - 1	nd		Vestbour 39 - 2	nd								s Eatbo 39 - 1B	und		Westbo 39 - 2B			
Approach		F	Castbour 39 - 1 T		v	Vestbour 39 - 2 T		Ne	orthbou 39 - 3	nd	So	outhbou 39 - 4	nd	Bu	s Eatbo	und	Bus	Westbo			
Approach 1) No. of lanes	ow rate	F	Castbour 39 - 1	nd U	- -	Vestbour 39 - 2	nd U	- No	orthbou 39 - 3 -	nd -	- Se	outhbou 39 - 4 -	nd -	Bu -	s Eatbo 39 - 1B	und -	Bus -	Westbo 39 - 2B	ound -		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	ow rate	F	39 - 1 T 2	nd U 1	- -	Vestbour 39 - 2 T 2	nd U 1	- -	orthbou 39 - 3 - -	nd -	- Se	outhbou 39 - 4 -	nd -	Bu - -	s Eatbo 39 - 1B T 1	und -	Bus -	Westbo 39 - 2B T 1	ound -		
Approach 1) No. of lanes 2) Basic value of saturation flo		- -	Eastbour 39 - 1 T 2,000	u 1 1,800	- -	Vestbour 39 - 2 T 2,000	nd U 1 1,800	- - -	orthbou 39 - 3 - -	nd - -	- - -	0uthbou 39 - 4 - -	nd - -	Bu - -	s Eatbo 39 - 1B T 1 2,000	und -	Bus - -	Westbo 39 - 2B T 1 2,000	ound -		
Approach 1) No. of lanes 2) Basic value of saturation flt 3) Adjustment factor for left 1) Adjustment factor for right		- - -	Castbour 39 - 1 T 2,000 1.00	U 1 1,800 1.00	- - -	Vestbour 39 - 2 T 2,000 1.00	u 1 1,800 1.00	- - - -	orthbou 39 - 3 - - -	nd - - -	- - - -	0uthbou 39 - 4 - - - -	nd - - -	Bu - - -	s Eatbo 39 - 1B T 1 2,000 1.00	und - -	Bus - - -	Westbo 39 - 2B T 1 2,000 1.00	ound -		
Approach 1) No. of lanes 2) Basic value of saturation flt 3) Adjustment factor for left 1) Adjustment factor for right		- - -	Eastbour 39 - 1 T 2,000 1.00 1.00	U 1 1,800 1.00 1.00	- - -	Vestbour 39 - 2 T 2,000 1.00 1.00	u 1 1,800 1.00 1.00	- - - -		nd - - -	- - - - -	- - - - -	nd - - -	Bu - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 1.00	und - -	Bus - - -	Westbo 39 - 2B T 1 2,000 1.00 1.00	ound -		
Approach 1) No. of lanes 2) Basic value of saturation fld 5) Adjustment factor for left 1) Adjustment factor for right 5) Saturation flow rate	:	- - -	Castbour 39 - 1 T 2 2,000 1.00 1.00 4,000	U 1 1,800 1.00 1,800	- - -	Vestbour 39 - 2 T 2,000 1.00 1.00 4,000	nd U 1 1,800 1.00 1.00 1,800	- - - -		nd - - -	- - - - -	- - - - -	nd - - -	Bu - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 1.00 2,000	und - -	Bus - - -	Westbo 39 - 2B T 1 2,000 1.00 1.00 2,000	ound -		
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for reft 4) Adjustment factor for right 5) Saturation flow rate	:	- - -	Castbour 39 - 1 T 2 2,000 1.00 1.00 4,000	U 1 1,800 1.00 1,800	- - -	Vestbour 39 - 2 T 2,000 1.00 1.00 4,000	nd U 1 1,800 1.00 1.00 1,800	- - - -		nd - - -	- - - - -	- - - - -	nd - - -	Bu - - - -	s Eatbo 39 - 1B T 2,000 1.00 1.00 2,000 2,000	und - -	Bus - - -	Westbo 39 - 2B T 2,000 1.00 1.00 2,000 2,000	ound -		
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for reft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)		- - -	T 2 2,000 1.00 1.00 4,000	U 1,800 1.00 1.800 1,800 1,800	- - -	Vestbour 39 - 2 T 2,000 1.00 1.00 4,000	nd U 1 1,800 1.00 1.00 1,800	- - - -	orthbou 39 - 3 - - - - - - -	nd - - -	- - - - -	90000000000000000000000000000000000000	nd - - -	Bu - - - -	s Eatbo 39 - 1B T 2,000 1.00 2,000 2,000 129	und - -	Bus - - -	Westbo 39 - 2B T 2,000 1.00 2,000 2,000 129	ound -		
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for reft 4) Adjustment factor for right 5) Saturation flow rate		- - -	Castbour 39 - 1 T 2,000 1.00 1.00 4,000 4,000	U 1 1,800 1.00 1.00 1,800 1,800	- - -	Vestbour 39 - 2 T 2,000 1.00 1.00 4,000 4,000	nd U 1,800 1.00 1.800 1,800 -	- - - -	orthbou 39 - 3 - - - - - - -	nd - - -	- - - - -	90000000000000000000000000000000000000	nd - - -	Bu - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0	und - -	Bus - - -	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 129 129 0	ound -		
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for left 3) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe	rs)	- - - - - -	Castbour 39 - 1 T 2 2,000 1.00 4,000 4,000 - 3,105	U 1,800 1.00 1.800 1,800 1,800 1,800	- - - -	Vestbour 39 - 2 T 2,000 1.00 4,000 4,000 - 2,775	nd U 1,800 1.00 1.800 1,800 1,800 - 169	- - - -		nd - - -	- - - - -		nd - - -	Bu - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129	und - -	Bus - - -	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 129	ound -		
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 0) PCU direction volume (tota	rs)		Castbour 39 - 1 T 2 2,000 1.00 4,000 4,000 - 3,105 3,105	U 1,800 1.00 1.800 1,800 1,800 - - 178 178 178 178	- - - -	Vestbour 39 - 2 T 2 2,000 1.00 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 2,775	nd U 1,800 1.00 1.800 1,800 - - - - - - - - - - - - - - - - - -	- - - -		nd - - -	- - - - -		nd - - - -	Bu - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0	und - -	Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 129 129 0	- - - -		
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 0) PCU direction volume (tota	rs) 1)		Castbour 39 - 1 T 2 2,000 1.00 4,000 4,000 - 3,105 3,105 3,105	U 1,800 1.00 1,800 1,800 - 178 - 178 178 178		Vestbour 39 - 2 7 2,000 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 2,775 0.694	nd U 1,800 1.00 1,800 1,800 - 169 169 169	- - - -		nd - - -	- - - -		nd - - - -	Bu - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	und - -	Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	λί	
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 0) PCU direction volume (tota	rs) 1)		Sastbour 39 - 1 T 2 2,000 1.00 1.00 4,000 4,000 3,105 3,105 3,105 3,105 3,105 3,105 3,105 3,105 3,105	U 1 1,800 1.00 1.00 1,800 1,800 - - 178 178 178 178 178 0.099		Vestbour 39 - 2 7 2,000 1.00 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 2,775 2,775 2,775 2,775	nd U 1,800 1.00 1,800 1,800 - 169 169 169 169 0.094	- - - -		nd - - -	- - - -		nd - - - -	Bu - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129	und - -	Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129	- - - -	0.306	
Approach 1) No. of lanes 2) Basic value of saturation flot 3) Adjustment factor for left 1) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 0) PCU direction volume (tota 10) Flow rate	rs) l) <u>10</u> 20		Sastbour 39 - 1 T 2 2,000 1.00 4,000 4,000 - 3,105 3,105 3,105 3,105 0.776	U 1,800 1.00 1.00 1,800 1,800 - 178 178 178 178		Vestbour 39 - 2 7 2,000 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 2,775 0.694	nd U 1,800 1.00 1.800 1,800 - - - - - - - - - - - - - - - - - -			nd 			nd - - - -	Bu - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	und - -	Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	0.306 0.470	
Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for reft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)	rs) l) <u>10</u> <u>20</u> <u>30</u>		Sastbour 39 - 1 T 2 2,000 1.00 1.00 4,000 4,000 3,105 3,105 3,105 3,105 3,105 3,105 3,105 3,105 3,105	U 1 1,800 1.00 1.00 1,800 1,800 - - 178 178 178 178 178 0.099		Vestbour 39 - 2 7 2,000 1.00 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 2,775 2,775 2,775 2,775	nd U 1,800 1.00 1,800 1,800 - 169 169 169 169 0.094			nd - - -			nd - - - -	Bu - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	und - -	Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	0.306 0.470 0.000	
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate 11) Necessary phase ratio	rs) l) <u>10</u> 20		Castbour 39 - 1 T 2 2,000 1.00 4,000 4,000 3,105 3,105 3,105 3,105 0.776 0.306 0.470	U 1 1,800 1.00 1.800 1,800 1,800 1,800 1,800 - 178 178 178 178 178 0.099 0.099		Vestbour 39 - 2 T 2,000 1.00 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 0.694 0.274 0.420	nd U 1 1,800 1.00 1.00 1.800 1.800 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.00 1.00 1.00 1.00 1.00 1.800 1.900 1.900 1.900 1.800 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.009 1.69 1.009		39 - 3 - - - - - - - - - - - - - - - - - -	nd	So - - - - - - - - - - - - - - - - - - -		nd - - - - - -	Bu - - - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0.065 0.065		Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 129 129 0.065 0.065	- - - - -	0.306 0.470	
Approach 1) No. of lanes 2) Basic value of saturation flot 3) Adjustment factor for left 1) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 0) PCU direction volume (tota 10) Flow rate	rs) l) <u>10</u> <u>20</u> <u>30</u>		Sastbour 39 - 1 T 2 2,000 1.00 1.00 4,000 4,000 3,105 3,105 3,105 3,105 3,105 3,105 3,105 3,105 3,105	U 1 1,800 1.00 1.00 1,800 1,800 - - 178 178 178 178 178 0.099		Vestbour 39 - 2 7 2,000 1.00 1.00 4,000 4,000 - 2,775 2,775 2,775 2,775 2,775 2,775 2,775 2,775	nd U 1,800 1.00 1,800 1,800 - 169 169 169 169 0.094			nd 			nd - - - -	Bu - - - - -	s Eatbo 39 - 1B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	und - -	Bus	Westbo 39 - 2B T 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	0.306 0.470 0.000	0.1

Intersection No.40: Ahram St., Osman Moharam St.

		F	Eastbour	ıd	V	/estbou	nd	N	orthbou	nd	So	uthbou	nd	Bus	Eastbo		Bus	Westbo		1	
Approach			40 - 1			40 - 2			40 - 3			40 - 4			40 - 1B			40 - 2B			
			Т	U		Т	U	-	-	-	-	-	-	-	Т	-	-	Т	-		
) No. of lanes			2	1		2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate		2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
b) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	1	-	-	-	-	1.00			1.00			
 Adjustment factor for right 			1.00	1.00		1.00	1.00	-	-	1	-	-	-	-	1.00	-	1	1.00	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800							-	2,000	-	-	2,000	-		
s) saturation now rate			4,000	1,800		4,000	1,800								2,000			2,000			
7) PCU direction volume(bus)															129			129			
() I CO unrection volume(bus)															129			129			
8) PCU direction volume(othe	·e)		2,799	318	0	2,754	280														
s) i ce uncetion volume(otne	3)		2,799	318		2,754	280								0			0			
9) PCU direction volume (tota	n		2,799	318		2,754	280							0	129	0	0	129	0		
, ,	,		2,799	318		2,754	280								129			129			
10) Flow rate				0.177		0.688	0.155								0.065			0.065		λi	Σλ
	1Φ		0.187			0.184									0.065			0.065		0.187	
11) Necessary phase ratio	2 Φ		0.513	0.177		0.504	0.155													0.513	0.70
	3 Φ								(All R	ed for P	edestriar	ı)								0.000	
	4 0																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

		E	astbour	ıd	1	Vestbun	d	N	orthbou	nd	Se	outhbou	nd		Eastbo		Bus	Westbo			
Approach			40 - 1			40 - 2			40 - 3			40 - 4			40 - 1B			40 - 2B			
			Т	U		Т	U	-	-	-	-	-	-	-	Т	-	-	Т	-		
1) No. of lanes			2	1		2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow	v rate		2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
			4,000	1,800		4,000	1,800							-	2,000	-	-	2,000	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800								2,000			2,000			
7) PCU direction volume(bus)															129			129			
7) FCU direction volume(bus)															129			129			
8) PCU direction volume(others			2,517	451	0	2,135	375														
a) FCU direction volume(others	5)		2,517	451		2,135	375														
9) PCU direction volume (total)			2,517	451		2,135	375								129			129			
9) FCU direction volume (total)			2,517	451		2,135	375								129			129			
10) Flow rate			0.629	0.251		0.534	0.209								0.065			0.065		λi	Σλ
	1Φ		0.129			0.109									0.065			0.065		0.129	
11) N.	2 Φ		0.500	0.251		0.424	0.209													0.500	0.629
11) Necessary phase ratio	3 0								(All	Red for	Pedestri	ian)								0.000	0.029
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.41: Ahram St., Nabarawy St.

		E	astbou	nd	W	/estbou	nd	N	orthbou	nd	Se	uthbou	nd	Bus	s Eastbo	und	Bus	Westbo	und		
Approach			41 - 1			41 - 2			41 - 3			41 - 4			41 - 1B			41 - 2B			
		T+R	Т	L+U	T+R	Т	L+U	-	-	-	-	-	-	-	Т		-	Т			
) No. of lanes			2	1		2	1		-	1		1			1	1	-	1			
) Basic value of saturation flo	w rate		2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
s) Saturation now rate			4,000	1,800		4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)									-	1		1			129			129			
() FCU direction volume(bus)									0			0			129			129			
3) PCU direction volume(other	···)		3,182	140	0	3,158	147		-	1	-	1									
s) i co un ection volume(other	3)		3,182	140		3,158	147		0			0			0			0			
)) PCU direction volume (tota	n		3,182	140		3,158	147		-	1		1		0	129	0	0	129	0		
	9		3,182	140		3,158	147		0			0			129			129			
10) Flow rate			0.796	0.078		0.790	0.082		-			-			0.065			0.065		λi	Σ
	1Φ		0.351			0.349									0.065			0.065		0.351	
1) Necessary phase ratio	2 Φ		0.444	0.078		0.441	0.082												I	0.444	0.7
rij recessary plase ratio	3 Φ								(All R	ed for P	edestriar)								0.000	
	4 0																			0.000	
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
4) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1	

		E	astbou	ıd	V	Vestbun	d	N	rthbou	nd	So	uthbou	nd	Bus	Eastbo	und	Bus	Westbo	ound	1	
Approach			41 - 1			41 - 2			41 - 3			41 - 4			41 - 1B			41 - 2B			
		T+R	Т	L+U	T+R	Т	L+U	-						-	Т		-	Т	-		
) No. of lanes			2	1		2	1	-	-	1		1			1	1	-	1			
2) Basic value of saturation flo	w rate		2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00		1	
Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	1		1			1.00	1	-	1.00			
5) Saturation flow rate			4,000	1,800		4,000	1,800	-	1	1	1	1	1		2,000	1	-	2,000			
s) saturation now rate			4,000	1,800		4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)								-	1	1	1	1	1		129			129			
() i ee un cenon volume(bus)									0			0			129			129			
8) PCU direction volume(other	(er		3,060	164		2,713	123	-	-	-	-	-	-							Į.	
)) i ee un eeuon volunie(otae			3,060	164		2,713	123		0			0			0			0			
)) PCU direction volume (total	n		3,060	164		2,713	123	-	-	-	-	-	-	0	129	0	0	129	0	ļ	
· · · · · ·	,		3,060	164		2,713	123		0			0			129			129			
10) Flow rate			0.765	0.091			0.069		-			-			0.065			0.065		λi	Σλ
	1Φ		0.371			0.329									0.065			0.065		0.371	
11) Necessary phase ratio	2 Φ		0.394	0.091		0.350	0.069													0.394	0.765
rij recessurj pinise rutio	3 0								(All I	Red for I	Pedestria	n)								0.000	
	4 Φ	I																		0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.42: Ahram St., Sheikh El Sherbeeny St.

