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كلية الهندسة و تكنولوجياالمعلومات

Graduation Project Report

Transportation Management Plan of Tubas Main Street

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THANKS

To our families...

To our teachers...

We especially thank Dr. Emad Al-Dawas for providing useful advice on the project and for his continuous follow-up with us from meetings and field visits.

Finally, a special thanks to our supervisor, Professor Khaled Al-Sahili, who did not hesitate to guide us, and gave useful advice.

ABSTRACT

Tubas Main Street is one of the most important streets in the city of Tubas. It has heavy traffic volumes almost all day long. This region and its surrounding areas are expected to grow at a rapid rate in the future and are expected to face emerging problems due to such growth. Therefore, it is important to shed light on the problem, find the causes, and find some applicable solutions so that the competent authorities can apply these solutions as much as possible.

This study focuses on:

1. Traffic operating conditions.
2. The engineering design of the streets in the region.
3. Proposing ideas and solutions to existing and expected problems.

The methodology that has been conducted in this study is based on previous studies in this area, as well as using techniques, methods, and references adopted locally and internationally. Our team made field visits to the considered area to report the state of the street, and collect field data on the traffic operating conditions to be used in the analysis phase. An appropriate design and management plan has been developed. The analysis and designs were based on American Association of State Highway and Transportation Officials (AASHTO), Highway Capacity Manual, and local specifications and standards. Finally, the completed work has been offered into a report with the necessary design plans, tables, figures and proposed solutions.

Results of the study are provided in this project include traffic conditions, and geometric designs need to be revised and redesigned in order to improve traffic conditions and reduce congestion level. It also includes improving traffic safety conditions for the study area. The results of this study will be useful for future studies as well. The final output will form a transportation management plan for the study area along with plans and ideas on improving the existing conditions in order to provide the best possible outcomes and solutions for forecasted problems.

CHAPTER ONE
INTRODUCTION

1.1 Introduction

1.1.1 General background

Tubas is one of the major cities in the West Bank, with a population of 67,340 people, according to the Palestinian Central Bureau of Statistics (PCBS, 2022). The city of Tubas is considered the largest agricultural city in the West Bank, and it gains its importance from its distinguished geographical location that connects the cities of the northern West Bank; Nablus and Jenin, with the Palestinian Valley. Tubas is considered a destination for a large number of people who travel to the city every day from the nearby agricultural areas, in addition to being considered a corridor and main business attraction in the area. As a result, large numbers of vehicles enter the city daily. This, in turn, causes an increase in traffic congestion on the main lanes of this area.

This project focuses on the main Tubas Street of the city of Tubas and the surrounding area, which is expected to grow rapidly in the coming years. It is also considered a corridor that connects the city center of Tubas with the surrounding villages and regions, which results in a large number of vehicles crossing the area on a daily basis. This project aims to study, evaluate, and provide solutions to the problems that are expected to appear in the region in the near future, in order to better manage the flow of vehicles, reduce travel time, and improve the experience of drivers and people traveling through the region and its surroundings.

Due to developments, Tubas City's traffic flow has greatly increased in recent years. However, more development is anticipated in the coming years, including developments in the commercial, industrial, and residential sectors in general in Tubas Governorate and in the study area in particular. This will create new activities and generate new traffic in this area.

This part of the city is relatively congested by the traffic produced, attracted by, or passing through the area. New buildings are constructed; major traffic comes from many places surrounding this area, and visitors from other cities and villages pass through the study area. There is also a proposed plan by the Tubas Municipality to construct a bypass ring road around the city, which will lead to mitigating some of the congestion, and will greatly affect driving and transportation conditions.

Based on the above, to assess the effects that current and upcoming developments (commercial, residential, and buildings) as well as future development of this area and its street network, traffic studies are required.

The effect of these factors will be discussed and evaluated in this project. Figure 1 shows the location of Tubas Governorate and city.

1.1.2 Study area

The study area for this project is located along the main street in Tubas City center , which has a length of 2170 m (see Figure 2).

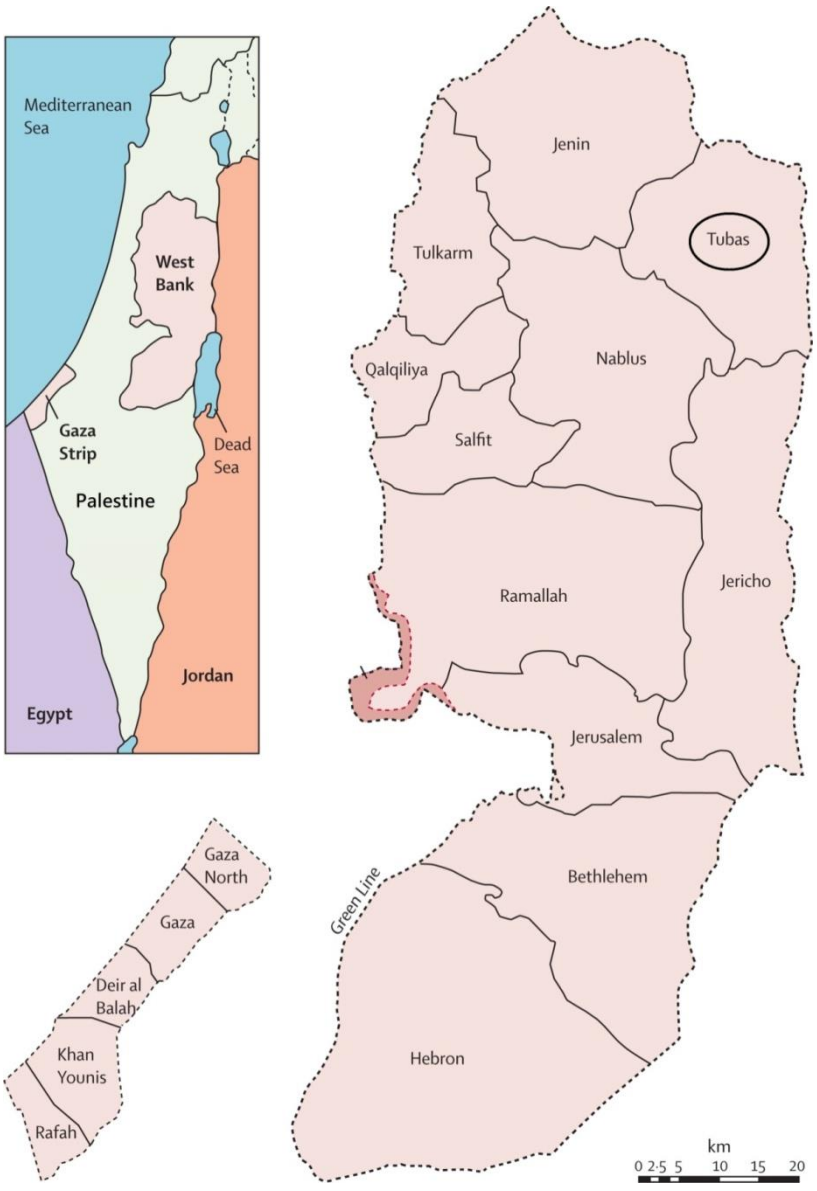

Figure 1: Map of Palestine Showing the Location of Tubas City

Figure 2: Location of the Study Area

1.1.3 Objectives

The study area can be considered as a fairly new constructed area with rehabilitated streets. Due to that, there are only some existing problems that will be mentioned and discussed in this project later, but a fair bit of this project will be on predicting future problems and working out possible solutions for them.

Therefore, our study will include the evaluation and proposed solution to these aspects:

1. Traffic operating conditions.
2. Geometric conditions of the streets in the area.
3. Parking conditions.
4. The impact of the proposed Passing-Through road project
5. Suggestions for solutions of existing and future problems.

1.2 Significance of the Study

The study area has heavy traffic volume almost all day long. It is also expected to grow and develop at a fast rate, and expected to have emerging problems due to this growth, such as congestion, delay, and deteriorating level of service.

The study and scenario planning will assess the current traffic system's level of service and, if necessary, seek to improve it in order to prevent the major anticipated escalation of traffic-related issues in the coming years.

This is expected to have a positive impact on the study area by organizing traffic and traffic related issues.

1.3 Report Outline

The graduation project report consists of seven chapters. The first chapter is the introduction, which gives a general background about the project. The description of study area is discussed in chapter two. The methodology of how the project's objectives will be achieved is presented in the third chapter. The data collection is explained in chapter four. Design criteria are illustrated in chapter five. Chapter six presents proposed scenarios and the last chapter contains conclusions and recommendations.

CHAPTER TWO
AREA DESCRIPTION

2.1 General Idea about the Study Area

Our study area can be classified as a mix of residential, commercial, light industrial, and agricultural area.

In this area, there are several intersections and some of them are controlled by roundabouts and intersections, these are:

1. Al Quds Roundabout
2. Tayaseer Intersection
3. The Municipality Roundabout
4. Al-Tawhid Mosque Roundabout
5. Al Turkish Hospital Roundabout

The following is a brief description of these locations.

2.2 Al Quds Roundabout

Martyr Al Quds Roundabout is a roundabout between a group of main and secondary roads, and all approaches have one lane in each direction with sidewalks. The surface type is asphalt with a good roughness, but it has some defects along the road like rutting, potholes, and reveling.

Markings on the road are not clear enough for the users of the road, and on some minor roads, it does not even exist.

The traffic control devices that are set at the minor roads are good from the point of type and sight distance, and are visible to all the vehicles.

There are no passenger loading facilities for public transport vehicles, and the roundabout has good night lighting.

The following figure shows Al Quds Roundabout**.**

Figure 3: Al Quds Roundabout

2.3 Tayaseer Intersection

Tayaseer Intersection is an intersection between a group of main and secondary roads, and all entrances have one lane in each direction with sidewalks. The surface type is asphalt with low roughness, but it has some defects along the way such as potholes and rutting.

There are no signs at the intersection and associated streets, and there is no pedestrian walkway with existing high pedestrian traffic.

Illegal parking leads to heavy congestion at this intersection, with violations of overtaking vehicles, while adhering to the priority of traffic.

All roads have an operating speed limit of 50 km/h.

The following figure shows the Tayaseer Intersection**.**

Figure 4: Tubas Main Street -Tayaseer Intersection

2.4 The Municipality Roundabout

The Municipality Roundabout is a roundabout between a group of main and secondary roads, and all approaches have one lane in each direction with sidewalks.

Markings on the road are not clear enough for the users of the road, and on some minor roads, it does not even exist.

The traffic control devices that are set at the minor roads are good from the point of type and sight distance, and are visible to all the vehicles.

There are no passenger loading facilities for public transport vehicles, and the roundabout has good night lighting.

The following figure shows The Municipality Roundabout.

Figure 5: The Municipality Roundabout

2.5 Al Tawhid Mosque Roundabout

The roundabout of Al Tawhid Mosque is a roundabout between a group of main and secondary roads, and all entrances have one lane in each direction with sidewalks, in addition to the presence of a one-way road. Surface type is asphalt with fine roughness.

There are no signs at the intersection and associated streets, and there is no pedestrian walkway with existing high pedestrian traffic.

Stopping and parking are illegal forms that lead to high congestion at this intersection due to the presence of a mosque during prayer times.

Entering the roundabout from main roads at high speed could also cause accidents.

The following figure shows Al Tawhid Mosque Roundabout.

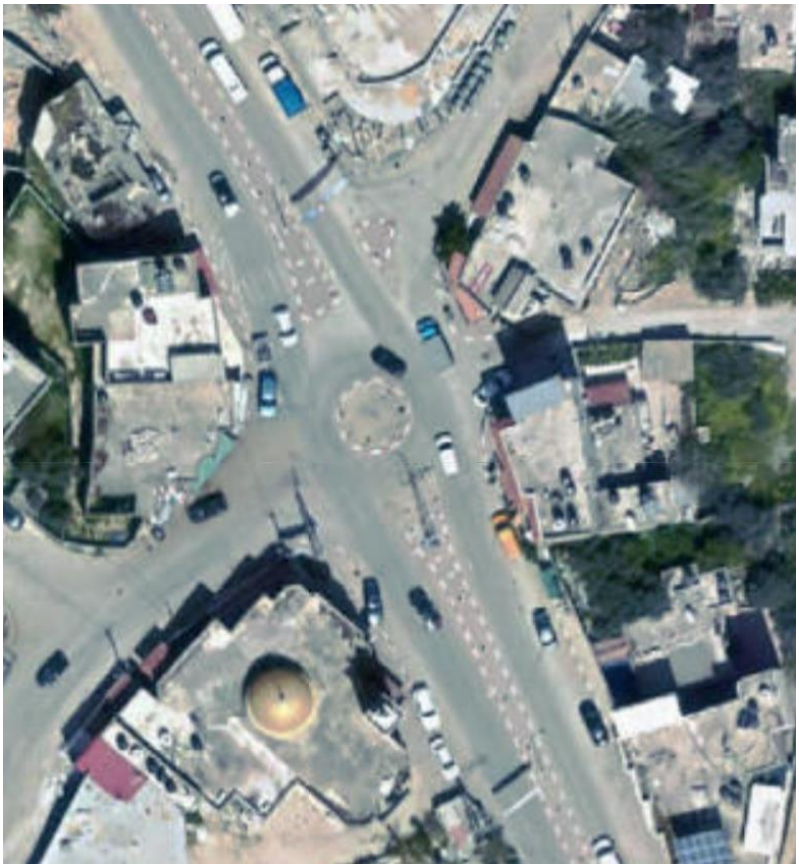

Figure 6: Al Tawhid Mosque Roundabout

2.6 Al Turkish Hospital Roundabout

Al Turkish Hospital Roundabout is a roundabout between a group of main and secondary roads. All entrances have one lane in each direction with sidewalks. The type of surface is asphalt with good roughness.

There are no signs at the intersection and associated streets.

Entering the roundabout from the main roads at a high speed and in an illegal manner can cause accidents.

It is expected to have urban expansion in the future, which will cause high population and traffic growth.

The following figure shows Al Turkish Hospital Roundabout.

Figure 7: Al Turkish Hospital Roundabout

CHAPTER THREE
METHODOLOGY

3.1 General Review

This chapter presents the methodology that was followed in order to achieve the desired objectives discussed before, which includes the collection, processing, and analyzing all of the study area related information by conducting traffic counts, road inventory studies, and geometric plans and analysis. Processing and analyzing were done using computer software's in order to estimate and determine future and current problems and suggesting alternative routes and solutions to these problems.

3.2 Data Collection and Field Inventory Studies

Maps and information about the study area were acquired from the Municipality of Tubas including land parcels and uses and existing roadway alignments. In order to conduct the required studies, several field visits were arranged to the study area so as to get a clearer idea about the general geometric, traffic flow, and pavement condition of the area through inventory studies to multiple sections and intersections throughout the study area.

Several pictures for each section and intersection taken into account in the inventory studies were taken.

Several volume counts with vehicle specification were conducted on the major intersections of the study area in order to determine the peak hour (PH), peak hour volume (PHV), peak hour factor (PHF), and the design vehicle selected for the design of the streets and intersections in the study area.

These counts were performed at these intersections for four total hours, two hours in the morning (7:00-9:00 am.) and two hours in the afternoon (1:00-3:00 pm.). Data was recorded on MS. Excel in order to calculate the variables mentioned above.

3.3 Standards and Specifications

The followed standards are based on the American Association of State Highways and Transportation Officials (AASHTO, 2011) and the Highway Capacity Manual (HCM, 2010). This is further supplemented by local standards.

The traffic operating conditions in the study area will be evaluated using Synchro Software.

3.4 Level of Service

3.4.1 General background

Level of service (LOS) is a measure used by traffic engineers for the effectiveness of elements of transportation infrastructure. It is most commonly used to analyze highway, but the concept has also been applied to intersections, transit, and pedestrian facilities.

The procedure at the operation level of analysis can be used to determine the capacity and level of service at the approaches of a signalized intersection or the overall level of service at an existing intersection. The LOS criteria are given in terms of average control delay per vehicle during an analysis period of 15 minutes. Six level of service are prescribed (HCM, 2010).

3.4.2 Level of service for un-signalized intersection

Un-signalized intersections LOS criteria can be further reduced into three intersections types: all-way stop controlled, two-way stop controlled, and roundabouts. All-way stop controlled intersections LOS is expected in terms of the average vehicle delay of all the movement, much like that of a signalized intersection. On the other hand, two-way stop controlled intersections.

LOS is defined in terms of the average vehicle control delay of an individual movement.

Table (1) presents level of service criteria for un-signalized intersection:

Table 1: Level of Service Criteria for Un-Signalized Intersection

Level of service	Average control delay (sec/veh)
A	≤10 sec
B	10-15 sec
C	15-25 sec
D	25-35 sec
E	35-50 sec
F	≥ 50 sec

Source: Highway Capacity Manual 2010, Transportation Research Board, 2010.

3.4.3 Level of service at signalized intersection

One of the most effective ways of controlling traffic at an intersection is to use traffic signals: the most important factor that selects the use of traffic signals is intersection's traffic volume, and other secondary factors like pedestrian. Traffic signals are used to eliminate many of conflict points, crashes…etc. because traffic signals regulate the approach to use the intersection in regular forms, which enable each approach to use the intersection in its specified time.

The procedure for determining the level of service (LOS) at an intersection can be used either a detailed or operational of a given intersection or a general planning estimate of the overall performance of an existing or planned signalized intersection. At the design level of analysis, more input data are required for a direct estimate of the level of service to be made. It is also possible at this level of analysis to determine the effect of changing signal timing.

LOS criteria are stated in terms of average delay per vehicle during a specified time period as shown in Table (2).

Table 2: Level of Service Criteria for Signalized Intersection

Level of service	Average Control delay (sec/veh)
A	≤10 sec
B	10-20 sec
C	20-35 sec
D	35-55 sec
E	55-80 sec
F	≥80 sec

SOURCE: Highway Capacity Manual 2010, Transportation Research Board, 2010.

3.5 Project Constrains

A few problems and constrains were faced during this project, some of which were overcome while others we had to work with in order to finish this project.

Constrains such as:

- Difficulty of forecasting future events, such as population growth and future plans.
- Limited right of way limits our options in terms of applicable solutions.
- Limited proposed solutions because of limitations in area of the study area.

- It is also expected that the budgetary constraint is an important one that faces Tubas Municipality in executing the proposed alternatives.

3.6 Proposed Solutions

Multiple solutions will be proposed for the various problems, varying from do-nothing solutions to the suggestion of completely new roundabout and traffic flow directions and adding new traffic elements.

CHAPTER FOUR
DATA COLLECTION

In order to conduct the required studies, several field visits were arranged to the study area so as to get a clearer idea about the general geometric, traffic flow, and pavement condition of the area through inventory studies to multiple sections and intersections throughout the study area.

4.1 Municipal Contribution

- A meeting was held with the mayor, Hussam Daraghmeh, the general manager of Tubas municipality, Hussam Abu Alyan, and engineer Iyad Daraghmeh, to clarify the most important traffic problems that the city is going through.
- Clarification about the strategic plan developed by the municipality of Tubas and the possibility of benefiting from the project that we are doing in this plan.
- The municipal engineer was contacted to attach the necessary plans and information to help us collect data.
- We also conducted a field visit in the presence of Prof. Dr. Khaled Al-Sahili, Dr. Imad Dawas and the municipality engineer.
- Informing the municipality engineer of the data collection process that we carried out during the project period and take advice and instructions from the engineer.

4.2 Roads Inventory Study

The road inventory study is an important task to determine the road way classification, road elements and its conditions.

Tubas main street has been divided into four sections. The number of lanes at each approach, existence of median, sidewalks, and its dimensions and conditions, was Identified through field works and studied at all sections.

4.2.1 Section one

Section description:

- It is a two lane street without median
- There are sidewalks on both sides of the street

- Parking is permitted on both sides of the street.
- It has a good pavement condition and good sidewalks condition.
- Illegal double parking of vehicles
- There are no crosswalk signs in this section
- There are no speed limit signs on this section.

Figure 8: Section 1 of the Main Tubas Street

Dimensions of the street elements in table (3)

Table 3: Dimensions of the Street Elements of Section 1

Section #	Side walk (SW) m	parking lane m	Travel Lane (TL) m	Travel Lane (TL) m	parking lane m	Side walk (SW) m	Right of way (ROW) m
1	2	2	6	6	2	1.2	19.2

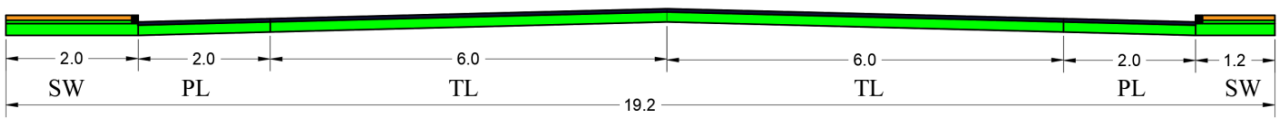

Figure 9: at Section 1 Existing Cross Section

4.2.2 Section two

Section description:

- It is a two lane street without median.
- There are sidewalks on both sides of the street.
- Parking is permitted on both sides of the street.
- It has a good pavement condition and good sidewalks condition.
- Illegal double parking of vehicles.
- There are no crosswalk signs in this section.
- There are no speed limit signs on this section.
- There is a taxi office that runs a traffic jam on the street.

Figure 10: Section 2 of the Main Tubas Street

Dimensions of the street elements in table (4)

Table 4: Dimensions of the Street Elements of Section 2

Section #	Side walk (SW) m	parking lane m	Travel Lane (TL) m	Travel Lane (TL) m	parking lane m	Side walk (SW) m	Right of way (ROW) m
2	1.5	2	4	4	2	2	15.5

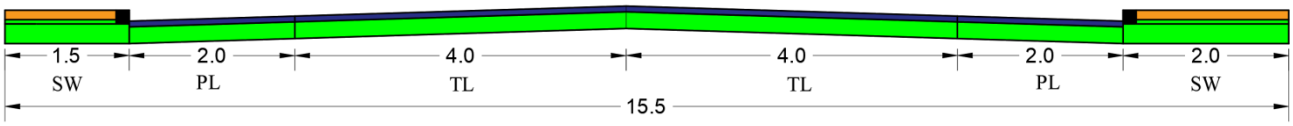

Figure 11: at Section 2 Existing Cross Section

4.2.3 Section three

Section description:

- It is a two lane street with median
- There are sidewalks on both sides of the street
- Parking is permitted on both sides of the street.
- It has a good pavement condition and good sidewalks condition.
- Illegal double parking of vehicles
- There are no crosswalk signs in this section
- There are no speed limit signs on this section.

Figure 12: Section 3 of the Main Tubas Street

Dimensions of the street elements in table (5)

Table 5: Dimensions of the Street Elements of Section 3

Section #	Side walk (SW) m	parking lane m	Travel Lane (TL) m	Median (M) m	Travel Lane (TL) m	parking lane m	Side walk (SW) m	Right of way (ROW) m
3	1	2	6	0.5	6	2	1.5	19

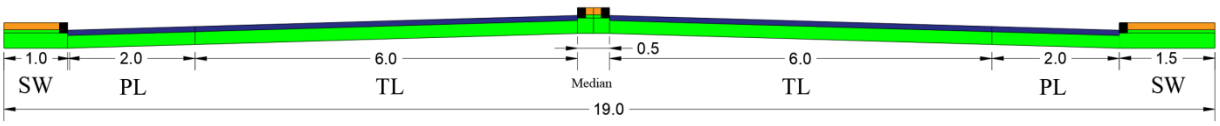

Figure 13: at Section 3 Existing Cross Section

4.2.4 Section four

Section description:

- It is a four lane street with median
- There are sidewalks on both sides of the street
- Parking is permitted on both sides of the street.
- It has a good pavement condition and good sidewalks condition.
- There are crosswalk signs in this section
- There are no speed limit signs on this section.

Figure 14: Section 4 of the Main Tubas Street

Dimensions of the street elements in table (6)

Table 6: Dimensions of the Street Elements of Section 4

Section #	Side walk (SW) m	Travel Lane (TL) m	Travel Lane (TL) m	Median (M) m	Travel Lane (TL) m	Travel Lane (TL) m	Side walk (SW) m	Right of way (ROW) m
4	3	3.5	3.5	2	3.5	3.5	3	22

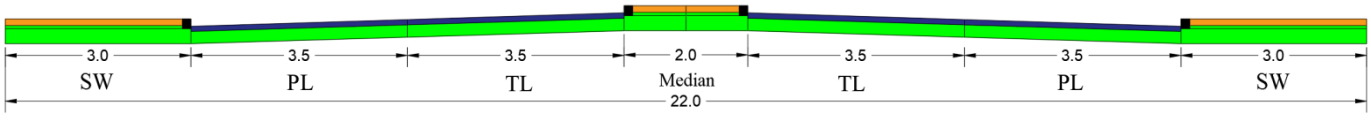

Figure 15: at Section 4 Existing Cross Section

4.3 Traffic Volume Counts

Traffic volume studies are conducted to collect data of the numbers and types of the different vehicles that pass a point on highway or intersection facility during a specified period. This period varies from as 15 minute to as much as a year depending on the anticipated use of the data.

The flow of traffic on any street or highway is greatly affected by the flow of traffic through the intersection points of the street or highway because the intersection usually performs at a level below that of any section of the road. As a result, the field study in this project will be focused on intersection counts only.

Counts were performed at all major intersections along the study corridor for 4 hours: 2 hours in the AM peak period (from 7:00 to 9:00 AM) and 2 hours in the PM peak period (from 1:00 to 3:00 PM). The records were entered in Microsoft. EXCEL, then the Peak Hour, Peak Hour Volume.

Three general classes of design vehicles have been established: passenger cars, trucks, and taxi vehicles.

The following figure shows the approaches of Al Quds Roundabout, as a sample. And the following table shows a traffic count sample.

The rest of the traffic count tables are included in the Appendix.

