State of Palestine دولة فلسطين
وزارة الحكم المحلي
Ministry of Local Government

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

صندوق تطوير وإقراض الهيئات المحلية
Municipal Development & Lending Fund

Integrated Cities and Urban Development Project (ICUD)

Comprehensive Public Transportation Master Plan for the Urban Center of Ramallah and Al-Bireh

Phase 4: Public Transportation Plan Formulation and Review

Volume 2 - Feasibility Analysis

ICUD is jointly implemented by the **Ministry of Local Government (MoLG** and the **Municipal Development and Lending Fund (MDLF)**

Submitted to: **MoLG and MDLF**
Funded by: **World Bank**
May 2021
Prepared by:
CDG, MOVE Mobility, & NCD

community development group
المجموعة الاستشارية للتنمية والاعمار
ARCHITECTS, ENGINEERS & PROJECT MANAGERS

move mobility
smart moving cities

Comprehensive Public Transportation Master Plan for the Urban Area of Ramallah and Al-Bireh

Phase 4: Public Transportation Plan Formulation and Review
Volume 2: Feasibility Analysis

Project data
Client: **Ministry of Local Government (MoLG) and Municipal Development and Lending Fund (MDLF)**
Project location: **Ramallah and Al-Bireh**
Project start date: **05.11.2019**
Authors: **MOVE Mobility, NCD, CDG and Transconsult, documented with MDLF**
Project stage: **Phase 4: Public Transportation Plan Formulation and Review**
Version: **final**

Table of Contents

Volume 2: Feasibility Analysis 5

1. Introduction 5

2. Part 1: Financial Feasibility 6

2.1. Investment Cost 6

2.1.1. Proposed Terminal Space and Usage 7

2.1.2. Shared investment cost among all scenarios 9

a. Land acquisition and rehabilitation 9

b. Terminals' construction cost 9

2.1.3. Investment cost for each Scenario 10

a. Corridors rehabilitation 10

b. Charging options 12

c. Stopping points 13

d. BRT cost 13

2.2. Returns to the municipalities 20

2.3. Other impacts 20

2.4. Operating cost 21

2.5. Fare structure 21

2.6. Recommended actions 22

3. Part II: Environmental Feasibility and Analysis 23

3.1. Introduction 23

3.1.1. Land acquisition and rehabilitation 23

3.1.2. Involuntary Resettlement 23

3.1.3. Economic Activities 24

3.1.4. Traffic 24

3.1.5. Public Facilities 24

3.1.6. Traffic Accidents 24

3.1.7. Ecosystems 25

3.1.8. Air Pollution 25

3.1.9. Water Pollution 25

3.1.10. Soil Contamination 25

3.1.11. Waste 26

3.1.12. Noise and Vibration 26

3.1.13. Other Impacts 26

3.2. Impact Identification and Mitigation Measures 26

4. Part III: Social Feasibility 29

4.1. Summary 29

4.2. Background 30

4.3. Purpose and Scope 30

4.4. Stakeholders 31

4.5. Methodology 32

4.6. Key Findings 32

4.6.1. The Main Variables of Social Feasibility 33

4.6.2. The Typology of the Main Variables 36

4.7. Mitigation Strategies 37

Appendix 1: Public Transportation Lines Distribution among the Proposed Terminals. 43

Appendix 2: Schemes of Options for Segregated Bus Lanes 45

Appendix 3: Environmental Screening of Subprojects 46

Appendix 4: Concept Scope of Work of the Detailed Feasibility Study 49

Volume 2: Feasibility Analysis

1. Introduction

This document is part of a series of documents that together are “The Comprehensive Public Transportation Master Plan for Ramallah-AlBireh Urban area”. The documents in the series are:

- Volume 1: Scenarios and Modeling
- Volume 2: Public Transport Master Plan
- Volume 3: Feasibility Analysis

This report presents the feasibility analysis aspects of the proposed scenarios to improve the public transportation sector in the study area. The technical apsects of the proposed scenarios have been introduced and analysed. However, in order to draw a more comprehensive picture of these scenarios, their feasibility should also be assessed. The feasibility analysis is divided into three parts; these are the finanancial analysis, the environmental impacts, and social feasibility.

In the table below we have summarized the main elements of the studied scenarios including the main corridors, distance between stops, vehicle typology, speed, capacity and interchange points.

Table 1: Summary of the scenarios

	Main corridors	Stops	Vehicle Typology	Speed	Capacity	Interchange
Scenario 1	Jaffa Street - AlEtha Street	300 meters	Bus	15 km	80	City center
Scenario 2A	Jaffa Street - AlEtha Street	500 meters	BRT	18 km	160	City center
Scenario 2B	Jaffa Street - AlEtha Street	500 meters	BRT	19 km	160	North and West terminals
Scenario 3A	Jaffa Street - AlEtha Street / Al Nahda street - Al Quds street	300 meters	Bus	15 km	80 & 50	City center
Scenario 3B	Jaffa Street - AlEtha Street / Al Nahda street - Al Quds street	300 meters	BRT	15 km	160, 80 & 50	City center
Scenario 4	Jaffa Street - AlEtha Street / Al Quds street	500 meters	BRT	18 km	160	City center

The following is a brief description of the proposed scenarios, which were presented in details in Volume 1.

Scenario	Description
1	Scenario 1 consists of the re-organization of the main corridor that connects the city from north to south west. The Key is the inclusion of terminals at the ends of the corridor. The terminals will have the function of receiving and organizing the demand of users at the entrance, circulation within the city and the exit of the city, collecting all the demand of passengers from different routes that come from both the north and the south west. Inside the urban area the passengers will be serviced by (only) two internal public transport routes, one for each corridor, which will have specific operating conditions. It includes providing exclusive lanes for the public transport route that circulates through the established corridors
2	Scenario 2 consists of the re-organization of the main corridor that connects the city from north to south west. Key is the inclusion of terminals at the ends of the corridor. The terminals will have the function of receiving and organizing the demand of users at the entrance, circulation within the city and the exit of the city, collecting all the demand of passengers from different routes that come from both the north and the south west. Inside the urban area the passengers will be served by (only) two internal public transport routes, one for each corridor, which will have specific operating conditions.

3	Scenario 3 consists of the re-organization of the two corridors that provide access to the center of the city from the north/south west corridor and the south corridor. Key is the inclusion of terminals at the ends of the corridors which will have the function of receiving and organizing the demand of users' circulation within the city and the exits, collecting all the demand of passengers from different routes that come from both the north, the south-west and the south. Within the triangle of these terminals the passengers will be served by the public transport route on the corridors, which will have specific operating conditions.
4	Scenario 4 consists of the re-organization of the three corridors that provide access to the center of the city from the north, the south west corridor and the south. Key is the inclusion of terminals at the ends of the corridors which will have the function of receiving and organizing the demand of users' circulation within the city and the exits, collecting all the demand of passengers from different routes that come from both the north, the south-west and the south. They will be supported by only one internal public transport route for each corridor, which will have specific operating conditions.

2. Part 1: Financial Feasibility

2.1. Investment Cost

Depending on the scenario, it is proposed that the more comfortable for passengers and to distribute the traffic through the city to have three main terminal stations (as shown in Figure 1), in addition to one transfer station at the core of the study area to exchange routes. This central station will attract people to the economic activity through the city center, and encourage passengers to tour the core of the urban area of Ramallah-AlBireh. The main terminals are:

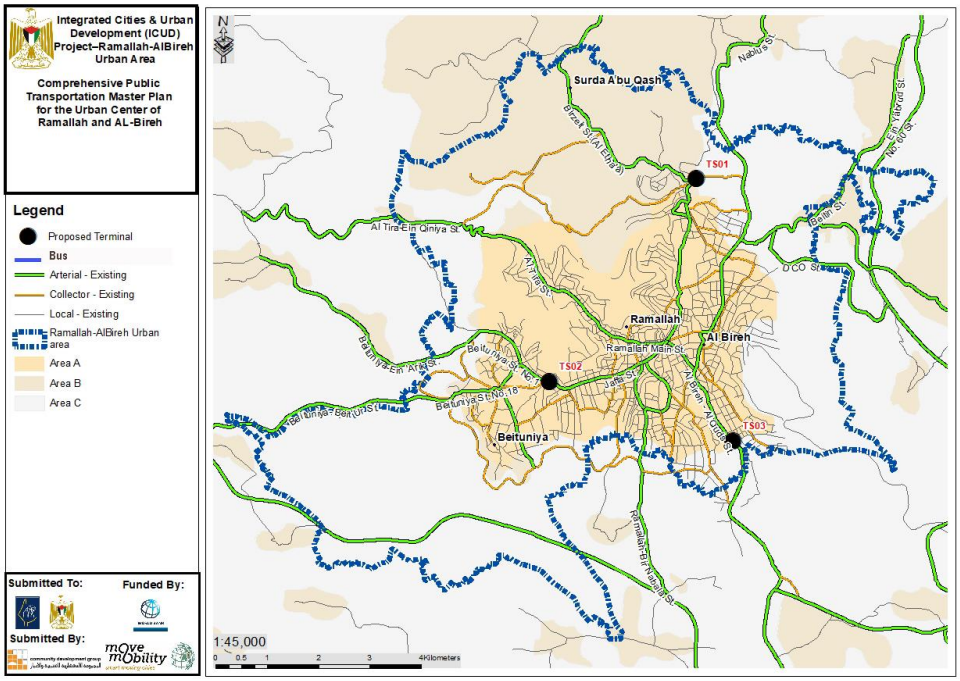


Figure 1: Location of the proposed terminals

» **North Terminal (TS01):** It is located in Al-Bireh area, at its northern border with Surda-Abu Qash, adjacent to the Ring Road. It is a municipality owned land for an approximate area of 8,400 m^2. This station will serve all public transportation lines coming from the north and east directions of the study area.