		ŀ	Castbour	ıd	v	/estbou	nd	N	orthbou	nd	Se	outhbou	nd	Bus	s Eastbo	und	Bus	Westbo			
Approach			42 - 1			42 - 2			42 - 3			42 - 4			42 - 1B			42 - 2B		[
		-	Т	U	-	Т	U	-	1	1	-	-	-	-	Т		-	Т	-		
) No. of lanes		-	2	1	-	2	1	-	1		-	-	-		1		-	1	-		
2) Basic value of saturation flo	ow rate	-	2,000	1,800	-	2,000	1,800	-	-	1	-	-	-	-	2,000	-	-	2,000			
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	1		-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	1		-	-	-	-	1.00		-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-		-	-	2,000	-	-	2,000	-		
s) Saturation now rate		-	4,000	1,800	-	4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)		-												-	129	1	-	129			
() I CO unection volume(bus)		-			-				0			0			129			129			
8) PCU direction volume(othe	re)	-	2,566	176		2,537	253														
s) i ee uireenon voianie(orae	13)	-	2,566	176	-	2,537	253		0			0			0			0			
9) PCU direction volume (tota	n	-	2,566	176	-	2,537	253	0	0	0	0	0	0	-	129	-	-	129	-		
· · · ·	.,	-	2,566	176	-	2,537	253		0			0			129			129			
10) Flow rate		-	0.641	0.098	-		0.141		-			-			0.065			0.065		λί	Σλ
	1Φ		0.202			0.199									0.065			0.065		0.202	
11) Necessary phase ratio	2 Φ		0.440	0.098		0.435	0.141													0.440	0.64
	3Φ							(A	ll Red fo	r Pedest	rian)									0.000	
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

		F	Castbour	ıd	1	Vestbun	d	Ne	orthbou	nd	Se	uthbou	nd	Bus	Eastbo	und	Bus	Westbo	ound		
Approach			42 - 1			42 - 2			42 - 3			42 - 4			42 - 1B			42 - 2B			
		-	Т	U	-	Т	U	-	-	1	1	1	-	-	Т	-		Т	-		
l) No. of lanes		-	2	1	-	2	1	-							1	-		1			
2) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-		-	1	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	1	-	-	-		1.00	-	1	1.00	-		
5) Saturation flow rate		-	4,000		-	4,000		-	-	-	-	-	-	1	2,000	-	-	2,000	-		
s) saturation now rate		-	4,000	1,800	-	4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
() i ee unterioù (olunie(bus)		-			-				0			0			129			129			
8) PCU direction volume(other	rs)	-	2,426	201	-	2,542	266														
.)	,	-	2,426	201	-	2,542	266		0			0			0			0			
)) PCU direction volume (tota	n	-	2,426	201	-	2,542	266	0	0	0	0	0	0	-	129	-	-	129	-		
, ,	.,	-	2,426	201	-	2,542	266		0			0			129			129			
10) Flow rate		-		0.112	-		0.148		-			-			0.065			0.065	-	λί	Σλ
	1Φ		0.185			0.193									0.065			0.065		0.193	
11) Necessary phase ratio	2 Φ		0.422	0.112		0.442	0.148													0.442	0.635
,	3 0								(All Red	tor Ped	estrian)									0.000	
	4 Φ	00/	00/	0.0/	0.0/	0.07	00/	00/	-	00/	00/	00/	00/	00/	00/	00/	0.0/	00/	0.07	0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
4) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.43: Ahram St., Taawon Sq.

		F	Castbou	nd	v	estbou	nd	No	orthbou	nd	Se	outhbou	nd	Bu	s Eatbo	und	Bus	Westbo	ound		
Approach			43 - 1			43 - 2			43 - 3			43 - 4			43 - 1B			43 - 2B		1	
		-	Т	U		Т	U	-	1	-	-			-	Т		-	Т		[
) No. of lanes		-	2	1	-	2	1	-	-	-	-		-		1	-	-	1	-		
) Basic value of saturation flo	w rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-		-	-	1.00		-	1.00			
) Adjustment factor for right			1.00	1.00	-	1.00	1.00	-	-	-	-			-	1.00		-	1.00	-		
) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-	1	
) Saturation now rate			4,000	1,800		4,000	1,800		-			-			2,000			2,000		[
) PCU direction volume(bus)														1	129	-	-	129	-	1	
) i ee un eenon volume(bus)		-	-	-	-	-	-		-			-			129			129	-	1	
) PCU direction volume(othe	rs)	-	1,846	250		2,416	250													1	
) i ce un tetton (olume(olue	,	-	1,846	250	-	2,416	250		-			-			0			0		Į.	
) PCU direction volume (tota	D	-	1,846	250	-	2,416	250	-	-	-	-	-	-	-	129	-	-	129	-	Į –	
0) Flow rate	,	-	1,846	250 0.139	-	2,416	250		-			-			129			129		λί	Σλ
0) Flow rate	1Φ	-	0.461	0.139	-	0.604	0.139		-	-		-			0.065			0.065		0.192	24
	20			0.139		0.192	0.139								0.005			0.005		0.192	•
1) Necessary phase ratio	30		0.515	0.139		0.412	0.139		(All R	ed for Pr	edestrian	<u> </u>						-		0.000	0.60
	4Φ								(0.000	•
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.000	
4) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	t	
PM Peak																				•	
		F	Castbou	nd	V	Vestbou	nd	No	orthbou	nd	Se	outhbou	nd		s Eatbo		Bus	Westbo		I	
Approach			43 - 1			43 - 2			43 - 3			43 - 4			43 - 1B			43 - 2B	-	1	
			Т	U	-	Т	U							-	Т		-	Т	-		

Approach			43 - 1			43 - 2			43 - 3			43 - 4			43 - 1B			43 - 2B			
		-	Т	U	-	Т	U	-	-	-	-	-	-	-	Т	-	-	Т	-	ĺ	
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	-	2,000	1,800		2,000	1,800		-		-				2,000		-	2,000	1		
3) Adjustment factor for left		-	1.00	1.00		1.00	1.00		-	1	-	-	1	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-		1.00	-		
5) Saturation flow rate		-	4,000	1,800		4,000	1,800		-		-	-	-	-	2,000		-	2,000	-		
3) Saturation now rate		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129		-	129	-		
7) FCU direction volume(bus)		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(other	e)	-	2,293	250		2,436	250														
8) I CO un ection volume(other	3)	-	2,293	250	-	2,436	250		-			-			0			0			
9) PCU direction volume (total	`	-	2,293	250		2,436	250		-		-	-	-	-	129		-	129	-		
	,	-	2,293	250	-	2,436	250		-			-			129			129			
10) Flow rate		-	0.573	0.139	-	0.609	0.139		-			-			0.065			0.065		λi	Σλ
	1Φ		0.182			0.193									0.065			0.065		0.193	
11) Necessary phase ratio	2 Φ		0.391	0.139		0.416	0.139													0.416	0.609
11) Necessary phase ratio	3Φ								(All Re	ed for Pe	edestrian)								0.000	0.009
	4 Φ								L I											0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.44: Ahram St., Sahl Hamza St.

		F	astbour	ıd	V	Vestbou	nd	N	orthbou	nd	Sc	outhbou	nd	Bu	s Eatbo		Bus	Westbo		I	
Approach			44 - 1			44 - 2			44 - 3			44 - 4			44 - 1B			44 - 2B		Ι	
		-	Т	U	-	Т	U	-	-	-	-	-	-	-	T+L	-	-	T+R	-	I	
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-	ļ	
2) Basic value of saturation fl	ow rate	-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-		-	-	-	-	1.00		-	1.00		Ι	
4) Adjustment factor for right	t	-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-	I	
5) Saturation flow rate			4,000	1,800	-	4,000	1,800			-	-	-		-	2,000	-	-	2,000		ł	
7) PCU direction volume(bus))		1,000	1,000		1,000	1,000							-	129	-	-	129 129		ţ	
		-	1,740	260	_	2,081	260					-						129		ł	
8) PCU direction volume(othe	ers)	-	1,740	260	-	2,081	260		-	·		-		-	0	· · · · · ·		0		ł	
		-	1,740	260		2,081	260		-			-	-		129	-		129	-	ł	
9) PCU direction volume (tota	al)	-	1,740	260	-	2,081	260	-			-		-	-	129		-	129	-	ł	
10) Flow rate		-	0.435	0.144		0.520	0.144		-			-			0.065			0.065		λί	Σλ
,	1Φ	1	0.134			0.161									0.065			0.065		0.161	1
11) N	2 Φ	1	0.301	0.144		0.360	0.144													0.360	0.500
11) Necessary phase ratio	3 Φ								(All	Red for	Pedestria	an)								0.000	0.520
	4 0																			0.000	1
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
																	00/	00/	0%		
, 0		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	l	
14) Ratio of right turn PM Peak			astbour			Westbun			orthbou			outhbou			s Eatbo	und		Westbo	ound	I	
, 0		F	astbour 44 - 1	ıd		Westbun 44 - 2	d								s Eatbo 44 - 3B	und	Bus	Westbo 44 - 4B	ound	I	
PM Peak Approach			astbour			Westbun			orthbou			outhbou			s Eatbo	und		Westbo	ound	I	
PM Peak Approach 1) No. of lanes	ow rate	-	Castbour 44 - 1 T	ıd	-	Westbun 44 - 2 T	d U	- N	orthbou 44 - 3 -	nd -	- Se	outhbou 44 - 4 -	nd -	Bu -	s Eatbo 44 - 3B T+L	und -	Bus -	Westbo 44 - 4B	ound	I	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fi	ow rate	- - -	Castbour 44 - 1 T 2,000	nd L+U 1 1,800	-	Westbun 44 - 2 T 2,000	d U 1 1,800	- N	orthbou 44 - 3 -	nd -	- Se	outhbou 44 - 4 -	nd -	Bu -	s Eatbo 44 - 3B T+L 1 2,000	und -	Bus -	Westbe 44 - 4B T+R 1 2,000	ound		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fh 3) Adjustment factor for left		- -	Castbour 44 - 1 T 2	nd L+U 1 1,800 1.00	-	Westbun 44 - 2 T 2	d U 1 1,800 1.00	- -	orthbou 44 - 3 - -	nd -		outhbou 44 - 4 - -	nd - -	Bu - -	s Eatbo 44 - 3B T+L 1 2,000 1.00	und -	Bus - -	Westbo 44 - 4B T+R 1	ound		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ		- - -	44 - 1 T 2,000 1.00	L+U 1 1,800 1.00 1.00	-	Westbun 44 - 2 T 2,000 1.00	d U 1,800 1.00 1.00	- - -	orthbou 44 - 3 - - -	nd - - -	- - -	outhbou 44 - 4 - - -	nd - - -	Bu - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 1.00	und - -	Bus - - -	Westbo 44 - 4B T+R 1 2,000 1.00 1.00	ound		
PM Peak Approach		- - - -	Castbour 44 - 1 T 2,000 1.00 1.00	nd L+U 1 1,800 1.00	-	Westbun 44 - 2 T 2,000 1.00 1.00	d U 1 1,800 1.00	- - - -	- - - - - -	nd - - - -	- - - - -	outhbou 44 - 4 - - - -	nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00	- - -	Bus - - - -	Westbo 44 - 4B T+R 1 2,000 1.00	- - -		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate	t	- - - -	T T 2 2,000 1.00 1.00 4,000 4,000	L+U 1 1,800 1.00 1.00 1,800	-	Westbun 44 - 2 7 2,000 1.00 1.00 4,000	d U 1,800 1.00 1.00 1,800	- - - -		nd - - - -	- - - - -		nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 1.00 2,000	- - -	Bus - - - -	Westbo 44 - 4B T+R 1 2,000 1.00 2,000	- - -		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ	t	- - - -	Eastbour 44 - 1 T 2 2,000 1.00 1.00 4,000 4,000	L+U 1 1,800 1.00 1.800 1,800	-	Westbun 44 - 2 T 2,000 1.00 1.00 4,000 4,000	d U 1,800 1.00 1.00 1,800 1,800	- - - -		nd - - - -	- - - - -		nd - - - -	Bu - - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 1.00 2,000 2,000	- - - -	Bus - - - -	Westbd 44 - 4B T+R 1 2,000 1.00 1.00 2,000 2,000	- - -		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate	t)	- - - -	Castbour 44 - 1 T 2 2,000 1.00 1.00 4,000 4,000 2,135	L+U 1 1,800 1.00 1.00 1,800 1,800 255	-	Westbun 44 - 2 T 2,000 1.00 4,000 4,000 2,074	d U 1,800 1.00 1.800 1,800 1,800 250	- - - -		nd - - - -	- - - - -	9uthbou 44 - 4 - - - - - -	nd - - - -	Bu - - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 2,000 2,000 2,000 129 129	- - - -	Bus - - - -	Westbe 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129	- - -		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus)	t)	- - - -	Castbour 44 - 1 T 2 2,000 1.00 4,000 4,000 2,135 2,135	nd L+U 1,800 1.00 1,800 1,800 255 255	-	Westburn 44 - 2 T 2 2,000 1.00 4,000 4,000 2,074 2,074	d U 1,800 1.00 1,800 1,800 1,800 250 250	- - - - -		nd - - - -			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 2,000 2,000 2,000 129 129 0	- - - -	Bus - - - - -	Westbd 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe	t) ers)	- - - -	Castbour 44 - 1 T 2 2,000 1.00 1.00 4,000 4,000 2,135 2,135 2,135	nd L+U 1,800 1.00 1,800 1,800 255 255 255	-	Westbun 44 - 2 T 2,000 1.00 1.00 4,000 4,000 2,074 2,074 2,074	d U 1,800 1.00 1,800 1,800 1,800 250 250 250	- - - -		nd - - - -	- - - - -		nd - - - -	Bu - - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 2,000 2,000 2,000 129 129 0 129	- - - -	Bus - - - -	Westbo 44 - 4B T+R 1 2,000 1.00 2,000 2,000 2,000 129 129	- - -		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	t) ers)		Addition T 2 2,000 1.00 1.00 4,000 4,000 2,135 2,135 2,135 2,135 2,135 2,135	nd L+U 1 1,800 1.00 1.00 1.800 1,800 1,800 255 255 255 255	-	Westburn 44 - 2 T 2,000 1.00 4,000 4,000 4,000 2,074 2,074 2,074 2,074	d U 1 1,800 1.00 1.00 1,800 1,800 250 250 250 250	- - - - -		nd - - - -			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129	- - - -	Bus - - - - -	Westbe 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129 129 129 129			E
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	t) ers) al)	- - - -	astbour 44 - 1 T 2 2,000 1.00 4,000 4,000 2,135 2,135 2,135 2,135 2,135 0.534	nd L+U 1,800 1.00 1,800 1,800 255 255 255	-	Westbun 44 - 2 7 2,000 1.00 4,000 4,000 4,000 2,074 2,074 2,074 2,074 2,074 0,519	d U 1,800 1.00 1,800 1,800 1,800 250 250 250	- - - - -		nd - - - -			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	Bus - - - - -	Westb 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129 129 129 0.065		λi 0.167	Σλ
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	t) ers) al)		astbour 44 - 1 T 2 2,000 1.00 1.00 4,000 4,000 2,135 2,135 2,135 2,135 2,135 0.534 0.167	nd L+U 1 1,800 1.00 1,800 1,800 1,800 255 255 255 255 0.142	-	Westbun 44 - 2 2,000 1.00 1.00 4,000 4,000 2,074 2,074 2,074 2,074 2,074 2,074 0,519 0.164	d U 1 1,800 1.00 1,800 1,800 1,800 250 250 250 250 250 0.139	- - - - -		nd - - - -			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 1 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129	- - - -	Bus - - - - -	Westbe 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129 129 129 129		0.167	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus)	t ers) al) <u>10</u> 20		astbour 44 - 1 T 2 2,000 1.00 4,000 4,000 2,135 2,135 2,135 2,135 2,135 0.534	nd L+U 1 1,800 1.00 1.00 1.800 1,800 1,800 255 255 255 255	-	Westbun 44 - 2 7 2,000 1.00 4,000 4,000 4,000 2,074 2,074 2,074 2,074 2,074 0,519	d U 1 1,800 1.00 1.00 1,800 1,800 250 250 250 250	- - - - -		nd 			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	Bus - - - - -	Westb 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129 129 129 0.065		0.167 0.367	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	t) ers) al)		astbour 44 - 1 T 2 2,000 1.00 1.00 4,000 4,000 2,135 2,135 2,135 2,135 2,135 0.534 0.167	nd L+U 1 1,800 1.00 1,800 1,800 1,800 255 255 255 255 0.142	-	Westbun 44 - 2 2,000 1.00 1.00 4,000 4,000 2,074 2,074 2,074 2,074 2,074 2,074 0,519 0.164	d U 1 1,800 1.00 1,800 1,800 1,800 250 250 250 250 250 0.139	- - - - -		nd 			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	Bus - - - - -	Westb 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129 129 129 0.065		0.167	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	t ers) al) <u>10</u> <u>20</u> <u>30</u>		astbour 44 - 1 T 2 2,000 1.00 1.00 4,000 4,000 2,135 2,135 2,135 2,135 2,135 0.534 0.167	nd L+U 1 1,800 1.00 1,800 1,800 1,800 255 255 255 255 0.142	-	Westbun 44 - 2 2,000 1.00 1.00 4,000 4,000 4,000 2,074 2,074 2,074 2,074 2,074 2,074 0,519 0.164	d U 1 1,800 1.00 1,800 1,800 1,800 250 250 250 250 250 0.139	- - - - -		nd 			nd - - - -	Bu - - - -	s Eatbo 44 - 3B T+L 2,000 1.00 2,000 2,000 2,000 129 129 0 0 129 129 0.065	- - - -	Bus - - - - -	Westb 44 - 4B T+R 1 2,000 1.00 2,000 2,000 129 129 129 129 0.065		0.167 0.367 0.000	2). 0.534