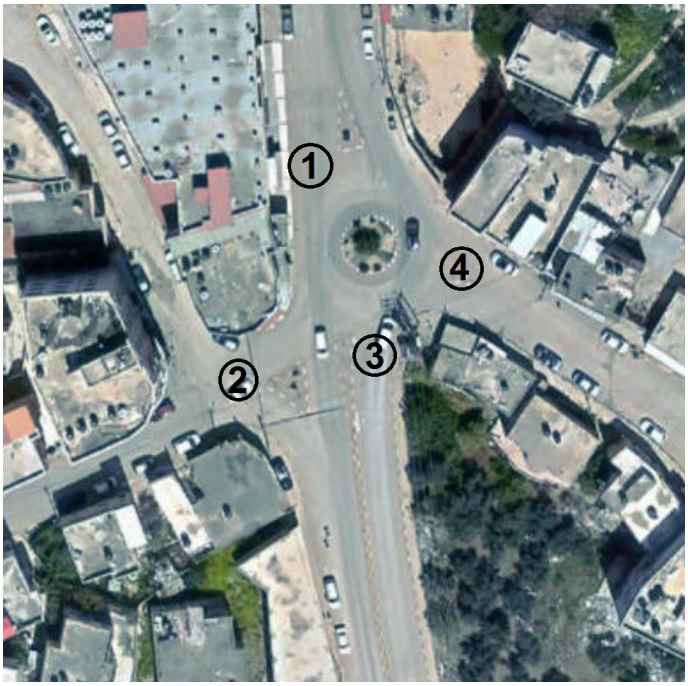

Figure 16: Approaches of Al Quds Roundabout

Table 7:Traffic Volume for the Al Quds Roundabout

Approach 1													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	2	1	1	65	20	5	2	0	0	2	1	0	99
7:15-7:30 AM	3	1	1	77	22	5	2	0	0	3	0	0	114
7:30-7:45 AM	3	1	0	63	23	5	3	0	0	2	0	2	102
7:45-8:00 AM	6	0	0	75	19	7	0	0	1	3	0	0	111
8:00-8:15 AM	6	0	0	67	12	6	2	0	1	3	0	0	97
8:15-8:30 AM	3	0	0	62	14	11	2	0	0	4	1	0	97
8:30-8:45 AM	6	1	1	71	17	12	1	0	0	2	0	1	112
8:45-9:00 AM	9	1	1	63	14	12	5	0	1	2	0	1	109
Total	38	5	4	543	141	63	17	0	3	21	2	4	841

Approach 2													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	10	1	0	2	0	0	0	0	0	0	0	0	13
7:15-7:30 AM	11	2	0	2	0	0	0	0	0	0	0	0	15
7:30-7:45 AM	13	1	0	2	0	0	0	0	0	0	0	0	16
7:45-8:00 AM	14	1	1	0	0	0	0	0	0	0	0	0	16
8:00-8:15 AM	12	1	2	0	0	0	0	0	0	0	0	0	15
8:15-8:30 AM	9	0	2	0	0	0	1	0	1	0	0	0	13
8:30-8:45 AM	6	0	0	0	0	0	2	0	0	0	0	0	8
8:45-9:00 AM	10	3	2	0	0	0	0	0	0	0	0	0	15
Total	85	9	7	6	0	0	3	0	1	0	0	0	111

Approach 3													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	0	1	0	80	20	4	8	0	0	2	0	0	115
7:15-7:30 AM	1	0	0	85	24	7	8	0	0	2	0	0	127
7:30-7:45 AM	0	0	0	75	16	4	2	0	2	0	0	0	99
7:45-8:00 AM	1	0	0	123	19	12	6	1	0	0	1	0	163
8:00-8:15 AM	1	1	0	94	26	8	7	1	0	0	0	0	138
8:15-8:30 AM	1	0	0	78	14	14	1	0	0	1	0	0	109
8:30-8:45 AM	1	0	0	91	33	7	2	0	1	1	0	0	136
8:45-9:00 AM	0	0	0	97	19	17	1	1	1	0	1	0	137
Total	5	2	0	723	171	73	35	3	4	6	2	0	1024

Approach 4													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	10	2	2	3	2	0	13	2	2	0	0	0	36

7:15-7:30 AM	11	2	1	4	1	0	15	1	2	0	0	0	37
7:30-7:45 AM	17	0	1	2	1	0	10	1	0	0	1	0	33
7:45-8:00 AM	10	0	3	1	0	1	13	1	1	0	0	0	30
8:00-8:15 AM	5	0	1	5	1	0	8	0	1	1	0	0	22
8:15-8:30 AM	7	1	2	2	0	0	10	0	0	0	1	0	23
8:30-8:45 AM	5	0	1	2	0	0	10	2	1	0	0	0	21
8:45-9:00 AM	5	1	2	0	0	2	10	1	0	1	0	0	22
Total	70	6	13	19	5	3	89	8	7	2	2	0	224
Total	198	22	24	1291	317	139	144	11	15	29	6	4	2200

4.4 Passing-Through Road Count

The main Tubas Street is a link between adjacent cities. The Municipality of Tubas has prepared a strategic plan for the city. One of the most important items of which is the establishment of the Passing-Through road (the bypass around the city of Tubas). Therefore, we conducted a study to evaluate the effectiveness of the Passing-Through road in alleviating the traffic congestion on the main Tubas Street, by determining the percentage of vehicles that pass through the main Tubas Street.

Two teams were formed; the first team was located at the beginning of the southern entrance to the city of Tubas and the second team at the beginning of the northern entrance to the city of Tubas; each team registered the license plates numbers of the vehicles entering and leaving the city of Tubas.

The count was conducted for 4 hours: 2 hours in the morning peak period (from 7:00 to 9:00 am) and 2 hours in the evening peak period (from 1:00 to 3:00 pm). Records were entered in Microsoft. Excel. The following figure shows the ring road and the main Tubas Street.

Figure 17: The Master Plan of the City of Tubas

The following table shows a road count sample. The rest of the traffic count tables are included in the Appendix**.**

Table 8: Plates Numbers for Vehicles Crossing the City from the South at (7:00-7:15 AM)

Plates for vehicles Crossing the city from the south (7:00-7:15 AM)					
number	vehicle plate	number	vehicle plate	number	vehicle plate
1	0384	37	2451	73	97
2	1077	38	5481	74	2363
3	4558	39	8746	75	3536
4	8966	40	2698	76	3697
5	2188	41	7497	77	3797
6	8581	42	4564	78	3756
7	0886	43	6353	79	0759
8	8296	44	3840	80	5569
9	2540	45	1519	81	7280
10	8326	46	3126	82	1233
11	7653	47	1094	83	7157
12	0727	48	5493	84	1479
13	9169	49	4099	85	1001
14	5665	50	2854	86	2131
15	1722	51	4895	87	7249
16	8164	52	0103	88	9838
17	8902	53	8355	89	5403
18	4048	54	6581	90	9501
19	2340	55	2443	91	7255
20	5026	56	9752	92	7012
21	5407	57	7336	93	5245
22	0390	58	4117	94	6351
23	6888	59	3375	95	0109
24	2030	60	0434	96	5139
25	0335	61	2778	97	5685
26	1637	62	6449	98	8972
27	3459	63	4203	99	1186
28	2394	64	5981	100	4623
29	2316	65	9192	101	0452
30	4984	66	8321	102	8356
31	0168	67	8403	103	7697
32	8004	68	0502	104	7803
33	0680	69	2063	105	6420
34	7168	70	4670	106	8805
35	1337	71	4378		
36	6233	72	7305		

4.5 Parking Count

The main Tubas Street contains shops, restaurants, service centers and government ministries, which necessitates the presence of parking spaces along the main street to meet the needs of road users. We conducted a study of whether the existing parking lots are sufficient or not, and finding solutions if necessary.

We divided the study area into four sections **:**

1. From Al Quds Roundabout to Tayaseer Intersection**.**
2. From Tayaseer Intersection to the Municipality Roundabout**.**
3. From the Municipality Roundabout to Al-Tawhid Mosque Roundabout**.**
4. From Al-Tawhid Mosque Roundabout to Al Turkish Hospital Roundabout**.**

License plates numbers of the vehicles parked on the left and right sides of each segment were recorded every half hour.

The following table shows a parking count sample. The rest of the parking count tables are included in the Appendix.

Table 9: License Plates Numbers of Vehicles Parked in Section 3

(section 3)												
number	9-9:30 AM		9:30-10 AM		10-10:30 AM		12-12:30 PM		12:30-1 PM		2:00-2:30 PM	
	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status
1	3326	legal	4380	illegal	3326	legal	1890	illegal	8111	legal	3326	legal
2	5885	legal	9426	legal	5352	legal	3326	legal	3326	legal	7916	illegal
3	6059	illegal	3326	legal	5568	illegal	1182	legal	2525	illegal	1993	legal
4	9192	legal	6213	illegal	6213	illegal	2525	illegal	4045	illegal	9201	legal
5	5527	legal	7955	illegal	5229	legal	4045	illegal	4953	illegal	7133	legal
6	6213	illegal	6696	illegal	7399	legal	6320	legal	9201	illegal	6749	legal
7	5098	legal	6189	illegal	5527	legal	9192	legal	4682	legal	5568	legal
8	2658	illegal	1275	legal	891	legal	5527	legal	6092	legal	5527	legal
9	8200	illegal	5670	legal	3367	legal	2939	legal	6288	legal	5583	legal
10	5213	legal	6278	legal	2815	illegal	8111	legal	7181	legal	1091	legal
11	7705	legal	4558	legal	6351	illegal	2815	legal	9192	legal	8885	legal
12	7210	legal	3870	illegal	8200	illegal	1953	legal	2939	illegal	3489	legal
13	6293	legal	4960	illegal	5213	legal	8885	legal	5527	legal	6305	legal
14	9551	legal	1156	legal	7705	legal	7501	legal	8885	legal	2700	illegal
15	7980	legal	8200	legal	7210	legal	5213	illegal	2815	legal	7507	illegal
16	5293	legal	5213	legal	2110	illegal	7705	legal	5452	legal	4173	legal
17	4281	legal	7705	legal	6229	legal	1426	legal	6813	legal	5213	legal
18	6036	illegal	7210	legal	5154	legal	2110	illegal	7500	illegal	2110	illegal
19	1456	legal	2110	illegal	9551	legal	2549	illegal	1809	legal	1240	legal
20	6186	legal	9551	legal	4654	legal	9551	legal	1066	legal	6988	legal
21	2609	legal	8817	illegal	4261	legal	6603	legal	5213	legal	6603	legal
22	6180	legal	8799	illegal	1300	illegal	5364	illegal	7705	legal	1581	illegal
23	7836	legal	1173	illegal	5291	illegal	4141	legal	2449	legal	5364	illegal
24	6231	legal	2062	illegal	1042	illegal	7231	legal	1426	legal	4281	legal
25	1014	legal	5357	legal	5111	legal	4281	legal	2900	legal	9931	legal
26	4002	legal	4282	legal	4361	legal	3100	legal	9551	legal	1327	legal
27	3618	legal	1300	legal	7452	legal	6479	illegal	2543	illegal	7332	legal
28	2112	illegal	6160	illegal	7501	legal	7293	legal	6603	legal	4361	legal
29			3160	legal	7836	legal	8450	legal	1581	illegal	3360	legal
30			4018	legal	6231	legal	4805	legal	1807	legal	7124	legal
31			4361	legal	1014	legal	8224	legal	5364	illegal	1014	legal
32			7836	legal	6177	illegal	1741	legal	6148	illegal	3618	illegal
33			6231	legal			4361	legal	4281	legal		
34			1014	legal			7604	legal	1300	illegal		
35			1807	legal			5561	legal	5212	legal		
36							7836	legal	1741	legal		
37							1014	legal	1404	legal		
38							2136	legal	9531	legal		
39									6277	legal		
40									1809	legal		
41									4089	legal		
42									1221	illegal		
43									3618	legal		
44									1950	illegal		

4.6 Traffic Accidents

Since the aim of our project is to study the operational conditions of the main road and find solutions to existing problems, we have obtained from the Traffic Police the accident records in the study area on the main street in the city of Tubas.

The following table shows an accidents count sample.

Table 10: Accidents Count Sample

id	Case number	year	date	time	Traffic case type	Traffic case reason	Location1	Related parties count	Vehicle count
1036968	TR/2019/1629	2019	4/1/2019	0:00:00	اضرار مادية	التحول عن مسلك السير	طوباس مقابل سوبر ماركت الفارس	2	1
1039645	TR/2019/4253	2019	8/1/2019	17:15:00	دهس	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	طوباس قرب دوار النخلة	2	1
1039569	TR/2019/4178	2019	9/1/2019	9:10:00	اضرار مادية	الرجوع للخلف والتسبب بحادث طرق	طوباس خلف المحكمة	2	2
1040631	TR/2019/5216	2019	11/1/2019	0:00:00	دهس	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	طوباس قرب مفرق تياسير	2	1
1043152	TR/2019/7684	2019	15/1/2019	7:30:00	اضرار مادية	عدم المحافظة على مسافة توقف آمن أثناء السفر	طوباس قرب براديس	2	2
1043430	TR/2019/7958	2019	15/1/2019	15:10:00	دهس	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	طوباس قرب التوحيد	2	1
1044282	TR/2019/8801	2019	16/1/2019	16:30:00	اضرار مادية	التحول عن مسلك السير	طوباس قرب اسواق المدينة	2	2
1044531	TR/2019/9046	2019	17/1/2019	10:10:00	تصادم	عدم تأمين الإستدارة يميناً أو يساراً	طوباس قرب سوبر ماركت الاخوة	5	2
1044523	TR/2019/9038	2019	17/1/2019	10:40:00	تصادم	عدم تأمين وقوف المركبة	طوباس دوار البلدية	2	2
1049460	TR/2019/13882	2019	25/1/2019	8:20:00	تصادم	عدم تأمين فتح الباب	طوباس امام مطعم ياسر	2	2

CHAPTER FIVE
DESIGN CRITERIA

The following are the geometric design criteria that were used to evaluate the geometric conditions of the study streets and intersections.

5.1 Functional Classification

Functional classification is applied to group of streets and highways according to the character of service they are intended to provide. However, the classification of highways into different operational systems, functional classes, or geometric types is needed for communication among engineers, administrators, and the public.

This classification system facilitates the systematic development of highways and the logical assignment of highway responsibilities among different jurisdictions.

Highways and streets are preliminary described as rural or urban roads, following the preliminary classification; highways are then classified separately for urban and rural areas under the following categories:

- Principal Arterials
- Minor Arterials
- Major Collectors
- Minor Collectors
- Local Roads and Streets

The street included in the study area (Main Tubas Street) is considered as Urban Principal Arterial Street.

5.2 Level of Service

The Highway Capacity Manual (HCM, 2010) defines the quality of traffic service provided by specific highway facilities under specific traffic demands by means of a level of service. The level of service characterizes the operating conditions on the facility in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic

interruptions, and comfort and convenience. Table (11) shows the general operating conditions represented by the level service. The specific definitions of level of service differ by facility type.

Table 11: General Definitions of Level of Service

Level of Service	General Operating Conditions
A	Free flow
B	Reasonably free flow
C	Stable flow
D	Approaching unstable flow
E	Unstable flow
F	Forced or breakdown flow

Source: Highway Capacity Manual 2010, Transportation Research Board, 2010

Choice of an appropriate level of service for design is properly left to the highway designer. The guidance in the preceding discussion should enable the designer to link the appropriate degrees of congestion to specific levels of service. The relationship between highway type and location and the level of service appropriate for design is summarized in Table (12).

Table 12: Guidelines for Selection of Design Level of Service

	Appropriate Level of Service for Specified Combinations of Area and Terrain Type			
Functional Class	Rural Level	Rural Rolling	Rural Mountainous	Urban and Suburban
Freeway	B	B	C	C or D
Arterial	B	B	C	C or D
Collector	C	C	D	D
Local	D	D	D	D

Source: Highway Capacity Manual 2010, Transportation Research Board, 2010.

5.3 Sidewalks (In General)

Sidewalk is the element of the highway used as pedestrians' access to public utilities, parks, shopping areas and transit stops.

The minimum sidewalk width is 1.2 m (Effective Width), sidewalk widths of 2.4 m or greater may be needed in commercial areas. If roadside appurtenances are situated on the sidewalk adjacent to the curb, additional width may be needed to secure the clear width.

Greater sidewalk widths should be considered for higher volume sidewalks and where the sidewalk is against the curb or wall. However, minimum sidewalk width of 2.9 m is considered as the streets are located in the somewhat commercial district.

5.4 Urban Arterials

Urban arterials carry large traffic volumes within and through urban areas. Their design varies from freeways with fully controlled access to two-lane streets. The type of arterial selected is closely related to the level of service desired for all users and to the urban context in which it is located. A principal objective for an urban arterial should be mobility of all users balanced with some degree of service to local development. Where full restriction of local access is not practical, designs that incorporate access management are desirable. Such designs could include roadways that provide separate turn lanes, consolidated driveways, medians, parking bays, or one-way streets.

5.4.1 Design speed

Design speeds for urban arterials generally range from 50 to 100 Km/h.

5.4.2 Level of service

When designing for future design year, urban and suburban arterials and their auxiliary facilities (i.e., turning lanes, intersections, interchanges, and traffic control signals and systems.), can be designed for level of service C or D. The choice of the design level of service for a facility involves striking an appropriate balance between the needs for serving motor vehicles, pedestrians, and bicycles; the context of the community; and the degree of confidence in future land use development and trip generation projections.

5.4.3 Alignment

The alignment of an urban arterial should be developed in accordance with its design speed, particularly where a principal arterial is to be constructed on a new location and is not restricted by right-of-way constraints. There are many situations, however, where this is not practical.

5.4.4 Lane width

Lane widths may vary from 3.0 to 3.6 m. Lane widths of 3.0 m may be used in more constrained areas where truck and bus volumes are relatively low and speeds are less than 60 km/h. Lane widths of 3.3 m are used quite extensively for urban arterial street designs. The 3.6-m lane widths are desirable, where practical, on high-speed, free-flowing, principal arterials.

5.4.5 Medians

Medians are a desirable feature of arterial streets and should be provided where space permits. In urban areas, where right-of-way is often limited, it is frequently necessary to determine how best to allocate the available space between border areas, traveled way, and medians. On the lower volume arterials, the decision is often resolved in favor of no median at all. However, a median 1.2 m wide is normally better than none, and it should be noted that any additional median width might reduce crash severity for vehicles that run off the road and can improve operation between intersections. Medians can also be a benefit to pedestrians by providing a refuge area, allowing pedestrians to cross one direction of traffic at a time, if the median is at least 1.9 m wide.

CHAPTER SIX

ANALYSIS AND RESULTS

6.1 Traffic Analysis

6.1.1 Input data

After the data collection stage, we entered it into the Excel program, then we determined the peak hour for the main intersections in the study area. Then we entered the traffic volumes and lane groups of the intersections into the Synchro program.

Table 13: Summary of Traffic Counts at Intersections

No. Intersection	Intersection Name	Peak Hour	Peak Hour Volume (veh/hr)	Peak Hour Factor
1	Al Quds Roundabout	7:30 - 8:30 AM	1217	0.95
2	Tayaseer Intersection	1:00 - 2:00 PM	1398	0.96
3	The Municipality Roundabout	1:15 - 2:15 PM	1364	0.94
4	Al-Tawhid Mosque Roundabout	1:30 - 2:30 PM	1385	0.98
5	Al Turkish Hospital Roundabout	7:45 - 8:45 AM	826	0.96

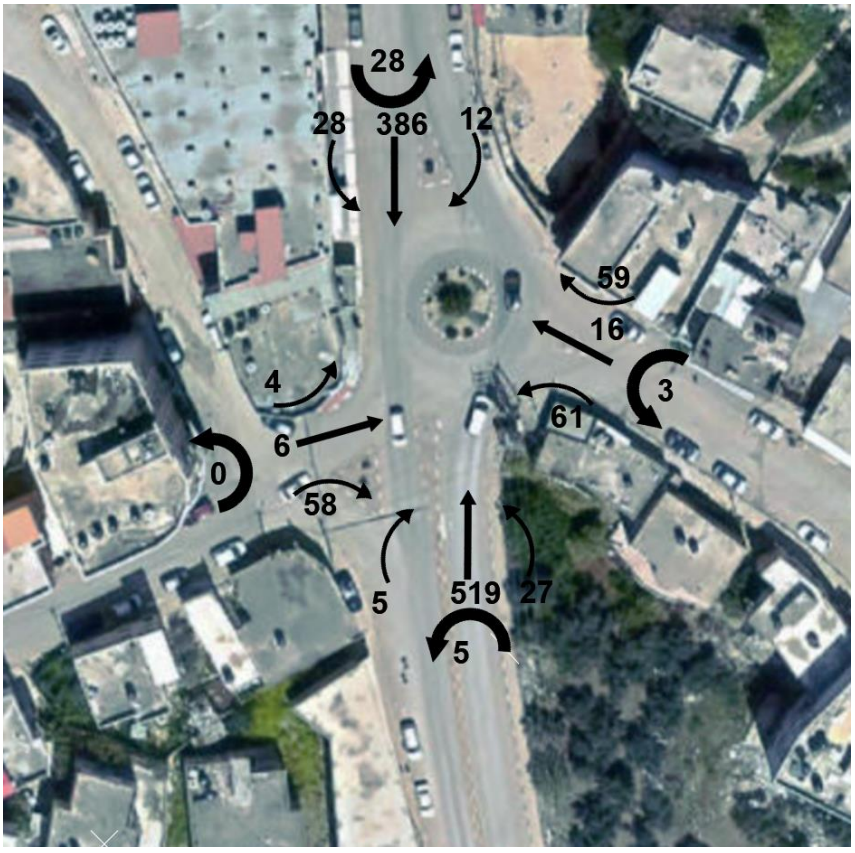

Figure 18: Peak Hour Volume of Al Quds Roundabout

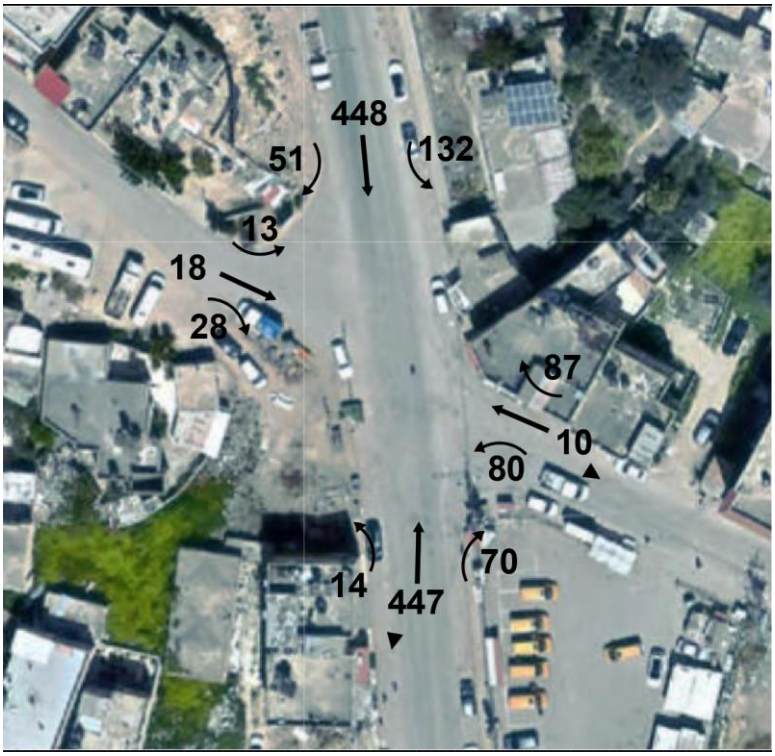

Figure 19: Peak Hour Volume of Tayaseer Intersection

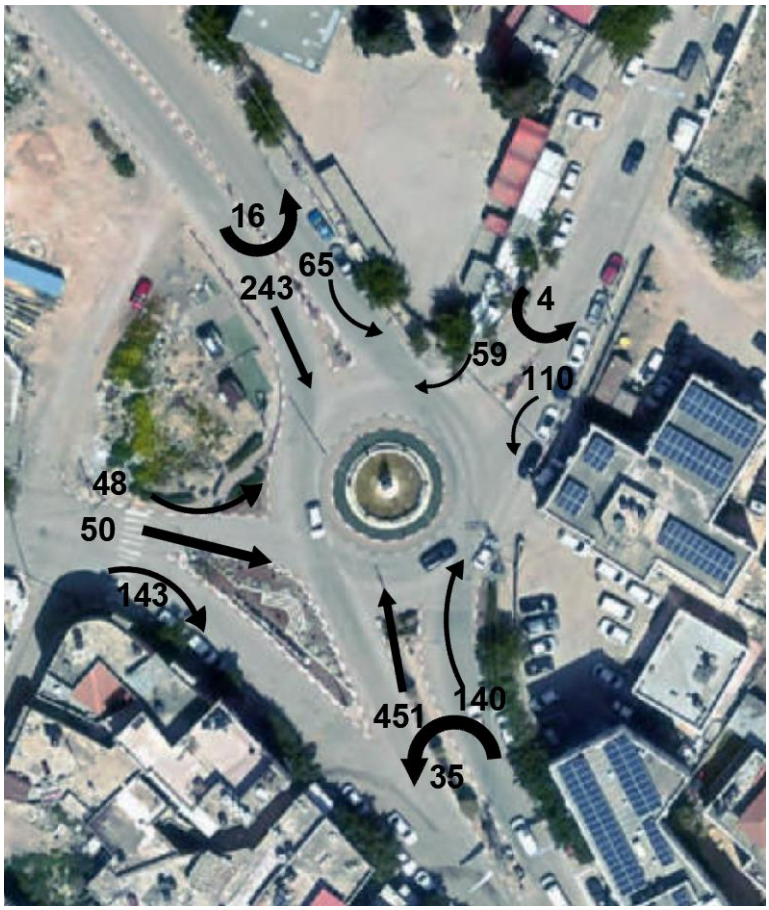

Figure 20: Peak Hour Volume of the Municipality Roundabout

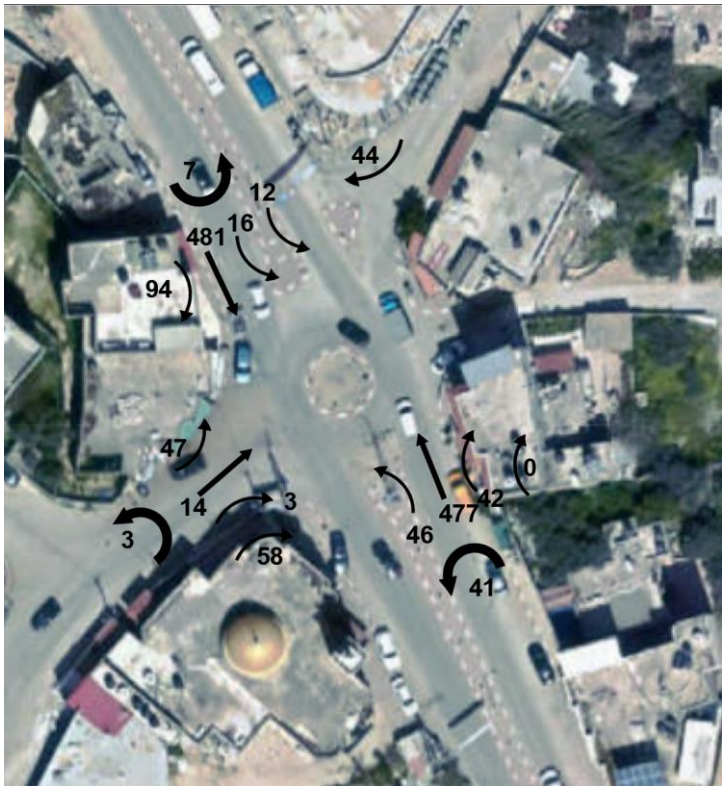

Figure 21: Peak Hour Volume of Al-Tawhid Mosque Roundabout

Figure 22: Peak Hour Volume of Al Turkish Hospital Roundabout

6.1.2 Analysis of the current situation using Synchro

Synchro is a program we used to analyze the current situation of the area as a network by drawing the network on the program and adding required data such as lanes, traffic volume, traffic control, and signals timing, which will be discussed later in this section.

The figure below shows the current layout of the study area intersections.