- **West Terminal (TS02).** It is located near the western border of Ramallah city near Beitunia. It has an approximate area of 9,265 m^2. This land has been acquisitioned by Ramallah Municipality. This terminal will serve all western and southwestern public transportation lines.
- **South Terminal (TS03).** This terminal will serve all public transportation lines south of the study area. It is estimated that it would have an approximate area of 10,000 m^2. It should be mentioned that the suggested location of South Terminal is tentative and should be finalized in cooperation with the Technical Committee.

The three main terminals will junction the centre of the city for passengers to ride and be able to switch the other public transport routes.

2.1.1. Proposed Terminal Space and Usage

The current area provided for all public transportation terminals and stations is approximately 18,000 m^2, distributed over 14 locations. The approximate number of current operating public transportation vehicles are shown in Table 2. However, field surveys and interviews with the drivers and operators showed slightly higher numbers.

Table 2: Number of Operating PT Vehicles and Type in the Study Area

Type of Service	No. of Registered Vehicles
Shared-Taxi – External	1066
Shared-Taxi – Internal	231
Bus – External	133
Bus – Internal	46
Grand Total	**1476**

Source: MOT

The proposed new terminals will serve as hubs for external public transportation lines. Based on the geographic distribution of public transportation lines and their operating vehicles, their approximate distribution among the terminals is shown in Table 3. In principle, external public transportation (PT) lines north of the study area will be using the north terminal, PT lines west and south west of the study area will be using the west terminal, and PT lines south of the study area will be using the south terminal. The specific PT lines and their distributions among the three terminals are provided in the Appendix.

The bus depots will be hosted at the terminals since the buses will park at night where the terminal will be empty of the public transportation vehicles and most other activities. The buses will be distributed among the three terminals. The available land are in each terminal is sufficient to host the buses overnight.

Table 3: Distribution of External Public Transportation Vehicles among Terminals

Terminal	Shared-Taxi	Small Buses	Conventional Buses
North Terminal Total	515	48	11
South Terminal Total	413	26	6
West Terminal Total	138	40	2
Total	**1066**	**114**	**19**

It is estimated that vehicles would be distributed among the origin station (40%), destination station (40%), and on the road (20%). Therefore, the maximum number of PT vehicles that would exist at any time in the terminal is 40% of the total vehicles on the route. The shared-taxi vehicles are the mini-van style (7 seats). The parking space for each vehicle type is approximately:

- Car/Mini-Van = 6.0x2.75 m (=18 m^2)
- Small bus = 8.0x3.0 m (=24.00 m^2),
- Conventional bus = 14.0x4.0 m (=56 m^2).

Furthermore, it is assumed that public transportation vehicles parking space will occupy 60% of the space (since they park in close proximity to each other) and the remaining will be for vehicles' circulation. However, regular parking vehicles occupy approximately 50% of the space, and the remaining is for circulation. Therefore, the estimated required area for public transportation vehicles' parking is shown in Table 4.

Table 4: Area Requirement for Public Transportation Vehicles' Parking

Terminal	North Terminal	South Terminal	West Terminal
Shared Taxis (m^2)	515x(40%)x18 = 3,708	413x(40%)x18 = 2,974	138x(40%)x18 = 994
Small Buses (m^2)	48x40%x24 = 461	26x40%x24 = 250	40x40%x24 = 384
Large Buses (m^2)	11x40%x56 = 246	6x40%x56 = 134	2x40%x56 = 45
Total Vehicles' Area (m^2)	**4,415**	**3,358**	**1,423**
Total Approximate Parking Space @ 60% (m^2)	**7,358**	**5,597**	**2,372**

The approximate land areas of the proposed new terminals are: 8,400 m^2 for the north terminal (TS01), 10,000 m^2 for the south terminal (TS03), and 9,265 m^2 for the west terminal (TS02). These terminals will act as multi-modal hubs with various activities including commercial, service, and park-and ride; therefore, a multi-story building will be required at each site. This will create opportunities as sources of revenue for municipalities. The design of the terminal is not within the scope; however, this should be done in a later stage before implementation.

It is estimated that the constructed structures at each terminal will occupy no more than 40% of the land area. It is also assumed that the structures will be 5 stories (one basement and four floors).

- North Terminal: 3,360 m^2 structures and 5,040 m^2 surface area.
- South Terminal: 4,000 m^2 structures and 6,000 m^2 surface area.
- West Terminal: 3,706 m^2 structures and 5,559 m^2 surface area.

It is assumed that all buses will park at grade, and, if available, the shared-taxis will also park at grade depending on the available land area and layout design, while the remaining, if any, will park in the constructed structure. Furthermore, 20% of the building (one floor) will be used for commercial use, and three floors will be used as a park-and-ride facility.

The estimated space usage at each terminal would be the following:

North Terminal:

- Surface Area = 5,040 m^2; distributed as 1,178 m^2 to accommodate all buses, and the remaining area (3,862 m^2) can comfortably accommodate all the shared-taxis.
- One Floor Area = 3,360 m^2; three floors could be used for park-and-ride for a total area of 10,080 m^2. Parking space for regular vehicles is 2.60 x 5.5 □14.5 m^2 for 50% of the floor space. Therefore, three floors can accommodate 279 vehicles.
- One floor area for commercial use.
- Therefore, a total of four floors is needed.

South Terminal:

- Surface Area = 6,000 m^2; distributed as 640 m^2 to accommodate all buses, and the remaining area (5,360 m^2) can comfortably accommodate all the shared-taxis.

- One Floor Area = 4,000 m^2, therefore three floors for park-and-ride for a total area of 12,000 m^2. Parking space for regular vehicles is 2.60 x 5.5 □14.5 m^2 for 50% of the floor space. Therefore, three floors can accommodate 309 vehicles.
- One floor area for commercial use.
- Therefore, a total of four floors is needed.

West Terminal:

- Surface Area = 5,559 m^2; distributed as 715 m^2 to accommodate all buses, and the remaining area (4,844 m^2) can accommodate all the shared-taxis.
- One Floor Area = 3,706 m^2; therefore, three floors for park-and-ride for a total area of 11,118 m^2. Parking space for regular vehicles is 2.60 x 5.5 □15 m^2 for 50% of the floor space. Therefore, two floors can accommodate 333 vehicles.
- One floor area for commercial use.
- Therefore, a total of four floors is needed.

The investment cost estimations based on the proposed scenarios are described below**.**

2.1.2. Shared investment cost among all scenarios

a. Land acquisition and rehabilitation

For the above-mentioned terminals, three pieces of land were allocated with different estimated square areas. The three assigned pieces of land will be part of the system that needs land rehabilitation and the construction of the terminals bodies to serve the terminal stations and for other purposes. These lands are located at the perimeter of the study area; therefore, land cost is much less than those for the core study area. It is estimated that, on average, the cost of each of land unit of (1000 m^2) for these areas is approximately $600,000; the estimated proposed land costs are presented in Table 5. In addition, those lands need rehabilitation to be ready for construction.

Table 5: Land Acquisition and Preparation

Item	Cost item	Station	Estimated area m^2	Cost per m^2 USD	Total cost USD	Notes
Terminal Land Area	Land Acquisition Cost	TS01 (1) (Al-Bireh)	8,400	600	5,040,000	Based on the estimated market prices
		TS02 (2) (Ramallah)	9,265	600	5,559,000	
		TS03 (Jabaa)	10,000	600	6,000,000	
Land Area Preparation and Rehabilitation					1,500,000	
Total					**18,099,000**	

(1) This land is a public land owned by the municipality of Al-Bireh; therefore, no payment is needed.
(2) This land has been acquisitioned by the municipality of Ramallah.

b. Terminals' construction cost

Through the proposed pieces of lands, a construction scheme was proposed, depending on the land area, the number of public transportation vehicles using the terminal, the number of park-and-ride vehicles, and the level of commercial uses desired in these terminals. More than one building structure could be constructed, depending on the architectural design of the facility and the level of demand.