		E	astbour	ıd	W	/estbou	nd	N	orthbou	nd	So	uthbou	nd	Bus	Eastbo	und	Bus	Westbo	ound	1	
Ammoork			45 - 1			45 - 2			45 - 3			45 - 4			45 - 1B			45 - 2B		1	
Approach		R		L+U	R		L+U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	•		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1		1	
2) Basic value of saturation flo	w rate	1,800		1,800	1,800		1,800	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00	-	1.00	1.00	-	1.00	-	1.00		-	0.99			
4) Adjustment factor for right		1.00		1.00	1.00		1.00	0.99		1.00	1.00		1.00		0.98		-	0.99	-		
5) Saturation flow rate		1,800		1,800	1,800		1,800	1,976	-	2,000	1,993	-	2,000	-	1,954	-	-	1,962	-		
s) saturation now rate		1,800		1,800	1,800		1,800		3,976			3,993			1,954			1,962			
7) PCU direction volume(bus)								67	503	298	0	93	48	23	102	4	11	107	11		
() i ee uireeusii (siuiie(sus)		0			0				867			140			129			129			
8) PCU direction volume(other	s)	168		69	412		529	179	756	448	15	211	119								
o) i ee uireedon volume(onie	<i>.</i> ,	168		69	412		529		1,383			345			0			0			
9) PCU direction volume (total)	168		69	412		529	246	1,259	746	15	303	166	23	102	4	11	107	11		
, ,	,	168		69	412		529		2,250			485			129			129			
10) Flow rate		0.094		0.038	0.229		0.294		0.348			0.086	_		0.066			0.066		λί	Σλ
	1Φ	L													0.066			0.066		0.066	
11) Necessary phase ratio	2 Φ	0.094		0.038	0.229		0.294													0.294	0.70
,	3Φ								0.348			0.086								0.348	
	4 Φ								,	-	Pedestria									0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	8%	0%	ļ	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	11%	0%	0%	3%	0%	0%	0%	18%	0%	0%	9%	0%	1	

Interpretion No 15: Abrom St	Morristava Dd
Intersection No.45: Ahram St.,	

		E	astbour 45 - 1	nd	V	Vestbur 45 - 2	ıd	No	orthbou 45 - 3	nd	So	uthbou 45 - 4	nd	Bus	Eastbo 45 - 1B		Bus	Westbo 45 - 2B			
Approach		R		L+U	R		L+U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-		T+L+ R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	1,800		1,800	1,800		1,800	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00	-	1.00	1.00	-	1.00	-	1.00		-	0.97			
4) Adjustment factor for right		1.00		1.00	1.00		1.00	0.98		1.00	0.99	-	1.00	-	0.98	-	-	1.00	-		
5) Saturation flow rate		1,800		1,800	1,800		1,800	1,965	1	2,000	1,981	1	2,000	-	1,958	-	-	1,938	-		
5) Satur alloir now rate		1,800		1,800	1,800		1,800		3,965			3,981			1,958			1,938			
7) PCU direction volume(bus)								30	383	85	8	43	10	22	104	3	2	91	36		
7) I CO unection volume(bus)		0			0				498			60			129			129			
8) PCU direction volume(other	·e)	233		89	318		606	296	832	379	31	244	100								
o) i ee uireetion volume(otner	3)	233		89	318		606		1,508			376			0			0			
9) PCU direction volume (total	h	233		89	318		606	326	1,214	464	39	287	110	22	104	3	2	91	36		
, , , , , , , , , , , , , , , , , , , ,	9	233		89	318		606		2,005			436			129			129			
10) Flow rate		0.130		0.050	0.177		0.337		0.380			0.094			0.066			0.067		λi	Σλ
	1Φ														0.066			0.067		0.067	
11) Necessary phase ratio	2 Φ	0.130		0.050	0.177		0.337													0.337	0.784
recessary phase ratio	3 Φ								0.380			0.094								0.380	0.704
	4 Φ								(l Red fo										0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	28%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	16%	0%	0%	9%	0%	0%	0%	17%	0%	0%	1%	0%		

Intersection No.46: Ahram St., Mansooreya Rd.

AM Peak

		E	astbou	ıd	v	estbou	nd	No	orthbou	nd	Se	uthbou	nd	Bu	s Eastbo	und	Bus	Westbo	ound	I	
Approach			46 - 1			46 - 2			46 - 3			46 - 4			46 - 1B			46 - 2B			
Арргоаси		T+R	Т	T+L+ U	T+R	Т	T+L+ U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R			
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-	[
2) Basic value of saturation flow	v rate	2,000	2,000	2,000	2,000	2,000	2,000	2,000		2,000	2,000		2,000	-	2,000			2,000			
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.94	1.00		0.98	-	1.00		-	0.98		1	
4) Adjustment factor for right		0.98	1.00	1.00	0.99	1.00	1.00	0.98	-	1.00	0.94	-	1.00	-	0.96		-	1.00	-		
5) Saturation flow rate		1,955	2,000	2,000	1,983	2,000	2,000	1,955	1	1,874	1,874	1	1,955	-	1,914	-	-	1,947	-	1	
5) Saturation now rate			5,955			5,983			3,829			3,829			1,914			1,947			
7) PCU direction volume(bus)								28	29	120	52	15	18	52	76	1	3	97	28		
() I CO direction volume(bus)									178	-		85			129			129			
8) PCU direction volume(others	a	550	2,092	6	216	2,566	33	162	133	434	186	55	64								
o) i co uncetton volume(otnen	"		2,647			2,815			729			305			0			0			
9) PCU direction volume (total)		550	2,092	6	216	2,566	33	190	162	555	238	70	82	52	76	1	3	97	28	ļ.	
, ,			2,647			2,815			907			390			129			129			
10) Flow rate	-		0.445			0.471			0.190			0.080			0.067			0.066		λi	Σλ
	1Φ														0.067			0.066		0.067	
11) Necessary phase ratio	2 Φ		0.445			0.471														0.471	0.728
,	3Ф								0.190			0.080								0.190	
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	1%	0%	0%	61%	0%	0%	21%	0%	1%	0%	0%	22%	0%	ł	
14) Ratio of right turn		21%	0%	0%	8%	0%	0%	21%	0%	0%	61%	0%	0%	0%	40%	0%	0%	3%	0%	l	

		E	astbou	ıd	١	Vestbun	d	No	orthbou	nd	Se	uthbou	nd	Bus	Eastbo	und	Bus	Westbo	und	[
Ammussah			46 - 1			46 - 2			46 - 3			46 - 4			46 - 1B			46 - 2B			
Approach		R	Т	T+L+ U	R	Т	T+L+ U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flo	w rate	1,800	2,000	2,000	1,800	2,000	2,000	2,000	1	2,000	2,000	1	2,000	-	2,000			2,000			
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.95	1.00	-	1.00	-	1.00		-	0.95			
4) Adjustment factor for right		0.97	1.00	1.00	0.98	1.00	1.00	0.96		1.00	1.00		1.00	-	0.96	-		0.98	-		
5) Saturation flow rate		1,748	2,000	1,994	1,773	2,000	1,993	1,924	1	1,901	2,000	1	1,998	-	1,917	-		1,870	-		
5) Saturation now rate			5,743			5,765			3,826			3,998			1,917			1,870			
7) PCU direction volume(bus)								48	29	83	0	78	0	50	78	1	24	49	57		
() i ce urecuon volume(bus)									160			78			129			129			
8) PCU direction volume(other	e)	887	2,359	63	296	1,762	62	205	91	249	0	393	4								
o) i eo arcenon volune(other	3)		3,309			2,120			545			397			0			0			
9) PCU direction volume (total	`	887	2,359	63	296	1,762	62	252	120	332	0	471	4	50	78	1	24	49	57		
,	,		3,309			2,120			704			475			129			129			
10) Flow rate			0.576			0.368			0.142			0.099			0.067			0.069		λί	Σλ
	1Φ														0.067			0.069		0.069	
11) Necessary phase ratio	2 Φ		0.576			0.368														0.576	0.788
rij recessar j pliase ratio	3Φ								0.142			0.099								0.142	0.730
	4 Φ																			0.000	
13) Ratio of left turn		0%	0%	3%	0%	0%	3%	0%	0%	47%	0%	0%	1%	0%	1%	0%	0%	44%	0%		-
14) Ratio of right turn		27%	0%	0%	14%	0%	0%	36%	0%	0%	0%	0%	0%	0%	39%	0%	0%	19%	0%		

Intersection No	.47: Malek Feisal	l St., Mansooreya	Rd.
AM Peak			

Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left			astbour						orthbou	nd	Sec. Sec. Sec. Sec. Sec. Sec. Sec. Sec.	outhbou	nd 👘		
1) No. of lanes 2) Basic value of saturation flov 3) Adjustment factor for left			47 - 1			Vestbou 47 - 2			47 - 3		54	47 - 4			
 2) Basic value of saturation flow 3) Adjustment factor for left 		-	4/ - 1		R	4/-2	L	R	T	-	-	T	L		
3) Adjustment factor for left		-	-	-	2	-	2	1	2	-	-	2	1		
3) Adjustment factor for left	w rate	-	-	-	1,800	-	1,800	2,000	2,000	-	-	2,000	1,800		
				-	1.00	-	1.00	1.00	1.00		-	1.00	1.00		
4) Adjustment factor for right		-	-	-	1.00	-	1.00	1.00	1.00	-	-	1.00	1.00		
		-	-	-	3.600	-	3,600	2,000	4.000	-	-	4.000	1.800		
5) Saturation flow rate			-		()	7,200			6,000			5,800			
7) PCU direction volume(bus)		-	-	-	410	0	80	35	30	0	0	15	228		
() FCU direction volume(bus)			-			490			65			-			
8) PCU direction volume(other	e)	-	-	-	1,523	0	490	45	561	0	0	333	835		
s) reo urection volume(other	»)		-	-		2,013			607			1,168			
9) PCU direction volume (total)	-	-	-	1,933	0	570	80	591	0	0	348	1,063		
,		ļ	-			2,503			672			1,411			
10) Flow rate	Lo X		-			0.280			0.112			0.243		λί	Σλ
	1Φ 2Φ					0.280			0.112			0.243		0.280	
11) Necessary phase ratio	20 30					(A11 R	ed for P	edestriar				0.243		0.243	0.52
	3Φ 4Φ	-				(7411)		cuesti iai						0.000	
13) Ratio of left turn	44	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.000	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Approach		E	astbour 47 - 1	na	,	Vestbur 47 - 2	10	INC	orthbou 47 - 3	na	50	outhbou 47 - 4	na		
		-	-	-	R	-	L	R	Т	-	-	Т	L		
I) No. of lanes		-	-	-	2	-	2	1	2	1	-	2	1		
2) Basic value of saturation flow	w rate	-	-	-	1,800	-	1,800	2,000	2,000		-	2,000	1,800		
3) Adjustment factor for left		-	-	-	1.00	-	1.00	1.00	1.00	-	-	1.00	0.92		
4) Adjustment factor for right		-	-	-	1.00	-	1.00	0.98	1.00	-	-	1.00	1.00		
5) Saturation flow rate		-	-	-	3,600	- 7,200	3,600	1,957	4,000	-	-	4,000	1,654		
		-	-	-	240	7,200	75	30	5,957 53	0	0	5,654 15	335		
7) PCU direction volume(bus)		-		-	240	315	13	30	83	U	0	- 15	335		
		-	-	-	1.054	0	548	85	400	0	0	300	930		
8) PCU direction volume(other	s)		-		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1,602			485			1,230			
		-	-	-	1,294	0	623	115	453	0	0	315	1,265		
)) PCU direction volume (total	'					1,917			567			1,580			
9) PCU direction volume (total			-			0.266			0.081			0.217		λi	Σλ
9) PCU direction volume (total) 10) Flow rate	T					0.266	1	1	1		1			0.266	
, , , ,	1Φ		-			0.200			0.00			0.045			
, , , ,	2Φ						Dad for 1	Dadaata' -	0.081			0.217		0.217	0.48
10) Flow rate	2Ф 3Ф						Red for I	Pedestria				0.217		0.217 0.000	0.48
10) Flow rate	2Φ	0%	0%	0%	0%		Red for I	Pedestria		0%	0%	0.217	80%	0.217	0.48

Intersection No.48: Malek Feisal St., Abu Bakr El Sadeeq St.