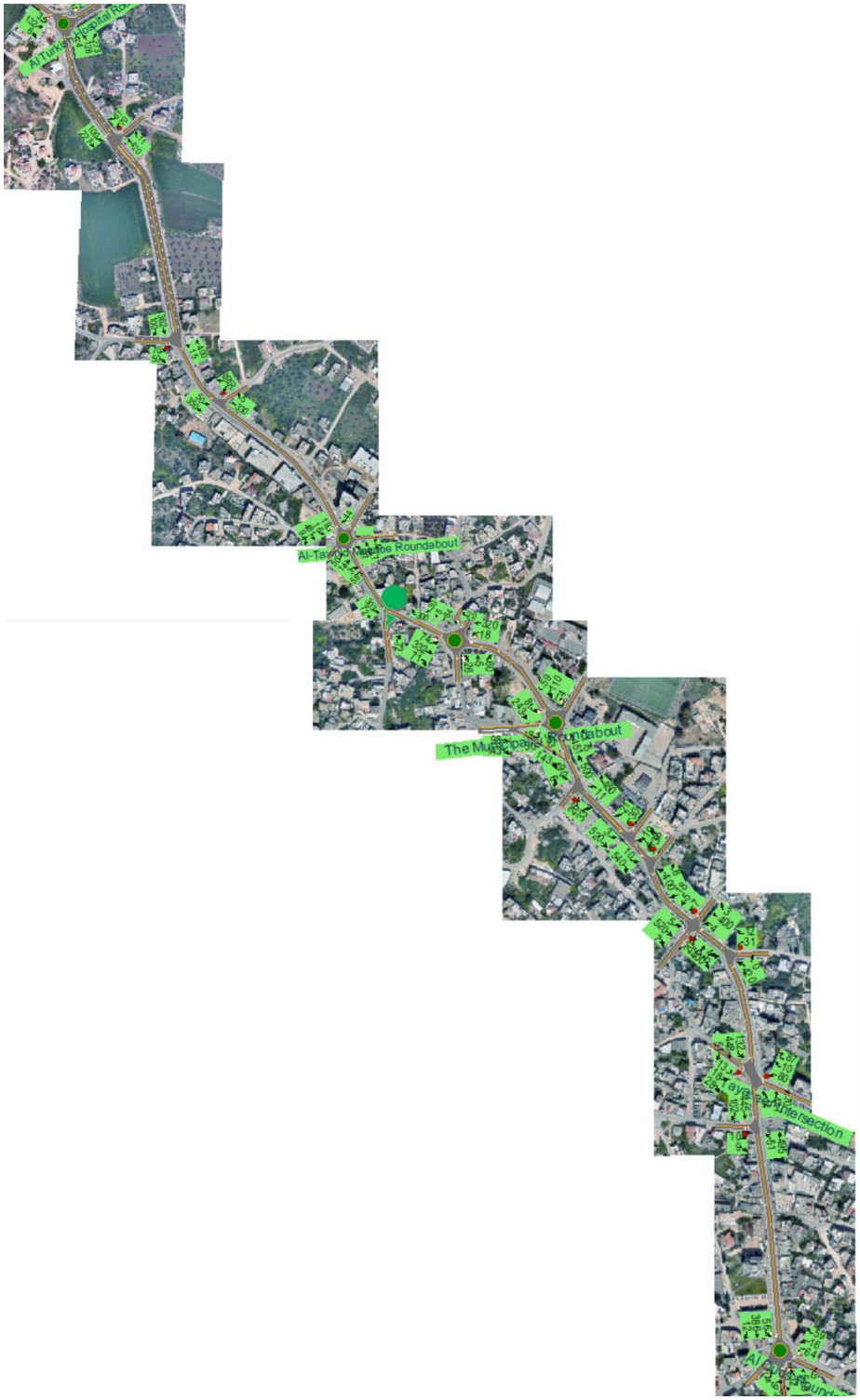

Figure 23: The Current Situation with Intersections Labels

6.1.3 Output data

Detailed tables are provided in the Appendix

Table 14: LOS for Iintersections

Intersection Name	Al Quds Roundabout	Tayaseer Intersection	The Municipality Roundabout	Al-Tawhid Mosque Roundabout	Al Turkish Hospital Roundabout
Intersection LOS	C	F	E	E	A
Delay (sec/veh)	15.2	33.5	43.1	36.8	9.1

The level of service in Al Quds Roundabout is C described as stable flow (acceptable delays), the level of service at Tayaseer Intersection is (F) described as forced flow (congested and queues fail to clear), the level of service at The Municipality Roundabout and Al-Tawhid Mosque Roundabout is (E) described as unstable flow, and the level of service at Al Turkish Hospital Roundabout is (A) described as free flow.

6.2 Passing-Through Count Analysis

Based on the traffic counts of vehicles passing through the main street, Table (15) provides the summary of results.

Table 15: Summary of Vehicles Crossing Through the Main Street

Category	Total number of vehicles	vehicles passed	percent %
Plates for vehicles entering the city from the south and leaving the city from the north at (7:00 - 9:00 AM)	670	176	26.27%
Plates for vehicles entering the city from the north and leaving the city from the south at (7:00 - 9:00 AM)	409	116	28.36%
Plates for vehicles entering the city from the south and leaving the city from the north at (1:00 - 3:00 AM)	684	176	25.73%
Plates for vehicles entering the city from the north and leaving the city from the south at (1:00 - 3:00 AM)	488	176	36.07%
Total	2251	644	28.61%

Based on the results of the crossing through traffic analysis, it was found that 28.61% of the traffic along the main street crosses through the city's main street.

6.3 Parking Count Analysis

We divided the study area into four sections, and we counted and analyzed each section separately:

6.3.1 Section One

From Al Quds Roundabout to Tayaseer Intersection**.**

Table 16: Spaces Required in the Section 1

section 1											
time (hour)	9:00	9:30	10:00	10:30	11:00	11:30		type	demand (Space-hour)	supply (Space-hour)	spaces required
No. Veh	48	52	63	56	55	64		space	64	60	4
Total space hour demand	141							(Space-hour)	141	171	0

The number of space is not enough; we need four more spaces. The number of space hour is enough.

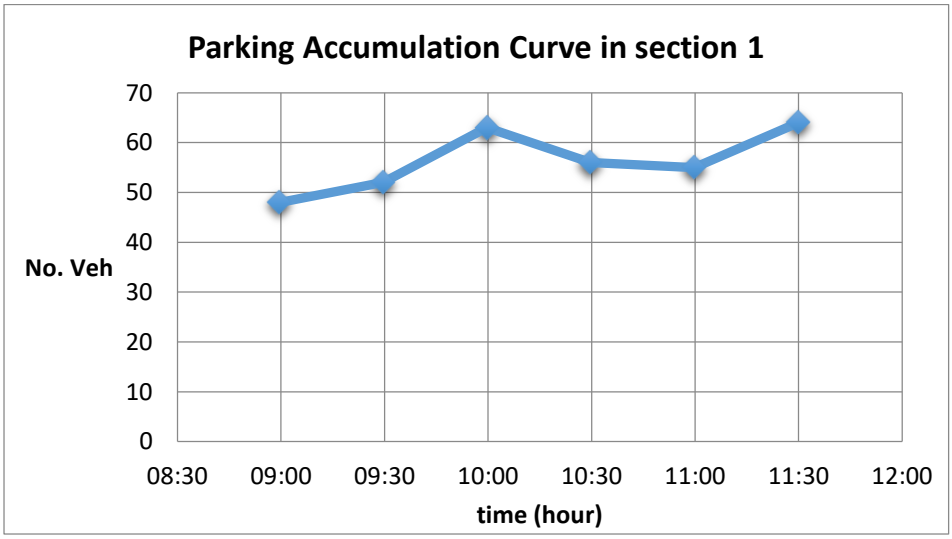

Figure 24: Parking Accumulation Curve of the Section 1

6.3.2 Section Two

From Tayaseer Intersection to the Municipality Roundabout**.**

Table 17: Spaces Required in the Section 2

section 2											
time (hour)	9:00	9:30	10:00	10:30	11:00	11:30		type	demand (Space-hour)	supply (Space-hour)	spaces required
No. Veh	88	93	105	109	103	100		space	109	77	32
Total space hour demand	252							(Space-hour)	252	219	33

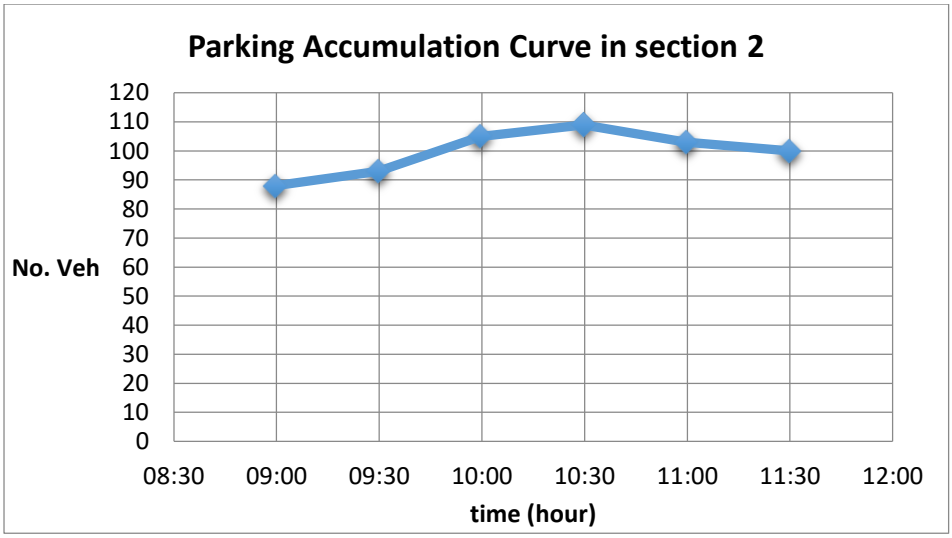

Figure 25: Parking Accumulation Curve of the Section 2

The number of space is not enough; we need thirty-two more spaces. The number of space hour is not enough, we need thirty-three more spaces.

6.3.3 section Three

From the Municipality Roundabout to Al-Tawhid Mosque Roundabout.

Table 18: Spaces Required in the Section 3

section 3										
time (hour)	9:00	9:30	10:00	10:30	11:00	11:30		type	demand (Space-hour)	supply (Space-hour)	spaces required
No. Veh	28	36	32	38	44	32		space	44	45	0
Total space hour demand	90							(Space-hour)	90	125.4	0

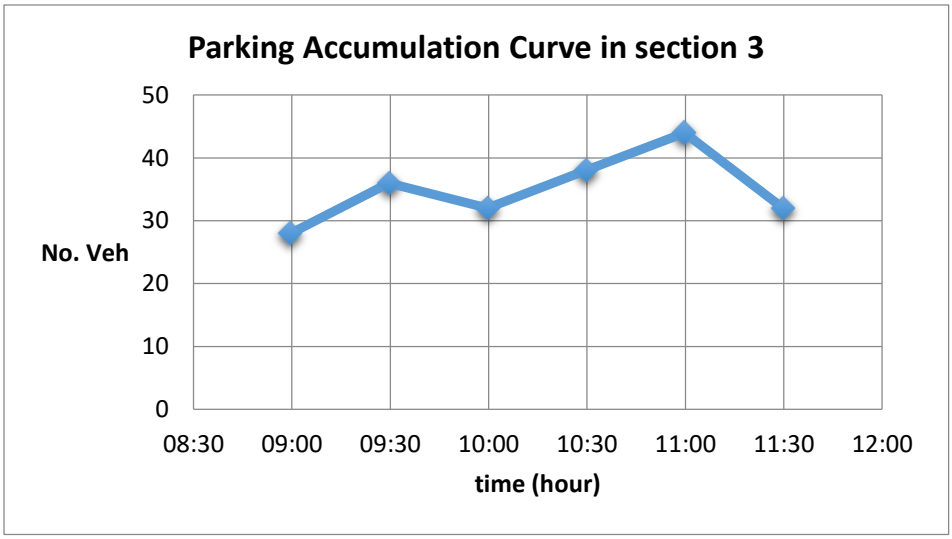

Figure 26: Parking Accumulation Curve of the Section 3

The number of space is enough as well as the number of space hours.

6.3.4 Section Four

From Al-Tawhid Mosque Roundabout to Al Turkish Hospital Roundabout.

Table 19: Spaces Required in the Section 4

section 4										
time (hour)	9:00	9:30	10:00	10:30	11:00	11:30		type	demand (Space-hour)	supply (Space-hour)	spaces required
No. Veh	42	45	45	45	51	41		space	51	181	0
Total space hour demand	113.75							(Space-hour)	113.75	515.85	0

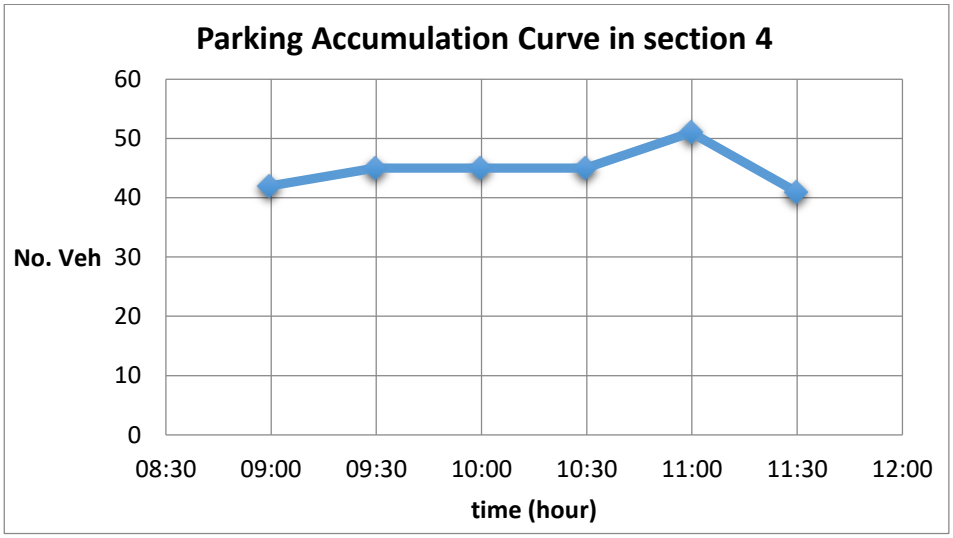

Figure 27: Parking Accumulation Curve of the Section 4

The number of space is enough as well as the number of spaces.

6.4 Accident Analysis

A total of 278 traffic accidents occurred in the study area out of 677 traffic accidents occurred in the city of Tubas during the period of 2019 – 2022, 41% of total accidents in the city. The summary of accidents in the study corridor is presented in Tables 20 - 23.

1. The Location

Table 20: Accidents based on Location

Location	number	percent %
قرب مفرق تياسير	30	38%
قرب مسجد التوحيد	23	29%
دوار البلدية	20	26%
امام مطعم ياسر	14	18%
دوار القدس	12	15%
امام مجمع الكراجات	17	22%
دوار المستشفى التركي	14	18%
مقابل بنك فلسطين	16	21%
قرب مديرية الشرطة	12	15%
مقابل بنك القدس	11	14%

The table shows that the highest percentage of accidents based on the location occurred at Tayaseer Intersection, followed by Al-Tawheed Mosque and Municipality Roundabout intersections.

2. Case type

Table 21: Accidents Based on Traffic Case Type

traffic case type	number	percent %
اضرار مادية	134	48%
تصادم	86	31%
دهس	45	16%
إنقلاب	13	5%
Sum	278	100%

The table shows that the highest percentage of accidents based on the case type is property damage. At the same time pedestrian accidents formed 16% of the total.

3. Cause

Table 22: Accidents Based on Cause

Cause of Accident	number	percent %
عدم المحافظة على مسافة توقف آمن أثناء السفر	61	21.94%
عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	46	16.55%
عدم تأمين الإستدارة يميناً أو يساراً	26	9.35%
التحول عن مسلك السير	26	9.35%

قيادة مركبة بسرعة لا تتفق بظروف الطريق	19	6.83%
الرجوع للخلف والتسبب بحادث طرق	14	5.04%
البدء بالمسير من حالة الوقوف	14	5.04%
عدم تأمين فتح الباب	12	4.32%
عدم الإمتثال لإشارة (قف) أو (إعطاء الأولوية)	12	4.32%
السوق بدون حذر	12	4.32%
اساب اخرى	36	12.95%
sum	278	100%

Results show that the highest percentage of accidents was due to "Not maintaining a safe stopping distance while traveling", followed by "not taking safety measures for pedestrians and riders."

Table 23 shows the highest causes at each of the studies intersection.

Table 23: Accidents at Major Intersections Based on Accident Cause

Name	Cause of Accident	number	percent %
قرب مفرق تياسير	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	7	23.3%
	عدم المحافظة على مسافة توقف آمن أثناء السفر	8	26.7%
	عدم الإمتثال لإشارة (قف) أو (إعطاء الأولوية)	4	13.3%
	عدم تأمين الإستدارة يميناً أو يساراً	4	13.3%
طوباس قرب مسجد التوحيد	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	6	26.1%
	عدم الإمتثال لإشارة (قف) أو (إعطاء الأولوية)	4	17.4%
طوباس دوار البلدية	عدم المحافظة على مسافة توقف آمن أثناء السفر	8	40.0%
	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	4	20.0%
	عدم إعطاء الأولوية للمركبات داخل الميدان	2	10.0%
امام مجمع الكراجات	الإستدارة وسط الطريق أو الإتجاه المعاكس	2	11.8%
	التحول عن مسلك السير	4	23.5%
	عدم تأمين فتح الباب	3	17.6%
طوباس امام مطعم ياسر	عدم تأمين فتح الباب	3	21.4%
	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	5	35.7%
	عدم تأمين الإستدارة يميناً أو يساراً	3	21.4%
طوباس دوار القدس	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	4	33.3%
	عدم المحافظة على مسافة توقف آمن أثناء السفر	4	33.3%
	قيادة مركبة بسرعة لا تتفق بظروف الطريق	2	16.7%
مقابل بنك فلسطين	البدء بالمسير من حالة الوقوف	3	18.8%
	التحول عن مسلك السير	3	18.8%
	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	2	12.5%
	عدم المحافظة على مسافة توقف آمن أثناء السفر	2	12.5%
قرب مديرية الشرطة	التحول عن مسلك السير	2	16.7%
	السوق بدون حذر	2	16.7%
	عدم المحافظة على مسافة توقف آمن أثناء السفر	2	16.7%
دوار المشفى التركي	عدم المحافظة على مسافة توقف آمن أثناء السفر	4	28.6%
	قيادة مركبة بسرعة لا تتفق بظروف الطريق	4	28.6%
	التحول عن مسلك السير	2	14.3%
طوباس مقابل بنك القدس	عدم إتخاذ التدابير اللازمة لسلامة عابري الطريق والركاب	2	18.2%
	التجاوز الخطر والغير مأمون أو للخط الفاصل المتواصل	1	9.1%
	عدم المحافظة على مسافة توقف آمن أثناء السفر	3	27.3%

CHAPTER SIX
PROPOSED SOLUTIONS

6.1 Why we will do this?

Due to:

- Parking problems - on street parking.
- Traffic congestion due to the increase in traffic volume and development in the region.
- Geometric problems at intersections
- High rate of accidents

6.2 Proposed Solutions

6.2.1 Traffic

Based on the results of the traffic volume analysis using Synchro program, it was found that the level of service at some of the intersections and roundabouts is poor. We examined warrants for the traffic lights. Based on the data collection available, Warrant 2 (4-hour volume), Warrant 3 (Peak hour volume), and Warrant 7 (Crash Experience), were examined. The results are presented in Table (24), a detailed table is provided in the Appendix.

Table 24: Test Result Warrants

Name intersection	Warrant 2	Warrant 3	Warrant 7
Al Quds Roundabout	no	no	no
Tayaseer Intersection	no	no	yes
The Municipality Roundabout	yes	yes	yes
Al-Tawhid Mosque Roundabout	yes	no	yes
Al Turkish Hospital Roundabout	no	no	no

The previous table shows that at least one warrant has been achieved at Tayaseer Intersection, the Municipality Roundabout, and Al-Tawhid Roundabout. Therefore, traffic signals have to be installed at these three intersections. Traffic signals at these locations were designed using Synchro, and the LOS results are presented in Table (25) and compared with existing conditions.

Table 25: Comparison Between LOS Results Before and After Installing Traffic Signals

Intersection name	Existing		With the installation of traffic lights	
	Delay (sec/veh)	Intersection LOS	Delay (sec/veh)	Intersection LOS
Tayaseer Intersection	33.5	F	16.8	B
The Municipality Roundabout	43.1	E	13.0	B
Al-Tawhid Mosque Roundabout	36.8	E	12.1	B

It is clear that the installation of traffic signals at these intersections improves the LOS significantly.

6.2.2 Passing-Through road

Based on the results of the crossing through traffic analysis, it was found that 28.61% of the traffic along the main street crosses through. Therefore, most of these would use the Ring Road once it is constructed, which will reduce the level of congestion along the main street. It is assumed that 70% of the Passing-Through traffic would use the Ring Road.

Percentage of vehicles using the main Tubas Street =100 – (28.21*0.7) = 80.2 %

The growth rate over five years was taken into consideration:

r = 3.5%

Growth Rate over 5 years = $(1+r)^n = (1+0.035)^5 = 1.19$

Percentage of vehicles using Tubas main street after five years = 80.2% * 1.19 = 95.4 %

As Table 26 shoes, the construction of the Ring Road will clearly improve traffic operations at the main street's intersections.

Table 26: Comparison Between Results of Before and After Constructing the Ring Road

Intersection name	Existing		Future without the Ring Road		Future with the Ring Road	
	Delay (sec/veh)	Intersection LOS	Delay (sec/veh)	Intersection LOS	Delay (sec/veh)	Intersection LOS
Al Quds Roundabout	15.2	C	28.5	D	12.4	B
Tayaseer Intersection	33.5	F	116.1	F	22.4	C
The Municipality Roundabout	43.1	E	105.5	F	33.3	D
Al-Tawhid Mosque Roundabout	36.8	E	108.1	F	35.4	E
Al Turkish Hospital Roundabout	9.1	A	9.9	A	8.9	A

6.2.3 Parking

- To solve the parking problem in Tubas street, it is recommended to use metered parking along the main street from 8 AM to 9 PM.

  The following figure shows the proposed location for the installation of parking meters in Section 2

Figure 28: The Proposed Location for the Installation of Parking Meters in Section 2

- This has to be enforced by the traffic city police.
- In addition, the municipality must enforce the planning regulations that require providing parking spaces for every building.

6.2.4 Accidents

Based on the results of the incidents we collected, there are some recommendations:

- Putting signs on the roads.

1. Stop sign.
2. Slow down signs.
3. Approaching a roundabout sign.
4. Footpath sign.

- Geometric modification of roads.

Based on the existing geometry, traffic volume analysis, and accident considerations, the following geometric improvement at the study intersections are proposed.

1. Al Quds Roundabout

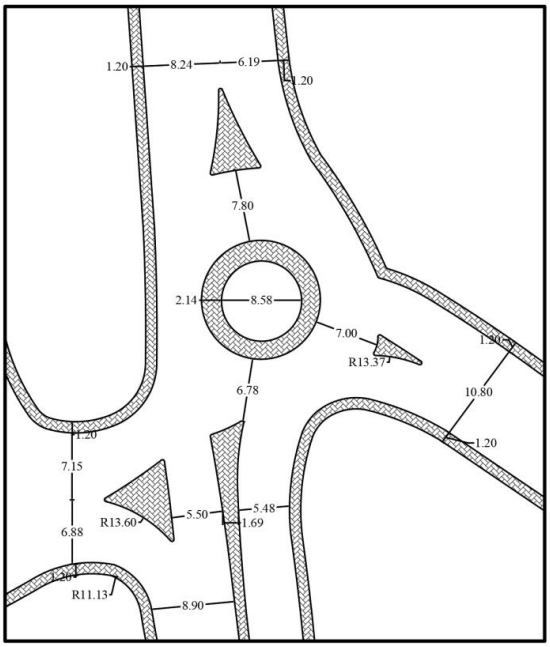

Figure 29: Engineering Improvements to the Current Situation at Al Quds Roundabout

2. Tayaseer Intersection

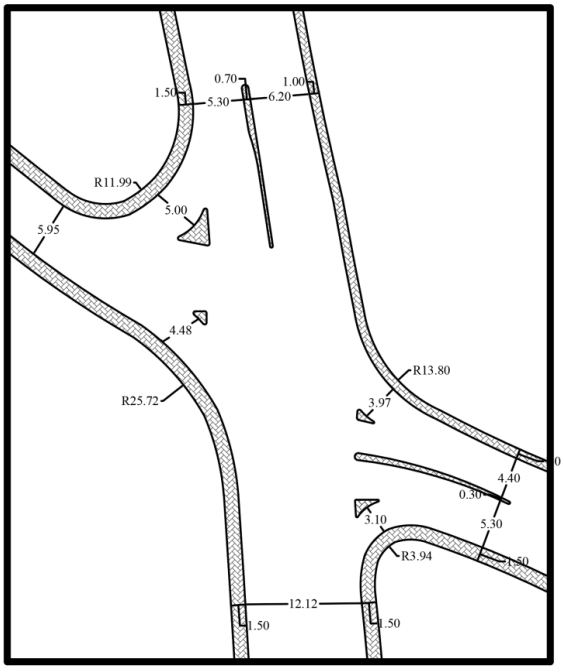

Figure 30: Engineering Improvements to the Current Situation at Tayaseer Intersection

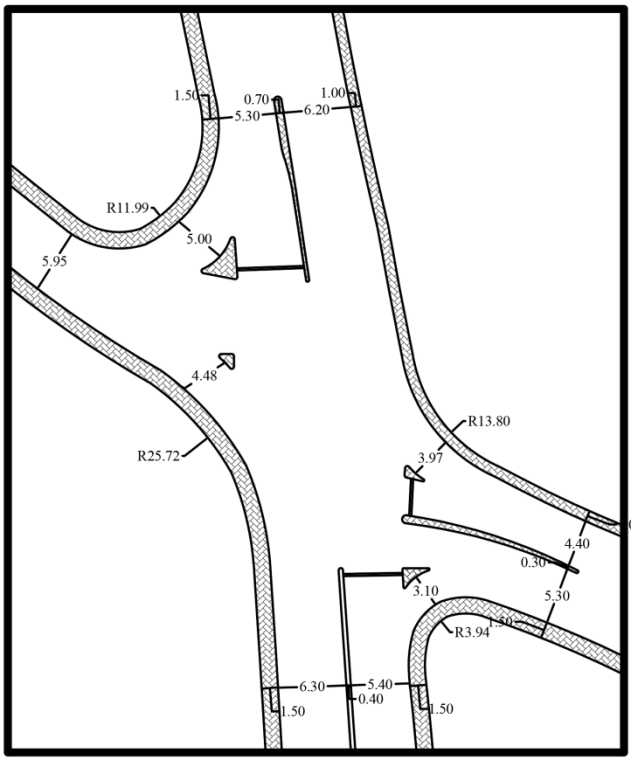

Figure 31: Engineering Improvements after Installing Traffic Lights at Tayaseer Intersection