The square areas and the cost of the construction for each station presented in Table 6. The city center terminal needs to be rehabilitated without any hard construction. It is estimated that construction will be on no more than 40% of the surface area of each land. The construction cost for the main terminals is estimated

at \$700 per m^2 (since large span floors would be constructed), while for the central station, the cost is estimated at \$250 per m^2, since no hard construction in anticipated.

Table 6: Estimated Terminals' Construction Cost

Item	Station	Estimated Construction Area m^{2*}	Cost per m^2 USD	Total Cost USD	Notes
Terminal Land Area	TS01 (Al-Bireh)	13,440	700	9,408,000	Based on the existing market prices
	TS02 (Ramallah)	14,824	700	10,376,800	
	TS03 (Jabaa)	16,000	700	11,200,000	
	City Center Station	1,500	250	375,000	
	Total			**31,359,800**	

*Construction area was estimated based on land area and number of vehicles that might use the terminals.

2.1.3. Investment cost for each Scenario

a. Corridors rehabilitation

Since segregated bus lanes are to be provided along the main routes leading to the three terminal; therefore, the remaining road width could fit either one lane (with one direction in the vicinity of the city center), as shown in Figure 2, or (at least) two full lanes (depending on the available right-of-way); one in each direction.

The specific layout of the lane distribution along each corridor will be determined in the detailed design of the public transportation routes and streets. However, conceptually, the location of the segregated bus lanes could be on the right, left, or center of the particular PT streets. This might vary from one segment to another along the same street while crossing intersections, and will vary from one street to another. The particular location will vary depending on the street's topology, stops, and traffic flow characteristics. Again, this should be determined in the detailed design stage of the project, which is beyond the scope of this assignment. The schematic options for such layout is provided in the Appendix.

Within the core of the urban area, roadways' right-of-way is limited (approximately 16 – 20 m). In addition, a no-car zone is proposed (as detailed in Volume 3). For those roadway segments, two bus lanes and only one additional lane (for commercial and emergency use) are proposed. On the other hand, outside the core area and along the major bus lines, roadways are relatively wide reaching 30-m right-of-way along Jerusalem Street. Therefore, two regular lane in both direction are proposed, in addition to the segregated bus lanes.

In the vicinity of the urban area core, the bus lanes, car lanes, and the middle island will certainly need to be rehabilitated. The distance along these routes from and to the three terminals were quantified. It is estimated that on average, the bus/BRT lanes (6.0 - 7.0 m), the middle island (1.5 - 2.5 m for bus and 2.5 for BRT), and one car lane (3.0 – 3.5 m), for a total average width of 11.5 m, need to be rehabilitated. The remaining street areas (sidewalk and existing lanes) are already available and need no rehabilitation.

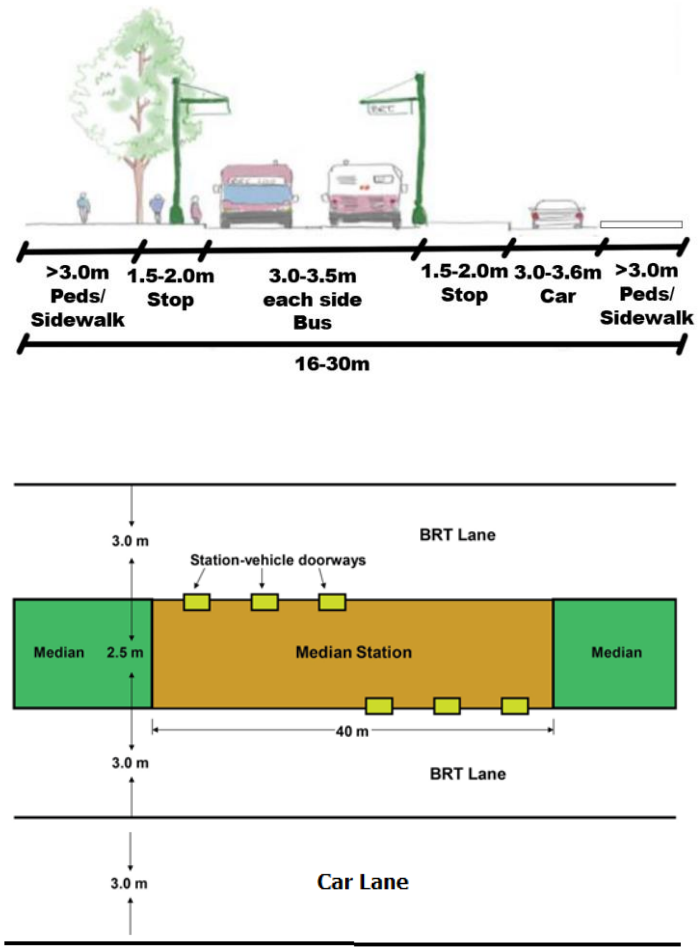


Figure 2: Schematic layout options of the Segragated Bus/BRT Lane

The roads to be rehabilitated may range from three lanes (2 bus lanes and one for cars) to four lanes (2 bus lanes and 2 car lanes), depending on the existing widths/right-of-way of the streets. The lengths of road segments are shown in Figure 3. The following segments can accommodate four lanes: (Bir Zeit (Al Ersal) Street, Yaffa Street, and Jerusalem Street). The average rehabilitation cost of 1 kilometer is $300,000 for bus lanes. However, BRT corridors are capital-intensive projects requiring busway construction, stations, traffic signals, real-time information displays, fare payment systems, vehicles, and new vehicle charging or maintenance facilities. Therefore, its cost could reach $1,000,000 for BRT lanes. The estimated costs are shown in Table 7.

Table 7: Corridors Rehabilitation Cost

Scenario	Route (km)	Cost per km, USD	Total, USD
1	6.5	300,000	1,950,000
2A	6.5	1,000,000	6,500,000
2B	10.0	1,000,000	10,000,000
3A	12.0	300,000	3,600,000
3B	6.5	1,000,000	6,500,000
	5.5	300,000	1,650,000
4	10.0	1,000,000	10,000,000

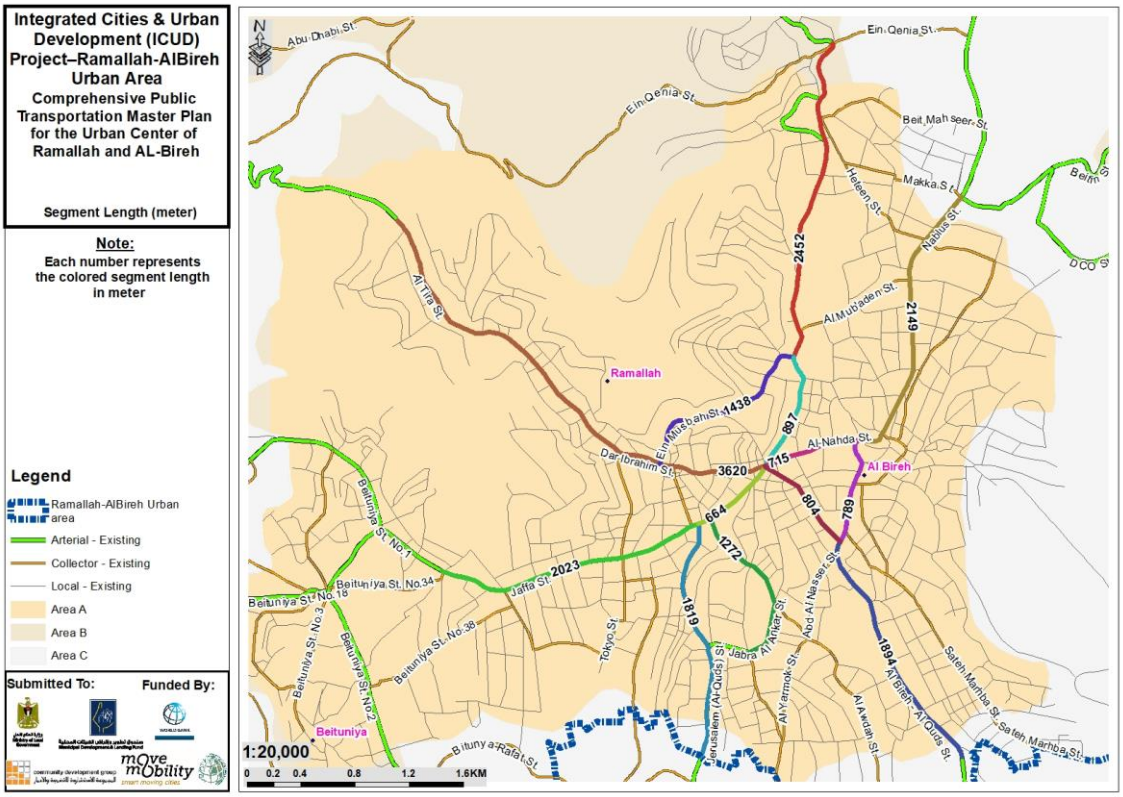


Figure 3: Segment lengths of proposed Public Transportation Routes

b. Charging options

Along with the trend of using clean energy, and reducing pollution and noise, using electric transportation regardless the choice of buses or other alternatives. It is essential there to have charging stations, each per terminal site. The charging stations will work mainly overnight where the “buses” in sleep mode. The “buses” will be distributed over nights to the three terminals.