		F	astbou	ıd	v	Vestbou	nd	Ne	orthbou	nd	Se	outhbou	nd		
Approach			48 - 1			48 - 2			48 - 3			48 - 4			
		T+R	Т	L	T+R	Т	L	T+R	-	T+L	T+R	-	T+L		
l) No. of lanes		1	2	1	1	2	1	1	-	1	1	1	1		
2) Basic value of saturation fl	ow rate	2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	0.99	1.00	-	0.98	1.00	-	0.97	1	
 Adjustment factor for right 	t	0.99	1.00	1.00	0.99	1.00	1.00	0.97	-	1.00	0.98	-	1.00	Í	
		1,989	4,000	1,800	1,989	4,000	1,790	1,940	-	1,953	1,953	-	1,940	1	
5) Saturation flow rate		5,9	989	1,800	5,9	989	1,790		3,893			3,893			
7) PCU direction volume(bus		7	126	7	15	293	15	15	22	7	7	22	15		
) ree unceuon volume(bus			33	7		08	15		44	-		-	-		
3) PCU direction volume(oth	ere)	72	1,372	72	86	1,639	86	86	158	72	72	158	86		
)) i e e un ceuon volume(otm	.13)	,	144	72		725	86		317			317			
9) PCU direction volume (tot	n.	79	1,498	79	102	1,931	102	102	181	79	79	181	102		
· · · · · · · · · · · · · · · · · · ·	,		577	79)33	102		361			361			
10) Flow rate		0.2	241	0.044	0.2	288	0.057		0.093			0.093		λί	Σ
	1Φ		0.241			0.288								0.288	
1) Necessary phase ratio	2Φ			0.044			0.057							0.057	0.4
(1) Necessary phase ratio	3Φ								0.093			0.093		0.093	0.4
	40					(All I	Red for I	Pedestria	m)					0.000	1
13) Ratio of left turn		0%	0%	5%	0%	0%	5%	0%	0%	22%	0%	0%	28%		
14) Ratio of right turn		5%	0%	0%	5%	0%	0%	28%	0%	0%	22%	0%	0%	1	

PM Peak		F	astbou	hd	v	Vestbou	nd	N	orthbou	nd	S	outhbou	nd	1	
Approach		-	48 - 1	10		48 - 2			48 - 3		5.	48 - 4			
		T+R	Т	L	T+R	Т	L	T+R	-	T+L	T+R	-	T+L	Ť.	
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1	1	
2) Basic value of saturation f	low rate	2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	0.99	1.00	-	0.97	1.00	-	0.97	1	
4) Adjustment factor for righ	ıt	0.99	1.00	1.00	0.99	1.00	1.00	0.97	-	1.00	0.97	-	1.00		
5) Saturation flow rate		1,989	4,000		1,989	4,000	1,790	1,946	-	1,947	1,947	-	1,946		
5) Saturation now rate		5,9	989	1,800	5,9	989	1,790		3,893			3,893			
7) PCU direction volume(bus)	6	107	6	7	131	7	7	13	6	6	13	7		
.)	,	-	13	6		38	7		25			-			
8) PCU direction volume(oth	ers)	81	1,542	81	83	1,576	83	83	164	81	81	164	83		
	,	,	523	81	/	559	83		328			328			
9) PCU direction volume (tot	al)	87	1,649		90	1,707	90	90	177	87	87	177	90	Ļ	
· · · · · ·	,	,	736	87		797	90		353			353			
10) Flow rate		0.2	271	0.048	0.2	277	0.050		0.084			0.084		λί	Σλ
	1Φ		0.271			0.277								0.277	
11) Necessary phase ratio	2 Φ			0.048			0.050							0.050	0.412
	3Ф					L			0.084			0.084		0.084	
	4Φ							r Pedest						0.000	
13) Ratio of left turn		0%	0%	5%	0%	0%	5%	0%	0%	25%	0%	0%	25%		
14) Ratio of right turn		5%	0%	0%	5%	0%	0%	25%	0%	0%	25%	0%	0%	1	

Intersection No.49: Malek	Feisal St.,	Maryooteya Rd.
AM Peak		5 5

		F	Castbour	nd	W	/estbou	nd	N	orthbou	ind	Se	outhbou	nd		
Approach			49 - 1			49 - 2			49 - 3			49 - 4			
		R		L	R		L	T+R		T+L	T+R		T+L		
l) No. of lanes		1		1	1		1	1		1	1		1		
2) Basic value of saturation f	low rate	1,800		1,800	1,800		1,800	2,000		2,000	2,000		2,000		
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98		
4) Adjustment factor for righ	nt	1.00		1.00	1.00		1.00	0.99		1.00	0.98		1.00		
5) Saturation flow rate		1,800		1,800	1,800		1,792	1,975		1,951	1,958		1,966		
s) saturation now rate			800	1,800		300	1,792		3,926			3,924			
7) PCU direction volume(bus	a	105		216	25		0	51	306	150	55	395	30		
/) Tee uncedon volume(bus	"		05	216		15	0		506	-		480			
8) PCU direction volume(oth	ers)	250		439	203		9	100	572	156	242	600	210		
o) i ee uireedon volume(ou			50	439		03	9		827			1,052			
9) PCU direction volume (tot	aD	355		655	228		9	150	877	306	297	995	240		
, , , , , , , , , , , , , , , , , , , ,			55	655		28	9		1,333			1,532			
10) Flow rate		0.	139	0.364	0.	113	0.005		0.340	-		0.390		λί	- Σλ
	1Φ		0.139	0.364		0.113	0.005							0.364	
11) Necessary phase ratio	2 Φ								0.340			0.390		0.390	0.7
,	3 Φ					(All R	ed for P	edestria	1)					0.000	
	4 Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	4%	0%	0%	23%	0%	0%	16%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	11%	0%	0%	19%	0%	0%		

PM Peak

		E	astbour	nd	W	/estbou	ıd	N	orthbou	nd	Se	outhbou	nd		
Approach			49 - 1			49 - 2			49 - 3			49 - 4			
		T+R		L	T+R		L	T+R		T+L	T+R		T+L		
1) No. of lanes		1		1	1		1	1		1	1		1		
2) Basic value of saturation flo	w rate	2,000		1,800	2,000		1,800	2,000		2,000	2,000		2,000		
3) Adjustment factor for left		1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99		
4) Adjustment factor for right		0.90		1.00	0.90		1.00	0.98		1.00	0.99		1.00		
5) Saturation flow rate		1,802		1,800	1,802		1,786	1,970		1,998	1,973		1,976		
s) saturation now rate		1,8	302	1,800	1,8	302	1,786		3,967			3,949			
7) PCU direction volume(bus)		60		153	48		0	13	123	0	5	261	5		
() TCO direction volume(bus)		6	60	153	4	-8	0		135			271			
8) PCU direction volume(othe	(ar	251		395	218		18	195	1,125	16	199	1,001	180		
o) ree uncedon volume(oue	(3)		51	395		18	18		1,335			1,380			
9) PCU direction volume (tota	n	311	0	548	265	0	18	207	1,248	16	204	1,262	185		
, ,	9	-	11	548		55	18		1,470			1,651			
10) Flow rate		0.1	139	0.304	0.1		0.010		0.371			0.418		λi	Σλ
	1Φ		0.139	0.304		0.121	0.010							0.304	
11) Necessary phase ratio	2 Φ								0.371			0.418		0.418	0.723
rij necessary plase ratio	3Φ					(All F	ted for I	Pedestria	n)		-			0.000	0.725
	4Φ										_			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	7%	0%	0%	1%	0%	0%	11%		
14) Ratio of right turn		100%	0%	0%	100%	0%	0%	14%	0%	0%	12%	0%	0%		

Intersection No.50: Malek Feisal St., Sahl Hamza St.

AM Peak

		F	Castbour	ıd	v	Vestbou	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			50 - 1			50 - 2			50 - 3			50 - 4			
		T+R	Т	U	-	Т	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1	-	-	-		
2) Basic value of saturation flo	w rate	2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
4) Adjustment factor for right		0.98	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,959	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
5) Saturation now rate		5,	959	1,800	-	6,000	1,800		3,600			-			
7) PCU direction volume(bus)		93	370	19	-	582	26	26		93		-	-		
7) Teo arrection volume(bus)			63	19	-	582	26		119			-			
8) PCU direction volume(othe	re)	284	1,235	62	-	1,267	67	67		284	-		1		
o) i co uncetton volume(otne			519	62	-	1,267	67		351			-			
9) PCU direction volume (tota	n	377	1,605	80	-	1,850	94	94	-	377	-	-	-		
, , , , , , , , , , , , , , , , , , , ,	9	,	982	80	-	1,850	94		471			-			
10) Flow rate		0.1	255	0.045	-	0.308			0.131			-		λi	Σλ
	1Φ		0.255			0.308								0.308	
11) Necessary phase ratio	2 Φ			0.045			0.052							0.052	0.491
rij necessarj plase ratio	3 Φ								0.131					0.131	0.01
	4Φ					· ·	ed for P		<i>(</i>					0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	80%	0%	0%	0%		
14) Ratio of right turn		19%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%		

		F	astbou	ıd	W	estbou	nd	Ne	orthbou	nd	Se	outhbou	nd		
Approach			50 - 1			50 - 2			50 - 3			50 - 4			
		T+R	Т	U	-	Т	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1	-	-	-		
2) Basic value of saturation flo	ow rate	2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	1	1.00	-	-	-		
4) Adjustment factor for right		0.99	1.00	1.00	-	1.00	1.00	1.00	1	1.00	-	-	-		
5) Saturation flow rate		1,987	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
5) Saturation now rate		5,9	987	1,800	-	6,000	1,800		3,600			-	-		
7) PCU direction volume(bus)		10	243	12	-	107	44	44		10	-	-	-		
() i ee uneeuon voianie(bus)		2	53	12	-	107	44		54			-			
8) PCU direction volume(othe	rs)	108	1,633	82	-	1,287	244	244		108	-	-	-		
o) i co unceuon volune(orne	13)	1	741	82	-	1,287	244		352			-			
9) PCU direction volume (tota	n	118	1,876	94	-	1,394	288	288	-	118	-		-		
· · · · ·	.,		994	94	-	1,394	288		406			-			
10) Flow rate		0.2	291	0.052	-	0.232	0.160		0.113			-		λί	Σλ
	1Φ		0.291			0.232								0.291	
11) Necessary phase ratio	2Φ			0.052			0.160							0.160	0.564
rij recessary plase ratio	3Φ								0.113					0.113	0.50-
	4Φ	1					or Pedes							0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	29%	0%	0%	0%		
14) Ratio of right turn		6%	0%	0%	0%	0%	0%	71%	0%	0%	0%	0%	0%		

Intersection No.51: Malek Feisal St., Safa Wel Marwa St.