3. The Municipality Roundabout

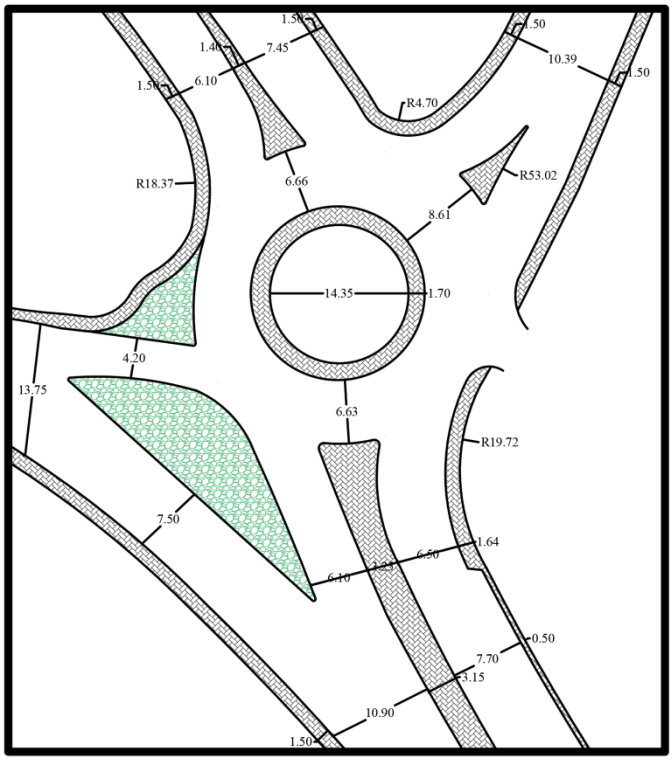

Figure 32: Engineering Improvements to the Current Situation at The Municipality Roundabout

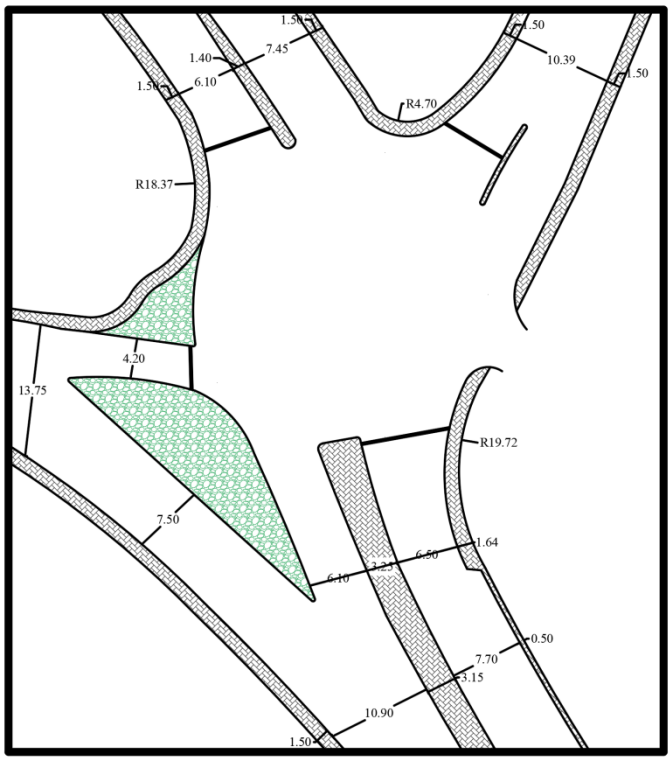

Figure 33: Engineering Improvements after Installing Traffic Lights at The Municipality Roundabout

4. Al-Tawhid Mosque Roundabout

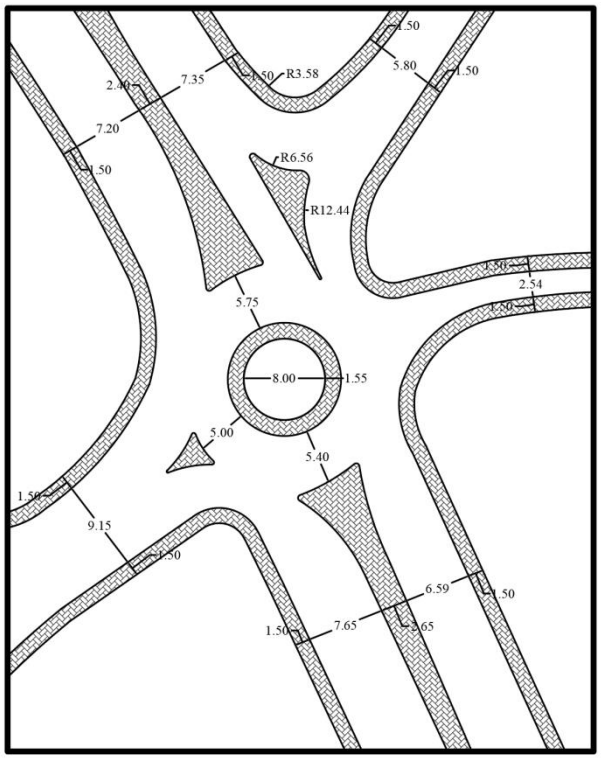

Figure 34: Engineering Improvements to the Current Situation at Al-Tawhid Mosque Roundabout

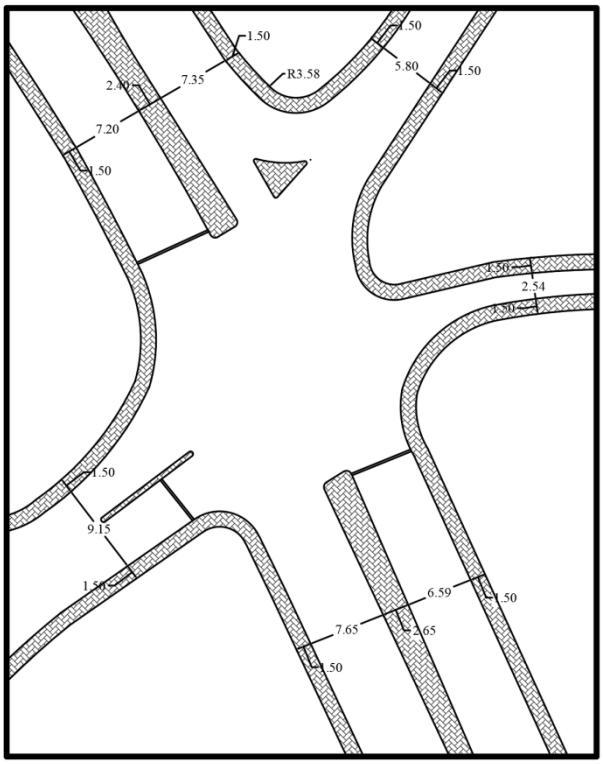

Figure 35: Engineering Improvements After Installing Traffic Lights at Al-Tawhid Mosque Roundabout

5. Al Turkish Hospital Roundabout

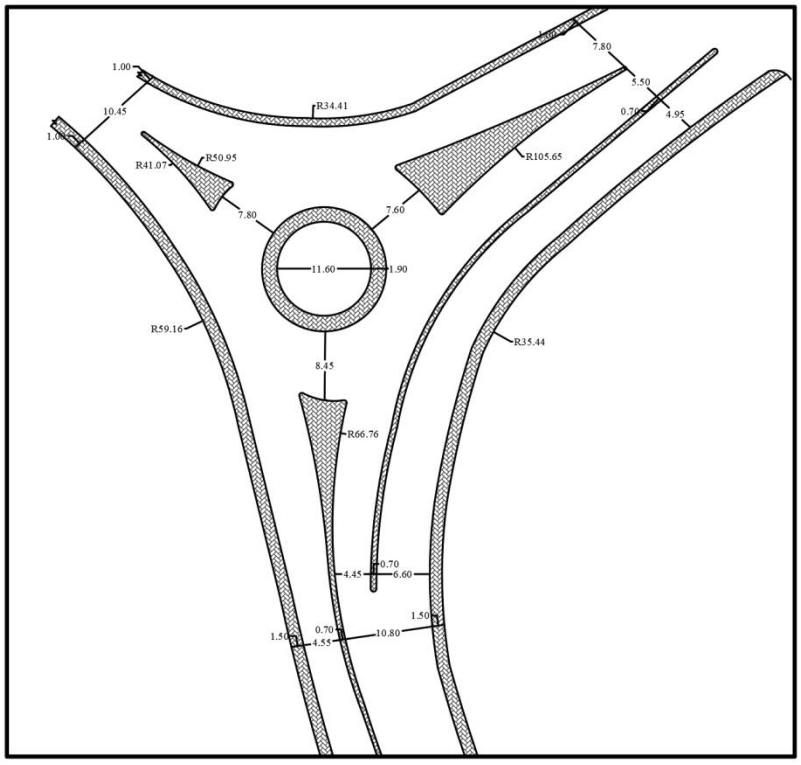

Figure 36: Engineering Improvements to the Current Situation at Al Turkish Hospital Roundabout

CHAPTER SEVEN
CONCLUSIONS

This chapter summarizes the work done throughout this project, directing attention to observed problems in the area (geometric, traffic, and future forecasted problems). In this project, suggested solutions to these problems are recommended.

We conducted field visits, traffic counts, and geometry inspections. These were incorporated into AutoCAD and Synchro software to evaluate and analyze the current conditions and proposed scenarios.

These studies shed some light on the following problems:

- Traffic analysis: There is a high level of delays at some intersections, creating a low level of service (LOS). This low LOS and high delays lead to an overall poor level of service in the area. This is to grow worse in the future.
- Geometry analysis: We have modified the geometric dimensions at the intersections and roundabouts located on the main Tubas Street, such as islands and sidewalks, to reduce traffic violations such as excessive speed, lack of priority, unorganized pedestrian traffic due to the lack of special areas for pedestrian crossing, and illegal parking on both sides of the streets and on intersections. This is expected to produce a better traffic flow and a decrease in the accident rate in the study area.

Therefore, it is recommended for Tubas Municipality to adopt the proposed improvements in this study. These include:

- Installing traffic signals at the three designated intersections
- Establish metered parking along the Main Street
- Improve the geometry at the intersections, as proposed in this study
- Join efforts to construct the Ring Road as it will reduce the traffic burden on the main street.
- This all has to be combined with strict enforcement by the traffic police.

REFERENCES

- American Association of State Highway and Transportation Official, AASHTO, a Policy on Geometric Design of Highways and Streets, Washington DC, 2011.

- Garber, J. & Hoel, A., “Traffic and Highway Engineering”, Fourth Edition, USA, 2009.

- Highway Capacity Manual (Transportation Research Board, Special Report 209, 2000).

- http://geomolg.ps/L5/Index.html?configBase=http://geomolg.ps/Geocortex/Essentials/REST/sites/A3/viewers/V1/virtualdirectory/Resources/Config/Default

  https://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=696

- Parascandolo, S., "Croydon Tramlink", KG2261, Institute for Design, 2007.

- PCBS. Projected Mid -Year Population for Tubas & Northern Valleys Governorate by Locality 2017-2026. Palestinian Central Bureau of Statistics, Ramallah, Palestine, 2022.

- Wilson, P., “TURBO ROUNDABOUT VS STANDARD MULTI LANE ROUNDABOUT", Hanson London UK, 2017.

Appendix

1. Traffic Volume Counts

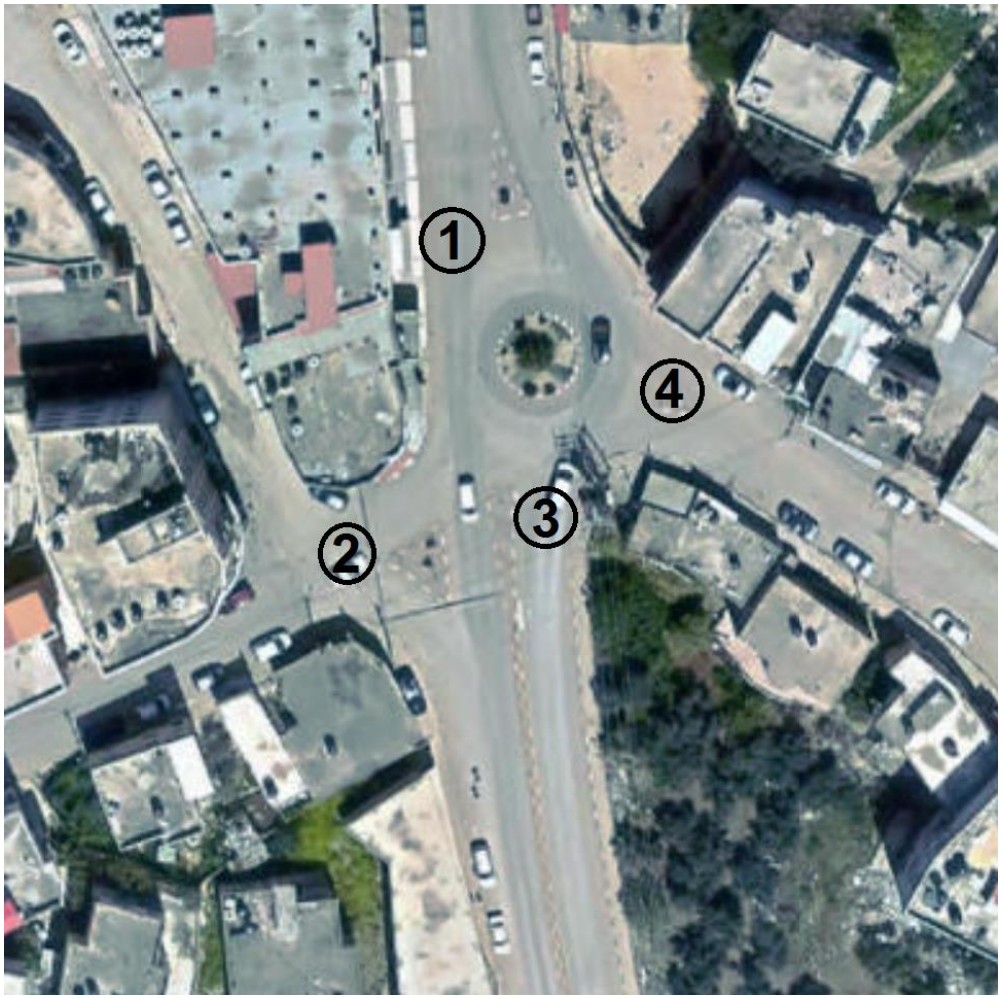

Figure 37: Approaches of Al Quds Roundabout

Count date: 7/11/2022, Monday

Table 27 :Traffic Volume for the Al Quds Roundabout from 7:00 – 9:00 AM

Approach 1													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	2	1	1	65	20	5	2	0	0	2	1	0	99
7:15-7:30 AM	3	1	1	77	22	5	2	0	0	3	0	0	114
7:30-7:45 AM	3	1	0	63	23	5	3	0	0	2	0	2	102
7:45-8:00 AM	6	0	0	75	19	7	0	0	1	3	0	0	111
8:00-8:15 AM	6	0	0	67	12	6	2	0	1	3	0	0	97
8:15-8:30 AM	3	0	0	62	14	11	2	0	0	4	1	0	97
8:30-8:45 AM	6	1	1	71	17	12	1	0	0	2	0	1	112
8:45-9:00 AM	9	1	1	63	14	12	5	0	1	2	0	1	109
Total	38	5	4	543	141	63	17	0	3	21	2	4	841

Approach 2													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	10	1	0	2	0	0	0	0	0	0	0	0	13
7:15-7:30 AM	11	2	0	2	0	0	0	0	0	0	0	0	15
7:30-7:45 AM	13	1	0	2	0	0	0	0	0	0	0	0	16
7:45-8:00 AM	14	1	1	0	0	0	0	0	0	0	0	0	16
8:00-8:15 AM	12	1	2	0	0	0	0	0	0	0	0	0	15
8:15-8:30 AM	9	0	2	0	0	0	1	0	1	0	0	0	13
8:30-8:45 AM	6	0	0	0	0	0	2	0	0	0	0	0	8
8:45-9:00 AM	10	3	2	0	0	0	0	0	0	0	0	0	15
Total	85	9	7	6	0	0	3	0	1	0	0	0	111

Approach 3													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	0	1	0	80	20	4	8	0	0	2	0	0	115
7:15-7:30 AM	1	0	0	85	24	7	8	0	0	2	0	0	127
7:30-7:45 AM	0	0	0	75	16	4	2	0	2	0	0	0	99
7:45-8:00 AM	1	0	0	123	19	12	6	1	0	0	1	0	163
8:00-8:15 AM	1	1	0	94	26	8	7	1	0	0	0	0	138
8:15-8:30 AM	1	0	0	78	14	14	1	0	0	1	0	0	109
8:30-8:45 AM	1	0	0	91	33	7	2	0	1	1	0	0	136
8:45-9:00 AM	0	0	0	97	19	17	1	1	1	0	1	0	137
Total	5	2	0	723	171	73	35	3	4	6	2	0	1024

Approach 4													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	10	2	2	3	2	0	13	2	2	0	0	0	36
7:15-7:30 AM	11	2	1	4	1	0	15	1	2	0	0	0	37
7:30-7:45 AM	17	0	1	2	1	0	10	1	0	0	1	0	33
7:45-8:00 AM	10	0	3	1	0	1	13	1	1	0	0	0	30
8:00-8:15 AM	5	0	1	5	1	0	8	0	1	1	0	0	22
8:15-8:30 AM	7	1	2	2	0	0	10	0	0	0	1	0	23
8:30-8:45 AM	5	0	1	2	0	0	10	2	1	0	0	0	21
8:45-9:00 AM	5	1	2	0	0	2	10	1	0	1	0	0	22
Total	70	6	13	19	5	3	89	8	7	2	2	0	224
Total	198	22	24	1291	317	139	144	11	15	29	6	4	2200

Table 28: Traffic Volume for the Al Quds Roundabout from 1:00 – 3:00 PM

Approach 1													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	1	1	0	60	18	4	1	0	1	1	0	0	87
1:15-1:30 PM	3	0	1	71	20	5	1	1	0	2	1	1	106
1:30-1:45 PM	2	0	0	60	22	14	2	0	0	2	0	0	102
1:45-2:00 PM	5	1	0	72	18	7	1	1	0	2	0	0	107
2:00-2:15 PM	5	0	0	65	10	5	1	0	1	1	0	0	88
2:15-2:30 PM	3	1	0	60	12	12	2	0	0	2	0	0	92
2:30-2:45 PM	5	0	0	69	15	8	1	1	0	2	0	1	102
2:45-3:00 PM	7	1	1	62	15	10	4	0	1	3	0	1	105
Total	31	4	2	519	130	65	13	3	3	15	1	3	789

Approach 2													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	9	0	1	1	0	0	1	0	0	0	0	0	12
1:15-1:30 PM	10	1	0	0	0	0	0	0	0	0	0	0	11
1:30-1:45 PM	12	1	1	1	0	0	0	0	0	0	0	0	15
1:45-2:00 PM	11	1	0	0	0	0	0	0	0	0	0	0	12
2:00-2:15 PM	10	1	0	1	0	0	1	0	0	0	0	0	13
2:15-2:30 PM	10	2	2	1	0	0	0	0	0	0	0	0	15
2:30-2:45 PM	5	1	1	0	0	0	1	0	0	0	0	0	8
2:45-3:00 PM	8	1	1	0	0	0	0	0	0	0	0	0	10
Total	75	8	6	4	0	0	3	0	0	0	0	0	96

Approach 3													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	1	0	0	79	19	3	7	0	0	1	0	0	110
1:15-1:30 PM	0	1	0	82	23	7	6	1	0	1	0	0	121
1:30-1:45 PM	0	0	0	73	15	4	3	0	1	0	1	0	97
1:45-2:00 PM	1	0	0	120	17	10	5	0	1	1	0	0	155
2:00-2:15 PM	0	0	0	90	24	7	6	0	0	0	0	0	127
2:15-2:30 PM	1	0	0	72	13	12	3	1	1	0	0	0	103
2:30-2:45 PM	0	1	0	89	30	5	2	0	1	1	0	0	129
2:45-3:00 PM	2	0	0	94	15	15	1	1	0	1	0	0	129
Total	5	2	0	699	156	63	33	3	4	5	1	0	971

Approach 4													
Time	Right			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	9	1	1	2	1	0	12	1	1	1	0	0	29
1:15-1:30 PM	9	1	1	3	1	0	13	1	1	0	1	0	31
1:30-1:45 PM	15	1	2	1	0	0	10	2	0	0	0	0	31
1:45-2:00 PM	7	0	1	2	0	1	11	1	2	0	0	0	25
2:00-2:15 PM	5	1	2	3	1	0	7	0	0	0	0	0	19
2:15-2:30 PM	4	0	0	1	0	0	9	0	1	1	0	0	16
2:30-2:45 PM	5	0	1	3	0	0	8	1	1	1	0	0	20
2:45-3:00 PM	6	1	1	2	0	1	7	0	0	0	1	0	19
Total	60	5	9	17	3	2	77	6	6	3	2	0	190
Total	171	19	17	1239	289	130	126	12	13	23	4	3	2046

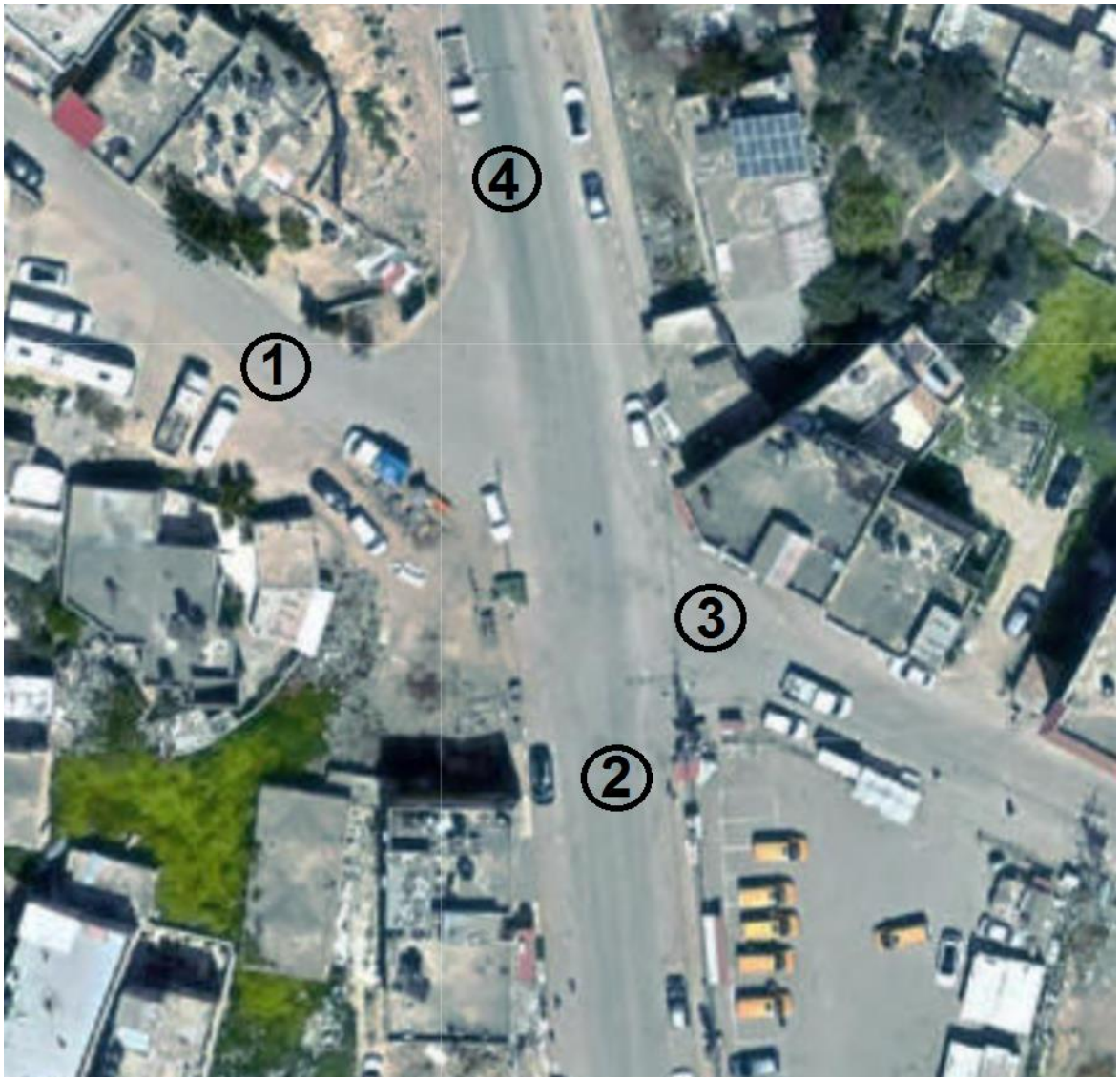

Figure 38: Approaches of Tayaseer Intersection

Count date: 9/11/2022, Wednesday

Table 29 :Traffic Volume for the Tayaseer Intersection from 7:00 – 9:00 AM

Approach 1													
Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	0	0	1	0	3	0	0	3	1	0	0	1	4
7:15-7:30 AM	1	0	0	1	4	1	1	6	0	1	0	1	8
7:30-7:45 AM	7	0	0	13	4	0	0	4	1	1	0	2	19
7:45-8:00 AM	5	1	0	8	2	0	0	2	2	0	1	3	13
8:00-8:15 AM	3	0	1	6	1	1	0	2	1	1	0	2	10
8:15-8:30 AM	8	0	1	10	1	0	0	1	4	0	1	5	16
8:30-8:45 AM	2	0	0	5	1	0	0	1	3	1	0	4	10
8:45-9:00 AM	3	1	0	7	1	0	1	2	6	0	0	6	15
Total	29	2	3	50	17	2	2	21	18	4	2	24	79

Approach 2													
Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	4	1	1	6	88	15	7	110	1	1	0	2	118
7:15-7:30 AM	4	2	1	7	90	12	14	116	0	1	0	1	124
7:30-7:45 AM	16	1	1	18	73	12	4	89	1	1	0	2	109
7:45-8:00 AM	17	2	0	19	72	8	5	85	1	1	0	2	106
8:00-8:15 AM	5	4	1	10	75	11	12	98	1	1	0	2	110
8:15-8:30 AM	5	3	1	9	74	6	6	86	1	0	0	1	96
8:30-8:45 AM	11	3	0	14	62	11	7	80	0	0	0	0	94
8:45-9:00 AM	9	4	0	13	55	11	5	71	1	1	0	2	86
Total	71	20	5	96	589	86	60	735	6	6	0	12	843

Approach 3

Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	12	1	1	14	1	2	0	3	4	4	1	9	26
7:15-7:30 AM	12	2	1	15	2	0	1	3	6	1	2	9	27
7:30-7:45 AM	15	0	1	16	0	1	0	1	18	1	3	22	39
7:45-8:00 AM	25	0	0	25	0	0	1	1	20	3	5	28	54
8:00-8:15 AM	15	2	1	18	1	0	1	2	10	5	4	19	39
8:15-8:30 AM	11	0	2	13	4	0	0	4	6	2	4	12	29
8:30-8:45 AM	8	0	0	8	0	1	1	2	7	0	0	7	17
8:45-9:00 AM	5	2	1	8	0	0	0	0	6	4	4	14	22
Total	103	7	7	117	8	4	4	16	77	20	23	120	253

Approach 4

Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	15	0	2	17	70	5	10	85	2	1	1	4	106
7:15-7:30 AM	5	1	0	6	72	6	8	86	9	2	3	14	106
7:30-7:45 AM	8	2	3	13	74	10	13	97	11	3	3	17	127
7:45-8:00 AM	3	4	2	9	81	16	17	114	19	6	4	29	152
8:00-8:15 AM	9	4	1	14	75	18	20	113	29	8	5	42	169
8:15-8:30 AM	8	8	0	16	65	11	12	88	18	7	2	27	131
8:30-8:45 AM	3	2	0	5	76	8	5	89	12	4	2	18	112
8:45-9:00 AM	4	1	2	7	65	10	7	82	15	2	1	18	107
Total	55	22	10	87	578	84	92	754	115	33	21	169	1010
Total	258	51	25	350	1192	176	158	1526	216	63	46	325	2185