The charging stations depend on the batteries, charging mechanism, and technology used. The charging scenario is once per bus per day with appropriate batteries. Based on the modern technology, each charge station can charge three buses for an approximate time of three hours. Therefore, the neededn number of charging station were estimated accordingly. The full cost per charge station is slightly less than $100,000 including construction and shelter. Table 8 illustrates the number of buses, charging station, and the total cost over the three period of prediction 5, 10, and up to 15 years.

Table 8: Overnight Charger Cost

	Scenario	2A	2B	3A	3B	4
Up to 5 years	Number of Buses	18	23	65	45	28
	Number of charging Stations	6	8	22	15	9
	Cost per station USD	100,000	100,000	100,000	100,000	100,000
	Total USD	600,000	766,667	2,166,667	1,500,000	933,333

	Scenario	2A	2B	3A	3B	4
Up to 5-10 years	Number of Buses	24	45	79	53	49
	Number of charging Stations	8	15	26	18	16

	Cost per station USD	100,000	100,000	100,000	100,000	100,000
	Total USD	800,000	1,500,000	2,633,333	1,766,66	1,633,333

Up to 10-15 years	**Scenario**	**2A**	**2B**	**3A**	**3B**	**4**
	Number of Buses	26	52	95	63	59
	Number of charging Stations	9	17	32	21	20
	Cost per station USD	100,000	100,000	100,000	100,000	100,000
	Total USD	866,667	1,733,333	3,166,667	2,100,00	1,966,667

c. Stopping points

Through the proposed corridors, the stopping points (stops) were distributed with 300 (for buses for scenarios 1 and 3) to 500 meters (for BRT for scenarios 2 and 4). BRT stops require special features; therefore, it is estimated cost is $20,000, while estimates for regular bus stops is $7,500. The total and number of stopping points and the costs were considered, as presented in Table 9.

Table 9: Stopping Points

Scenario	Route KM	Distance per Stopping point, "meter"	Stopping point numbers	Cost per unit, USD	Total, USD
1	6.5	300	22	7,500	165,000
2A	6.5	500	13	20,000	260,000
2B	10.0	500	20	20,000	400,000
3A	12.0	300	40	7,500	300,000
3B	6.5	500	13	20,000	260,000
	5.5	300	19	7,500	142,500
4	10.0	500	20	20,000	400,000

d. BRT cost

The total cost of BRT buses and regular buses depends on the proposed scenario. The following tables illustrate the total investment in BRT buses for both 160 and 80 passengers, and for 50 passengers' buses.

Table 10: Summary of BRT / Bus Cost Per Scenario

Scenario	2-A

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus - Required	Investment cost per bus	Total Investment cost - Bus
Up to 5 years	I01_Coming	18	3.3	160	20	8	66	2733	6	750,000	4,500,000
	I01_Coming	16	3.3	160	15	6	49.5	1929	4	750,000	3,000,000
	I07_Coming	24	3.2	160	13.3	7	42.67	1678	5	750,000	3,750,000
	I07_Coming	20	3.2	160	8	4	25.6	1305	3	750,000	2,250,000
	Total		13				183.77	7645	18.0		13,500,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost
Up to 5-10 years	I01_Coming	18	3.3	160	24	10	79.2	3104	7	750,000	5,250,000
	I01_Coming	16	3.3	160	17.1	6	56.57	2191	5	750,000	3,750,000
	I07_Coming	24	3.2	160	17.1	9	54.86	1906	7	750,000	5,250,000
	I07_Coming	20	3.2	160	15	7	48	1463	5	750,000	3,750,000
	Total		13.0				238.6	8,664.0	24		18,000,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost
Up to 10-15 years	I01_Coming	18	3.3	160	20	8	66	3046	6	750,000	4,500,000
	I01_Coming	16	3.3	160	20	7	66	2480	5	750,000	3,750,000
	I07_Coming	24	3.2	160	24	12	76.8	2722	10	750,000	7,500,000
	I07_Coming	20	3.2	160	15	7	48	2132	5	750,000	3,750,000
	Total		13				257	10,380	26		19,500,000

Scenario	2-B

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5 years	I01_Coming in	38	6.5	160	20	15	130	4038	13	750,000	9,750,000
	I01_Coming out	40	6.5	160	15	12	97.5	3607	10	750,000	7,500,000
	Total		13				228	7,645	23		17,250,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5-10 years	I01_Coming in	38	6.5	160	40	29	260	4567	25	750,000	18,750,000
	I01_Coming out	40	6.5	160	30	23	195	4097	20	750,000	15,000,000
	Total		13				455	8,664	45		33,750,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 10-15 years	I01_Coming in	38	6.5	160	40	29	260	5178	25	750,000	19,000,000
	I01_Coming out	40	6.5	160	40	30	260	5202	27	750,000	20,000,000
	Total		13				520	10,380	52		39,000,000

Scenario 3-A

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5 years	I01_Coming in	19	3.3	80	40	16	132	2733	13	450,000	5,850,000
	I01_Coming out	17	3.3	80	30	11	99	1929	9	450,000	4,050,000
	I07_Coming in	25	3.2	80	24	12	76.8	1678	10	450,000	4,500,000
	I07_Coming out	21	3.2	80	15	7	48	1305	5	450,000	2,250,000

	I02_Coming in	17	2.8	50	30	11	84	1205	9	250,000	2,250,000
	I02_Coming out	15	2.8	50	24	8	67.2	1230	6	250,000	1,500,000
	I04a_Coming in	15	2.6	80	30	10	78	1973	8	450,000	3,600,000
	I04a_Coming out	13	2.6	50	30	9	78	1284	7	250,000	1,750,000
	Total		23.8		223	84	663	13337	67		25,750,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5-10 years	I01_Coming in	19	3.3	80	60	24	198	4210	19	450,000	8,550,000
	I01_Coming out	17	3.3	80	40	15	132	4202	11	450,000	4,950,000
	I07_Coming in	25	3.2	80	40	20	128	2948	17	450,000	7,650,000
	I07_Coming out	21	3.2	80	24	11	76.8	1665	8	450,000	3,600,000
	I02_Coming in	17	2.8	50	30	11	84	1262	9	450,000	4,050,000
	I02_Coming out	15	2.8	50	30	10	84	2030	8	450,000	3,600,000
	I04a_Coming in	15	2.6	80	17.1	6	44.57	1230	4	450,000	1,800,000
	I04a_Coming out	13	2.6	50	15	5	39	791	3	450,000	1,350,000
	Total		23.8		256.1	102	786.37	18338	79		35,550,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 10-15 years	I01_Coming in	19	3.3	80	60	24	198	4429	19	450,000	8,550,000
	I01_Coming out	17	3.3	80	60	22	198	4048	17	450,000	7,650,000
	I07_Coming in	25	3.2	80	40	20	128	3170	17	450,000	7,650,000
	I07_Coming out	21	3.2	80	30	13	96	2722	11	450,000	4,950,000
	I02_Coming in	17	2.8	50	30	11	84	1393	9	250,000	2,250,000
	I02_Coming out	15	2.8	50	30	10	84	1319	8	250,000	2,000,000
	I04a_Coming in	15	2.6	80	30	10	78	1909	8	450,000	3,600,000
	I04a_Coming out	13	2.6	50	40	12	104	1939	9	250,000	2,250,000
			23.8		320	122	970	20929	95		38,900,000