		F	astbour	ıd	W	Vestbou	nd	N	orthbou	nd	So	outhbou	nd		
Approach			51 - 1			51 - 2			51 - 3			51 - 4			
		-	Т	L+U	T+R	Т	U	-	-	-	R	-	L		
l) No. of lanes		-	3	1	1	2	1	-	-	-	1	-	1		
2) Basic value of saturation flo	w rate	-	2,000	1,800	2,000	2,000	1,800	-	-	-	1,800	-	1,800		
3) Adjustment factor for left		-	1.00	1.00	1.00	1.00	1.00	-	-	-	1.00	-	1.00		
4) Adjustment factor for right		-	1.00	1.00	0.99	1.00	1.00	-	-	-	1.00	-	1.00		
5) Saturation flow rate		-	6,000 6,000	1,800 1,800	1,989	4,000	1,800	-	-	-	1,800	- 3,600	1,800		
7) PCU direction volume(bus)		-	428 428	23 23	31	598 29	23 23				23	-	31		
8) PCU direction volume(othe	rs)	-	1,549 1,549	82 82	69 1,3	1,312 381	82 82	-	-	-	82	- 151	69		
9) PCU direction volume (tota	0	-	1,977	104	101	1,910	104	-	-	-	104	-	101		
10) El	·	-	1,977	104		010	104		-			205			100
10) Flow rate	h a	-	0.329	0.058	0.2	231	0.058		-			0.057		λί	Σλ
	1Φ 2Φ		0.329	0.058		0.231	0.058		-					0.329	
11) Necessary phase ratio	20 30	-		0.058			0.058		-			0.057		0.058	0.444
	$\frac{3\Psi}{4\Phi}$					(4 1	Red for	D. I. d				0.057		0.057	
13) Ratio of left turn	4Ψ	0%	0%	0%	0%	(Al		0%	1an)	0%	0%	0%	0%	0.000	
		0,0	0%	0%		0%	0%	0%	0%	0%	0.7.0	0.7.0			
, 0		0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	 	
14) Ratio of right turn PM Peak Approach			0% Castbour 51 - 1			0% Westbur 51 - 2			0% orthbou 51 - 3			0% outhbou 51 - 4]	
PM Peak			astbour			Vestbur			orthbou			outhbou			
PM Peak Approach		E	Castbour 51 - 1	nd		Vestbur 51 - 2	d	N	orthbou	nd	So	outhbou 51 - 4	nd		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fle	w rate	F	Castbour 51 - 1 T	nd L+U	T+R	Vestbur 51 - 2 T	dU	-	orthbou 51 - 3 -	nd -	R	outhbou 51 - 4 -	nd L		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	w rate	- -	Castbour 51 - 1 T 3	nd L+U 1	T+R 1 2,000 1.00	Westbur 51 - 2 T 2	d U 1	- -	orthbou 51 - 3 -	nd - -	R 1	outhbou 51 - 4 -	nd L 1		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	w rate	- - -	Castbour 51 - 1 T 3 2,000 1.00 1.00	nd L+U 1,800 1.00 1.00	T+R 1 2,000 1.00 0.99	Vestbur 51 - 2 7 2,000 1.00 1.00	U 1 1,800 1.00 1.00	- -	51 - 3 - -	nd _ _ _	R 1 1,800 1.00 1.00	outhbou 51 - 4 - - -	nd L 1,800 1.00 1.00		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right	w rate	- - -	T T 3 2,000 1.00 1.00 6,000 6,000	nd L+U 1,800 1.00 1,800	T+R 1 2,000 1.00 0.99 1,989	Vestbun 51 - 2 2,000 1.00 4,000	d U 1,800 1.00 1,800	- - -	orthbou 51 - 3 - - -	nd - - -	R 1 1,800 1.00	outhbou 51 - 4 - - - - -	nd L 1,800 1.00		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right	w rate	- - -	Castbour 51 - 1 T 3 2,000 1.00 6,000 6,000	nd L+U 1,800 1.00 1,800 1,800	T+R 1 2,000 1.00 0.99 1,989 5,9	Vestbur 51 - 2 2,000 1.00 4,000 289	d U 1,800 1.00 1.00 1,800 1,800	- - -	- - -	nd - - -	R 1 1,800 1.00 1.00 1,800	outhbou 51 - 4 - - -	nd L 1,800 1.00 1.00 1,800		
PM Peak	w rate	- - - - -	T T 3 2,000 1.00 6,000 6,000 216	nd L+U 1,800 1.00 1,800 1,800 11	T+R 1 2,000 1.00 0.99 1,989 5,5 6	Vestbur 51 - 2 2,000 1.00 4,000 289 111	d U 1,800 1.00 1.00 1,800 1,800 11	- - -	51 - 3 - - - - -	nd - - -	R 1 1,800 1.00 1.00	51 - 4 - - - - 3,600	nd L 1,800 1.00 1.00		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate	w rate	- - - - - -	T T 3 2,000 1.00 1.00 6,000 6,000 216 216	L+U 1,800 1.00 1.00 1,800 1,800 11 11	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1	Vestbur 51 - 2 2,000 1.00 1.00 4,000 89 111 17	d U 1,800 1.00 1.00 1.800 1.800 11 11	- - -		nd - - -	R 1 1,800 1.00 1.800 23	51 - 4 - - - - 3,600 -	nd L 1,800 1.00 1.00 1,800 31		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate			T T 3 2,000 1.00 1.00 6,000 216 216 1,765	L+U 1,800 1.00 1.00 1,800 1,800 11 11 93	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85	Vestbur 51 - 2 2,000 1.00 4,000 89 111 17 1.623	d U 1,800 1.00 1.00 1.800 1.800 11 11 93	- - -		nd - - -	R 1 1,800 1.00 1.00 1,800	51 - 4 - - - - 3,600 - -	nd L 1,800 1.00 1.00 1,800		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)		- - - - - - - - - - - - - - - - - - -	Eastbour 51 - 1 T 3 2,000 1.00 6,000 6,000 216 216 1,765	L+U 1,800 1.00 1,800 1,800 11 11 93 93	T+R 1 2,000 1.00 0.99 5,5 6 1 85 1,7	Vestbur 51 - 2 2,000 1.00 4,000 289 111 17 1.623 708	d U 1,800 1.00 1.00 1.00 1.800 11 11 93 93	- - -	orthbou 51 - 3 - - - - - - - - - - - - -	nd - - - -	So R 1 1,800 1.00 1,800 23 82	51 - 4 - - - - 3,600 - - - 151	nd L 1,800 1.00 1.00 1.800 31 69		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe	rs)		Eastbour 51 - 1 T 3 2,000 1.00 1.00 6,000 6,000 216 216 1,765 1,765 1,981	L+U 1 1,800 1.00 1,800 1,800 1,800 1,800 1,800 1,800 1,00 1,800 1,00 1,800 11 93 104	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91	Vestbur 51 - 2 2,000 1.00 4,000 289 111 17 1.623 708 1,734	d U 1,800 1.00 1.00 1.800 1.800 11 11 93 93 104	- - -		nd - - -	R 1 1,800 1.00 1.800 23	51 - 4 - - - - 3,600 - - - - - - - - - - - - - - - - - -	nd L 1,800 1.00 1.00 1,800 31		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	rs)	- - - - - - - - - - - - - - - - - - -	Eastbour 51 - 1 T 3 2,000 1.00 6,000 6,000 216 216 1,765	L+U 1,800 1.00 1,800 1,800 11 11 93 93	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91 1,8	Vestbur 51 - 2 2,000 1.00 4,000 289 111 17 1.623 708	d U 1,800 1.00 1.00 1.00 1.800 11 11 93 93	- - -	orthbou 51 - 3 - - - - - - - - - - - - -	nd - - - -	So R 1 1,800 1.00 1,800 23 82	51 - 4 - - - - 3,600 - - - 151	nd L 1,800 1.00 1.00 1.800 31 69	λί	Σλ
PM Peak Approach I) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)	rs)		Castbour 51 - 1 T 3 2,000 1.00 6,000 216 216 1,765 1,981 1,981	L+U 1 1,800 1.00 1.00 1.800 1.800 11 11 93 93 104 104	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91 1,8	Vestbur 51 - 2 2,000 1.00 1.00 4,000 89 111 17 1,623 708 1,734 325 285	d U 1,800 1.00 1.00 1.800 1.800 11 11 11 93 93 104 104	- - -		nd - - - -	So R 1 1,800 1.00 1,800 23 82	outhbou 51 - 4 - - - - - - - - - - - - - - - - - -	nd L 1,800 1.00 1.00 1.800 31 69	λi 0.330	Σλ
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	rs) I)		astbour 51 - 1 T 3 2,000 1.00 6,000 216 1,765 1,981 1,981 0.330	L+U 1 1,800 1.00 1.00 1.800 1.800 11 11 93 93 104 104	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91 1,8	Vestbur 51 - 2 2,000 1.00 1.00 4,000 89 111 17 1,623 708 1,734 325	d U 1,800 1.00 1.00 1.800 1.800 11 11 11 93 93 104 104	- - -		nd - - - -	So R 1 1,800 1.00 1,800 23 82	outhbou 51 - 4 - - - - - - - - - - - - - - - - - -	nd L 1,800 1.00 1.00 1.800 31 69	0.330	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	rs) 1) 1 <u>0</u> 20		astbour 51 - 1 T 3 2,000 1.00 6,000 216 1,765 1,981 1,981 0.330	nd L+U 1 1,800 1.00 1.00 1.800 11 11 93 93 104 104 0.058	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91 1,8	Vestbur 51 - 2 2,000 1.00 1.00 4,000 89 111 17 1,623 708 1,734 325 285	d U 1,800 1.00 1.00 1.800 11 11 93 93 104 104 0.058	- - -		nd - - - -	So R 1 1,800 1.00 1,800 23 82	51 - 4 - - - - - - - - - - - - - - - - - - -	nd L 1,800 1.00 1.00 1.800 31 69	0.330 0.058	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	rs) 1) [1 Φ		astbour 51 - 1 T 3 2,000 1.00 6,000 216 1,765 1,981 1,981 0.330	nd L+U 1 1,800 1.00 1.00 1.800 11 11 93 93 104 104 0.058	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91 1,8	Vestbur 51 - 2 T 2 2,000 1.00 4,000 89 111 17 1,623 708 1,734 325 285 0.285	d U 1,800 1.00 1.00 1.800 11 11 93 93 104 104 0.058	- - - - - -		nd - - - -	So R 1 1,800 1.00 1,800 23 82	outhbou 51 - 4 - - - - - - - - - - - - - - - - - -	nd L 1,800 1.00 1.00 1.800 31 69	0.330	<u>Σλ</u> 0.445
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 9) PCU direction volume (tota 10) Flow rate	rs)		astbour 51 - 1 T 3 2,000 1.00 6,000 216 1,765 1,981 1,981 0.330	nd L+U 1 1,800 1.00 1.00 1.800 11 11 93 93 104 104 0.058	T+R 1 2,000 1.00 0.99 1,989 5,9 6 1 85 1,7 91 1,8	Vestbur 51 - 2 T 2 2,000 1.00 4,000 89 111 17 1,623 708 1,734 325 285 0.285	d U 1 1,800 1.00 1.800 1.800 1.800 1.800 1.800 1.800 1.800 1.00 1.	- - - - - -		nd - - - -	So R 1 1,800 1.00 1,800 23 82	51 - 4 - - - - - - - - - - - - - - - - - - -	nd L 1,800 1.00 1.00 1.800 31 69	0.330 0.058 0.057	

Intersection No.52: Malek Feisal St., Sheikh El Sherbeeny St.

AM Peak															
AM I Cak		E	astbou	nd	W	estbou	nd	Ne	orthbou	nd	Se	uthbou	nd		
Approach			52 - 1			52 - 2			52 - 3			52 - 4			
		T+R	T	L+U	T+R	T	L+U	T+R		T+L	T+R		T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flo	w rate	2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	•	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	•	0.97		
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00	1.00	0.97	-	1.00	0.97	1	1.00		
5) Saturation flow rate		1,991	4,000	1,800	1,994	4,000	1,800	1,936	- 3.872	1,936	1,936	- 3.872	1,936		
7) PCU direction volume(bus)		20	900 20	58 58	3	640 43	108	14	19 48	14	29	38	29		
8) PCU direction volume(othe	rs)	85	1,618	102	52	1,268	338	150	200	150	154	205	154		
.,	.,	1,5	703	102	55	1.908	338 446	164	500 219	164	182	512 243	182		
9) PCU direction volume (tota	I)		523	160		1,908	446	104	548	104	182	607	182		
10) Flow rate			284	0.089		220	0 248		0.142			0.157		λί	Σλ
-,	1Φ	0	0.284	0.007	0	0.220	0.240							0.284	
	20		0.201	0.089		0.220	0.248							0.248	
11) Necessary phase ratio	- 3Φ			01002			0.2.0		0.142			0.157		0.157	0.689
	4 Φ					(Al	l Red fo	r Pedestr	ian)			01107		0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%		
/ 0		4%	0%	0%	3%	0%	0%	30%	0%	0%	30%	0%	0%		
14) Ratio of right turn PM Peak			0% Castbour	0%	3%	0% Vestbun	0%	30%	0% orthbou	0%	30%	0% outhbou	0%		
, ,		E	0% Castbour 52 - 1	0% nd	3%	0% Vestbun 52 - 2	0%	30%	0% orthbou 52 - 3	0% nd	30%	0% outhbou 52 - 4	0% nd		
PM Peak Approach		E T+R	0% Castbour 52 - 1 T	0% nd L+U	3% 	0% Vestbun 52 - 2 T	0% nd L+U	30% Ne T+R	0% orthbou	0% nd T+L	30% So T+R	0% outhbou 52 - 4 -	0% nd T+L		
PM Peak Approach 1) No. of lanes	w rate	E	0% Castbour 52 - 1	0% nd	3%	0% Vestbun 52 - 2	0%	30%	0% orthbou 52 - 3	0% nd	30%	0% outhbou 52 - 4	0% nd		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo	ow rate	E T+R 1 2,000	0% Castbour 52 - 1 T 2,000	0% nd L+U 1 1,800	3% T+R 1 2,000	0% Vestbun 52 - 2 T 2,000	0% d L+U 1 1,800	30% Ne T+R 1 2,000	0% orthbou 52 - 3 - - -	0% nd T+L 1 2,000	30% Se T+R 1 2,000	0% outhbou 52 - 4 - -	0% nd T+L 1 2,000		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left		E T+R 1	0% Castbour 52 - 1 T 2	0% nd L+U 1	3% T+R 1	0% Vestbur 52 - 2 T 2	0% d L+U 1	30% No T+R 1	0% orthbou 52 - 3 -	0% nd T+L 1	30% Se T+R 1	0% outhbou 52 - 4 - -	0% nd T+L 1		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right		E T+R 1 2,000 1.00 0.99 1,980	0% astbour 52 - 1 7 2,000 1.00 1.00 4,000	0% L+U 1,800 1.00 1.00 1,800	3% T+R 1 2,000 1.00 0.98 1,969	0% Vestbun 52 - 2 7 2,000 1.00 1.00 4,000	0% d L+U 1,800 1.00 1.00 1,800	30% No T+R 1 2,000 1.00	0% orthbou 52 - 3 - - - - - -	0% nd T+L 1 2,000 0.97	30% Se T+R 1 2,000 1.00	0% 52 - 4 - - - -	0% nd T+L 1 2,000 0.97		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right		E T+R 1 2,000 1.00 0.99 1,980 5,5	0% astbour 52 - 1 7 2,000 1.00 1.00 4,000 980	0% L+U 1,800 1.00 1.00 1,800 1,800	3% T+R 1 2,000 1.00 0.98 1,969 5,9	0% Vestbun 52 - 2 7 2,000 1.00 1.00 4,000 269	0% d L+U 1,800 1.00 1.00 1,800 1,800	30% Ne T+R 1 2,000 1.00 0.97 1,936	0% orthbou 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936	30% Se T+R 1 2,000 1.00 0.97 1,936	0% 52 - 4 - - - - - - - - 3,872	0% nd T+L 1 2,000 0.97 1.00 1,936		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate		F T+R 1 2,000 1.00 0.99 1,980 5,5 33	0% Castbour 52 - 1 T 2,000 1.00 1.00 4,000 980 145	0% L+U 1,800 1.00 1.00 1,800 1,800 20	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25	0% Vestbun 52 - 2 2,000 1.00 1.00 4,000 069 328	0% L+U 1,800 1.00 1.800 1,800 1,800 35	30% T+R 1 2,000 1.00 0.97	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00	30% Se T+R 1 2,000 1.00 0.97	0% outhbou 52 - 4 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)		F T+R 1 2,000 1.00 0.99 1,980 5,5 33	0% astbour 52 - 1 7 2,000 1.00 1.00 4,000 980	0% L+U 1,800 1.00 1.00 1,800 1,800 20 20	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25	0% Vestbun 52 - 2 7 2,000 1.00 1.00 4,000 269	0% d L+U 1,800 1.00 1.00 1,800 1,800	30% Ne T+R 1 2,000 1.00 0.97 1,936	0% orthbou 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936	30% Sc T+R 1 2,000 1.00 0.97 1,936 13	0% 52 - 4 - - - - - - - - 3,872	0% nd T+L 1 2,000 0.97 1.00 1,936		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)		F T+R 1 2,000 1.00 0.99 1.980 5.0 3.33 1 158	0% 52 - 1 T 2,000 1.00	0% L+U 1,800 1.00 1.800 1,800 20 20 213 213	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3 267 1,0	0% Vestbun 52 - 2 2,000 1.00 1.00 4.000 969 328 53 1,407 574	0% L+U 1,800 1.00 1.800 1,800 35 35 416 416	30% T+R 1 2,000 1.00 0.97 1,936 22	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Se T+R 1 2,000 1.00 0.97 1,936	0% 52 - 4 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 13		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe	rs)	E T+R 1 2,000 1.00 0.99 1,980 5,9 33 1 1 158 158 191	0% astbour 52 - 1 T 2,000 1.00 4,000 980 145 78 1,733	0% L+U 1,800 1.00 1.800 1,800 20 20 213	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3 267 1,0 292	0% Vestbun 52 - 2 7 2,000 1.00 1.00 4.000 669 328 33 1,407	0% L+U 1,800 1.00 1.800 1,800 35 35 416	30% T+R 1 2,000 1.00 0.97 1,936 22	0% orthbou 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22	30% Sc T+R 1 2,000 1.00 0.97 1,936 13	0% 52 - 4 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 13		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flu 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	rs)	E T+R 1 2,000 1.00 0.999 1.980 5.5 33 1: 1:58 1.58 1.58 1.58 1.58 1.20 1.91 1.91	0% astbour 52 - 1 T 2,000 1.00 1.00 4,000 980 145 78 1,733 891 1,878	0% L+U 1 1,800 1.00 1.00 1.800 20 20 213 213 233	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3: 267 1,9 292 292 2,0	0% Vestbun 52 - 2 2,000 1.00 1.00 4,000 069 328 53 1,407 574 1,734	0% L+U 1 1,800 1.00 1.800 1.800 1.800 1.800 35 35 416 416 451	30% T+R 1 2,000 1.00 0.97 1,936 22 167	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Set T+R 1 2,000 1.00 0.97 1,936 13 149	0% 52 - 4 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1.936 13 149	λί	Σλ
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flu 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	rs)	E T+R 1 2,000 1.00 0.999 1.980 5.5 33 1: 1:58 1.58 1.58 1.58 1.58 1.20 1.91 1.91	0% astbour 52 - 1 T 2,000 1.00 1.00 4,000 280 1.45 78 1,733 891 1,878 068	0% L+U 1 1,800 1.00 1.00 1.800 20 20 213 213 233 233	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3: 267 1,9 292 292 2,0	0% Vestbun 52 - 2 2,000 1.00 1.00 4,000 69 328 33 1,407 574 1,734 026	0% L+U 1 1,800 1.00 1.800 1.800 1.800 1.800 1.800 4.16 4.16 4.51 4.51	30% T+R 1 2,000 1.00 0.97 1,936 22 167	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Set T+R 1 2,000 1.00 0.97 1,936 13 149	0% outhbou 52 - 4 - - - - - 3,872 17 - 198 495 215 538	0% nd T+L 1 2,000 0.97 1.00 1.936 13 149	λi 0.316	Σλ.
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 3) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	rs) l)	E T+R 1 2,000 1.00 0.999 1.980 5.5 33 1: 1:58 1.58 1.58 1.58 1.58 1.20 1.91 1.91	0% 52 - 1 T 2,000 1.00 4,000 980 145 78 1,733 891 1,878 068 316	0% L+U 1 1,800 1.00 1.800 20 213 213 233 0.129	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3: 267 1,9 292 292 2,0	0% 52 - 2 T 2,000 1.00 4,000 669 328 53 1,407 674 1,734 26	0% L+U 1 1,800 1.00 1.800 1.800 1.800 1.800 1.800 4.16 4.16 4.51 4.51	30% T+R 1 2,000 1.00 0.97 1,936 22 167	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Set T+R 1 2,000 1.00 0.97 1,936 13 149	0% outhbou 52 - 4 - - - - - 3,872 17 - 198 495 215 538	0% nd T+L 1 2,000 0.97 1.00 1.936 13 149		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate	rs) l)	E T+R 1 2,000 1.00 0.999 1.980 5.5 33 1: 1:58 1.58 1.58 1.58 1.58 1.20 1.91 1.91	0% 52 - 1 T 2,000 1.00 4,000 980 145 78 1,733 891 1,878 068 316	0% L+U 1 1,800 1.00 1.00 1.800 20 20 213 213 233 233	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3: 267 1,9 292 292 2,0	0% 52 - 2 T 2,000 1.00 4,000 669 328 53 1,407 674 1,734 26	0% L+U 1 1,800 1.00 1.800 1.800 1.800 1.800 1.800 1.800 1.800 4.16 4.16 4.51 4.51 0.251	30% T+R 1 2,000 1.00 0.97 1,936 22 167	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Set T+R 1 2,000 1.00 0.97 1,936 13 149	0% outhbou 52 - 4 - - - - - 3,872 17 - 198 495 215 538	0% nd T+L 1 2,000 0.97 1.00 1.936 13 149	0.316	<u>Σλ</u> 0.711
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 3) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	rs) l) 20	E T+R 1 2,000 1.00 0.999 1.980 5.5 33 1: 1:58 1.58 1.58 1.58 1.58 1.20 1.91 1.91	0% 52 - 1 T 2,000 1.00 4,000 980 145 78 1,733 891 1,878 068 316	0% L+U 1 1,800 1.00 1.800 20 213 213 233 0.129	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3: 267 1,9 292 292 2,0	0% Vestbun 52 - 2 7 2,000 1.00 1.00 1.00 4,000 069 328 53 1,407 574 1,734 026 80 0.280	0% L+U 1 1,800 1.00 1.800 1.800 1.800 1.800 1.800 1.800 1.800 4.16 4.16 4.51 4.51 0.251	30% T+R 1 2,000 1.00 0.97 1.936 22 167 189	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Set T+R 1 2,000 1.00 0.97 1,936 13 149	0% 52 - 4 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1.936 13 149	0.316 0.251	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 3) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(tota 10) Flow rate	rs) l) <u>10</u> <u>20</u> <u>30</u>	E T+R 1 2,000 1.00 0.999 1.980 5.5 33 1: 1:58 1.58 1.58 1.58 1.58 1.20 1.91 1.91	0% 52 - 1 T 2,000 1.00 4,000 980 145 78 1,733 891 1,878 068 316	0% L+U 1 1,800 1.00 1.800 20 213 213 233 0.129	3% T+R 1 2,000 1.00 0.98 1,969 5,9 25 3: 267 1,9 292 292 2,0	0% Vestbun 52 - 2 7 2,000 1.00 1.00 1.00 4,000 069 328 53 1,407 574 1,734 026 80 0.280	0% L+U 1,800 1.00 1.800 1.800 35 35 416 416 451 451 0.251 0.251	30% T+R 1 2,000 1.00 0.97 1.936 22 167 189	0% 52 - 3 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1,936 22 167	30% Set T+R 1 2,000 1.00 0.97 1,936 13 149	0% 52 - 4 - - - - - - - - - - - - -	0% nd T+L 1 2,000 0.97 1.00 1.936 13 149	0.316 0.251 0.144	