Table 30: Traffic Volume for the Tayaseer Intersection from 1:00 – 3:00 PM

Approach 1													
Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	1	1	0	2	5	1	1	7	1	1	0	2	11
1:15-1:30 PM	1	0	0	1	4	1	1	6	0	0	1	1	8
1:30-1:45 PM	8	0	1	9	3	0	0	3	2	1	0	3	15
1:45-2:00 PM	8	0	2	10	2	0	0	2	3	0	0	3	15
2:00-2:15 PM	2	0	0	2	2	0	0	2	0	0	0	0	4
2:15-2:30 PM	7	0	0	7	2	0	0	2	5	0	0	5	14
2:30-2:45 PM	3	0	1	4	1	0	0	1	4	1	0	5	10
2:45-3:00 PM	4	0	0	4	1	1	0	2	3	0	0	3	9
Total	34	1	4	39	20	3	2	25	18	3	1	22	86

Approach 2													
Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	5	3	0	8	90	17	10	117	1	2	0	3	128
1:15-1:30 PM	5	2	0	7	95	15	11	121	1	0	0	1	129
1:30-1:45 PM	18	0	4	22	74	13	25	112	1	4	0	5	139
1:45-2:00 PM	18	4	0	22	79	10	8	97	3	2	0	5	124
2:00-2:15 PM	9	3	0	12	77	15	8	100	2	0	0	2	114
2:15-2:30 PM	7	5	2	14	78	7	12	97	2	0	0	2	113
2:30-2:45 PM	12	4	0	16	64	10	9	83	1	0	0	1	100
2:45-3:00 PM	10	5	0	15	60	8	7	75	1	1	0	2	92
Total	84	26	6	116	617	95	90	802	12	9	0	21	939

Approach 3													
Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	13	0	2	15	1	1	1	3	5	1	3	9	27
1:15-1:30 PM	14	0	3	17	1	1	1	3	7	2	4	13	33
1:30-1:45 PM	18	3	0	21	1	0	0	1	12	4	2	18	40
1:45-2:00 PM	28	1	1	30	1	1	0	2	21	4	1	26	58
2:00-2:15 PM	17	0	2	19	2	0	0	2	14	4	3	21	42
2:15-2:30 PM	14	0	3	17	3	0	1	4	11	2	2	15	36
2:30-2:45 PM	10	2	1	13	2	0	0	2	8	2	3	13	28
2:45-3:00 PM	9	3	1	13	1	1	0	2	9	2	2	13	28
Total	123	9	13	145	12	4	3	19	87	21	20	128	292

Approach 4													
Time	Right				Through				Left				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	22	1	5	28	74	6	18	98	4	0	0	4	130
1:15-1:30 PM	4	2	1	7	79	8	14	101	10	2	4	16	124
1:30-1:45 PM	7	1	0	8	85	12	13	110	20	4	7	31	149
1:45-2:00 PM	7	1	0	8	88	15	16	119	30	5	3	38	165
2:00-2:15 PM	9	4	0	13	83	17	18	118	35	7	3	45	176
2:15-2:30 PM	2	3	0	5	71	10	7	88	11	4	3	18	111
2:30-2:45 PM	3	7	0	10	76	10	10	96	9	3	5	17	123
2:45-3:00 PM	6	2	0	8	66	9	10	85	11	8	3	22	115
Total	60	21	6	87	622	87	106	815	130	33	28	191	1093
Total	301	57	29	387	1271	189	201	1661	247	66	49	362	2410

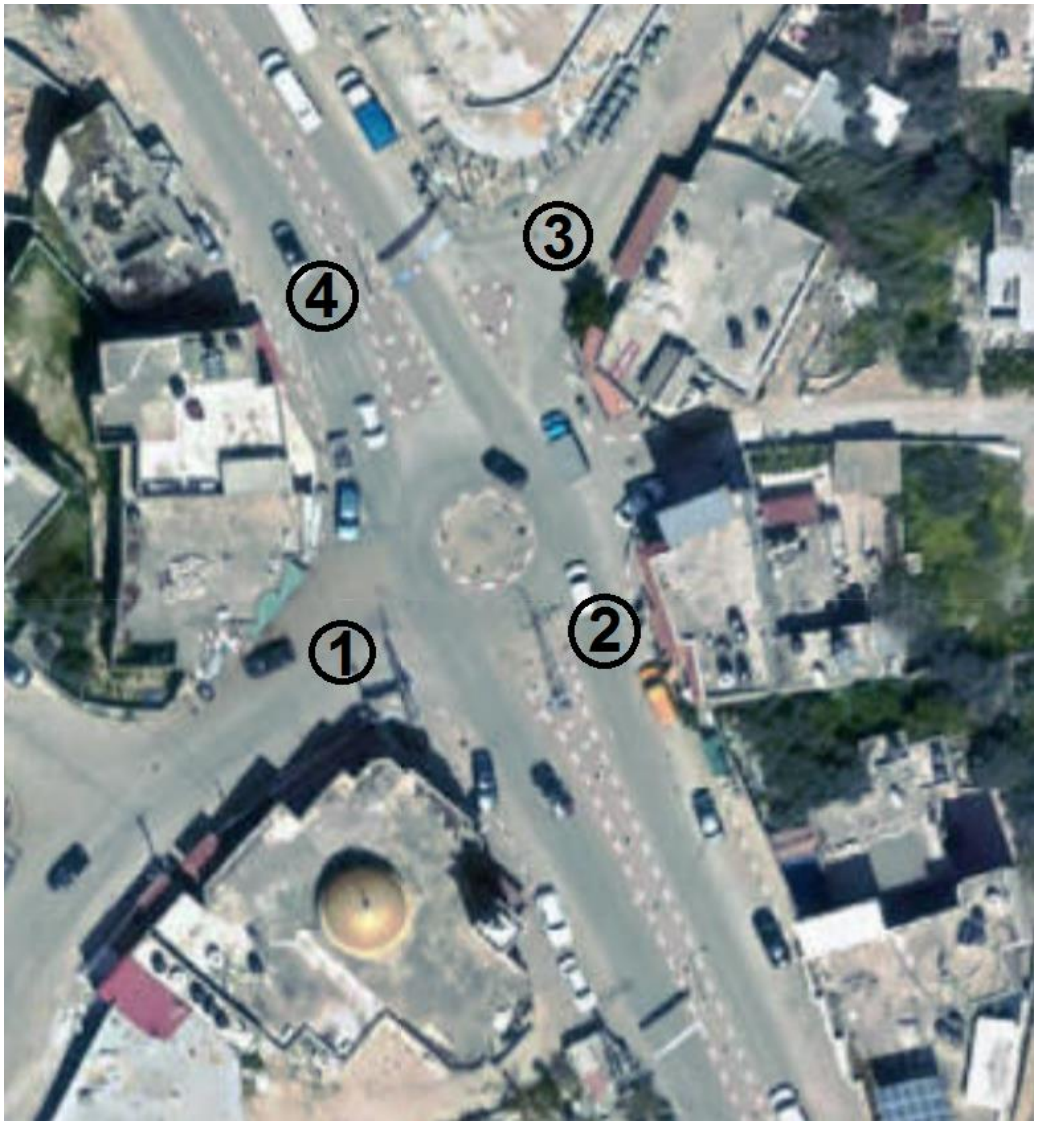

Figure 39: Approaches of Al Tawhid Mosque Roundabout

Count date: 15/11/2022, Tuesday

Table 31 :Traffic Volume for the Al-Tawhid Mosque Roundabout from 7:00 – 9:00 AM

Approach 1																
Time	Right			Through 1			Through 2			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	9	1	0	0	0	0	1	1	0	4	1	1	0	0	0	18
7:15-7:30 AM	10	0	1	1	0	0	0	0	0	6	0	0	1	0	0	19
7:30-7:45 AM	11	1	1	0	1	0	2	1	0	8	1	0	0	0	0	26
7:45-8:00 AM	10	1	0	1	0	0	0	2	0	6	3	0	0	0	0	23
8:00-8:15 AM	9	1	2	0	0	0	2	1	0	4	2	1	1	0	0	23
8:15-8:30 AM	10	0	1	1	1	0	1	1	0	6	0	1	0	0	0	22
8:30-8:45 AM	5	0	2	0	0	0	3	0	0	9	0	0	0	1	0	20
8:45-9:00 AM	6	0	1	0	0	0	1	0	0	8	1	1	0	0	0	18
Total	70	4	8	3	2	0	10	6	0	51	8	4	2	1	0	169

Approach 2																
Time	Right 1			Right 2			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	0	0	0	8	1	0	74	14	21	6	0	1	7	1	0	133
7:15-7:30 AM	0	0	0	7	0	1	79	18	18	8	1	0	8	0	0	140
7:30-7:45 AM	0	0	0	6	0	0	94	14	15	10	0	0	9	1	1	150
7:45-8:00 AM	0	0	0	6	1	1	74	20	14	10	1	0	5	0	1	133
8:00-8:15 AM	0	0	0	5	0	0	43	13	16	6	1	0	5	0	0	89
8:15-8:30 AM	0	0	0	7	0	0	83	17	20	5	0	1	2	1	0	136
8:30-8:45 AM	0	0	0	5	1	1	69	18	18	65	1	1	5	0	0	184
8:45-9:00 AM	0	0	0	7	0	0	85	17	14	6	0	0	3	1	1	134
Total	0	0	0	51	3	3	601	131	136	116	4	3	44	4	3	1099

Approach 3

Time	Right															Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	4	1	0													5
7:15-7:30 AM	6	1	1													8
7:30-7:45 AM	6	1	1													8
7:45-8:00 AM	5	0	2													7
8:00-8:15 AM	4	0	2													6
8:15-8:30 AM	8	2	0													10
8:30-8:45 AM	4	1	0													5
8:45-9:00 AM	6	0	2													8
Total	43	6	8	0	0	0	0	0	0	0	0	0	0	0	0	57

Approach 4

Time	Right			Through			Left 1			Left 2			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	16	3	1	87	19	19	2	0	0	0	2	0	1	0	0	150
7:15-7:30 AM	13	2	0	86	18	17	3	1	0	1	1	0	1	1	0	144
7:30-7:45 AM	18	3	0	73	21	13	1	0	0	2	2	0	1	0	0	134
7:45-8:00 AM	16	3	1	75	24	15	1	1	0	1	1	0	2	1	0	141
8:00-8:15 AM	15	4	1	84	22	13	1	0	0	0	2	0	1	1	0	144
8:15-8:30 AM	9	1	2	76	20	13	1	0	0	1	0	0	1	1	0	125
8:30-8:45 AM	11	4	2	75	16	14	2	1	0	1	1	0	1	1	0	129
8:45-9:00 AM	11	2	1	82	19	11	2	2	0	0	2	0	1	0	0	133
Total	109	22	8	638	159	115	13	5	0	6	11	0	9	5	0	1100
Total	152	28	16	689	162	118	614	136	136	122	15	3	53	9	3	2256

Table 32: Traffic Volume for the Al-Tawhid Mosque Roundabout from 1:00 – 3:00 PM

Approach 1

Time	Right			Through 1			Through 2			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	10	2	2	1	0	0	2	1	0	5	3	0	1	0	0	27
1:15-1:30 PM	12	2	1	1	1	0	1	1	0	7	1	1	0	0	0	28
1:30-1:45 PM	13	1	1	0	0	0	2	2	0	8	2	0	0	0	0	29
1:45-2:00 PM	12	1	1	0	0	0	1	3	0	5	4	1	0	0	0	28
2:00-2:15 PM	9	2	3	0	0	0	2	1	0	6	4	0	0	0	0	27
2:15-2:30 PM	11	1	1	1	0	0	1	0	0	8	0	1	1	0	0	25
2:30-2:45 PM	6	0	2	0	1	0	5	1	0	12	2	1	0	1	0	31
2:45-3:00 PM	7	0	3	0	0	0	2	0	0	11	1	1	1	0	0	26
Total	80	9	14	3	2	0	16	9	0	62	17	5	3	1	0	221

Approach 2

Time	Right 1			Right 2			Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	0	0	0	10	1	1	77	15	20	8	1	0	8	0	1	142
1:15-1:30 PM	0	0	0	9	2	0	80	20	18	9	2	1	9	1	1	152
1:30-1:45 PM	0	0	0	8	1	1	95	18	19	10	1	2	10	2	2	169
1:45-2:00 PM	0	0	0	7	0	2	78	22	15	11	0	0	7	0	0	142
2:00-2:15 PM	0	0	0	5	1	0	55	15	17	8	2	0	7	0	1	111
2:15-2:30 PM	0	0	0	8	1	0	85	17	22	7	1	1	3	2	0	147
2:30-2:45 PM	0	0	0	8	0	2	71	19	17	7	0	0	7	1	1	133
2:45-3:00 PM	0	0	0	10	1	1	87	18	15	7	1	1	3	0	0	144
Total	0	0	0	65	7	7	628	144	143	67	8	5	54	6	6	1140

Approach 3																
Time	Right															Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	5	1	0													6
1:15-1:30 PM	7	1	1													9
1:30-1:45 PM	7	2	1													10
1:45-2:00 PM	8	3	2													13
2:00-2:15 PM	7	0	2													9
2:15-2:30 PM	9	3	0													12
2:30-2:45 PM	4	0	0													4
2:45-3:00 PM	7	0	2													9
Total	54	10	8	0	0	0	0	0	0	0	0	0	0	0	0	72

Approach 4																
Time	Right			Through			Left 1			Left 2			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	18	4	2	88	20	20	3	1	0	1	2	0	2	0	0	161
1:15-1:30 PM	15	3	1	85	19	18	4	2	0	2	1	0	0	0	0	150
1:30-1:45 PM	20	5	1	75	22	14	2	1	0	1	2	0	0	1	0	144
1:45-2:00 PM	18	3	2	78	25	17	3	0	0	2	1	0	2	2	0	153
2:00-2:15 PM	17	5	4	85	23	14	2	1	0	1	2	0	0	0	0	154
2:15-2:30 PM	11	1	3	80	22	17	2	1	0	1	0	0	2	0	0	140
2:30-2:45 PM	12	5	1	77	17	15	1	0	0	1	1	0	0	1	0	131
2:45-3:00 PM	12	3	1	85	21	15	1	0	0	0	2	0	0	1	0	141
Total	123	29	15	653	169	130	18	6	0	9	11	0	6	5	0	1174
Total	177	39	23	718	176	137	646	150	143	76	19	5	60	11	6	2386

Figure 40: Approaches of Al Turkish Hospital Roundabout

Count date: 16/11/2022, Wednesday

Table 33 :Traffic Volume for the Al Turkish Hospital Roundabout from 7:00 – 9:00 AM

Approach 1													
Time	Right				Left				U-turn				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	65	10	7	82	25	4	2	31	0	0	0	0	113
7:15-7:30 AM	64	9	8	81	20	4	3	27	1	0	0	1	109
7:30-7:45 AM	40	7	5	52	16	8	2	26	2	0	0	2	80
7:45-8:00 AM	43	5	10	58	30	4	3	37	0	0	0	0	95
8:00-8:15 AM	41	6	7	54	29	7	2	38	1	0	0	1	93
8:15-8:30 AM	33	7	10	50	13	12	0	25	0	0	0	0	75
8:30-8:45 AM	32	7	9	48	8	1	0	9	0	0	0	0	57
8:45-9:00 AM	35	5	7	47	7	1	0	8	0	1	0	1	56
Total	353	56	63	472	148	41	12	201	4	1	0	5	678

Approach 2													
Time	Right				Left				U-turn				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	3	1	0	4	35	5	5	45	0	0	0	0	49
7:15-7:30 AM	4	2	0	6	39	6	6	51	0	0	0	0	57
7:30-7:45 AM	5	2	0	7	33	12	8	53	1	0	0	1	61
7:45-8:00 AM	5	3	0	8	41	9	9	59	1	0	0	1	68
8:00-8:15 AM	4	1	0	5	55	6	11	72	0	0	0	0	77
8:15-8:30 AM	2	1	0	3	47	9	12	68	0	0	0	0	71
8:30-8:45 AM	2	2	0	4	37	3	5	45	0	0	0	0	49
8:45-9:00 AM	3	0	0	3	34	2	3	39	0	0	0	0	42
Total	28	12	0	40	321	52	59	432	2	0	0	2	474

Approach 3													
Time	Right				Left				U-turn				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
7:00-7:15 AM	1	1	0	2	17	5	1	23	1	0	0	1	26
7:15-7:30 AM	1	0	0	1	16	6	0	22	0	0	0	0	23
7:30-7:45 AM	1	0	0	1	19	7	1	27	1	0	0	1	29
7:45-8:00 AM	1	1	0	2	22	4	1	27	0	1	0	1	30
8:00-8:15 AM	1	0	0	1	29	12	3	44	0	0	0	0	45
8:15-8:30 AM	2	0	0	2	22	10	2	34	0	1	0	1	37
8:30-8:45 AM	0	1	0	1	18	4	2	24	0	0	0	0	25
8:45-9:00 AM	1	1	0	2	18	5	2	25	0	0	0	0	27
Total	8	4	0	12	161	53	12	226	2	2	0	4	242
Total	389	72	63	524	630	146	83	859	8	3	0	11	1394

Table 34: Traffic Volume for the Al Turkish Hospital Roundabout from 1:00 – 3:00 PM

Approach 1													
Time	Right				Left				U-turn				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	63	9	6	78	21	3	1	25	1	0	0	1	104
1:15-1:30 PM	62	8	7	77	19	3	2	24	0	0	0	0	101
1:30-1:45 PM	36	8	5	49	14	7	2	23	1	0	0	1	73
1:45-2:00 PM	39	6	9	54	28	3	2	33	1	0	0	1	88
2:00-2:15 PM	40	5	7	52	25	5	1	31	0	0	0	0	83
2:15-2:30 PM	30	5	9	44	12	11	1	24	1	0	0	1	69
2:30-2:45 PM	31	6	8	45	6	1	0	7	0	0	0	0	52
2:45-3:00 PM	34	6	5	45	6	1	0	7	0	1	0	1	53

Total	335	53	56	444	131	34	9	174	4	1	0	5	623

Approach 2

Time	Right				Left				U-turn				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	2	0	0	2	31	4	4	39	1	0	0	0	41
1:15-1:30 PM	3	1	0	4	34	5	5	44	1	0	0	0	48
1:30-1:45 PM	5	1	0	6	29	10	5	44	0	0	0	1	51
1:45-2:00 PM	4	1	0	5	37	8	8	53	0	0	0	1	59
2:00-2:15 PM	3	0	0	3	52	5	9	66	1	0	0	0	69
2:15-2:30 PM	1	0	0	1	45	8	9	62	0	0	0	1	64
2:30-2:45 PM	1	1	0	2	39	1	5	45	0	0	0	0	47
2:45-3:00 PM	2	1	0	3	33	1	2	36	0	0	0	0	39
Total	21	5	0	26	300	42	47	389	3	0	0	3	418

Approach 3

Time	Right				Left				U-turn				Total
	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	Passenger	Taxi	Truck	Total	
1:00-1:15 PM	0	0	0	0	15	4	0	19	0	0	0	0	19
1:15-1:30 PM	0	1	0	1	15	5	1	21	0	0	0	0	22
1:30-1:45 PM	1	1	0	2	17	6	0	23	0	1	0	1	26
1:45-2:00 PM	0	0	0	0	20	4	0	24	1	0	0	1	25
2:00-2:15 PM	1	1	0	2	25	10	1	36	1	1	0	2	40
2:15-2:30 PM	1	0	0	1	20	10	1	31	1	0	0	1	33
2:30-2:45 PM	1	0	0	1	16	3	1	20	0	0	0	0	21
2:45-3:00 PM	0	0	0	0	15	4	2	21	0	0	0	0	21
Total	4	3	0	7	143	46	6	195	3	2	0	5	207
Total	360	61	56	477	574	122	62	758	10	3	0	13	1248

Figure 41: Approaches of The Municipality Roundabout

Count date: 22/11/2022, Tuesday

Table 35: Traffic Volume for The Municipality Roundabout from 7:00 – 9:00 AM

Approach 1													
Time	Right						Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	10	1	2				20	4	3	0	0	0	40
7:15-7:30 AM	11	2	1				22	3	2	1	0	0	42
7:30-7:45 AM	9	1	2				19	2	2	0	0	1	36
7:45-8:00 AM	13	2	1				15	1	1	0	0	0	33
8:00-8:15 AM	15	1	1				25	2	2	0	0	0	46
8:15-8:30 AM	8	3	2				22	3	2	1	1	0	42
8:30-8:45 AM	10	2	1				26	2	2	0	0	1	44
8:45-9:00 AM	11	2	2				20	1	3	0	1	0	40
Total	87	14	12	0	0	0	169	18	17	2	2	2	323

Approach 2													
Time				Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM				46	7	13	6	0	1	0	0	1	74
7:15-7:30 AM				40	5	10	5	0	0	0	1	1	62
7:30-7:45 AM				38	4	8	8	2	1	0	0	0	61
7:45-8:00 AM				42	2	12	11	0	2	1	1	0	71
8:00-8:15 AM				39	7	10	9	1	0	1	0	0	67
8:15-8:30 AM				40	5	9	6	3	1	0	1	0	65
8:30-8:45 AM				37	6	6	8	2	0	1	0	1	61
8:45-9:00 AM				42	7	11	5	1	0	0	0	0	66
Total	0	0	0	324	43	79	58	9	5	3	3	3	527

Approach 3													
Time	Right			Through						U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	20	3	7	84	14	17				5	2	1	153
7:15-7:30 AM	25	2	6	70	11	20				4	1	1	140
7:30-7:45 AM	19	1	4	75	9	18				5	1	2	134
7:45-8:00 AM	17	1	3	88	13	15				3	2	3	145
8:00-8:15 AM	22	2	8	83	15	11				2	3	5	151
8:15-8:30 AM	26	3	6	80	11	22				1	5	3	157
8:30-8:45 AM	30	5	4	77	9	16				4	2	2	149
8:45-9:00 AM	25	2	3	71	7	18				3	4	1	134
Total	184	19	41	628	89	137	0	0	0	27	20	18	1163

Approach 4													
Time	Right			Through			left						Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
7:00-7:15 AM	30	3	2	7	0	0	12	0	0				54
7:15-7:30 AM	25	2	1	5	0	0	10	1	0				44
7:30-7:45 AM	33	1	1	3	1	0	9	0	1				49
7:45-8:00 AM	22	1	2	8	1	0	7	1	1				43
8:00-8:15 AM	30	2	2	7	2	1	10	1	0				55
8:15-8:30 AM	32	1	3	5	1	1	11	2	0				56
8:30-8:45 AM	36	3	2	4	2	1	8	1	1				58
8:45-9:00 AM	30	1	1	3	1	0	5	2	1				44
Total	238	14	14	42	8	3	72	8	4	0	0	0	403
Total	509	47	67	994	140	219	299	35	26	32	25	23	2416

Table 36: Traffic Volume for The Municipality Roundabout from 1:00 – 3:00 PM

Approach 1													
Time	Right						Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	10	1	2				20	4	3	0	0	0	40
1:15-1:30 PM	11	2	1				22	3	2	1	0	0	42
1:30-1:45 PM	9	1	2				19	2	2	0	0	1	36
1:45-2:00 PM	13	2	1				15	1	1	0	0	0	33
2:00-2:15 PM	15	1	1				25	2	2	0	0	0	46
2:15-2:30 PM	8	3	2				22	3	2	1	1	0	42
2:30-2:45 PM	10	2	1				26	2	2	1	0	1	45
2:45-3:00 PM	11	2	2				20	1	3	0	1	0	40
Total	87	14	12	0	0	0	169	18	17	3	2	2	324

Approach 2													
Time				Through			Left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM				46	7	13	6	0	1	0	0	1	74
1:15-1:30 PM				43	5	10	5	0	0	2	1	1	67
1:30-1:45 PM				40	5	8	11	2	1	3	0	0	70
1:45-2:00 PM				50	4	12	15	0	2	3	1	0	87
2:00-2:15 PM				39	7	10	17	1	0	5	0	0	79
2:15-2:30 PM				40	5	9	12	3	1	1	1	0	72
2:30-2:45 PM				41	6	6	8	2	0	1	0	1	65
2:45-3:00 PM				42	7	11	5	1	0	0	0	0	66
Total	0	0	0	341	46	79	79	9	5	15	3	3	580

Approach 3													
Time	Right			Through			left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	30	3	2	7	0	0	12	0	0				54
1:15-1:30 PM	25	2	1	7	1	0	10	1	0				47
1:30-1:45 PM	33	1	1	14	2	0	9	0	1				61
1:45-2:00 PM	22	1	2	11	2	0	12	1	1				52
2:00-2:15 PM	30	2	2	10	2	1	10	1	0				58
2:15-2:30 PM	32	1	3	6	1	1	11	2	0				57
2:30-2:45 PM	36	3	2	4	2	1	8	1	1				58
2:45-3:00 PM	30	1	1	7	1	0	5	2	1				48
Total	238	14	14	66	11	3	77	8	4	0	0	0	435

Approach 4													
Time	Right			Through			left			U-turn			Total
	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	Passenger	Taxi	Truck	
1:00-1:15 PM	20	3	7	84	14	17				5	2	1	153
1:15-1:30 PM	25	2	6	70	11	20				4	1	1	140
1:30-1:45 PM	19	1	4	85	10	18				5	1	2	145
1:45-2:00 PM	17	1	3	88	13	15				3	2	3	145
2:00-2:15 PM	25	2	8	83	15	11				2	3	5	154
2:15-2:30 PM	26	3	6	80	11	22				1	5	3	157
2:30-2:45 PM	31	5	4	77	9	16				4	2	2	150
2:45-3:00 PM	25	2	3	71	7	18				3	4	1	134
Total	188	19	41	638	90	137	0	0	0	27	20	18	1178
Total	513	47	67	1045	147	219	325	35	26	45	25	23	2517