Scenario	3-B

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5 years	I01_Coming in	19	3.3	160	20	8	66	2733	6	600,000	3,600,000
	I01_Coming out	17	3.3	160	15	6	49.5	1929	4	600,000	2,400,000
	I07_Coming in	25	3.2	160	13.3	7	42.67	1678	6	600,000	3,600,000
	I07_Coming out	21	3.2	160	8.6	4	27.43	1305	3	600,000	1,800,000
	I02_Coming in	17	2.8	50	30	11	84	1205	9	250,000	2,250,000
	I02_Coming out	15	2.8	50	24	8	67.2	1230	6	250,000	1,500,000
	I04a_Coming in	15	2.6	80	30	10	78	1973	8	450,000	3,600,000
	I04a_Coming out	13	2.6	80	17.1	6	44.57	1284	4	450,000	1,800,000
			23.8		158	60	459.37	13337	45		20,550,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5-10 years	I01_Coming in	19	3.3	160	30	12	99	4210	10	600,000	6,000,000
	I01_Coming out	17	3.3	160	24	9	79.2	4202	7	600,000	4,200,000
	I07_Coming in	25	3.2	160	24	12	76.8	2948	10	600,000	6,000,000
	I07_Coming out	21	3.2	160	13.3	6	42.67	1665	5	600,000	3,000,000
	I02_Coming in	17	2.8	50	30	11	84	1262	9	250,000	2,250,000
	I02_Coming out	15	2.8	50	30	10	84	2030	8	250,000	2,000,000
	I04a_Coming in	15	2.6	80	17.1	6	44.57	1230	4	450,000	1,800,000
	I04a_Coming out	13	2.6	80	10	3	26	791	2	450,000	900,000
			23.8		178.4	69	536.24	18338	53		26,150,000

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 10-15 years	I01_Coming in	19	3.3	160	40	16	132	4429	13	600,000	7,800,000
	I01_Coming out	17	3.3	160	30	11	99	4048	9	600,000	5,400,000
	I07_Coming in	25	3.2	160	20	10	64	3170	8	600,000	4,800,000
	I07_Coming out	21	3.2	160	20	9	64	2722	7	600,000	4,200,000
	I02_Coming in	17	2.8	50	30	11	84	1393	9	250,000	2,250,000
	I02_Coming out	15	2.8	50	30	10	84	1319	8	250,000	2,000,000
	I04a_Coming in	15	2.6	80	30	10	78	1909	8	450,000	3,600,000
	I04a_Coming out	13	2.6	80	24	8	62.4	1939	5	450,000	2,250,000
			23.8		224	85	667.4	20929	65.2		32,300,000

Scenario	4

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5 years	I01_Coming North-	38	6.5	160	20	15	130	4038	13	750,000	9,500,000
	I01_Coming South	40	6.5	160	15	12	97.5	3607	10	750,000	7,500,000
	I04a_Coming in	15	2.6	160	15	5	39	1973	4	750,000	2,812,500
	I04a_Coming out	13	2.6	160	9.2	3	24	1284	2	750,000	1,495,000
	Total	106	18			35	291	10,902	28	3,000,000	21,307,500

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 5-10 years	I01_Coming North-	38	6.5	160	40	29	260	4567	25	750,000	19,000,000
	I01_Coming South	40	6.5	160	30	23	195	4097	20	750,001	15,000,020
	I04a_Coming in	15	2.6	160	9.2	4	24	1230	2	750,002	1,725,005
	I04a_Coming out	13	2.6	160	5.2	2	13.57	791	1	750,003	845,003
	Total	106	18	640	84	58	493	10,685	49		36,570,028

	Route	Cycle time	Route length (Km)	Capacity	Frequency	Fleet	Total Km	Boarding	Bus	Investment cost per bus	Total Investment cost - Bus
Up to 10-15 years	I01_Coming North-	38	6.5	160	40	29	260	5178	25	750,000	19,000,000
	I01_Coming South	40	6.5	160	40	30	260	5202	27	750,000	20,000,000
	I04a_Coming in	15	2.6	160	15	5	39	1909	4	750,000	2,812,500
	I04a_Coming out	13	2.6	160	13.3	4	34.67	1939	3	750,000	2,161,250
	Total	106	18	640	108	68	594	14,228	59		43,973,750

2.2. Returns to the municipalities

By considering the cost of construction of the system, the localities will gain both one-time revenues "eviction amount", which is amount paid before occupying the space, and recurring revenues, which is the annual rent. According to the existing market conditions and the risk margin, an estimation of both the one-time revenues "eviction amount", and recurring revenues were estimated. The existing market prices at the core of the study area where the public transportation terminals are currently located were obtained. However, since the proposed stations are located at the outskirts of the study area, their prices were estimated as one-third of those in the study area core.

Out of the total constructed area, 20% were allocated for commercial purposes; of which 60% of the space is considered as the actual occupied area while the rest (40%) is not actually occupied (corridors, stairs, service facilities, etc.). This allocated area (20%) x (60%) is the subject of the "eviction amount" revenues and rent revenues, as presented in Table 11. Therefore, localities "municipalities" can use the "eviction amount" as a fund for the construction cost, and can use the recurring annual rent to cover the operating costs of the terminals areas.

The annual rent was estimated based on 30-35 m^2 area per location/shop for an estimated 6000-7000 USD of annual rent. Therefore, rent is approximately 200 USD per m^2.

Table 11: Returns to Municipalities

Item	Station	Terminal Area (m^2)	Commercial use (m^2)	Revenues per m^2 (USD)	Total annual income (USD)
Annual Rent	TS01	16,800	2,016	200	403,200
	TS02	18,530	2,224	200	444,800
	TS03	20,000	2,400	200	480,000
Total					**1,328,000**
One-time Payment	TS01	16,800	2,016	7,500	15,120,000
	TS02	18,530	2,224	7,500	16,680,000
	TS03	20,000	2,400	7,500	18,000,000
Total					**49,800,000**

2.3. Other impacts

Existing taxis: It is expected that the existing owners of the transportation service will resist the implementation of such a plan, where they can lose their source of living by losing operating their public vehicles. It is recommended here that all the existing owners of such vehicles will be joining in "Private Shareholding Company" that will have the ownership of the new "buses" or the choice of operating the new system (as drivers, for example), and still be the owners of the new system. The following options were suggested for the existing taxi offices and owners:

Approximately 250 taxis are now working through the internal routes of the target area, approximately 30% of them belongs to taxis offices (source: MOT), which is around 75 taxis. Therefore, with the cooperation of MOT, those could be relocated and work through the targeted areas as office taxis.

The rest of about 175 taxis (or taxi drivers) have the following alternatives:
Can be enrolling within the new private sharehodling company in the new system and be shareholders.

With governmental assistance they could:

- Be transferred to new routes “lines” with proper arrangement by the MOT.
- Be added to the existing taxi offices within the targeted area.
- Be part of the employees of the new company as drivers, administrative employees, technicians, ticketing, etc. Some of the drivers are educated persons and have university degrees (Source: MOT); therefore, could be employed in various services of the new system.
- Be properly trained through a targeted capacity building program so as to be part of the new system.

It should be noted that no one single option will work for all drivers and owners. Therefore, this has to be dealt with individually.

2.4. Operating cost

The proposed option is that a private sector investment will own and operate the system. The private sector will be able to follow the development of the new technology and be more efficient to operate the system.

A detailed feasibility study for all the investment, revenues, and operating expenses shall be conducted for the benefit of the private sector investors. Some of the components belong to municipalities as the case of the terminal station and its assets. However, we have to be keen about which components belong to the private investors and those for municipalities.

2.5. Fare structure

Conceptually, the fare structure for the proposed public transportation system can be described as follows:

Items	Formula	Notes
Operating cost – variable-direct	Add	Power, oil
Operating cost – variable - indirect	Add	Maintenance, cleaning, etc.
Fixed operating cost	Add	Staff, rent, insurance, etc.
Depreciation	Add	Based on the cost and useful life using the straight line method
Total operating cost	Sum of above	
Return on investment	Add	% of the invested capital
Total required revenues	=	
Total passengers per year	Divide	Number of passengers
Fare per passenger	=	Expected fare per passenger to fulfill the target objective of the project

Currently, the intra-city fare of the public transportation lines ranges (2.5 – 3.0 ILS), covering line from Beituniya, Qalandia, and Al-Ersal to the city center. Therefore, when the new system starts, it is estimated that the fare should not exceed the current prices so that the system remains competitive and be able to attract additional passengers. However, if the passenger will use the public transportation for the whole route from the three main terminals, additional fair is assumed. The details of such fair should be part of the detailed financial feasibility study to be conducted before implementing the system. Based on that and for the purpose of the detailed feasibility study, the 2.5 or 5 ILS can be used to estimate the total revenues.