Intersection No.53:	Malek	Feisal	St.,	Hassan	Mohamed	St.
AM Peak						

		E	astbour	nd	v	Vestbou	nd	N	orthbou	ind	Se	outhbou	nd		
Approach			53 - 1			53 - 2			53 - 3			53 - 4			
		T+R	Т	U		Т	L+U	R		L		-	-		
1) No. of lanes		1	2	1	-	3	1	1		1		-	-		
2) Basic value of saturation flo	w rate	2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
4) Adjustment factor for right		0.99	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
D. S. town the an diamagnetic		1,988	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
5) Saturation flow rate		7,7	788	1,800	-	6,000	1,800		3,600			-			
7) PCU direction volume(bus)		34	611	34		528	28	28		31		-	-		
) reo unection volume(bus)		6	45	34	-	528	28		58			-			
8) PCU direction volume(othe	re)	83	1,496	83	0	1,672	88	88	0	75	-	-	-		
s) ree uncertain volume(oute	13)	1.	579	83	-	1,672	88		163			-			
)) PCU direction volume (tota	n	117	2,107	117	-	2,200	116	116	-	105	-	-	-		
· · · · ·	.,		224	117	-	2,200	116		221			-			
10) Flow rate		0.2	203	0.065	-	0.367	0.064		0.061			-		λi	Σ
	1Φ		0.203			0.367								0.367	
1) Necessary phase ratio	2Φ			0.065			0.064					-		0.065	0.4
i) necessary phase ratio	3Φ								0.061					0.061	0.4
	4Φ					<u> </u>	ed for P							0.000	
Ratio of left turn		0%	0%	5%	-	0%	0%	0%	0%	48%	0%	0%	0%		
4) Ratio of right turn		5%	0%	0%	-	0%	0%	52%	0%	0%	0%	0%	0%		

PM Peak

		E	astbou	nd	1	Vestbur	d	Ne	orthbou	nd	Se	outhbou	nd		
Approach			53 - 1			53 - 2			53 - 3			53 - 4			
		T+R	Т	T+U	-	Т	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1		-	-		
2) Basic value of saturation fl	ow rate	2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-				
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00		-	-		
4) Adjustment factor for righ	t	0.99	1.00	1.00	-	1.00	1.00	1.00	-	1.00		-	-		
5) Saturation flow rate		1,988	4,000	1,800		6,000	1,800	1,800		1,800		-	-		
s) saturation now rate		7,7	788	1,800	-	6,000	1,800		3,600			-			
7) PCU direction volume(bus		5	94	5		136	7	7		5		-	-		
7) FCU direction volume(bus		9	19	5	-	136	7		12			-			
8) PCU direction volume(othe	ne)	112	2,010	112	0	2,163	114	114	0	100		-	-		
s) recourrection volume(our	:15)	2,1	21	112	-	2,163	114		214			-			
9) PCU direction volume (tot:	n	117	2,103	117	-	2,299	121	121	-	105		-	-		
, , , ,	u)	2,2	220	117	-	2,299	121		226			-			
10) Flow rate		0.2	272	0.065	-	0.383	0.067		0.063			-		λί	Σ
	1Φ		0.272			0.383								0.383	
11) Necessary phase ratio	2Φ			0.065			0.067					-		0.067	0.5
i i j necessar y phase ratio	3Φ								0.063					0.063	0.5
	4 Φ					(All R	ed for Pe	edestrian)					0.000	
13) Ratio of left turn		0%	0%	5%	-	0%	0%	0%	0%	46%	0%	0%	0%		
4) Ratio of right turn		5%	0%	0%	-	0%	0%	54%	0%	0%	0%	0%	0%		

Intersection No.54: Malek Feisal St., Osman Moharam St.

		F	astbour	ıd	v	estbou	nd	Ne	orthbou	nd	Se	outhbou	nd
Approach			54 - 1			54 - 2			54 - 3			54 - 4	
		T+R	Т	L+U	T+R	Т	L+U	T+R	-	T+L	T+R	-	T+L
) No. of lanes		1	2	1	1	2	1	1	-	1	1		1
Basic value of saturation f	low rate	2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000
) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	-	0.97
) Adjustment factor for righ	ıt	0.99	1.00	1.00	0.97	1.00	1.00	0.97	-	1.00	0.97		1.00
5) Saturation flow rate		1,981	4,000	1,800	1,940	4,000	1,800	1,936	-	1,936	1,936	-	1,936
) Saturation now rate			981	1,800		940	1,800		3,872			3,872	
) PCU direction volume(bus)	20	900	58	73	395	83	12	15	12	23	30	23
) i ee uitetioii (oluiite(olu	,	_	20	58		68	83		38			-	
) PCU direction volume(oth	ers)	229	1,651	536	649	1,442	444	120	160	120	123	164	123
) i co uncensi volume(ou			80	536		091	444		400			410	
) PCU direction volume (tot	aD	249	2,551	594	722	1,837	527	132	175	132	146	194	146
, , ,	,		300	594		559	527		438			486	
0) Flow rate		0.	314	0.330	0.	352	0.293		0.113	-		0.125	-
	1Φ		0.314			0.352							
1) Necessary phase ratio	2Φ			0.330			0.293						
, muse rutio	3 Φ								0.113			0.125	
	4 Φ							r Pedesti					
3) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%
4) Ratio of right turn		9%	0%	0%	28%	0%	0%	30%	0%	0%	30%	0%	0%

PM Peak															
		F	astbour	ıd	W	estbou/	nd	N	orthbou	nd	Se	outhbou	nd		
Approach			54 - 1			54 - 2			54 - 3			54 - 4			
		T+R	Т	L+U	T+R	Т	L+U	T+R		T+L	T+R		T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1		1	l	
2) Basic value of saturation flo	ow rate	2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	-	0.97		
4) Adjustment factor for right		0.97	1.00	1.00	0.99	1.00	1.00	0.97	-	1.00	0.97	-	1.00	[
5) Saturation flow rate		1,949	4,000	1,800	1,988	4,000	1,800	1,936	-	1,936	1,936	-	1,936		
5) Saturation now rate		5,9	949	1,800	5,9	988	1,800		3,872			3,872			
7) PCU direction volume(bus)		15	230	88	65	175	5	18	23	18	10	14	10		
() Teo uncerion volume(bus)		2	45	88	24	40	5		58			-			
8) PCU direction volume(othe	rs)	600	1,731	366	83	2,356	530	121	160	121	119	158	119		
o) i eo uncenon volume(one	13)	2,2	331	366	2,4	139	530		402			396			
9) PCU direction volume (tota	n	615	1,961	454	148	2,531	535	138	183	138	129	172	129		
,	.,		576	454		579	535		460			430			-
10) Flow rate		0.3	392	0.252	0.4	407	0.297		0.119			0.111		λί	Σλ
	1Φ		0.392			0.407								0.407	1
11) Necessary phase ratio	2Φ			0.252			0.297							0.297	0.823
(1) Necessary phase ratio	3Φ								0.119			0.111		0.119	0.823
	4Φ							Pedestri						0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%		
14) Ratio of right turn		24%	0%	0%	6%	0%	0%	30%	0%	0%	30%	0%	0%		

Intersection No.55: Malek Feisal St., Madkoor St.