2. Passing-Through Count

Count date: 21/2/2023, Tuesday

Table 37: Plates for Vehicles Entering the City from the South

Plates for vehicles entering the city from the south																
number	7:00-7:15 AM	7:15-7:30 AM	7:30-7:45 AM	7:45-8:00 AM	8:00-8:15 AM	8:15-8:30 AM	8:30-8:45 AM	8:45-9:00 AM	1:00-1:15 PM	1:15-1:30 PM	1:30-1:45 PM	1:45-2:00 PM	2:00-2:15 PM	2:15-2:30 PM	2:30-2:45 PM	2:45-3:00 PM
1	0384	0678	6431	5664	1334	0353	5641	6215	5116	2148	9581	0401	2365	8031	6382	0304
2	1077	2943	5895	6265	4789	6714	4290	1257	6325	0213	2225	2344	5116	1862	0076	4645
3	4558	5783	5357	4273	8109	8600	5727	9722	1992	0842	7132	4938	0196	8364	4281	7578
4	8966	2016	1740	2265	2130	2992	2196	6288	0206	7881	0237	3510	9132	1209	4997	7026
5	2188	5217	6922	6268	1932	4393	3820	5115	0872	7881	0450	7861	5861	9523	7691	1872
6	8581	7884	6712	4108	8688	5870	8323	7930	7178	7180	1132	1826	0226	4184	5223	6332
7	0886	4921	2148	5953	9402	6750	4056	2779	1209	9799	7214	0513	4928	8433	5018	0996
8	8296	4524	1917	0569	0083	0789	1503	337	0467	8204	0467	3542	3894	2844	0595	8106
9	2540	4393	4803	6455	7917	0004	5116	5705	5635	4984	4285	4257	3693	9187	6626	4003
10	8326	071	3664	7049	8321	1718	3446	0765	5769	2787	2897	5433	5370	8743	1552	7885
11	7653	0862	4511	3828	6467	7472	2347	5406	2764	5505	6075	4280	5440	4145	0777	3378
12	0727	6783	0862	9129	5191	5309	0166	4766	2717	4195	4559	5968	8901	5697	6460	1828
13	9169	3999	3583	143	5582	9904	4665	0397	5376	4727	4750	4735	0809	2279	6084	5460
14	5665	9636	3592	1335	4832	0555	1126	1891	5122	5722	7423	1628	3760	5641	2034	5437
15	1722	6807	4714	8408	3862	8657	124	8275	9453	5653	3716	2612	9760	7561	0886	4983
16	8164	8831	0155	7684	4633	2394	0610	8904	2231	1016	4160	6481	3236	2725	6398	8775
17	8902	7861	2403	6225	0292	6046	1031	1427	4921	1960	6416	8539	4922	7227	3430	6476
18	4048	4559	0519	0167	5193	0787	8118	4938	1154	6749	3515	7577	6075	4003	1533	7186
19	2340	3906	3065	7889	9498	4803	4772	1221	8479	4511	0686	6545	5185	6240	2325	3459
20	5026	4528	3874	1176	1017	9663	7570	0450	1311	6105	8152	9255	4376	2652	4521	7479
21	5407	5298	4123	8469	1857	2887	8296	1526	3303	6309	5795	7683	2844	6582	0281	8088
22	0390	5326	3922	872	3231	1334	9745	7865	0196	2458	7218	9523	6934	7584	2698	0196
23	6888	3036	121	0541	6438	3072	0848	0776	2069	3540	6517	1850	1771	3994	1982	3445
24	2030	4238	1994	3178	3221	6309	6418	4637	0072	6843	5440	8605	8471	0962	1019	6385
25	0335	8582	5337	3372	2825	5464	9352	9520	5064	0094	3494	8387	3791	2563	2599	3623
26	1637	3372	1950	4984	0226	0384	4212	1334	1106	5543	5762	2078	78866	1247	4803	3505
27	3459	2596	3365	0312	2721	1639	0304	4654	2233	2608	6810	4695	1828	0682	9059	1067
28	2394	9842	2179	1841	7192	4735	4183	1120	4453	0605	2130	7232	0425	7885	4999	6650
29	2316	1984	0628	9851	3502	2325	7426	7339	669	2451	0167	0917	6073	0828	4551	4983
30	4984	0165	3412	0123	7977	4734	2103	3697	6387	5165	1704	8456	9901	2848	4915	3807
31	0168	3078	8177	6510	4559	3624	4536	6810	5641	6470	2136	5481	5752	5733	4378	5343
32	8004	2298	3874	2590	6790	3892	4250	8884	5176	8689	1192	0155	0421	4820	5165	1726
33	0680	6836	5019	0777	0877	1187	7206	7000	0415	0425	6346	7282	6238	1872	4533	3123
34	7168	4108	0231	9760	4726	2287	7336	4287	0304	2207	4137	7282	0387	2201	9580	9131

35	1337	6445	2079	5808	0720	6456	3068	0167	5870	8255	6213	0686	6527	6220	7403	7233
36	6233	7015	5139	0149	6189	4795	6522	2538	4244	8371	6869	1689	4441	0308	4072	2452
37	2451	4000	7330	4102	0957	9434	5494	4829	0007	1092	0287	0897	6136	4559	0167	0135
38	5481	3704	1192	1031	2529	9455	0544	4803	6634	7281	4015	5455	5593	8150	3872	2591
39	8746	6650	8916	1770	4983	4767	2058	0771	6656	6311	3905	2432	2013	6231	8505	7533
40	2698	2336	9867	0083	1071	4041	5861	8541	3495	1527	2353	5377	1387	0541	6136	0605
41	7497	4649	9527	4724	0196	9576	3202	0113	0381	0326	7925	1340	4984	5772	6620	1237
42	4564	7160	0985	5700	1181	0076	6861	9540	3419	2063	2170	6454	582	2818	8436	1641
43	6353	1175	6573	6055	6220	4421	2063	2176	0513	3911	5700	7192	5095	0180	0907	4648
44	3840	4251	3515	0974	5541	4558	2665	0496	4726	0203	7764	0468	4796	2675	8592	8068
45	1519	0220	1523	4220	5466	4892	6139	5322	2463	4235	3574	5526	8297	6177	7844	9732
46	3126	8327	7164	7198	0538	3390	4984	2878	2927	7914	2394	4803	2461	8275	6373	0925
47	1094	8759	4582	5658	1120	0678	5163	1438	7962	7675	5798	5568	1637	3869	2105	4984
48	5493	4019	9180	0606	8879	5589	1648	3981	8321	9664	0434	7519	4838	1629	6760	7221
49	4099	4026	814	6749	6549	5610	2236	6378	2894	7253	2434	9153	0253	5425	4734	9843
50	2854	9831	2140	2563	7053	4582	3001	0412	5794	0766	0165	3969	1584	5217	0344	6315
51	4895	1601	3478	1289	4908	2180	4301	6166	2695	1130	4021	4582	6099	0301	4083	4537
52	0103	1433	9244	6422	7244	8608	3968	1456	1559	4220	5826	972	0193	5845	2892	8414
53	8355	2067	8661	6756	8519	4720	4587	6231	9425	0040	2228	6134	2333	3246	0228	2591
54	6581	7416	5820	4156	3850	2698	3996	6914	6582	8225	9512	5250	2140	8738	6570	4643
55	2443	0028	5202	5215	2333	4309	1641	8703	7412	3204	5180	4097	3687	1784	6294	0425
56	9752	3382	3459	4988	4732	0562	5139	3018	6085	4695	5287	1523	1350	6948	9523	0284
57	7336	6442	5581	3159	9902	5826	0329	0418	4239	0954	7177	1211	3399	9772	3800	6080
58	4117	2151	7281	9915	2461	0165	2301	6456	8434	9799	1134	6878	2389	0652	4727	0172
59	3375	6240	2452	5760	1960	8840	5231	7230	8934	5585	2623	9814	9581	2845	8305	4057
60	0434	3023	3654	0461	1890	8028	0855	1624	1984	7424	2431	6402	9367	1410	3399	8393
61	2778	8933	1828	8297	1826	2356	1122	0168	6287	8291	9469	2214	1547	0726	6776	1171
62	6449	4960	9549	2063	2846	8498	7107	0059	2377	6540	7046	7803	3324	6097	3160	6885
63	4203	1628	2885	5345	7338	2811	1436	8893	4243	3729	0862	4305	2178	8129	2717	0135
64	5981	3278	8920	569	8903	0954	9331	7021	5561	2066	7690	4732	3406	0397	2897	3013
65	9192	2953	5143	4575	4938	0513	0802	1022	4717	1440	0642	5505	5347	5231	4582	6086
66	8321	0196	6194	2132	6214	9644	7616	7015	2846	5202	8069	2647	9457	6136	4223	1771
67	8403	8466	4143		1049	3629	7432	2883	1427	9907	110	0136	2743	0018	9469	5165
68	0502	2201	2882		2363	0353	0188	2824	1289	5410	3741	2318	1902	2937	1613	2844
69	2063	2435	4325		1890	9969	6263	7502	6218	9523	8714	8369	8568	1372	6456	3372
70	4670	1638	0558		6094	1347	0730	8377	7967	2893	2853	7094	2042	0188	1753	5406
71	4378	6438	0344		8086	2071	9580	1669	1228	0425	3707	1097	0807	2215		1967
72	7305	2334	1879		8092	1534	0774	1750		2005	4220	0100	6432	8136		1030
73	97	6316	2707		3615	6203	2722	3785		5394	5292	6603	0931	4938		6296
74	2363	4904	5116		7330	0600	0605	0049		5843	6638	6833	9450	4572		0353
75	3536	6993			0112	7963	0004	4930		8239	4140	8482	6278	5443		6766
76	3697	1018			7056	1788	0174	0515		5625	121	9797	5139	8870		0971
77	3797	1448			6691	0681	0209	8317		7596	3541	3488	5892	0686		0048

78	3756	5046			5486	5280	4663	2472		7596	2542	4335	3109	0880		8392
79	0759	2364			5461	6983	6019	5659		7577	6282	1867	5167	3623		4789
80	5569	4398			6843	6169	8203	4582		6529	5990	6342	65	4727		4026
81	7280	1154				4922	6881			1758	5631	8347	6043	8325		3245
82	1233	1334				0930	4228			6457	3890	8074	1879	0194		0302
83	7157	9614				1637	1917			1763	3024	5539	4915	4083		
84	1479	8896				2745	1665			9241	3537	2838	5571	2172		
85	1001	0014				8104	8370			8084	5898	5438	0501	8169		
86	2131	3319				6493	4559			1707	0640	5397	4029	5659		
87	7249	2412				6229	3178			1790	8499	7304	1537	0614		
88	9838	8905				2599	5000			7568	0656	2543	6517	7205		
89	5403	7239				2364	6367			6493	5185	4176	1030	6022		
90	9501	1354				1851	2530			5475	3109	1832	1396			
91	7255	7544				2540	1789			5013	1354	2650	2153			
92	7012	5180				5403	5191			8070	1733	5277	5760			
93	5245	0422				7190	7424			7038	4233	8837	1890			
94	6351	7641				2062	8894			6274	5369	3243	7502			
95	0109	6287				6582	7917			7778	8283	1450	0173			
96	5139	8600				6331	4012			2079	6183	7281	2063			
97	5685	1426				0015	0360			5071	4584	6285	6124			
98	8972	7300				3950	6397			5231	4588	1453	79+43			
99	1186	5761					8034			3624	0078	1021	2579			
100	4623	1238					6097			0119	6892	5692	9131			
101	0452	1562					2472			8122	0284	4390	4904			
102	8356	0033					5358			6184	9638	1933	5768			
103	7697	5687					9423			5566	2922	5191	2863			
104	7803	5144								2733	3502	4341				
105	6420	0797								3950	2604	1995				
106	8805	0037								1402	1927	4676				
107		6278								9980	6783	2053				
108		0935									2410	1268				
109		3062									7483	6957				
110		9189										6390				
111		1208										3654				
112		8152										3536				
113		5785										1489				
114		4969										2052				
115		6691										5703				
116		3980										6838				
117		3055										0300				
118		8817										3174				
119		0308										5945				
120		9722										5175				

121		8491														

Table 38: Plates for Vehicles Leaving the City from the North

Plates for vehicles leaving the city from the north																
number	7:00-7:15 AM	7:15-7:30 AM	7:30-7:45 AM	7:45-8:00 AM	8:00-8:15 AM	8:15-8:30 AM	8:30-8:45 AM	8:45-9:00 AM	1:00-1:15 PM	1:15-1:30 PM	1:30-1:45 PM	1:45-2:00 PM	2:00-2:15 PM	2:15-2:30 PM	2:30-2:45 PM	2:45-3:00 PM
1	3360	5633	7280	8661	0083	6790	2356	5664	4988	5583	7283	5250	2311	4179	1982	4645
2	6229	0109	6738	3459	9898	3850	1154	3068	6315	0291	5722	2548	4889	1250	4734	3032
3	3305	5139	5704	5178	3501	9360	0954	2379	0381	4866	8714	3167	5599	9741	6760	5149
4	2335	6438	5629	4139	7165	5832	5119	0855	0258	9953	5292	9814	0087	5352	0035	0453
5	7672	1479	0996	0155	6055	3618	5219	3170	5158	5561	0638	1211	0253	2026	5251	7578
6	2757	1111	3119	1074	0118	2021	7557	1589	4824	0954	7093	141	1540	2136	8966	7320
7	8112	7320	7641	0188	6802	1660	1534	2301	3374	7349	5634	4489	5731	5425	4391	7407
8	7698	3260	2136	0879	7198	8908	4260	4536	2053	4844	3573	4305	4844	1499	8163	5437
9	3904	1180	3204	3478	8847	9450	6876	0730	3509	3204	6603	1174	5820	4263	6145	1175
10	0050	3259	7930	7661	0116	0112	3112	4005	8565	2240	5999	2647	530	3990	8291	3568
11	1453	5217	1628	4143	569	2788	6676	0004	7765	2993	4021	1097	9799	4981	7660	0182
12	2721	7012	3587	9799	6230	3617	5575	9580	4067	4260	5143	5951	0899	5443	2066	2768
13	1017	0258	5588	5044	6273	4908	6732	9745	6085	4235	0959	1193	6414	2801	0907	0927
14	5273	4623	9614	7689	0487	8072	6493	5382	4239	6457	3109	2882	1047	6224	7072	6476
15	7976	5149	1326	6573	7917	0182	4045	8203	7290	6668	1354	9797	2225	4712	2102	6579
16	2871	2222	7452	1260	4005	5461	5087	5000	7412	7107	7177	4689	1878	4038	0679	2717
17	0807	1728	8152	8172	2472	5111	5589	0610	8180	7568	4588	7123	3500	3476	2325	1209
18	4028	6758	5707	2707	7095	6214	7190	6881	8367	3905	0284	2214	4916	4442	5311	6760
19	2210	4356	8103	3310	5633	9902	7669	1906	6164	0350	6760	1867	4127	0880	1562	6152
20	5291	4238	4969	4437	5770	549	9644	8008	1371	5238	1130	5434	5353	3514	6776	7479
21	4043	0768	6252	8920	4832	0789	6409	2236	0979	3496	5590	0074	4029	1327	1613	7855
22	0377	7901	5144	6253	9402	5676	7056	5081	8854	8610	5699	5548	8568	7205	2099	2311
23	8586	4277	6431	143	2523	5309	6084	3022	1154	5539	6299	5625	2308	4683	9043	4407
24	5785	1446	0446	7684	6873	0004	0513	0334	8087	2680	9638	5397	110	5044	5041	1894
25	5560	0811	0335	3980	9498	7472	1126	4437	9406	1763	0226	2780	5655	0614	535	5093
26	8032	4649	0028	5041	1641	9904	5727	0459	2768	2079	6783	8857	5768	1552	5263	5769
27	4558	6914	5670	2627	5432	1857	0166	9423	1588	5013	7606	4967	087	6339	3500	5405
28	6361	2139	0106	2953	6233	0555	1858	4445	1228	4877	8007	5227	8071	4420	6739	5728
29	5699	0412	5447	7210	4553	9683	1138	4297	4878	4796	6566	5446	0344	3430	7026	7663
30	6404	4251	5270	1841	9042	0381	9434	5041	2838	8803	2320	0182	3786	0224	4410	1067

31	5401	7416	4946	5425	2529	6749	3500	5377	3027	3950	4005	1450	6832	4667	5869	5632
32	4788	4260	1018	6510	6467	5541	330	0082	0336	8941	2922	2832	5505	8460	1328	9892
33	8326	9831	2403	1479	6306	6186	0093	2516	7180	6224	6019	5068	6218	6084	5460	1892
34	6	2067	6240	0777	7524	1013	0848	1891	8012	6320	1099	6342	1852	2450	979	3013
35	454	6487	3085	7887	8223	0606	2825	5647	0491	0843	9469	1933	8998	6508	5105	2143
36	3172	0466	4714	9851	8829	1639	2347	7132	6845	4750	6213	8995	8078	4005	1828	2538
37	3356	141	121	0394		2990	4967	5425	5505	0760	3615	6399	5629	5231	7885	6086
38	1406	6955	8246	0261		7300	4374	4548	1438	3515	2241	8844	6444	3853	6914	4579
39	5665	9733	4123	7523		3624	3319	6287	5057	9155	6346	1756	5571	9059	1094	5665
40	2990	1447	5869	6399		8566	3800	1082	6387	4854	1826	8250	6530	4599	7705	3807
41	4048	0609	0843	1770		7533	7761	7073	0147	0778	4257	5703	1862	8544	8002	3445
42	182	9636	2179	1176		3258	2708	8834	4414	4704	2129	6838	7812	2538	1556	6385
43	0680		2342	6225		6489	0258	0280	1599	0177	1988	0300	1839	5410	1360	4997
44	1994		1950	1496		7766	9453	7865	9670	5440	4288	3174	6073	8129	8554	6086
45	4853		8177	6329		4041	2196	2395	3790	1758	2857	5945	9187	7127	4929	3511
46	4335		4639			4421	5165	5002	2392	0798	6545	3514	5167	2788	3972	4699
47	0899		0231			0787	8104	6888	1874	7778	0668	4579	1209	2351	5350	
48	4984		9395			4734	2740	0675	5874	8424	1717	1628	3957	0076	3123	
49	8723		3365			4892	8479	6006	5963	8424	0879	3693	3118	9580	5423	
50	8746		1988			7199	6522	6816	6218	6587	7232	3157	4439	9497	2217	
51	3840		5761			2180		1412	7604	4283	5090	9901	7354	5527	2489	
52	7490		6270			2698		2103	6843	4673	0645	5752	2754	0965	1087	
53	3756		4263			5060		4654	0094	1173	0469	4277	1919	6429	4597	
54	3176		3515			3819		3515	5543	2551	3357	6414	5766	3516	4511	
55	7093					3390		3046	2608	1477	0012	0605	5360	4997		
56	0540					5347		4173	0710	2136	6481	5346	4139	9612		
57	4585					0308		4287	6470	1192	4801	4335	8277	6381		
58	5493					0843		7425	4650	3501	5675	2627	5652	1322		
59	5493					3615		6378	5394	1402	5953	6506	5740	0194		
60	9752					785		9540	7706	0966	5133	3540	1247			
61	5165					1187		1556	3500	3603	5280	1582	0682			
62	8464							0412	1527	8558	9153	5440	2848			
63	5820							5193	5783	6669	1227	4376	0642			
64	6888							5193	2112	1925	4684	4290	2201			
65	0439							0418	7594	4103	5041	6455	0472			
66	8817							5193	1138	2375	972	2461	1872			
67	4192							0418	5926	0016	8074	2333	0450			
68	2031							3018	7962	4137	8842	2140	7561			
69	4183							8464	1294	3178	5037	3687	5772			
70	4812							1624	0320	9670	121	3517	0301			
71	2013							0058	0148	2085	3509	4484	6220			

72	815							8893	4391	4549	8673	1994	5845			
73	0759							4702		383	5481	6270	1233			
74	6701									5785	8002	3505	0999			
75	5037									5425	1523	7407	4947			
76	5569									7764		7260				
77	0682									7005						
78	6730									7768						
79	6304									8152						
80	5431									4139						
81	7604									6054						
82	5245									0439						
83										2298						
84										1852						

Table 39: Plates for Vehicles Entering the City from the North

Plates for vehicles entering the city from the north																
number	7:00-7:15 AM	7:15-7:30 AM	7:30-7:45 AM	7:45-8:00 AM	8:00-8:15 AM	8:15-8:30 AM	8:30-8:45 AM	8:45-9:00 AM	1:00-1:15 PM	1:15-1:30 PM	1:30-1:45 PM	1:45-2:00 PM	2:00-2:15 PM	2:15-2:30 PM	2:30-2:45 PM	2:45-3:00 PM
1	4984	9072	1655	8112	6018	2334	8235	2184	3049	5447	889	0172	5832	2788	5352	6573
2	5683	8912	1620	8079	0533	0072	6790	7533	3318	5761	4403	7199	6822	065	8054	7524
3	5746	4050	378	5352	5770	7407	6476	5733	5951	1270	0394	4247	2034	5062	2453	6749
4	2182	5371	2801	5434	2675	4957	5945	9756	2136	7880	2794	5675	6295	3516	1209	3585
5	3568	4859	4788	0186	4844	2901	0680	911	3454	2892	1094	1240	9995	5545	0300	4235
6	0295	6269	1977	1541	3509	3204	4089	9841	309	5447	5090	4356	6938	1962	5186	6214
7	5165	5766	5305	3133	6484	7684	3819	1682	4579	0727	5575	8129	0466	0504	3656	0466
8	1596	5167	2658	5670	3501	7805	0381	1446	2081	1669	8124	3834	8180	0453	1455	7901
9	4106	4260	3395	0445	6177	8550	0155	6566	0148	738	0999	2762	1909	8029	5925	1175
10	4699	660	9054	1018	5545	8343	1211	1327	5783	4553	6400	0855	4136	0071	2338	3119
11	7524	843	2742	3506	6052	0610	6499	1641	7663	6914	6911	1992	6496	6415	236	7672
12	7116	7261	1581	9683	0615	7868	8469	3179	0147	8210	0595	1017	9498	4257	0816	5291
13	3032	141	0678	6278	2788	6244	5382	3946	1512	0421	7165	8558	5846	0605	4291	7885
14	4750	5859	5041	8246	0258	7754	3443	6328	098	4699	0519	4205	7407	2556	5633	3378
15	7320	2593	4056	87 (UN)	5431	5386	4005	5356	4583	8020	9865	8317	5425	3882	5272	3505
16	8721	0194	5505	5178	6240	2108	6337	4984	4251	5585	6460	7008	0962	4619	6361	1294
17	1175	3847	4227	1628	8521	3617	3615	3672	810	2447	0969	6749	8172	1884	6228	5402
18	5044	0487	0297	0226	4438	3501	4358	5551	9255	1333	2184	8072	1998	7742	4087	5262

19	2221	1982	4541	1260	2379	7604	5550	5705	2311	3585	1477	0782	1032	0301	6729	6449
20	6304	4482	4372	6873	8150	1412	1858	0986	7163	3410	1122	0298	1994	2461	2271	7977
21	7698	7136	4787	7053	9034	3319	3088	6223	3915	6760	0071	3143	7217	1298	2830	1482
22	2136	4689	7844	0986	2845	1950	6816	0182	627	6453	1591	8917	2136	4005	7242	4277
23	3254	1862	5291	5738	5377	6732	4546	4548	1193	3167	1591	8805	0177	1954	6320	8920
24	5149	5425	5044	5924	6299	5264	8375	4929	3769	8508	3505	2465	599	1581	1027	0120
25	1933	7145	0378	4487	843	9953	0275	0478	5579	7662	543	2859	3514	8594	6271	4231
26	749	2579	4929	9620	3500	2140	4045	0777	6213	7206	5730	0686	5173	3420	4959	3651
27	5527	1846	6207	2708	5918	7760	3500	6493	5629	4844	1207	1681	601	6145	0879	1029
28	5460	3568	7668	3407	5004	0592	9174	9493	7242	3452	5844	4260	5560	9752	5699	6379
29	8031	0405	5136	5149	8517	0708	1556	6493	6484	1807	2340	481	8414	8959	5090	7640
30	9734	9018	0182	9580	2472	0317	2179	9453	5119	1381	4654	1821	9283	3059	5273	3501
31	8347	8804	0334	7666	6409	4801	8834	8353	5183	0120	1867	5768	0224	2516	4507	5761
32	5808	2013	3840	0755	4529	4325	3509	6315	1561	1960	8250	6218	9084	2866	5655	4005
33	3943	8377	0177	9934	0304	4017	6653	7283	7129	3786	3735	8071	3583	6438	4227	1335
34	2489	3515	2222	5432	6084	6394	4957	3922	0843	1852	9799	6485	6964	0950	2501	0469
35	1440	5552	5032	2920		1540	0464	2890	3996	4604	5325	7101	8088	3628	6054	7015
36	4921	4593	1774	3413		5119	3151	5081	5451	1440	0138	1763	4821	2143	1410	4251
37	3027	5397	5075	4298		7747	0228	5555	8200	4427	7606	4265	5432	1087	4824	1726
38	1157	5165	5943	0118		8908	8438	3453	6948	8784	6388	0183	6392	0927	6126	7233
39	4652	5820	1192	2105		6892	2196	1345	383	5337	1765	0853	4335	0975	8723	2221
40	1786	5196	1170	5676		8829	5041	5374	0098	5044	8424	6342	6554	1903	4883	9580
41	2585	0811	3179	3756		6239	4297	3170	9014	9945	7354	4150	5771	4796	1750	6381
42	0624	9895	2460	5949		4967		6712	4325	0386	1252	0843	5822	2704	6924	8112
43	6216	3972	5617	8829		0177		6006	5891	0339	2230	1158	5481	3537	5037	4420
44	7705	5844	4608	3786		2832		0310	3688	3993	2965	4593	1211	8568	7225	5041
45	6739	9576		6300		6428		5634	1476	1202	7290	2686	3800	5618	1190	0811
46	6438			2714		7484		2605	2231	0504	5503	8834	6714	7472	5476	3511
47	8854			3163		2158		1665	6540	6508	1322	4097	9744	5943	2067	
48	6273			0052		9404		7115	3754	4850	6367	7976	1903	0951	1588	
49	5222			1999		4806		5382	3754	6446	7071	5015	2161	7433	7064	
50	4007			1447		1770		8735	0941	4967	7283	6280	5044	2297	3511	
51	2190			1556		5157		1354	3357	5143	766	6164	569	7673	7012	
52	2767			1074		2534		5673	1851	0726	4850	3277	4072	5798	1826	
53	1227			3923		9477		4671	2325	1138	6011	7407	1130	4335	0973	
54	6730			9739		5218		2665	6430	9580	0807	4335	9155	5041	4926	
55	1349			3559		6760		0082	6277	0336	6813	3302	2112	8113	6213	
56	1571			0821		7181		0320	8087	1209	4680	0412	4481	5086	2826	
57	785			0067		9712		5677	0782	7072	8163	8835	3515	9124	6584	
58	4335					5594		9066	725	1824	5655	1168	7224	8366	5583	
59	2127					4931		5868	0306	1281	979	0611	8180	1265	0385	

60	6385					6233		4548	7203	5662	3614	1788	2308	6395	0199	
61	3356					7443		2342	9716	7872	4908	9041	0239	7101	4531	
62	8736					0261		7993	3423	3080	2181	4335	7561	1120	4673	
63	4041					9360		6214	1438	7039	0260	4944	2597	9709	8234	
64	3500					1111		2768	3872	8296	8149	1852		3152	0927	
65	2106					0714		4408	3544	0459		1792		0405	6224	
66	4365					5192			5270	6869		6244		4532		
67	6906					5176			7320	0459		1852		5954		
68	6906					7093			5425	6869		1792		5676		
69	0395					5982			4438	0359		6244		0316		
70	0540								9670	3843		1839				
71	2526									9501		3935				
72	1669									1044		0035				
73	4506									3514		4704				
74	6603									5041		3595				
75	2557									4667		7762				
76	3709											5360				
77												1017				
78												2108				
79												9664				
80												5352				
81												0096				