Based on the current passenger demand, it is expected once the system is operational it may not be able to operate at a profit. Therefore, government subsidies in the earlier years become necessary to compensate for the deficit, and for the system to operate at a good service quality so that it would attract additional passengers. Therefore, the governmental subsidies should be deducted from the total cost. After few years of operation, when the system becomes successful and additional riders are attracted, it is expected that the system would be able to operate for profit; therefore, the government subsidies could be reduced gradually. Such a formula should be laid out in the detailed financial study.

2.6. Recommended actions

Before implementing the system, there is a need for a comprehensive and detailed feasibility study for the project with more specifications about all system components including the detailed operational assumptions for both operating costs and revenues to encourage the private sector to invest and be part of the system. Table 12 illustrates an example of some operating expenses and revenues components. The specific values of these components are not available at the current time.

Also investors have to assess the returns and both the financial and economic indicators “NPV, IRR, EPS” that convince the investors to pay back their investment in a reasonable period of time.
In order to give support for the project including the concept of government subsidy at the beginning till the system kicks off and attracts more riders and becomes more feasible, the following are some actions that can help in the first phase of the project as governmental support:

- Reduction or exemption of all or part of the custom fees for the BRT or bus system, charging stations, and any other imported equipment for the completion and operating the project.
- Offer tax exemption based on the investment incentives that can be given to the new investment projects.
- Offer special price for electricity where the main source of the power will be the electricity.
- Governmental support to cover specific portion of the fare at the first two years of the operations and till the project runs at the breakeven mode.

Table 12: Samples of operating expenses and revenues for the system “Feasibility Requirements”

Item	Measurement units	Description
Invested Capital		
Vehicle depreciation	% of value of vehicle / year	Over 12 years – straight line depreciation method
Cost of capital	Invested capital and the effective annual interest rate on invested capital	The cost of investment in addition to the cost of borrowed funds and working capital
Fixed Operating Costs		
Driver salaries	Employees / vehicle	Salaries including all employees benefits
Salaries of mechanics	Employees / vehicle	
Salaries of administrative personnel and supervisors	Employees / vehicle	
Other administrative expenses	% of variable costs + maintenance + personnel	To be addressed based on the operating plan and the structure of the new organization
Fleet insurance	% of value of vehicle / year	Based on the fleets specifications and cost
Variable Operating Costs		
Charging electricity	Per 100 km	Based on the fleets specifications
Tires New tires Rethreading	Units / 100,000 km Units / 100,000 km	Based on the fleets specifications

Lubricants Motor, batteries Transmission Differential Grease	Quarts of gallon / 10,000 km Quarts of gallon / 10,000 km Quarts of gallon / 10,000 km Kilograms / 10,000 km	Based on the fleets specifications
Maintenance	% of value of vehicle / year	Based on the fleets specifications
Revenues		
Number of passengers on annual basis	Passengers	Base on the existing actual passengers and the estimation for the coming periods
Fare per passengers	ILS per passenger	Also based on the estimation of passengers growth trend in the coming periods
Return on investment		
Return on investment	% on the invested capital	To be added on annual basis so as to assess the predicted revenues that is able to fulfil the goal of the project

3. Part II: Environmental Feasibility and Analysis

3.1. Introduction

Based on the characteristics presented in prefeasibility study for the three alternative transportation modes; BRT, LRT and TTS, it is clear that the TTS is a preferable option over the BRT or LRT in the corridor connection niche of transport as well as the city shaping niche of urban planning. Saying this, the investment to implement a BRT system is far less than an LRT system. LRT attracts more people and has less noise and pollution than the diesel version of the buses; however, the electrical bus has the same quality in terms of noise and pollution. If the LRT is used with the highest capacity, then the operating cost will be lower than the BRT system. The investment in the TTS is the highest and the required passenger capacity is high and not available at the time being. Compromising the relatively little increase in the noise caused by BRT as compared to TTS, it has the lowest capital cost while achieving the objective of this project; the transportation technical study recommended the BRT system. According to the MDLF procedure (Environmental and Social Management Framework (ESMF) 2017) of categorizing the environmental impact of project, then the environmental screening of subprojects and the environmental management checklist is shown in Appendix 1.

The potential environmental impacts of the BRT system on the project are presented here.

3.1.1. Land acquisition and rehabilitation

For the above-mentioned terminals, three pieces of land were allocated with different estimated square areas. The three assigned pieces of land will be part of the system that need both the rehabilitation of the land and the construction of the terminals structures and facilities to serve the terminals functions and for commercial purposes as well. These lands are located at the perimeter of the study area; therefore, land cost is much less than those for the core study area.

3.1.2. Involuntary Resettlement

For the roads leading to the proposed three terminals, the lanes and the island in the middle of the road need to be rehabilitated and may pose a risk of resettlement. The distance through the lanes from and to the three terminals were quantified per square meters area. The roads to be rehabilitated may range from three lanes (two bus lanes and one for cars) to four lanes (two bus lanes and two car lanes), depending on the

existing widths of the streets Hence it is essential to check for the Right of Way (ROW) regulation if the selected roads need any enlargement and hence an involuntary resettlement is needed.

The following mitigations measures can be applied:

- Try to minimize property expropriation and resettlement to the practical extent byimproving BRT design.
- Prepare an Initial Resettlement Plan to deal with compensation and resettlement issues.
- Follow Palestinian legislation and best practices, as well as World Bank ESMF for compensation and resettlement, ESS5.

3.1.3. Economic Activities

As was proposed before, the BRT proposed route is done mostly by private operators. One of the impacts will be the reduction of routes/trips for these transporters, which could lead to a reduction of income for these operators. As a positive impact, the project will generate employment during the construction phase. Construction jobs can be an important area of employment for unskilled labor groups.

Mitigation measures:

- Involve affected drivers in stakeholder meetings.
- Implement job-creating program for drivers.

3.1.4. Traffic

Overall, the project is expected to have a positive impact on traffic by promoting public mass transportation. However, the primary negative impacts are associated with the construction phase, such as temporary disruption to the local traffic in the working area.

Mitigation measures:

- The construction works should be planned to minimize impacts on local traffic.
- Providing a bypass road or avoiding construction works during peak hours.

3.1.5. Public Facilities

All public infrastructure along roads are to be rehabilitated such as street lights, traffic signals and signs, bus stops, and garbage containers, etc.; they may have to be displaced if they interfere with the construction.

Mitigation measures:

- Consult and coordinate with relevant public organizations about the relocation offacilities.
- Restore the public facilities if they are damaged during construction.

3.1.6. Traffic Accidents

Construction vehicles and heavy machinery will be used during the construction phase, traveling from the construction yard to the construction sites. This may increase probability of road accidents with other vehicles and pedestrians.

During the operational phase, the BRT system may initially increase the risks of accidents when pedestrians and other vehicles are not yet used to the system. However, the separation of public transport vehicles from mixed traffic is typically employed to make a new BRT operate efficiently, reducing the risks of accidents.

Mitigation Measures:

- Safe operation of construction vehicles.

- Improvements to pedestrian crossings and traffic signage.
- Training for the BRT operators on safe operation.
- Awareness campaigns.

3.1.7. Ecosystems

The project area is in an urban area, with little vegetation or natural habitats. However, once the project is to be implemented there is a need to check for any patch of vegetation close to the suggested terminal areas. This could affect the ecosystem as the vegetation patch serve as air purification. Also, there is a need to check if there are any small agricultural areas used by local people which may be lost.

Mitigation measures:

- Relocation/redesign of the BRT terminal to avoid patch of vegetation.
- If this is not possible, reduce the terminal footprint to minimize the impact.
- Compensate for crops loss.

3.1.8. Air Pollution

During the construction phase an increase in pollutant emissions from construction vehicles is expected, which will affect air quality in the project area. However, during the operation phase, this impact will reverse, and air quality would be improved by the BRT system, especially if cleantechnologies are used to run the buses. With a reduction in the number of private transport vehicles and low capacity shared taxis and an increase in new vehicles with clean technologies, air quality will be improved, and public health would be improved though a reduction in respiratory illnesses caused by these emissions.

Mitigation measures:

- During construction, emission of air pollutants should be minimized by using low-emission machines and keeping good maintenance.
- The amount of emissions should comply with Palestinian legal standards for airquality.
- Ensure that the BRT system to be implemented uses clean technologies.
- Encourage mode shifting from private vehicles to public transport.
- Monitor air quality.

3.1.9. Water Pollution

During the construction phase, liquid wastes that are not properly treated may pollute surface and underground water resources. Special attention must be paid to runoff water from construction sites, to prevent any contamination of the nearby region of the BRT.

Mitigation measures:

- Waste oil, other lubricants, and industrial solvents should be recycled or disposed in an approved manner.
- Proper drainage systems should be constructed.