		E	astbou	nd	W	estbou	nd	N	orthbou	ind	S	outhbound		
Approach			55 - 1			55 - 2			55 - 3			55 - 4		
		T+R	Т		T+R	Т	L+U	R		L				
1) No. of lanes		1	3		1	2	1	1		1				
2) Basic value of saturation fl	ow rate	2,000	2,000		2,000	2,000	1,800	1,800	-	1,800				
3) Adjustment factor for left		1.00	1.00		1.00	1.00	1.00	1.00	-	0.95				
4) Adjustment factor for right		0.98	1.00		0.98	1.00	1.00	0.95		1.00				
5) Saturation flow rate		1,967			1,962		1,800	1,706	-	1,706				
o) outui uuon now rute		,	67			962	1,800		3,412				_	
7) PCU direction volume(bus)		104	587		80	373 53	80 80	98	195	98			_	
			1.688		_	1.308	280	343	195	343		г		
8) PCU direction volume(othe	rs)		1,088			1,308	280	545	685	545		ļ	_	
		402	2,275			1,681	360	440	005	440				
9) PCU direction volume (tota	I)		577)41	360		880					
10) Flow rate			336			342	0.200		0.258				λί	Σλ
	1Φ		0.336			0.342							0.342	
11) Necessary phase ratio	2 Φ						0.200						0.200	0.80
11) Necessary phase ratio	3Φ								0.258				0.258	0.80
	4Φ						ed for Pe	destrian)					0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	50%				
14) Ratio of right turn		15%	0%	0%	18%	0%	0%	50%	0%	0%				
PM Peak		F	asthou	nd		Vestbur	d	N	orthbou	ınd	s	outhbound		
		E	astbour	nd	\ \	Vestbur	d	N	orthbou 55 - 3	ınd	s	outhbound	\neg	
PM Peak Approach		E T+R	astbour 55 - 1 T	nd	T+R	Vestbur 55 - 2 T	d L+U	No R	orthbou 55 - 3 -	ınd L	s	outhbound 55 - 4		
Approach			55 - 1	nd		55 - 2			55 - 3		s			
Approach 1) No. of lanes 2) Basic value of saturation fl	ow rate	T+R	55 - 1 T	nd	T+R	55 - 2 T	L+U	R	55 - 3 -	L	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left		T+R 1	55 - 1 T 3	nd	T+R 1	55 - 2 T 2	L+U 1	R 1	55 - 3 - -	L 1	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left		T+R 1 2,000 1.00 0.99	55 - 1 T 3 2,000 1.00 1.00	nd	T+R 1 2,000 1.00 0.98	55 - 2 T 2,000 1.00 1.00	L+U 1 1,800 1.00 1.00	R 1 1,800 1.00 0.95	55 - 3 - -	L 1 1,800 0.95 1.00	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right		T+R 1 2,000 1.00 0.99 1,971	55 - 1 T 3 2,000 1.00 1.00 6,000	nd	T+R 1 2,000 1.00 0.98 1,961	55 - 2 T 2,000 1.00 1.00 4,000	L+U 1 1,800 1.00 1,800	R 1 1,800 1.00	55 - 3 - - - - -	L 1 1,800 0.95	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right		T+R 1 2,000 1.00 0.99 1,971 7,9	55 - 1 T 3 2,000 1.00 1.00 6,000 071		T+R 1 2,000 1.00 0.98 1,961 5,9	55 - 2 T 2,000 1.00 4,000 061	L+U 1 1,800 1.00 1,800 1,800	R 1 1,800 1.00 0.95 1,706	55 - 3	L 1 1,800 0.95 1.00 1,706	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for righ 5) Saturation flow rate		T+R 1 2,000 1.00 0.99 1,971 7,9 35	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200		T+R 1 2,000 1.00 0.98 1,961 5,9 34	55 - 2 T 2,000 1.00 4,000 061 433	L+U 1 1,800 1.00 1,800 1,800 34	R 1 1,800 1.00 0.95	55 - 3 - - - 3,412	L 1 1,800 0.95 1.00	S			
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)	:	T+R 1 2,000 1.00 0.99 1,971 7,5 35 2:	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 4	55 - 2 T 2,000 1.00 4,000 061 433 67	L+U 1 1,800 1.00 1.800 1,800 34 34	R 1 1,800 1.00 0.95 1,706 42	55 - 3 - - - - -	L 1,800 0.95 1.00 1,706 42	S			
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)	:	T+R 1 2,000 1.00 0.99 1,971 7,9 35 2: 320	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159	55 - 2 T 2 2,000 1.00 4,000 061 433 67 433	L+U 1 1,800 1.00 1.00 1,800 1,800 34 34 159	R 1 1,800 1.00 0.95 1,706	55 - 3 - - - 3,412 83	L 1 1,800 0.95 1.00 1,706	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe	rs)	T+R 1 2,000 1.00 0.99 1,971 7,9 35 22 320 2,4	55 - 1 T 3 2,000 1.00 6,000 071 200 35 2,093 113	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159	55 - 2 T 2 2,000 1.00 4,000 961 433 67 433 92	L+U 1 1,800 1.00 1.00 1,800 1,800 34 34 159 159	R 1 1,800 1.00 0.95 1,706 42 503	55 - 3 - - - 3,412	L 1,800 0.95 1.00 1,706 42	S			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe	rs)	T+R 1 2,000 1.00 0.99 1,971 7,5 35 320 2,4 355	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 4,159 59 193	55 - 2 T 2 2,000 1.00 4,000 061 433 67 433	L+U 1 1,800 1.00 1.00 1,800 1,800 34 34 159	R 1 1,800 1.00 0.95 1,706 42	55 - 3 - - - 3,412 83	L 1,800 0.95 1.00 1,706 42 503	S			
Approach 1) No. of lanes 2) Basic value of saturation fle 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	rs)	T+R 1 2,000 1.00 0.99 1,971 7,5 320 2,2,4 355 2,6	55 - 1 T 3 2,000 1.00 6,000 71 200 35 2,093 113 2,293		T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159 59 193 1,0	55 - 2 T 2,000 1.00 4,000 061 433 67 433 92 866	L+U 1 1,800 1.00 1,800 1,800 1,800 34 34 159 159 193	R 1 1,800 1.00 0.95 1,706 42 503	55 - 3 - - - 3,412 83 1,005	L 1,800 0.95 1.00 1,706 42 503	S			Σλ
Approach 1) No. of lances 2) Basic value of saturation fle 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota	rs)	T+R 1 2,000 1.00 0.99 1,971 7,5 320 2,2,4 355 2,6	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093 413 2,293 648	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159 59 193	55 - 2 T 2,000 1.00 4,000 061 433 67 433 92 866 059	L+U 1 1,800 1.00 1,800 1,800 34 34 159 159 193	R 1 1,800 1.00 0.95 1,706 42 503	55 - 3 - - - - 3,412 83 1,005 1,088	L 1,800 0.95 1.00 1,706 42 503	S		λi 0.332	Σλ
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate	rs) I) 20	T+R 1 2,000 1.00 0.99 1,971 7,5 320 2,2,4 355 2,6	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093 413 2,293 548 332	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159 59 193	55 - 2 T 2,000 1.00 1.00 4,000 061 433 67 433 92 866 059 178	L+U 1 1,800 1.00 1,800 1,800 34 34 159 159 193	R 1 1,800 1.00 0.95 1,706 42 503	55 - 3 - - - - 3,412 83 1,005 1,088	L 1,800 0.95 1.00 1,706 42 503	8			
Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate	rs) I)	T+R 1 2,000 1.00 0.99 1,971 7,5 320 2,2,4 355 2,6	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093 413 2,293 548 332	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159 59 193	55 - 2 T 2 2,000 1.00 4,000 4,000 67 433 67 433 92 866 59 178	L+U 1 1,800 1.00 1,800 1,800 34 34 159 159 193 0,107 0,107	R 1 1,800 0.95 1,706 42 503 544	55-3 - - - 3,412 83 1,005 1,088 0.295 0.295	L 1,800 0.95 1.00 1,706 42 503	s		0.332	<u>Σλ</u> 0.73
Approach 1) No. of lanes 2) Basic value of saturation fly 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume (tota 10) Flow rate 11) Necessary phase ratio	rs) I) 20	T+R 1 2,000 1.00 0.99 1,971 7,5 320 2,2,4 355 2,6	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093 413 2,293 548 332	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159 59 193	55 - 2 T 2 2,000 1.00 4,000 4,000 67 433 67 433 92 866 59 178	L+U 1 1,800 1.00 1,800 1,800 34 34 159 159 193 0,107 0,107	R 1 1,800 1.00 0.95 1,706 42 503	55-3 - - - 3,412 83 1,005 1,088 0.295 0.295	L 1,800 0.95 1.00 1,706 42 503	s		0.332	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation fl 3) Adjustment factor for left 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(othe 9) PCU direction volume(tots 10) Flow rate 11) Necessary phase ratio 13) Ratio of left turn 14) Ratio of right turn	rs)	T+R 1 2,000 1.00 0.99 1,971 7,5 320 2,2,4 355 2,6	55 - 1 T 3 2,000 1.00 1.00 6,000 071 200 35 2,093 413 2,293 548 332	nd	T+R 1 2,000 1.00 0.98 1,961 5,9 34 44 159 59 193	55 - 2 T 2 2,000 1.00 4,000 4,000 67 433 67 433 92 866 59 178	L+U 1 1,800 1.00 1,800 1,800 34 34 159 159 193 0,107 0,107	R 1 1,800 0.95 1,706 42 503 544	55-3 - - - 3,412 83 1,005 1,088 0.295 0.295	L 1,800 0.95 1.00 1,706 42 503	S		0.332 0.107 0.295	<u>Σλ</u> 0.73

Intersection No.56: Malek Feisal St., Saad Ebn Aby Waqqas St.

Approach		F	Castbour 56 - 1	ıd	Westb 56 -		N	Northbound 56 - 3			outhbou 56 - 4	ł		
approuch		T+R	<u> 30-1</u> Г Т	U	T	- L+U	R		L	-		-		
1) No. of lanes		1	2	1	3	1	1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,00	0 1,80	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	1.0		1.00	-	1.00	-	-	-	Ι	
4) Adjustment factor for right		1.00	1.00	1.00	1.0	1.00	1.00	-	1.00	-	-	-	Ι	
5) Saturation flow rate		1,996	4,000	1,800	6,00	0 1,80	1,800	-	1,800	-	-	-	Ι	
s) saturation now rate		7,3	796	1,800	6,00	6,000 1,800		3,600		-				
7) PCU direction volume(bus)		18	443	45	59		37	0	37	-	-	-	Ι	
() I CO ull ection volume(bus)		4	60	45	59	15		73			-		1	
8) PCU direction volume(others)		40	2,513	284	2,24	6 403	204	0	204	-	-	-	Ι	
8) FCU direction volume(othe	rs)	2,5	553	284	2,24	6 403		409			-			
9) PCU direction volume (total)		58	2,955	329	2,84	3 418	241	-	241	-	-	-	Ι	
, , , , , , , , , , , , , , , , , , , ,	1)	3,013 329		329	2,84	2,843 418		482			-			
10) Flow rate		0.327 0.183		0.183	0.47	0.474 0.232		0.134			-			2
	1Φ		0.327		0.47	4							0.474	
11) Necessary phase ratio	2 Φ			0.183		0.23	!				-		0.232	2 0.8
(1) Necessary phase ratio	3Φ							0.134					0.134	0.0
	4Φ				(All	(All Red for Pe		,					0.000	
13) Ratio of left turn		0%	0%	11%	0%	0%	0%	0%	50%	0%	0%	0%		
14) Ratio of right turn		2%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	Ι	
PM Peak													_	
		Eastbound			Westh	N	Northbound			outhbou	1			
Approach		56 - 1			56 -	2		56 - 3			56 - 4	1		
		T+R	Т	T+U	Т	L+U	R	-	L	-	-	-	1	
1) No. of lanes		1	2	1	3	1	1	-	1	-	-	-	1	
2) Basic value of saturation flo	ow rate	2,000	2,000	1,800	2,00	0 1,80	1,800		1,800	-	-	-	I	
3) Adjustment factor for left		1.00	1.00	1.00	1.0	1.00	1.00	-	1.00	-	-	-	Ι	
4) Adjustment factor for right		1.00	1.00	1.00	1.0	0 1.00	1.00		1.00		1	-	T	

4) Aujustinent laetoi loi ligi		1.00	1.00	1.00		1.00	1.00	1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,993	4,000	1,800		6,000	1,800	28 0 5: 190 0	-	1,800			-	[
5) Saturation now rate		7,	7,793			6,000	1,800	3,600				-			
7) PCU direction volume(bus)		10	215	15		213	5	28	0	28			-	[
7) Teo un ection volume(bus)		2	25	15		213	5		55			-			
8) PCU direction volume(othe)	83	2,548	458		2,567	162	190	0	190			-	[
a) FCU direction volume(othe	irs)	2,	631	458		2,567	162		379			-			
9) PCU direction volume (tota	n	93	2,763	473		2,780	167	217	-	217			-	[
, , ,	u)	2,	856	473		2,780	167		434			-			
10) Flow rate		0.	338	0.263		0.463	0.093	0.121		-			λί	Σλ	
	1Φ		0.338			0.463								0.463	
11) Necessary phase ratio	2 Φ			0.263			0.093					-		0.263	0.847
11) Necessary phase ratio	3Φ								0.121					0.121	0.847
	4Φ					(All	Red for	Pedestria	n)					0.000	
13) Ratio of left turn		0%	0%	17%		0%	0%	0%	0%	50%	0%	0%	0%		
14) Ratio of right turn		3%	0%	0%		0%	0%	50%	0%	0%	0%	0%	0%		