Table 40: Plates for Vehicles Leaving the City from the South

Plates for vehicles leaving the city from the south																
number	7:00-7:15 AM	7:15-7:30 AM	7:30-7:45 AM	7:45-8:00 AM	8:00-8:15 AM	8:15-8:30 AM	8:30-8:45 AM	8:45-9:00 AM	1:00-1:15 PM	1:15-1:30 PM	1:30-1:45 PM	1:45-2:00 PM	2:00-2:15 PM	2:15-2:30 PM	2:30-2:45 PM	2:45-3:00 PM
1	4290	0367	1982	2976	9580	3372	0188	3615	1923	5408	8465	0339	3236	4593	4150	0957
2	8600	8321	3568	3157	0755	1192	0426	1508	0211	9799	3164	6540	8185	0183	2154	8154
3	4772	5095	4203	4942	1411	2845	1826	0015	2284	4402	5951	2165	2604	3872	7943	9796
4	5291	1171	4108	3372	2563	0335	3968	4546	1368	0996	6945	4928	1890	5287	1533	0927
5	7691	0028	8804	8600	4833	4289	8028	3088	7168	2245	0686	678	0640	0853	7872	1850
6	2372	7015	7261	7416	4269	8003	5705	6266	8602	9523	1960	5585	0331	1771	1788	2686
7	1450	6714	9018	5098	6309	3536	0072	0275	7266	6294	0149	3526	6493	3399	2844	3756
8	1637	4984	5698	6422	5407	4559	5569	2599	4392	2461	5414	8528	0715	1181	8539	8594
9	6833	1154	4087	2460	0578	4921	4102	5429	1731	1782	4325	4233	5475	0945	4999	2134

10	4223	3866	1994	8821	5944	7070	3968	4220	7650	0228	8199	2431	4559	0205	5756	7472
11	7803	1740	3515	5617	1638	8297	3345	6587	4246	5098	6080	1544	7046	6432	5822	9041
12	2451	3027	0487	8905	3138	5488	0019	4056	6231	8960	0686	5697	5246	2348	6201	9907
13	0464	1638	3892	5231	4635	1718	9722	8476	1132	3495	1512	6274	1289	3298	3243	5347
14	9763	3509	1867	7609	5388	7983	8321	2173	4685	1927	4692	3706	1311	0298	3969	7265
15	0647	0678	0165	4177	8092	0226	7257	6169	1962	0188	6540	5686	6844	0057	5329	3537
16	6605	0102	5798	4789	6460	7218	7484	2272	0412	0854	6143	4273	6708	0845	1211	6579
17	7838	1334	4559	7977	4984	1917	1951	7304	2451	1803	6329	4085	0807	3534	2389	6438
18	4691	0083	8493	5776	1993	7230	6750	4984	5223	2130	9901	4967	7038	7688	4084	5799
19	7736	0967	4533	4724	7283	0486	7697	4442	3049	1411	7596	8774	1030	8746	6152	4521
20	0123	3943	5397	5493	1628	2721	5197	1519	0047	5402	7281	0726	7132	3621	3834	9179
21	6603	6922	5820	6207	8999	0353	5157	0033	3515	1482	2478	1118	4669	3000	9455	4579
22	7280	8896	0349	1689	0344	5087	2534	4575	3051	5293	9469	8499	0014	8357	9766	4572
23	4564	3459	1335	3179	3072	0143	7754	5653	0167	0425	0941	4984	2897	8884	2161	8582
24	4874	1157	8654	1523	3923	0790	6760	4012	399	0957	0936	3915	1878	2468	2470	9124
25	2188	6194	4506	5095	0067	4273	5658	4084	5467	1322	8321	9580	2542	4789	7178	2524
26	7068	7239	1031	8219	1289	3441	3178	4256	8225	4976	1526	3072	2365	8416	0361	2937
27	2231	785	0194	4582	4885	9867	5345	4510	3640	6240	3544	1018	6813	9041	4237	6055
28	5026	9843	5808	0100	4301	0304	3126	6957	5446	5558	2201	4026	4726	7596	1704	7015
29	9367	3372	6061	8827	2547	6278	6350	7610	6331	2136	5119	1209	2540	4908	4577	5202
30	0040	6787	1293	5434	5685	6097	1770	2452	8624	9726	7786	1294	3502	5064	4072	6050
31	4582	3702	8581	5671	1447	0174	8908	3072	7186	5134	4582	3132	2356	1075	9155	2448
32	0652	7336	6691	4227	5309	7073	2979	0228	6331	5139	6075	7330	1829	4944	9469	5165
33	1120	4041	8894	1334	2317	2901	8182	8541	2005	4727	2148	0336	619	9581	9523	1753
34	2422	2063	5180	0308	2325	2323	4726	7244	7924	0877	7165	1281	6097	6227	8581	4248
35	4564	5584	8611	2265	6296	6691	0353	0445	2695	3287	5568	2623	0136	6244	4796	1265
36	3446	2698	6586	5707	5191	7684	5819	4140	6417	6650	5165	2884	5370	1925	6136	8366
37	0106	2600	2351	3392	1797	6327	2765	1073	5156	7015	7701	6277	8387	1017	0452	2599
38	5746	3440	5403	3062	2063	4957	4582	1591	0412	3318	3943	3822	5455	8204	4481	5395
39	2182	6914	1977	1731	2321	2317	0068	5568	7169	0308	5447	1044	0266	8471	1890	0124
40	6241	2526	0268	6587	4393	2507	8204	1071	7254	5207	2079	8605	8149	6983	0329	7304
41	7102	1669	0434	6772	1334	2992	2364	6233	1430	2993	2233	7456	2181	5632	5139	3152
42	0176	7015	4938	3583	7432	2472	8273	1021	0821	0304	6438	1132	8933	1160	2214	8411
43	2897	5469	2596	3510	4086	0855	5192	8265	8814	5223	7073	4390	3654	7596	1130	4532
44	6231	5337	5305	3328	6298	1053	7186	4558	1404	6558	1669	6184	9523	6364	0432	3882
45	5343	0480	4962	1641	6177	4280	3738	5466	5724	1282	2432	7206	0172	3758	4108	1158
46	6303	2309	3395	9683	2430	2108	5075	4957	4551	2881	9255	9697	4247	0974	7249	0316
47	3808	0736	0037	6329	3892	4511	6790	1017	3233	8408	7880	4160	3574	1763	4984	1932
48	0152	8296	8904	5116	5870	3502	5945	911	4453	1134	3214	1638	1809	1246	1438	5188
49	5653	0435	0019	4859	5289	4572	1046	5280	0226	1623	3578	3874	0501	569	3488	2189
50	5116	7233	3412	5817	2161	1637	2590	5963	5653	9842	1092	5470	8129	1556	065	0300

51	7336	2557	0094	0191	3520	0196	9527	5808	5053	1151	127	9581	4695	6869	6392	1903
52	0424	3132	8482	6220	7026	2926	7923	4559	6469	2721	0781	0421	5870	1828	8313	1209
53	1984	0193	8237	5139	0985	4056	3459	0678	9035	8275	1561	2725	6231	6256	3109	2295
54	0167	5167	6266	0832	8150	6358	4785	1688	4559	0610	2452	1824	0855	4533	9450	1455
55	9760	4999	8689	4748	1851	4803	6456	7192	0515	3170	1970	0363	8558	9153	1456	4252
56	4106	4727	5560	5738	8688	2363	1950	0033	8031	4589	7921	0889	4938	2563	0226	9752
57	9501	5185	2148	7650	5820	9953	8608	1173	6309	4251	2447	3688	8124	9733	9555	0766
58	5193	1238	0998	5924	0877	1890	8235	7053	5580	4231	0466	3007	7071	9131	4727	8371
59	7416	8517	6714	3111	3981	0395	2435	8840		3392	3247	4975	4281	1440	0862	0628
60	2136	3400	5664	0167	1427	5377	0562	1637		4787	3585	1960	6136	7762	5648	8168
61	4750	1586	9576	4487	6278	4349	5116	0331		1427	3266	2353	1240	4136	8629	8244
62	3357	6573	6582	2051	2331	9760	5143	0858		6582	5488	1819	5191	4582	4257	8185
63	2538	8933	6922	1629	8053	4801	2066	4930		6213	1333	6178	1387	3791	0098	2704
64	4082	5641	9072			4362	2885	0397		8743	0558	2394	2432	3505	1134	8769
65	0353	4648	9549			1954	2062	7432		5496	8508	0120	7290	7889	6415	6685
66	0925	0862	8592			4202	1334	8498		2844	7662	0097	5776	2034	3231	4378
67	7332	3707	5410			3994	0165	3946		5505	4132	1111	4205	0917	0503	4087
68	1933	8817	8364			2188	7497	9501		5635	9412	7036	0958	2733	5060	0954
69	2461	1596	4803			8408	8938	6566		6017	0415	0837	6288	0357	4619	6361
70	6445	0466	7661			2372	8516	3246		5387	2640	8296	6460	0397	5406	2830
71	0226	6807	7844			3512	7519	3267		2463	5080	0595	1049	5789	1298	7242
72	2005	2452	9054				6861	0076		5779	5761	8867	3023	5165	9232	6271
73	8355	1826	4693				3443	3178		3729	5026	7432	0862	1282	3055	0879
74	0686	4689	2103				7539	0777		8416	3419	1122	4988	2563	4511	0301
75	0600	2148	1259				2832	9360		3179	6609	3469	0798	1168	2470	6528
76	5460	5859	9368				2063	4595		6449	0169	5474	2859	0137	1581	3508
77	6442						9969	5820		7129	0076	2853	4243	6341	3779	166
78							5700	1031		4923	1031	1018	4921	0458	1884	6326
79								8853		3996	5116	2410	1017	1032	0931	9709
80								2176			5659	3716	0686	8917	1954	4003
81								5406			6304	0513	6621	8343	4916	6356
82								5149			0226	0287	1681	7483	6417	8878
83								0384			6620	0237	4265	0686	0007	3315
84								0776			9945	0071	8283	3595	3505	7482
85								3922			9523	5180	0167	4536	5383	4507
86								7570			2170	1890	2586	0196	4272	1337
87								6315			3510	5768	7242	0935	2650	6099
88								6738			8920	3542	0519	5560	1788	0344
89											7392	5733	0481	3547	5504	5197
90												5826		0962	5659	0196
91												0208		9283	0950	8631

92												6201		8302	2063	0065
93												2063		6233	7282	4824
94												1368		7300	7253	8369
95												8347		6160	0595	9523
96												5165		6260	5183	2688
97												1207		6237	0425	4226
98												3753		1909	6833	0384
99												6138		8088	5133	2501
100												6685			4915	9189
101												8069				5700
102												3023				8152
103												1278				3875
104												6085				7166
105												6454				5481
106												3796				4883
107												3889				0397
108												7683				5273
109																2067
110																1233
111																7064
112																5237

3. Parking count

Count date: 1/3/2023, Wednesday

Table 41: License Plates Numbers of Vehicles Parked in Section 1

(section 1)												
number	9-9:30 AM		9:30-10 AM		10-10:30 AM		10:30-11:00 PM		11:00-11:30 PM		11:30-12:00 PM	
	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status
1	6364	legal	6364	legal	6364	legal	724	illegal	3250	illegal	4658	illegal
2	6214	legal	2458	legal	8770	legal	6329	legal	1190	legal	823	illegal
3	6143	legal	9143	legal	2003	legal	7203	legal	1932	illegal	4735	legal
4	7255	legal	7255	legal	9143	legal	1583	legal	7374	legal	4762	legal
5	2556	legal	2556	legal	8830	legal	9568	illegal	4662	legal	331	legal
6	4210	legal	3769	legal	7255	legal	9143	legal	4840	legal	9567	legal
7	1222	legal	4442	legal	2556	legal	8488	legal	4854	legal	211	legal
8	4442	legal	4065	legal	6277	legal	4210	legal	4630	legal	4702	legal
9	4005	legal	2280	legal	4772	legal	5868	legal	8488	legal	8488	legal
10	9914	legal	9914	legal	2058	legal	4496	legal	3257	legal	9900	legal
11	5705	legal	2860	legal	6810	legal	3001	legal	5868	legal	3257	legal
12	2280	legal	3931	legal	4005	legal	3114	legal	6287	legal	5868	legal
13	2860	legal	7669	legal	5538	legal	6231	legal	4005	legal	6287	legal
14	3931	legal	6023	legal	1126	illegal	6335	legal	1104	legal	8006	legal
15	7669	legal	1798	legal	3866	illegal	4005	legal	9189	legal	5768	legal
16	6023	legal	2047	illegal	4101	legal	1104	legal	9914	legal	2958	legal
17	1798	legal	7510	illegal	3460	legal	9189	legal	3800	illegal	2958	legal
18	1260	legal	2138	legal	9914	legal	9914	legal	2280	legal	6693	illegal
19	6009	legal	6883	illegal	8601	legal	2280	legal	3302	legal	9189	legal
20	3912	legal	4582	illegal	2280	legal	5334	legal	3363	legal	1104	legal
21	8488	legal	4758	legal	5334	legal	2860	illegal	5334	legal	4211	legal
22	6456	legal	4824	legal	2860	legal	3919	legal	4175	legal	9189	legal
23	3233	legal	4662	illegal	7709	legal	4704	legal	2109	legal	9914	legal
24	4325	legal	7368	illegal	4707	legal	6023	legal	4704	legal	4381	illegal
25	5653	legal	7430	legal	8290	legal	1798	legal	6023	legal	5047	legal
26	6869	legal	7360	legal	1798	legal	4060	legal	1798	legal	4935	legal
27	7239	legal	8488	legal	6623	legal	7948	legal	4284	legal	5334	legal
28	5474	legal	1657	legal	2580	legal	1200	legal	8601	legal	6833	legal
29	6785	legal	8070	legal	5178	illegal	3233	legal	8330	legal	4704	legal

30	1582	legal	6456	legal	7510	legal	7161	legal	2392	legal	3023	legal
31	3900	legal	3233	legal	7430	illegal	6869	legal	9453	legal	6023	legal
32	2131	legal	1985	legal	4360	legal	5474	legal	9300	legal	4175	legal
33	5836	legal	6869	legal	8488	legal	6785	legal	6869	legal	8998	legal
34	4152	legal	5474	legal	8070	legal	1582	legal	5358	legal	4284	legal
35	5776	legal	6785	legal	6456	legal	8539	legal	6489	legal	5549	legal
36	8449	legal	1582	legal	6043	illegal	2131	legal	8440	legal	1610	legal
37	6252	legal	3900	legal	3233	legal	1623	legal	1582	legal	9502	illegal
38	2830	legal	2131	legal	1985	legal	7914	legal	2058	legal	8434	illegal
39	4000	legal	2362	illegal	6671	legal	8915	illegal	2131	legal	4803	illegal
40	6449	legal	5476	legal	6869	legal	2362	illegal	2690	illegal	1306	legal
41	5797	legal	8479	legal	7239	legal	2640	legal	5476	illegal	3611	legal
42	5798	legal	6252	legal	5349	legal	5476	legal	9700	legal	5775	legal
43	7336	legal	2830	legal	5474	legal	5414	legal	4889	legal	6869	legal
44	5549	legal	4000	legal	6785	legal	4152	legal	6252	legal	1582	legal
45	6680	legal	6449	legal	1582	legal	6252	legal	7000	legal	2131	legal
46	6304	legal	5798	legal	3900	legal	7000	legal	4000	legal	1741	illegal
47	4191	legal	7336	legal	2131	legal	4000	legal	3900	legal	6130	illegal
48	3132	illegal	5549	legal	1870	illegal	3900	legal	5798	legal	364	legal
49			6680	illegal	9232	illegal	5798	legal	7336	legal	5476	legal
50			1017	legal	2362	illegal	7336	legal	6880	illegal	7889	legal
51			6009	legal	8364	legal	5549	legal	6139	illegal	2830	legal
52			4191	legal	5476	legal	6880	illegal	9522	legal	5566	illegal
53					8482	legal	3505	legal	1704	legal	8479	illegal
54					6252	legal	6415	illegal	9293	legal	4152	legal
55					8411	legal	8982	legal	4191	legal	4000	legal
56					2830	legal	4191	legal			3900	legal
57					4000	legal					5798	legal
58					6449	legal					7336	legal
59					5798	legal					7669	legal
60					7336	legal					2058	illegal
61					2003	illegal					1327	legal
62					1920	illegal					6139	illegal
63					4191	illegal					2006	legal
64											4191	legal

Table 42: License Plates Numbers of Vehicles Parked in Section 2

(section 2)												
number	9-9:30 AM		9:30-10 AM		10-10:30 AM		10:30-11:00 PM		11:00-11:30 PM		11:30-12:00 PM	
	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status
1	6231	legal	2816	legal	2138	legal	8601	legal	1610	legal	7917	illegal
2	3067	legal	3067	legal	4398	legal	1600	legal	9502	legal	1974	legal
3	1782	legal	1782	legal	1974	legal	1610	legal	1692	legal	4500	legal
4	9590	legal	9590	legal	4402	legal	9502	legal	2538	legal	3067	legal
5	1969	legal	6326	legal	3067	legal	1692	legal	3365	legal	1690	legal
6	3250	legal	1969	legal	1782	legal	7718	legal	1974	legal	9590	legal
7	6062	legal	3250	legal	7742	legal	1974	legal	2556	legal	5617	legal
8	8032	legal	6032	legal	9590	legal	3067	legal	4725	legal	8032	legal
9	2714	legal	6941	legal	6326	legal	1782	legal	3067	legal	3312	legal
10	1356	legal	6050	legal	2679	legal	9590	legal	8032	legal	6941	legal
11	7357	legal	2714	legal	3250	legal	2327	legal	2327	legal	9182	legal
12	7179	legal	1356	legal	8032	legal	3250	legal	5951	legal	6050	legal
13	1188	illegal	7357	legal	6941	legal	6941	legal	213	legal	5846	legal
14	6350	legal	6207	legal	2714	legal	5211	legal	6941	legal	4942	legal
15	8904	illegal	8304	illegal	6375	legal	6050	legal	605	legal	2714	legal
16	4870	illegal	6350	illegal	6050	legal	5846	legal	4942	legal	6207	illegal
17	1074	illegal	1756	illegal	1356	legal	4942	legal	5753	legal	6004	illegal
18	1861	legal	8904	illegal	7357	legal	6207	legal	7357	legal	1181	illegal
19	2380	illegal	4870	illegal	4942	legal	7357	legal	6207	legal	4128	illegal
20	1046	legal	1074	illegal	6207	legal	1750	legal	1750	illegal	2714	legal
21	7428	legal	1861	legal	6004	illegal	6350	legal	1181	illegal	8904	illegal
22	6993	legal	3516	legal	3530	illegal	1137	legal	6350	legal	4870	illegal
23	6569	legal	6569	legal	3530	legal	4870	illegal	1137	legal	1861	legal
24	6442	legal	6993	legal	1631	legal	8904	legal	1240	legal	6682	legal
25	6862	legal	7017	legal	8904	illegal	1866	legal	487	legal	4954	legal
26	7217	legal	7217	legal	4870	illegal	2395	legal	7369	illegal	8453	legal
27	9790	legal	1203	legal	1861	legal	1240	legal	8904	illegal	9930	legal
28	7426	illegal	5190	legal	8576	legal	9795	illegal	5223	illegal	8430	legal
29	6130	legal	1660	legal	2105	legal	9930	legal	368	legal	2523	legal
30	3731	illegal	3731	legal	1731	legal	5647	legal	124	legal	4562	illegal
31	2779	legal	6391	legal	4700	legal	6569	legal	9842	legal	1556	legal
32	6391	legal	4051	legal	1240	legal	6993	legal	531	legal	4200	legal
33	4051	legal	4772	legal	6280	legal	7017	legal	9930	legal	6495	legal
34	4930	legal	3517	legal	8550	legal	7062	legal	6569	legal	4688	legal

35	5505	legal	1252	legal	6569	legal	6805	legal	94	legal	7217	legal
36	5526	legal	2211	legal	6171	legal	7217	legal	4200	legal	519	legal
37	4930	legal	6205	legal	5154	legal	3517	legal	7017	legal	7041	legal
38	2650	legal	3720	illegal	7017	legal	8764	legal	8275	legal	6391	legal
39	1252	legal	3438	legal	7217	legal	3731	legal	519	legal	3517	legal
40	6355	illegal	6356	legal	8053	legal	6391	legal	5139	legal	6885	legal
41	7753	illegal	7753	legal	5190	legal	8400	legal	3731	legal	5178	legal
42	7334	illegal	1240	legal	3731	legal	5635	legal	6391	legal	5489	legal
43	1240	legal	9617	legal	4051	legal	6277	legal	1660	legal	5618	legal
44	9617	legal	4144	legal	6391	legal	1932	legal	6192	legal	4999	legal
45	7300	legal	2795	legal	1666	legal	5489	legal	4202	legal	5697	legal
46	7590	illegal	8550	legal	5664	legal	4930	legal	4600	legal	2050	legal
47	2795	legal	6917	legal	5618	legal	4051	legal	5489	legal	1240	legal
48	8550	legal	4434	illegal	4930	legal	6745	legal	7349	illegal	2580	legal
49	6917	legal	1089	illegal	3512	legal	7753	legal	1576	legal	4144	legal
50	9250	legal	2950	legal	7812	illegal	7812	legal	408	legal	5317	legal
51	3583	legal	6602	legal	7753	legal	1576	legal	124	legal	8550	legal
52	7830	legal	1034	legal	3720	legal	1240	legal	9617	legal	7039	legal
53	1680	legal	1680	illegal	8580	legal	9617	legal	4144	legal	1576	legal
54	1830	legal	9968	illegal	1240	legal	4144	legal	2795	legal	6295	legal
55	1570	legal	3132	illegal	1250	legal	2795	legal	1089	legal	8185	legal
56	5610	legal	3670	legal	1260	legal	5470	legal	9968	legal	8411	legal
57	9722	legal	1830	legal	1270	legal	8550	legal	8550	legal	8084	legal
58	4049	legal	1570	legal	1280	legal	1404	legal	1404	legal	7270	legal
59	3092	legal	5610	illegal	1290	legal	7039	legal	7039	legal	5410	legal
60	2512	illegal	6252	illegal	1300	legal	1003	legal	1003	legal	7688	legal
61	5488	illegal	5476	illegal	1310	legal	1909	legal	1909	legal	5287	legal
62	2062	illegal	9722	illegal	1320	legal	295	legal	2950	legal	3250	legal
63	6774	illegal	4049	legal	1330	legal	3132	legal	3490	legal	1570	legal
64	6325	legal	3092	legal	1340	legal	4675	legal	1969	legal	6618	legal
65	2393	legal	2512	legal	1350	legal	8297	legal	7688	legal	8230	illegal
66	4369	legal	2062	illegal	1360	legal	1969	legal	1570	legal	3188	legal
67	8725	legal	6774	legal	6295	legal	9501	legal	7807	legal	4049	legal
68	3170	legal	6325	legal	3231	legal	7688	legal	8230	illegal	3092	legal
69	5337	legal	2393	legal	1830	legal	1830	legal	5610	illegal	2512	legal
70	2138	illegal	4369	legal	1570	legal	1200	legal	2420	illegal	1597	illegal
71	2452	legal	2844	legal	2594	illegal	1570	legal	6004	legal	9138	illegal
72	8477	illegal	2452	legal	5610	illegal	6239	legal	4049	legal	6774	legal
73	8864	legal	2130	legal	9226	illegal	8230	illegal	3092	legal	6325	legal

74	8300	legal	4330	illegal	9722	illegal	2130	legal	2512	illegal	2393	legal
75	2800	legal	4537	legal	4049	legal	9722	legal	5198	illegal	4369	legal
76	6952	illegal	1560	illegal	3092	legal	4049	legal	5148	illegal	8400	legal
77	4844	illegal	3501	legal	2512	legal	3369	legal	6774	illegal	6168	legal
78	8104	illegal	8477	legal	4801	illegal	3092	legal	6325	legal	7370	legal
79	7416	legal	2280	legal	6774	illegal	2512	legal	2393	legal	2241	legal
80	4510	legal	8300	legal	6325	legal	9620	illegal	4369	legal	5337	legal
81	4562	legal	2800	legal	2393	legal	6774	legal	9722	legal	4735	illegal
82	7977	legal	6952	illegal	4369	legal	5148	illegal	1810	legal	4689	illegal
83	1197	legal	5618	illegal	2844	legal	6325	legal	5647	legal	4335	illegal
84	7041	legal	4692	illegal	4408	legal	2393	legal	5303	legal	3500	legal
85	1208	legal	7491	illegal	2161	legal	4369	legal	4689	illegal	6282	legal
86	4386	legal	5300	legal	5227	legal	6239	legal	6034	legal	5021	legal
87	8106	legal	1756	illegal	5900	illegal	1190	legal	8837	illegal	8271	legal
88	1310	illegal	7977	legal	3769	legal	5692	legal	421	illegal	2612	legal
89			1197	legal	6997	illegal	5303	illegal	6187	legal	8300	legal
90			7041	legal	8477	legal	4689	illegal	3027	legal	3810	legal
91			1208	legal	2006	legal	6495	illegal	8300	legal	5286	illegal
92			4309	legal	3748	legal	2435	illegal	1111	legal	6347	illegal
93			8106	legal	8300	legal	3027	legal	5280	illegal	2636	legal
94					6952	illegal	2646	illegal	6347	illegal	4210	illegal
95					2991	illegal	8300	legal	2100	illegal	4101	illegal
96					2100	legal	7604	illegal	2636	legal	4693	legal
97					7416	legal	5286	illegal	4510	legal	1197	legal
98					4510	legal	2100	legal	7977	legal	7041	legal
99					5300	legal	6397	illegal	1197	legal	3068	illegal
100					7977	legal	8891	illegal	7041	legal	8106	legal
101					1197	legal	2636	legal	1208	legal		
102					7041	legal	4510	legal	3931	legal		
103					1208	legal	9722	legal	8106	legal		
104					6309	legal	7977	legal				
105					8106	legal	1197	legal				
106							7041	legal				
107							1208	legal				
108							2523	legal				
109							8106	legal				