3.1.10. Soil Contamination

Similar to the impact above, during the construction phase, liquid wastes that are not properly treated may contaminate soil.

Mitigation measures:

- Waste oil, other lubricants, and industrial solvents should be recycled or disposed in an approved manner according to EQA regulation for hazardous waste management.
- Proper drainage systems should be constructed.

3.1.11. Waste

During the construction phase, various types of solid waste may be generated.

Mitigation measures:

- A waste management plan should be created before construction.
- Solid wastes should be recycled or disposed in an approved manner.
- Ensure the BRT stations and terminals are equipped with waste bins.

3.1.12. Noise and Vibration

During the construction phase, noise and vibration levels may increase temporarily due to the use of machinery and other construction equipment. However, during the operational phase, noise levels are expected to decrease.

Mitigation measures:

- Respect noise levels as stated in the Palestinian legislation.
- Do not conduct construction works during the night period.
- Minimize the construction time close to sensitive receptors like hospitals and schools.
- Employ noise dampening devices.
- Encourage shifting from private vehicles to public transport.

3.1.13. Other Impacts

It is expected that the existing owners of the transportation service will resist the implementation of such a plan, if it is implemented just like a technical “hardware” step. After all they can lose their source of living by losing operating their public vehicles. On the other hand, it could be arranged that the drivers will stay on board. This way the public transport professionals of today and yesterday will be “partners in change” for the public transport in Ramallah-Al Bireh urban area. It is recommended here that all the existing owners of such vehicles could join in “Private Shareholding Company” that will have the ownership of the new “buses” or the choice of operating the new system (as drivers, for example), and still be the owners of the new system. Other options are also available for these owners.

3.2. Impact Identification and Mitigation Measures

The list below is the brief summary of potential social/environmental impacts of the BRT project that are identifiable at this stage. Potential mitigation measures were also identified.

Table 13: Potential Social / Environmental Impacts and Mitigation Measures for the Proposed BRT Project

No.	Check Items	Rating	Notes	Mitigation
Social Environment				
1	Involuntary resettlement	B	The project will cause someinvoluntary resettlement. Although the exact number of affected people is still not known.	A more detailed survey is neededat the feasibility study stage. An Initial Resettlement Plan (IRP) or Resettlement ActionPlan (RAP) needs to be made, including compensation and resettlement assistance programs.
2	Traffic	B	Overall the project is expected tohave a positive impact on traffic by promoting public mass transportation. However, some negative impact may be caused temporarily during construction.	The construction works should beplanned to minimize impacts on local traffic. The possible mitigation measures are, for example, providing a bypass road or avoiding construction worksduring peak hours.

3	Public facilities	B	Some public facilities may be affected, such as footbridges, streetlights, bus stops and traffic signals.	The public facilities must be preserved or restored after construction of BRT.
4	Cultural property	D	There are no cultural heritagesites located near the project site.	
5	Water rights and right of common	D	There will be no impact of the project on water rights.	
6	Health, sanitation and hazards.	D	The project will not have an effect on health and sanitation.	
7	Traffic accidents	B	During the operational phase, the BRT system may initially increase the risks to accidents when pedestrians and other vehicles are not yet used to the system. However, the separation of public transport vehicles from mixed traffic is typically employed to make a new BRT operate efficiently, reducing therisks of accidents.	Public awareness campaigns on traffic safety, and training for the BRT operators on safe operation.
8	Indigenous people	D	There is no ethnic minority group or indigenous people in the project area.	
Natural environment				
No.	**Check Items**	**Rating**	**Notes**	**Mitigation**
9	Topography and geological features	D	The project will not have any impact on topography or geological features as it will be constructed on existing roads.	
10	Soil erosion	D	The project will not cause soil erosion.	
11	Hydrological situation	D	The project will not affect the aquatic environment.	
12	Flora, fauna and biodiversity	D	The project site is an urban area and there is no endangeredspecies.	
13	Ecosystems	B	The project area is in an urban area, with little vegetation or natural habitats. However, once the project is accepted there is a need to check for any patch of vegetation close to the suggested terminal areas.	Redesign/relocation of the BRT terminal to avoid any patch of vegetation
13	Landscape	D	The project will not affect Landscapes, on the contrary it will improve the seen.	

14	Global warming	D	The project is expected to have apositive impact on global warming, especially if the bussystem uses clean energy.	
Pollution				
15	Air pollution	B	During the construction phase,emissions may increase temporarily due to the use of machinery and other construction equipment.	Emissions should be minimized byusing low-emission machines and keeping good maintenance. The amount of emission should complywith the Palestinian legal standards for air quality.
16	Water pollution	B	During the construction phase,liquid wastes that are not properly treated may pollute surface and underground water resources.	Waste oil, other lubricants, and industrial solvents should be recycled or disposed in an approved manner. Proper drainagesystem should be constructed.
17	Soil contaminations	B	During the construction phase,liquid wastes that are not properly treated may pollute soil.	Waste oil, other lubricants, and industrial solvents should be recycled or disposed in according with the Palestinian Hazardous waste management by law.
18	Waste	B	During the construction phase, avariety of solid waste may be generated.	The waste should be treated anddisposed appropriately in compliance with the Palestinian environmental regulations.
19	Noise and vibration	B	During the construction phase,noise and vibration levels mayincrease temporarily due to the use of machinery and other construction equipment.	The level of noise and vibrationcaused by construction works should be kept with the Palestinian legal limit.
20	Ground sinking	D	The project will not cause ground sinking.	

Rating:

A: Serious impact is expected

B: Some impact is expected.

C: Extent of impact is unknown.

D: No or negligible impact including positive impact is expected.

Source: Environmental and Social Management Framework, Municipal Development Program Phase III, March 2017.

4. Part III: Social Feasibility

4.1. Summary

The extent to which any social intervention would contribute to the development of any given community is determined by a variety of factors. However, one of the most significant factors would be the extent to which the community is consulted about the design of the project and engaged in its implementation. Otherwise, its feasibility and sustainability become at stake. Participation can be viewed as a cooptation strategy or an empowerment one. This, to a great extent, becomes the planners call.

The Public Transportation Master Plan (PTMP) can be designed and implemented with or without the participation of the local community of the urban areas of Ramallah and Al-Bireh, but the whole difference will be on its feasibility first, its impact of the development of this community secondly, and its sustainability on the long run.

The MoLG has differentiated between different types and levels of community participation (MoLG, 2010). On the very bottom, the lowest level, is the information-sharing level. At a higher level comes the involvement in the decision-making process, then the voluntary contributions the community members can bring to the project. As a ten-year intervention project, PTMP project leadership should think carefully about where they think the local community should and can stand, and how. This project may take this community to a new ground in terms of development opportunities, ways of thinking, and life style of its member or it can presented as a routine one that will take the community to position that is slightly further from where it stands in the time being.

Social feasibility study is the first step towards enhancing the PTMP community cooptation strategy, which will most likely result in temporary buy-in situation or a community empowerment strategy that will most likely result in sustainable ownership. Accordingly, social feasibility can be addressed to understand the potential conflict and resistance, then mitigation strategies need to be figured out and designed, or to leave no one behind through wider range of strategies including those of resistance mitigation ones. This report section is intended to pave the road for future comprehensive social feasibility study, since it is focused on highlighting the main sources of the conditions that may determine the PTMP likelihood of successful implementation.

Acronyms:

BIA	Beneficiary Impact Assessment
CBOs	Community Based Organizations
CSOs	Civil Society Organizations
HQ	Head Quarter
HR	Human Resources
LCs	Local Councils
LGUs	Local Governance Units
MDLF	Municipality Development and Lending Fund
MoLG	Ministry of Local Governance
NGOs	Non-Governmental Organizations
PTPFR	Public Transportation Plan Formulation and Review
PTMP	Public Transportation Master Plan
PNA	Palestinian National Authority
PwDs	Persons with Disabilities
SIA	Social Impact Assessment

4.2. Background

Ramallah, Al-Bireh and the urban centers surrounding them (including the three refugees camps; Al-Jalazon, Al-Am'ari and Qadoura) have been subject to spontaneous socioeconomic developments, which were peaking over the years followed the signing of Oslo Peace-building agreements including the establishment of the Palestinian National Authority (PNA). These localities, ever since, were turned to be the attraction locations for international diplomatic missions and services, the condensed existence of the Palestinian NGOs (headquarters mainly), the business management centers of the Palestinian private sector players, the center for the Palestinian ministries and the semi-governmental organizations / establishments, high collection of post-secondary education institutions, and many others at the national level. At the local level, these urban areas have had their big share from the local NGOs, charitable societies, private sector investors, etc. Parallel to those development, the demand on effective and dynamic infrastructure has increased extensively, including the public transportation. As rapidly growing urban cites, the demand on compatible infrastructure become a more challenging matter given the intensively increased internal and external mobility of people. The public transportation have fallen way below the expected and needed adequate responsiveness to those and other developments, which resulted in community negative perceptions, higher dependency on private vehicles for travelling to any purpose, loose control over the quality of the transportation services, transportation system that is gender-blind and bluntly insensitive to groups with special needs, and eventually degraded satisfaction on the quality of life of the lay persons.