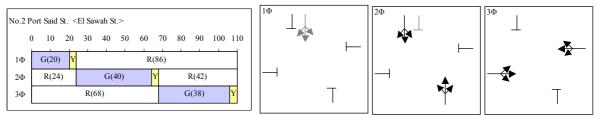
AM Peak		E	astbour	nd	Westbound			No	orthbou	nd	So	uthbou	1		
Approach		57 - 1			57 - 2			57 - 3			57 - 4				
		T+R	T		T+R	T	L+U	R	-		R	-			
1) No. of lanes		1	3		1	2	1	2	-		2	-			
2) Basic value of saturation flo	w rate	2,000	2,000		2,000	2,000	1,800	1,800	-		1,800	-			
3) Adjustment factor for left		1.00	1.00		1.00	1.00	1.00	1.00	-		1.00	-			
4) Adjustment factor for right		1.00	1.00		0.98	1.00	1.00	1.00	-		1.00	-			
		1.995			1.968	4.000	1.800	3.600	-		3.600	-			
5) Saturation flow rate			95				1.800	3,600			3,600			1	
7) PCU direction volume(bus)		3 242 245				66		3			10				
						66		3			10				
8) PCU direction volume(others)		71	3,172		405	2,154	473		71			185			
		3,243		2,559		473	71			185			1		
0) BCIL Broaden and an a family (4.4.1)			3,414		412	2,372	538	0	74	0	0	195	0	I	
9) PCU direction volume (total	,		188			784	538		74			195	_		
10) Flow rate		0.4	106		0.4	466	0.299	0.021				0.051		λi	Σλ
	1Φ		0.406			0.466								0.466	
11) Necessary phase ratio	2Φ						0.299		0.021			0.051		0.299	0.766
11) Necessary phase ratio	3 Φ					(All	Red for	Pedestria	n)					0.000	0.700
	4 Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
,		2%	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%]	
14) Ratio of right turn PM Peak			astbour			Vestbun			orthbou			uthbou		1	
,		E	astbour 57 - 1			Vestbun 57 - 2	d	No	orthbou 57 - 3		Se	outhbou 57 - 4			
PM Peak Approach		E T+R	astbour 57 - 1 T		T+R	Vestbun 57 - 2 T	d L+U	R	orthbou 57 - 3 -		So R	outhbou 57 - 4 -			
PM Peak Approach		E	astbour 57 - 1			Vestbun 57 - 2	d	No	orthbou 57 - 3		Se	outhbou 57 - 4			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo	w rate	E T+R 1 2,000	astbour 57 - 1 T 3 2,000		T+R 1 2,000	Vestbun 57 - 2 T 2,000	d L+U 1 1,800	No R 2 1,800	orthbou 57 - 3 -		R 2 1,800	outhbou 57 - 4 -			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	w rate	E T+R 1 2,000 1.00	astbour 57 - 1 T 3 2,000 1.00		T+R 1 2,000 1.00	Vestbun 57 - 2 T 2,000 1.00	d L+U 1 1,800 1.00	R 2 1,800 1.00	orthbou 57 - 3 -		R 2 1,800 1.00	outhbou 57 - 4 - - -			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for left	w rate	E T+R 1 2,000 1.00 1.00	astbour 57 - 1 T 3 2,000 1.00 1.00		T+R 1 2,000 1.00 0.99	Vestbun 57 - 2 T 2,000 1.00 1.00	d L+U 1,800 1.00 1.00	No R 2 1,800 1.00 1.00	orthbou 57 - 3 -		R 2 1,800 1.00 1.00	outhbou 57 - 4 -			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for keft 4) Adjustment factor for right	w rate	E T+R 1 2,000 1.00 1.00 1,991	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000		T+R 1 2,000 1.00 0.99 1,979	Vestbun 57 - 2 T 2,000 1.00 1.00 4,000	d L+U 1,800 1.00 1.00 1,800	R 2 1,800 1.00			R 2 1,800 1.00				
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for keft 4) Adjustment factor for right	w rate	E T+R 1 2,000 1.00 1.00 1,991 7,5	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 991		T+R 1 2,000 1.00 0.99 1,979 5,9	Vestbun 57 - 2 2 2,000 1.00 1.00 4,000 079	d L+U 1,800 1.00 1.00 1,800 1,800	No R 2 1,800 1.00 1.00	57 - 3 - - - - 3,600		R 2 1,800 1.00 1.00	57 - 4 - - - - 3,600			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for kft 4) Adjustment factor for right 5) Saturation flow rate	w rate	F T+R 1 2,000 1.00 1.00 1.991 7,5 28	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 991 410		T+R 1 2,000 1.00 0.99 1,979 5,9 48	Vestbun 57 - 2 2,000 1.00 4,000 079 395	d L+U 1,800 1.00 1.00 1,800 1,800 128	No R 2 1,800 1.00 1.00	57 - 3 - - - - 3,600 28		R 2 1,800 1.00 1.00	57 - 4 - - - - 3,600 30			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for kft 4) Adjustment factor for right 5) Saturation flow rate	w rate	F T+R 1 2,000 1.00 1.00 1.991 7,5 28 43	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 091 410 38		T+R 1 2,000 1.00 0.99 1,979 5,9 48	Vestbun 57 - 2 2,000 1.00 1.00 4,000 079 395 43	d L+U 1,800 1.00 1.00 1,800 1,800 128 128	No R 2 1,800 1.00 1.00	57 - 3 - - - - 3,600 28 28		R 2 1,800 1.00 1.00	57 - 4 - - - - - - 3,600 30 30			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for kft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus)		E T+R 1 2,000 1.00 1.00 1.991 7,9 28 4 133	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 091 410 38 3,240		T+R 1 2,000 1.00 0.99 1,979 5,9 48 48 48	Vestbun 57 - 2 T 2,000 1.00 1.00 4,000 079 395 43 2,433	d L+U 1 1,800 1.00 1.00 1.800 1.800 1.800 128 128 347	No R 2 1,800 1.00 1.00	57 - 3 - - - 3,600 28 28 133		R 2 1,800 1.00 1.00	57 - 4 - - - - - 3,600 30 30 192			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for keft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other	s)	E T+R 1 2,000 1.00 1.00 1.991 7,9 28 42 133 3,3	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 991 410 38 3,240 374		T+R 1 2,000 1.00 0.99 1,979 5,9 48 48 4 260 2,0	Vestbur 57 - 2 7 2,000 1.00 1.00 4,000 079 395 43 2,433 593	d L+U 1 1,800 1.00 1.00 1.800 1.800 128 128 347 347	R 2 1,800 1.00 3,600	57 - 3 - - - - 3,600 28 28 133 133	nd	R 2 1,800 1.00 3,600	57 - 4 - - - - - - - - - - - - - - - - - - -	nd		
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for keft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other	s)	E T+R 1 2,000 1.00 1.00 1.991 7.5 28 4: 133 3.3 161	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 991 410 38 3,240 374 3,650		T+R 1 2,000 1.00 0.99 1,979 5,9 48 260 2,1 308	Vestbun 57 - 2 7 2,000 1.00 1.00 1.00 4,000 079 395 43 2,433 593 2,828	d L+U 1 1,800 1.00 1.00 1,800 1,800 128 128 347 347 474	No R 2 1,800 1.00 1.00	57 - 3 - - - - 3,600 28 28 133 133 161		R 2 1,800 1.00 1.00	57 - 4 - - - - 3,600 30 30 192 192 222			
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for keft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other 9) PCU direction volume(total	s)	E T+R 1 2,000 1.00 1.991 7,5 28 43 133 3,3 133 133 3,3 161 3,8	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 991 410 38 3,240 374 3,650 11		T+R 1 2,000 1.00 0.99 1,979 5,9 48 44 260 2,9 308 3,	Vestbun 57 - 2 7 2 2,000 1.00 1.00 4,000 079 395 43 2,433 935 2,828 36	d L+U 1 1,800 1.00 1.800 1,800 128 128 347 347 474 474	R 2 1,800 1.00 3,600	orthbou 57 - 3 - - - - - - - - - - - - -	nd	R 2 1,800 1.00 3,600	outhbou 57 - 4 - - - - - - - - - - - - - - - - - -	nd		53
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for keft 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(bus) 8) PCU direction volume(other 9) PCU direction volume(total	s)	E T+R 1 2,000 1.00 1.991 7,5 28 43 133 3,3 133 133 3,3 161 3,8	astbour 57 - 1 T 3 2,000 1.00 6,000 901 410 38 3,240 374 3,650 311 422		T+R 1 2,000 1.00 0.99 1,979 5,9 48 44 260 2,9 308 3,	Vestbun 57 - 2 T 2,000 1.00 1.00 4,000 079 395 43 2,433 593 2,828 36 524	d L+U 1 1,800 1.00 1.00 1,800 1,800 128 128 347 347 474	R 2 1,800 1.00 3,600	57 - 3 - - - - 3,600 28 28 133 133 161	nd	R 2 1,800 1.00 3,600	57 - 4 - - - - 3,600 30 30 192 192 222	nd	λi 0.524	Ελ
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(tota) 8) PCU direction volume(tota) 10) Flow rate	s)) [1Φ	E T+R 1 2,000 1.00 1.991 7,5 28 43 133 3,3 133 133 3,3 161 3,8	astbour 57 - 1 T 3 2,000 1.00 1.00 6,000 991 410 38 3,240 374 3,650 11		T+R 1 2,000 1.00 0.99 1,979 5,9 48 44 260 2,9 308 3,	Vestbun 57 - 2 7 2 2,000 1.00 1.00 4,000 079 395 43 2,433 935 2,828 36	d L+U 1 1,800 1.00 1,00 1,800 1,800 128 128 347 347 474 474 474 0,263	R 2 1,800 1.00 3,600	57 - 3 	nd	R 2 1,800 1.00 3,600	57 - 4 	nd	0.524	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo	s)) 10 20	E T+R 1 2,000 1.00 1.991 7,5 28 43 133 3,3 133 133 3,3 161 3,8	astbour 57 - 1 T 3 2,000 1.00 6,000 901 410 38 3,240 374 3,650 311 422		T+R 1 2,000 1.00 0.99 1,979 5,9 48 44 260 2,9 308 3,	Vestbun 57 - 2 T 2,000 1.00 1.00 4,000 079 395 43 2,433 593 2,828 36 524 0.524	d L+U 1 1,800 1.00 1.00 1.800 1.800 1.800 1.28 347 347 474 474 0.263 0.263	No R 2 1,800 1.00 3,600 0	orthbou 57 - 3 - - - 3,600 28 28 133 133 161 161 0.037 0.037	nd	R 2 1,800 1.00 3,600	outhbou 57 - 4 - - - - - - - - - - - - - - - - - -	nd	0.524 0.263	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(tota) 8) PCU direction volume(tota) 10) Flow rate	s)) 10 20 30	E T+R 1 2,000 1.00 1.991 7,5 28 43 133 3,3 133 133 3,3 161 3,8	astbour 57 - 1 T 3 2,000 1.00 6,000 901 410 38 3,240 374 3,650 311 422		T+R 1 2,000 1.00 0.99 1,979 5,9 48 44 260 2,9 308 3,	Vestbun 57 - 2 T 2,000 1.00 1.00 4,000 079 395 43 2,433 593 2,828 36 524 0.524	d L+U 1 1,800 1.00 1.00 1.800 1.800 1.800 1.28 347 347 474 474 0.263 0.263	R 2 1,800 1.00 3,600	orthbou 57 - 3 - - - 3,600 28 28 133 133 161 161 0.037 0.037	nd	R 2 1,800 1.00 3,600	outhbou 57 - 4 - - - - - - - - - - - - - - - - - -	nd	0.524 0.263 0.000	
PM Peak Approach 1) No. of lanes 2) Basic value of saturation flo 3) Adjustment factor for right 4) Adjustment factor for right 5) Saturation flow rate 7) PCU direction volume(tota) 8) PCU direction volume(tota) 10) Flow rate	s)) 10 20	E T+R 1 2,000 1.00 1.991 7,5 28 43 133 3,3 133 133 3,3 161 3,8	astbour 57 - 1 T 3 2,000 1.00 6,000 901 410 38 3,240 374 3,650 311 422		T+R 1 2,000 1.00 0.99 1,979 5,9 48 44 260 2,9 308 3,	Vestbun 57 - 2 T 2,000 1.00 1.00 4,000 079 395 43 2,433 593 2,828 36 524 0.524	d L+U 1 1,800 1.00 1.00 1.800 1.800 1.800 1.28 347 347 474 474 0.263 0.263	No R 2 1,800 1.00 3,600 0	orthbou 57 - 3 - - - 3,600 28 28 133 133 161 161 0.037 0.037	nd	R 2 1,800 1.00 3,600	outhbou 57 - 4 - - - - - - - - - - - - - - - - - -	nd	0.524 0.263	Σλ 0.788

Intersection No.57: Malek Feisal St., Nady St.

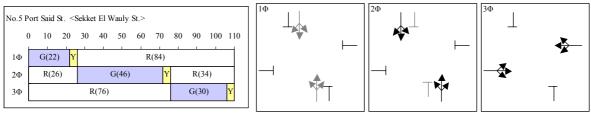
Source: JICA Study Team

Figure B.1 Proposed Signal Phasing System for Key Intersections

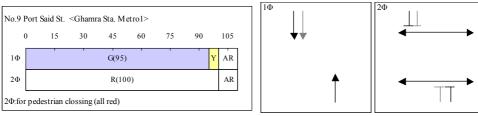
Intersection No.2: Port Said St., Sawah St.



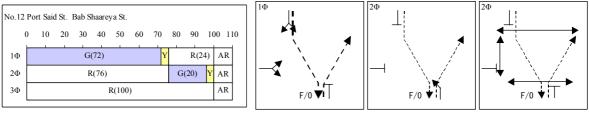
Intersection No.5: Port Said St., Sekket El Wayly St.



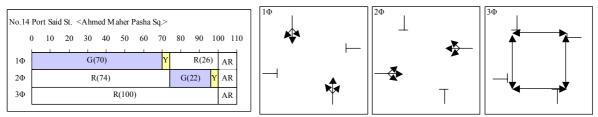
Intersection No. 9 : Port Said St., Ghamra Station. Metro Line 1.



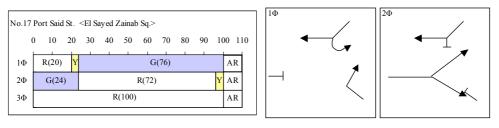
Intersection No.12: Port Said St., Bab EL Shaareya Sq.



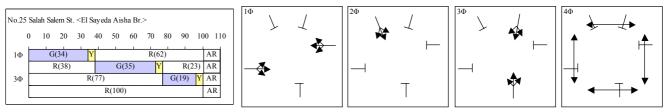
Intersection No.14: Port Said St., Ahmed Maher Pasha Sq.



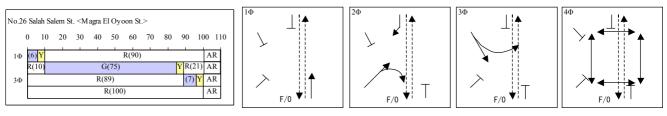
Intersection No.17: Port Said St., Sayeda Zeinab Sq.



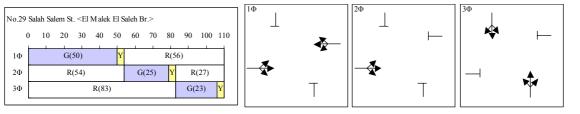
Intersection No.25: Qalaa St., Salah Salem St. (Salah Salem St., Sayeda Aisha Br)



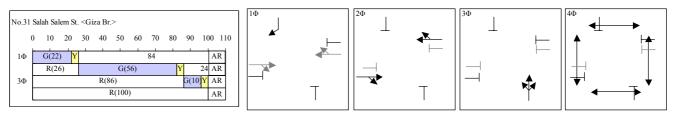
Intersection No.26: Salah Salem St., Magra El Oyoon St.



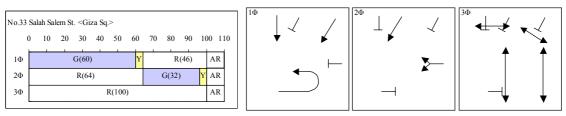
Intersection No.29: Salah Salem St., Malek El Saleh Br.



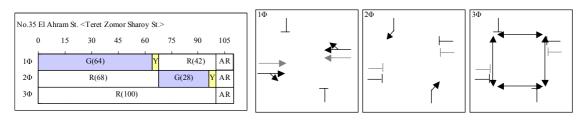
Intersection No.31: Salah Salem St., Malek El Saleh Br.



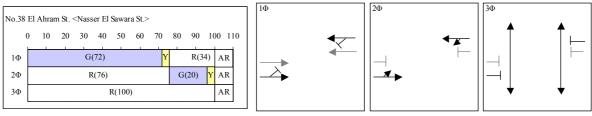
Intersection No.33: Salah Salem St., Giza Sq.



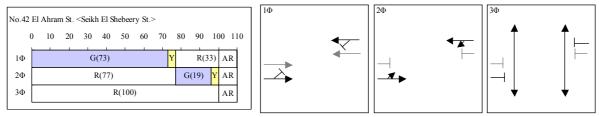
Intersection No.35: Ahram St, Tereat El Zomor El Sharqy St.



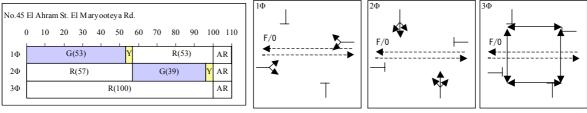
Intersection No.38: Ahram St, Nasser El Thawra St.



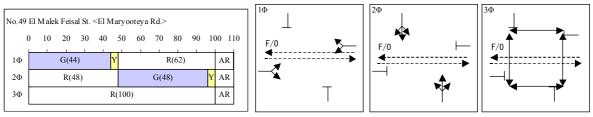
Intersection No.42: Ahram St, Sheikh El Sherbeeny St.



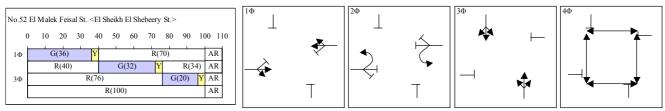
Intersection No.45: Ahram St, Maryoteya Rd.



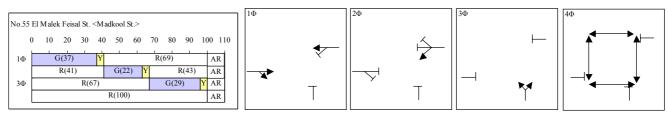
Intersection No.49: Malek Feisal St., Maryoteya Rd.



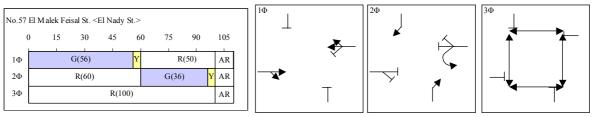
Intersection No.52: Malek Feisal St., Sheikh El Sherbeeny St.



Intersection No.55: Malek Feisal St., Madkoor St.



Intersection No.57: Malek Feisal St., Nady St.



Source: JICA Study Team