Table 43: License Plates Numbers of Vehicles Parked in Section 3

(section 3)												
number	9-9:30 AM		9:30-10 AM		10-10:30 AM		10:30-11:00 PM		11:00-11:30 PM		11:30-12:00 PM	
	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status
1	3326	legal	4380	illegal	3326	legal	1890	illegal	8111	legal	3326	legal
2	5885	legal	9426	legal	5352	legal	3326	legal	3326	legal	7916	illegal
3	6059	illegal	3326	legal	5568	illegal	1182	legal	2525	illegal	1993	legal
4	9192	legal	6213	illegal	6213	illegal	2525	illegal	4045	illegal	9201	legal
5	5527	legal	7955	illegal	5229	legal	4045	illegal	4953	illegal	7133	legal
6	6213	illegal	6696	illegal	7399	legal	6320	legal	9201	illegal	6749	legal
7	5098	legal	6189	illegal	5527	legal	9192	legal	4682	legal	5568	legal
8	2658	illegal	1275	legal	891	legal	5527	legal	6092	legal	5527	legal
9	8200	illegal	5670	legal	3367	legal	2939	legal	6288	legal	5583	legal
10	5213	legal	6278	legal	2815	illegal	8111	legal	7181	legal	1091	legal
11	7705	legal	4558	legal	6351	illegal	2815	legal	9192	legal	8885	legal
12	7210	legal	3870	illegal	8200	illegal	1953	legal	2939	illegal	3489	legal
13	6293	legal	4960	illegal	5213	legal	8885	legal	5527	legal	6305	legal
14	9551	legal	1156	legal	7705	legal	7501	legal	8885	legal	2700	illegal
15	7980	legal	8200	legal	7210	legal	5213	illegal	2815	legal	7507	illegal
16	5293	legal	5213	legal	2110	illegal	7705	legal	5452	legal	4173	legal
17	4281	legal	7705	legal	6229	legal	1426	legal	6813	legal	5213	legal
18	6036	illegal	7210	legal	5154	legal	2110	illegal	7500	illegal	2110	illegal
19	1456	legal	2110	illegal	9551	legal	2549	illegal	1809	legal	1240	legal
20	6186	legal	9551	legal	4654	legal	9551	legal	1066	legal	6988	legal
21	2609	legal	8817	illegal	4261	legal	6603	legal	5213	legal	6603	legal
22	6180	legal	8799	illegal	1300	illegal	5364	illegal	7705	legal	1581	illegal
23	7836	legal	1173	illegal	5291	illegal	4141	legal	2449	legal	5364	illegal
24	6231	legal	2062	illegal	1042	illegal	7231	legal	1426	legal	4281	legal
25	1014	legal	5357	legal	5111	legal	4281	legal	2900	legal	9931	legal
26	4002	legal	4282	legal	4361	legal	3100	legal	9551	legal	1327	legal
27	3618	legal	1300	legal	7452	legal	6479	illegal	2543	illegal	7332	legal
28	2112	illegal	6160	illegal	7501	legal	7293	legal	6603	legal	4361	legal
29			3160	legal	7836	legal	8450	legal	1581	illegal	3360	legal
30			4018	legal	6231	legal	4805	legal	1807	legal	7124	legal
31			4361	legal	1014	legal	8224	legal	5364	illegal	1014	legal
32			7836	legal	6177	illegal	1741	legal	6148	illegal	3618	illegal

33			6231	legal			4361	legal	4281	legal		
34			1014	legal			7604	legal	1300	illegal		
35			1807	legal			5561	legal	5212	legal		
36							7836	legal	1741	legal		
37							1014	legal	1404	legal		
38							2136	legal	9531	legal		
39									6277	legal		
40									1809	legal		
41									4089	legal		
42									1221	illegal		
43									3618	legal		
44									1950	illegal		

Table 44: License Plates Numbers of Vehicles Parked in Section 4

(section 4)												
number	9-9:30 AM		9:30-10 AM		10-10:30 AM		10:30-11:00 PM		11:00-11:30 PM		11:30-12:00 PM	
	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status	vehicle plate	status
1	1583	legal	1583	legal	1583	legal	1583	legal	9356	illegal	1583	legal
2	9520	legal	3383	legal	3383	legal	3303	legal	1583	legal	3383	legal
3	5291	legal	9520	legal	1340	legal	5200	legal	7781	illegal	9520	legal
4	9469	legal	5291	legal	9520	legal	2311	legal	2152	legal	1111	legal
5	2468	legal	1060	legal	5400	legal	9520	legal	3383	legal	1060	legal
6	1060	legal	5337	legal	4667	legal	5531	legal	9520	legal	5531	legal
7	1067	legal	8338	legal	2272	legal	2079	legal	8612	legal	1067	legal
8	5583	legal	1067	legal	1067	legal	8612	legal	5531	legal	5385	legal
9	3221	legal	9396	legal	5505	legal	4667	legal	2979	legal	9396	legal
10	1111	legal	3221	legal	9396	legal	5385	legal	1067	legal	6450	legal
11	1409	legal	5832	legal	3221	legal	3221	legal	1950	legal	4620	legal
12	2699	legal	1770	legal	6450	legal	2885	legal	5385	legal	5517	legal
13	9201	legal	4155	legal	6532	legal	3372	legal	3221	legal	2099	legal
14	4256	legal	1409	legal	1468	legal	8450	legal	2885	legal	9800	legal
15	6155	legal	2248	legal	2099	legal	1843	legal	9396	legal	7407	legal
16	4667	legal	2099	legal	2227	legal	7250	legal	2098	legal	1724	legal
17	1541	legal	4256	legal	8236	legal	1409	legal	5670	legal	2311	legal
18	4023	legal	6329	legal	6155	legal	2301	legal	8411	legal	4023	legal

19	1446	legal	6155	legal	1724	legal	2099	legal	8582	legal	1111	legal
20	8945	legal	4667	legal	1541	legal	4256	legal	6450	legal	1111	legal
21	2979	illegal	2077	legal	4023	legal	1060	legal	4118	legal	195	legal
22	2396	legal	1724	legal	8945	legal	7767	illegal	4620	legal	1790	legal
23	7333	legal	1541	legal	2979	illegal	5326	illegal	1409	legal	6240	legal
24	1740	legal	4023	legal	5531	legal	1724	legal	1994	legal	6600	legal
25	8868	illegal	8945	legal	7133	legal	4023	legal	2099	legal	8668	illegal
26	1496	illegal	2979	illegal	6883	legal	5291	legal	4639	legal	4252	legal
27	5958	legal	7026	legal	2350	legal	9660	legal	2816	illegal	4904	legal
28	4073	legal	5531	legal	1740	legal	7133	legal	1467	legal	5958	legal
29	4593	legal	7133	legal	8868	illegal	6760	illegal	1724	legal	2047	legal
30	9940	legal	8110	legal	6233	legal	2241	legal	8622	legal	6445	illegal
31	3870	legal	1740	legal	5958	legal	6419	legal	4023	legal	6305	legal
32	4681	legal	8868	illegal	2047	legal	2241	legal	5291	legal	4602	legal
33	2380	legal	1908	legal	8411	legal	6419	legal	9880	legal	1992	legal
34	2500	legal	5958	legal	6445	illegal	8868	illegal	7133	legal	4246	legal
35	3650	legal	8239	legal	9940	legal	1733	illegal	7718	legal	7332	illegal
36	3636	legal	4073	illegal	4682	legal	5958	illegal	2523	legal	1658	illegal
37	3653	legal	9940	legal	1994	illegal	1230	legal	2241	legal	6312	illegal
38	9069	legal	1993	legal	5406	illegal	6445	illegal	8868	illegal	9069	illegal
39	8567	illegal	2340	legal	7277	illegal	8592	illegal	4106	legal	283	legal
40	8448	legal	9069	illegal	5278	legal	4682	legal	5958	legal	6448	legal
41	383	legal	6448	illegal	5353	illegal	4282	legal	2047	legal	5545	legal
42	7245	legal	283	legal	8567	illegal	9069	illegal	7106	legal		
43			7245	legal	6448	legal	8567	illegal	6445	legal		
44			5545	illegal	283	legal	283	legal	6277	illegal		
45			8567	illegal	7245	legal	5545	illegal	1993	illegal		
46									1994	illegal		
47									4246	legal		
48									9069	illegal		
49									8567	illegal		
50									283	legal		
51									5545	illegal		

4. Traffic analysis Output

Table 46: Output Data of the Study Network

Measures of Effectiveness

06/07/2023

Network Totals

Number of Intersections	18
Control Delay / Veh (s/v)	3
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	3
Total Delay (hr)	16
Stops / Veh	0.42
Stops (#)	7403
Average Speed (km/hr	36
Total Travel Time (hr)	55
Distance Traveled (km)	1963
Fuel Consumed (l)	396
Fuel Economy (km/l)	5.0
CO Emissions (kg)	7.37
NOx Emissions (kg)	1.42
VOC Emissions (kg)	1.70
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	0
Performance Index	36.3

Table 45: Output Data of Al Quds Roundabout

Lanes, Volumes, Timings
3: Al Quds Roundabout

06/07/2023

Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NER2
Lane Configurations												
Traffic Volume (vph)	64	16	59	32	519	5	56	386	12	4	6	58
Future Volume (vph)	64	16	59	32	519	5	56	386	12	4	6	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%		0%		
Storage Length (m)		0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Storage Lanes		1	0	0		0	0		0	1	0	
Taper Length (m)		7.5		7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.943			0.999			0.996		0.872		
Flt Protected		0.972			0.997			0.994		0.997		
Satd. Flow (prot)	0	1707	0	0	1531	0	0	1521	0	1619	0	0
Flt Permitted		0.972			0.997			0.994		0.997		
Satd. Flow (perm)	0	1707	0	0	1531	0	0	1521	0	1619	0	0
Link Speed (k/h)		50			50			50		50		
Link Distance (m)		68.0			52.5			155.7		53.8		
Travel Time (s)		4.9			3.8			11.2		3.9		
Confl. Peds. (#/hr)	5	5	5	5		5	5		5	5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)					15			15				
Mid-Block Traffic (%)		0%			0%			0%		0%		
Adj. Flow (vph)	70	17	64	35	564	5	61	420	13	4	7	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	0	0	604	0	0	494	0	74	0	0
Sign Control		Yield			Yield			Yield		Yield		

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 64.9%		ICU Level of Service C	
Analysis Period (min) 15			

Table 47: Output Data of Tayaseer Intersection

Lanes, Volumes, Timings
8: Tayaseer Intersection 06/07/2023

Lane Group	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	80	10	87	14	447	70	132	448	51	13	18	28
Future Volume (vph)	80	10	87	14	447	70	132	448	51	13	18	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)	0%				0%			0%			0%	
Storage Length (m)	0.0	0.0		0.0		0.0	0.0		0.0		0.0	0.0
Storage Lanes	1	0		0		0	0		0		1	0
Taper Length (m)	7.5			7.5			7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.926				0.982			0.989			0.937	
Flt Protected	0.978				0.999			0.990			0.974	
Satd. Flow (prot)	1687	0	0	0	1508	0	0	1505	0	0	1700	0
Flt Permitted	0.978				0.999			0.990			0.974	
Satd. Flow (perm)	1687	0	0	0	1508	0	0	1505	0	0	1700	0
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	71.6				60.1			53.4			59.2	
Travel Time (s)	5.2				4.3			3.8			4.3	
Confl. Peds. (#/hr)	5	5	5	5		5	5		5	5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)					15			15				
Mid-Block Traffic (%)	0%				0%			0%			0%	
Adj. Flow (vph)	87	11	95	15	486	76	143	487	55	14	20	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	193	0	0	0	577	0	0	685	0	0	64	0
Sign Control	Stop				Free			Free			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	92.2%	ICU Level of Service F	
Analysis Period (min)	15		

Table 48: Output Data of The Municipality Roundabout

Lanes, Volumes, Timings
15: The Municipality Roundabout 06/07/2023

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWU	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	48	50	0	0	451	175	81	243	0	4	110	0
Future Volume (vph)	48	50	0	0	451	175	81	243	0	4	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)		0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0
Storage Lanes		1	0	0		0	0		0		1	0
Taper Length (m)		7.5		7.5			7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.962						0.954	
Flt Protected		0.950						0.988			0.968	
Satd. Flow (prot)	0	1770	0	0	1568	0	0	1840	0	0	1720	0
Flt Permitted		0.950						0.988			0.968	
Satd. Flow (perm)	0	1770	0	0	1568	0	0	1840	0	0	1720	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		47.2			44.3			74.3			62.5	
Travel Time (s)		3.4			3.2			5.3			4.5	
Confl. Peds. (#/hr)	5	5	5	5		5	5		5	5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)					5							
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	52	54	0	0	490	190	88	264	0	4	120	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	680	0	0	352	0	0	188	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	82.4%	ICU Level of Service E	
Analysis Period (min)	15		

Table 49: Output Data of Al-Tawhid Mosque Roundabout

Lanes, Volumes, Timings
27: Al-Tawhid Mosque Roundabout 06/07/2023

Lane Group	NBL	NBT	NBR	SBL2	SBL	SBT	SBR	NEL	NET	NER	NER2	SWR
Lane Configurations												
Traffic Volume (vph)	87	447	42	19	16	481	94	50	14	3	58	44
Future Volume (vph)	87	447	42	19	16	481	94	50	14	3	58	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%				0%			0%			
Storage Length (m)	0.0		0.0		0.0		0.0	0.0		0.0		0.0
Storage Lanes	0		0		0		0	0		0		1
Taper Length (m)	7.5				7.5			7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990				0.979			0.934			0.865
Flt Protected		0.992				0.997			0.980			
Satd. Flow (prot)	0	1601	0	0	0	1545	0	0	1705	0	0	1611
Flt Permitted		0.992				0.997			0.980			
Satd. Flow (perm)	0	1601	0	0	0	1545	0	0	1705	0	0	1611
Link Speed (k/h)		50				50			50			
Link Distance (m)		59.4				69.2			35.2			
Travel Time (s)		4.3				5.0			2.5			
Confl. Peds. (#/hr)	5		5	5	5		5	5		5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		5				10						
Mid-Block Traffic (%)		0%				0%			0%			
Adj. Flow (vph)	95	486	46	21	17	523	102	54	15	3	63	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	0	663	0	0	135	0	0	48
Sign Control		Yield				Yield			Yield			

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			

Table 50: Output Data of Al Turkish Hospital Roundabout

Lanes, Volumes, Timings
39: Al Turkish Hospital Roundabout 06/07/2023

Lane Group	WBU	WBL	WBR	NBU	NBL	NBR	SEU	SEL	SER
Lane Configurations									
Traffic Volume (vph)	2	252	26	4	128	273	3	132	6
Future Volume (vph)	2	252	26	4	128	273	3	132	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%	
Storage Length (m)		0.0	0.0		0.0	0.0		0.0	0.0
Storage Lanes		1	0		1	1		1	0
Taper Length (m)		7.5			7.5			7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									
Frt		0.988				0.850		0.994	
Flt Protected		0.957			0.950			0.954	
Satd. Flow (prot)	0	1761	0	0	1770	1583	0	1766	0
Flt Permitted		0.957			0.950			0.954	
Satd. Flow (perm)	0	1761	0	0	1770	1583	0	1766	0
Link Speed (k/h)		50			50			50	
Link Distance (m)		56.6			70.8			53.1	
Travel Time (s)		4.1			5.1			3.8	
Confl. Peds. (#/hr)	5	5	5	5	5	5	5	5	5
Confl. Bikes (#/hr)									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0
Parking (#/hr)									
Mid-Block Traffic (%)		0%			0%			0%	
Adj. Flow (vph)	2	274	28	4	139	297	3	143	7
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	304	0	0	143	297	0	153	0
Sign Control		Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			

5. Proposed Solutions on Traffic

Table 51: Test Result Warrants

Intersection name	Time(h)	Major Street Vol (veh/h)			Minor Street Vol (veh/h)				crashes / year	Warrant 2	Warrant 3	Warrant 7
		SB	NB	total	WB	EB	high vol	Delay level(veh-h)				
Al Quds Roundabout	7:00-8:00 AM	504	426	504	60	136	136	0.517	4.5	yes	no	no
	8:00-9:00 AM	520	415	520	51	88	88	0.367		no	no	no
	1:00-2:00 PM	483	402	483	50	116	116	0.438		no	no	no
	2:00-3:00 PM	488	387	488	46	74	74	0.317		no	no	no
Tayaseer Intersection	7:00-8:00 AM	457	491	948	44	146	146	1.768	7.5	yes	no	yes
	8:00-9:00 AM	386	519	905	51	107	107	1.470		no	no	yes
	1:00-2:00 PM	520	568	1088	49	158	158	1.926		yes	no	yes
	2:00-3:00 PM	419	525	944	37	134	134	1.591		yes	no	yes
The Municipality Roundabout	7:00-8:00 AM	190	268	190	572	151	572	3.225	5.1	yes	yes	yes
	8:00-9:00 AM	213	259	213	591	172	591	3.333		yes	yes	yes
	1:00-2:00 PM	583	298	583	214	151	214	1.207		yes	no	yes
	2:00-3:00 PM	595	282	595	221	173	221	1.246		yes	no	yes
Al-Tawhid Mosque Roundabout	7:00-8:00 AM	556	569	1125	86	28	86	0.272	5.75	yes	no	yes
	8:00-9:00 AM	543	531	1074	83	29	83	0.268		yes	no	yes
	1:00-2:00 PM	605	608	1213	112	38	112	0.358		yes	no	yes
	2:00-3:00 PM	535	566	1101	109	34	109	0.342		yes	no	yes
Al Turkish Hospital Roundabout	7:00-8:00 AM	397	235	632	108		108	0.432	4.6	no	no	no
	8:00-9:00 AM	281	239	520	134		134	0.536		no	no	no
	1:00-2:00 PM	366	199	565	92		92	0.368		no	no	no
	2:00-3:00 PM	257	219	476	115		115	0.460		no	no	no

Table 52: Compare Between Results after and Before Installing Traffic Lights on Tayaseer Intersection

Lanes, Volumes, Timings
8: Tayaseer Intersection — before installing traffic lights — 06/09/2023

Lane Group	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	80	10	87	14	447	70	132	448	51	13	18	28
Future Volume (vph)	80	10	87	14	447	70	132	448	51	13	18	28
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97				1.00			1.00			0.97	
Frt	0.926				0.982			0.989			0.937	
Flt Protected	0.978				0.999			0.990			0.974	
Satd. Flow (prot)	1646	0	0	0	1501	0	0	1501	0	0	1674	0
Flt Permitted	0.978				0.981			0.788			0.974	
Satd. Flow (perm)	1637	0	0	0	1474	0	0	1193	0	0	1652	0
Satd. Flow (RTOR)	48				20			12			30	
Adj. Flow (vph)	87	11	95	15	486	76	143	487	55	14	20	30
Lane Group Flow (vph)	193	0	0	0	577	0	0	685	0	0	64	0
Turn Type	Prot			Perm	NA		Perm	NA		Perm	Prot	
Protected Phases	8!				2			6			4!	
Permitted Phases				2			6			4		
Detector Phase	8			2	2		6	6		4	4	
Switch Phase												
Minimum Initial (s)	5.0			5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5			22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5			67.5	67.5		67.5	67.5		22.5	22.5	
Total Split (%)	25.0%			75.0%	75.0%		75.0%	75.0%		25.0%	25.0%	
Yellow Time (s)	3.5			3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0			1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0				0.0			0.0			0.0	
Total Lost Time (s)	4.5				4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max			Max	Max		Max	Max		Max	Max	
Act Effct Green (s)	18.0				63.0			63.0			18.0	
Actuated g/C Ratio	0.20				0.70			0.70			0.20	
v/c Ratio	0.53				0.56			0.82			0.18	
Control Delay	29.8				8.9			19.6			20.0	
Queue Delay	0.0				0.0			0.0			0.0	
Total Delay	29.8				8.9			19.6			20.0	
LOS	C				A			B			B	
Approach Delay	29.8				8.9			19.6			20.0	
Approach LOS	C				A			B			B	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 16.8 — Intersection LOS: B
Analysis Period (min) 15

Splits and Phases: 8: Tayaseer Intersection

Lanes, Volumes, Timings
8: Tayaseer Intersection — After installing traffic lights — 06/07/2023

Lane Group	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	80	10	87	14	447	70	132	448	51	13	18	28
Future Volume (vph)	80	10	87	14	447	70	132	448	51	13	18	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)	0%				0%			0%			0%	
Storage Length (m)	0.0	0.0		0.0		0.0	0.0		0.0		0.0	0.0
Storage Lanes	1	0		0		0	0		0		1	0
Taper Length (m)	7.5			7.5			7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.926				0.982			0.989			0.937	
Flt Protected	0.978				0.999			0.990			0.974	
Satd. Flow (prot)	1687	0	0	0	1508	0	0	1505	0	0	1700	0
Flt Permitted	0.978				0.999			0.990			0.974	
Satd. Flow (perm)	1687	0	0	0	1508	0	0	1505	0	0	1700	0
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	71.6				60.1			53.4			59.2	
Travel Time (s)	5.2				4.3			3.8			4.3	
Confl. Peds. (#/hr)	5	5	5	5		5	5		5	5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)					15			15				
Mid-Block Traffic (%)	0%				0%			0%			0%	
Adj. Flow (vph)	87	11	95	15	486	76	143	487	55	14	20	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	193	0	0	0	577	0	0	685	0	0	64	0
Sign Control	Stop				Free			Free			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 92.2% — ICU Level of Service F
Analysis Period (min) 15

Table 53: Compare Between Results after and Before Installing Traffic Lights on The Municipality Roundabout

Lanes, Volumes, Timings
15: The Municipality intersection — After installing traffic lights — 06/09/2023

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations												
Traffic Volume (vph)	48	50	0	0	451	175	81	243	0	114	0	59
Future Volume (vph)	48	50	0	0	451	175	81	243	0	114	0	59
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.99			1.00		0.98		
Frt					0.962					0.954		
Flt Protected		0.950						0.988		0.968		
Satd. Flow (prot)	0	1770	0	0	1554	0	0	1840	0	1701	0	0
Flt Permitted		0.950						0.754		0.968		
Satd. Flow (perm)	0	1725	0	0	1554	0	0	1403	0	1687	0	0
Satd. Flow (RTOR)					54					27		
Adj. Flow (vph)	52	54	0	0	490	190	88	264	0	124	0	64
Lane Group Flow (vph)	0	106	0	0	680	0	0	352	0	188	0	0
Turn Type	Perm	Prot			NA		Perm	NA		Prot		
Protected Phases		4!			2			6		8!		
Permitted Phases	4						6					
Detector Phase	4	4			2		6	6		8		
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0	5.0		5.0		
Minimum Split (s)	22.5	22.5			22.5		22.5	22.5		22.5		
Total Split (s)	23.0	23.0			67.0		67.0	67.0		23.0		
Total Split (%)	25.6%	25.6%			74.4%		74.4%	74.4%		25.6%		
Yellow Time (s)	2.0	2.0			2.0		2.0	2.0		2.0		
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0		1.0		
Lost Time Adjust (s)		0.0			0.0			0.0		0.0		
Total Lost Time (s)		3.0			3.0			3.0		3.0		
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max			Max		Max	Max		Max		
Act Effct Green (s)		20.0			64.0			64.0		20.0		
Actuated g/C Ratio		0.22			0.71			0.71		0.22		
v/c Ratio		0.28			0.61			0.35		0.47		
Control Delay		31.4			8.8			6.2		30.4		
Queue Delay		0.0			0.0			0.0		0.0		
Total Delay		31.4			8.8			6.2		30.4		
LOS		C			A			A		C		
Approach Delay		31.4			8.8			6.2		30.4		
Approach LOS		C			A			A		C		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 13.0 — Intersection LOS: B
Analysis Period (min) 15

Splits and Phases: 15: The Municipality Roundabout

Lanes, Volumes, Timings
15: The Municipality Roundabout — before installing traffic lights — 06/07/2023

Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWU	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	48	50	0	0	451	175	81	243	0	4	110	0
Future Volume (vph)	48	50	0	0	451	175	81	243	0	4	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)		0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0
Storage Lanes		1	0	0		0	0		0		1	0
Taper Length (m)		7.5		7.5			7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.962						0.954	
Flt Protected		0.950						0.988			0.968	
Satd. Flow (prot)	0	1770	0	0	1568	0	0	1840	0	0	1720	0
Flt Permitted		0.950						0.988			0.968	
Satd. Flow (perm)	0	1770	0	0	1568	0	0	1840	0	0	1720	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		47.2			44.3			74.3			62.5	
Travel Time (s)		3.4			3.2			5.3			4.5	
Confl. Peds. (#/hr)	5	5	5	5		5	5		5	5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)					5							
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	52	54	0	0	490	190	88	264	0	4	120	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	680	0	0	352	0	0	188	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type: Other
Control Type: Roundabout
Intersection Capacity Utilization 82.4% — ICU Level of Service E
Analysis Period (min) 15

Table 54: Compare Between Results after and Before Installing Traffic Lights on Al-Tawhid Mosque Roundabout

Lanes, Volumes, Timings
27: Al-Tawhid Mosque intersection — After installing traffic lights — 06/09/2023

Lane Group	NBL	NBT	NBR	SBL2	SBL	SBT	SBR	NEL	NET	NER	NER2	SWR
Lane Configurations												
Traffic Volume (vph)	87	447	42	19	16	481	94	50	14	3	58	44
Future Volume (vph)	87	447	42	19	16	481	94	50	14	3	58	44
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00				1.00			0.98			0.97
Frt		0.990				0.979			0.934			0.865
Flt Protected		0.992				0.997			0.980			
Satd. Flow (prot)	0	1597	0	0	0	1539	0	0	1676	0	0	1611
Flt Permitted		0.839				0.951			0.980			
Satd. Flow (perm)	0	1351	0	0	0	1468	0	0	1671	0	0	1567
Satd. Flow (RTOR)						34			63			761
Adj. Flow (vph)	95	486	46	21	17	523	102	54	15	3	63	48
Lane Group Flow (vph)	0	627	0	0	0	663	0	0	135	0	0	48
Turn Type	Perm	NA		Perm	Perm	NA		Perm	NA			Perm
Protected Phases		2				6			4			
Permitted Phases	2			6	6			4				6
Detector Phase	2	2		6	6	6		4	4			6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5		15.0	15.0			22.5
Total Split (s)	38.0	38.0		37.0	37.0	37.0		15.0	15.0			37.0
Total Split (%)	71.7%	71.7%		69.8%	69.8%	69.8%		28.3%	28.3%			69.8%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		2.0	2.0			3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0		1.0	1.0			1.0
Lost Time Adjust (s)		0.0				0.0			0.0			0.0
Total Lost Time (s)		4.5				4.5			3.0			4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max	Max		Max	Max			Max
Act Effct Green (s)		33.5				33.5			12.0			33.5
Actuated g/C Ratio		0.63				0.63			0.23			0.63
v/c Ratio		0.74				0.71			0.32			0.04
Control Delay		13.7				11.3			12.5			0.0
Queue Delay		0.0				0.0			0.0			0.0
Total Delay		13.7				11.3			12.5			0.0
LOS		B				B			B			A
Approach Delay		13.7				11.3			12.5			
Approach LOS		B				B			B			

Intersection Summary
Cycle Length: 53
Actuated Cycle Length: 53
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 12.1 — Intersection LOS: B
Analysis Period (min) 15

Splits and Phases: 27: Al-Tawhid Mosque Roundabout

Lanes, Volumes, Timings
27: Al-Tawhid Mosque Roundabout — before installing traffic lights — 06/07/2023

Lane Group	NBL	NBT	NBR	SBL2	SBL	SBT	SBR	NEL	NET	NER	NER2	SWR
Lane Configurations												
Traffic Volume (vph)	87	447	42	19	16	481	94	50	14	3	58	44
Future Volume (vph)	87	447	42	19	16	481	94	50	14	3	58	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Grade (%)		0%				0%			0%			
Storage Length (m)	0.0		0.0		0.0		0.0	0.0		0.0		0.0
Storage Lanes	0		0		0		0	0		0		1
Taper Length (m)	7.5				7.5			7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990				0.979			0.934			0.865
Flt Protected		0.992				0.997			0.980			
Satd. Flow (prot)	0	1601	0	0	0	1545	0	0	1705	0	0	1611
Flt Permitted		0.992				0.997			0.980			
Satd. Flow (perm)	0	1601	0	0	0	1545	0	0	1705	0	0	1611
Link Speed (k/h)		50				50			50			
Link Distance (m)		59.4				69.2			35.2			
Travel Time (s)		4.3				5.0			2.5			
Confl. Peds. (#/hr)	5		5	5	5		5	5		5	5	5
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		5				10						
Mid-Block Traffic (%)		0%				0%			0%			
Adj. Flow (vph)	95	486	46	21	17	523	102	54	15	3	63	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	0	663	0	0	135	0	0	48
Sign Control		Yield				Yield			Yield			

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	