Constructing or installing a modernized public transportation system is an ambitious intervention to address the internal and external people mobility challenges encountering these urban centers. However, the successful implementation of such intervention is not dependent on the quality of its technical design only. It is dependent on the extent to which the local Palestinian community, including the wide spectrum of stakeholders, is positively conceiving it and ready to develop the needed ownership and sense of belonging. According to the Public Transportation Plan Formulation and Review report, the PTMP is guided by the aim of:

A public transport system should be a system that is continuously developing in a sustainable way, and that contributes to improving liveability and accessibility.

The aspired specifications of the proposed PTMP (Speed (not in congestion), Reliable, Safe, Frequent, Comfortable, Attractive, Easy to use, and Reasonably priced) clearly reflect the shortcomings in the existing public transportation system that is used by those who cannot afford an alternative transportation means that are costly and not covering all areas, in addition to the poor responsiveness to those with special needs including PwDs) (PTPFR, 2021).

4.3. Purpose and Scope

Social Impact theory suggests that the social context in which a project will be applied may pose a complex set of factors and conditions that may facilitate a successful implement or may significantly obstruct its progress toward planned objectives. Also, social impact of any project should be explored to the extent possible using evidence-based research methods. Social Feasibility Study (SFS) reflects the earlier dimension of Social Impact Assessment (SIA), than the later. The extent to which the proposed project / intervention may influence the means by which the community residents meet their social needs, or can be challenged by the existing way of thinking / awareness and patterns of daily practices, in addition to many other aspects, need to be assessed in order to take them into consideration in the designing and implementation phases. The community, including all individuals and sub-groups and sectors, is the main beneficiary from any social intervention. The extent to which this client is consulted and engaged about the change the intervention will bring about is a crucial determinant for its legitimacy.

The purpose of this report is to provide a preliminary overview of the most relevant variables that would determine the social feasibility of the PTMP-Ramallah and Al Bireh and a framework to address the social

consequences of its implementation. Even though this report is not based on evidence – based assessments, it provides, to the extent possible, a realistic and a contextualized implementation framework.

This report will focus on identifying and analyzing the main variables that should be considered to maximize the social feasibility of this project through a process of redistribution of social costs and benefits between the different stakeholders (local communities included). The need to strike the balancing scales would be extremely necessary to establish a sense of fair-treatment, considerate approach, and a sense of buy-in. Enhancing the maximum engagement of the community and the spectrum of stakeholders as early as possible in the planning phase will be remarkably critical factor to avoid serious risks to the successful implementation, as long as boosting the community development of these urban centers constitute a central part of the whole purpose of this project.

Accordingly, this report will focus on identifying and defining the most common and contextually relevant dimensions / variables that need to be considered while assessing the social feasibility of this project, recommended strategies and actions framework that can be applied to avoid, mitigate or compensate for its adverse consequences.

Additionally, this report will not and is not expected to get into the detailed specifications of the selected transportation scenario (as described in the Public Transportation Plan Formulation and Review (PMTFR) document) and how it is responsive to the population (different types of riders), either on its own right or in comparison with the other scenarios.

4.4. Stakeholders

Any social feasibility study, that may be conducted in the future, will require taking into consideration the perceived consequences of the PTMP on a range of stakeholders (listed below). Given the limited time and other resources at this stage, this report will provide a reflective and speculated consequences on some of these stakeholders but from the standpoint of the experts team and representatives of limited number of official entities that were or still engaged in it. However, this list is capable of addition and omission as the PTMP management finds convenient:

	Name
1.	**Governmental Sector**
	Ministry of Transport (HQ and staff in ministry offices)
	Ministry of Local Government (HQ and staff in ministry offices)
	Ministry of Education (HQ and staff in ministry offices)
	Ministry of Tourism (HQ and staff in ministry offices)
	Ministry of National Economy (HQ and staff in ministry offices)
	Ministry of Social Development (HQ and staff in ministry offices)
	Ministry of Health
	MDLF (HQ and staff)
	Public schools (staff and students)
	Local Government Units (LGUs)
	Local Councils (LCs)
2.	**Civil Society Sector**
	NGOs and charitable societies

	CBOs
	Grassroot organization
	Representatives of political parties
	Community leaders and activists
	Samples of households (male and female headed families)
3.	**Private Sector**
	Public transportation owners and drivers
	Sample of merchandise (shops, groceries, tourism business and others)
	Gaz stations owners and sample of official managers / staff
	Private schools (management and teachers)
	Health centers and private clinics
	Nurseries
	Tertiary education institutions (staff and students)

4.5. Methodology

The findings and suggestions included in this report were concluded through intensive review of relevant project documents, consultative interviews and discussions with selected individuals and groups of experts, in addition to review of carefully selected literature published on similar projects, in addition to the personal experiences of the consultant as a Palestinian professional who have been travelling to and from these urban areas on for many years, on daily basis for some years. Out of those sources, the consultant extracted a list of applicable dimensions of social feasibility for an infrastructure project like PTMP and the convenient arguments about them.

Accordingly, the contents of this report should be considered as valid basis and guideline for future actions to be undertaken to enhance the social feasibility of the project and should not be considered as an alternative to an evidence-based feasibility assessment. Interviews and discussions covered with the following capacities:

- Representatives of the project consultancy firm (2).
- Representatives (4) of the Palestinian Ministry of Transport and Higher Traffic Council.
- Representatives of Joint Services Council and Municipalities (3).
- Expert engineer from Nablus municipality / engineering department (1).

4.6. Key Findings

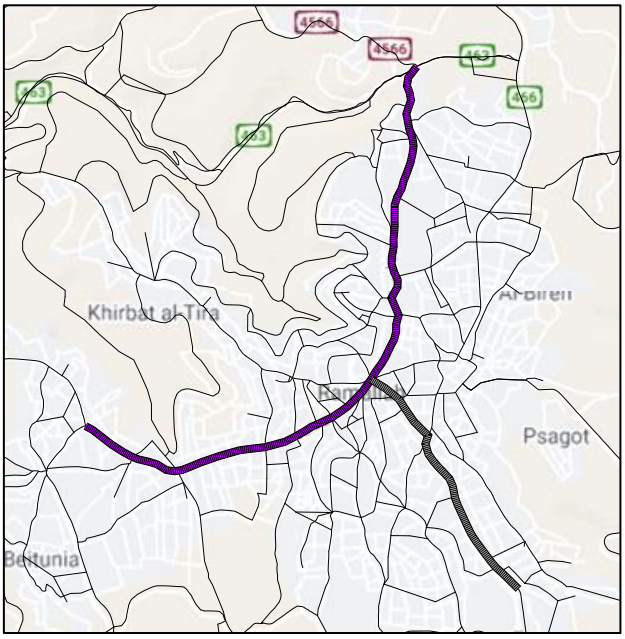
Two main types of findings will be presented within the scope of this report. These are the social variables constituting the sources for the possible impacts, and the speculated typology of these variable. The strategies suggested by the consultant and participants in this review will be provided in this section, which comes as a mix between the professionals consulted and the social development consultant who drafted this report. Given the fact that any Beneficiary Impact Assessment (BIA), being an evidence-based one or one that relies on rapid review of available documents and screening the views of involved experts like this one, the outcome is a kind of baseline describing the most relevant variables of social feasibility (for some can be considered as indicators) and the present status of each variable based on reasonable speculations. That is to shed light on the areas where actions or further efforts to be exerted to enhance the likelihood of success of the project, which is, in our case, the minimum / or no resistance to the proposed public transportation master plan (PTMP), and the sustainability of its benefits on the long term future. Therefore, 'no-action' option / strategy may leave the feasibility of this project at higher level of risk compared with

‘systematic action plan’ option / strategy that may be applied to address the predicted social consequences of the PTMP (which will be the focus of section 4.2).

4.6.1. The Main Variables of Social Feasibility

» **Community Participation:**
The extent to which the local community is engaged in the project planning phase may facilitate smooth implementation. Engagement may be highly significant through reasonable representation of various interest groups in making decision that may influence their daily life, since these groups may become more cooperative when having a platform to voice out their issues and concerns as well as the impact of the PTMP on their vital interests. This participation may better inform the PTMP leadership on how to be more responsive to the needs of the local community groups that are not adequately addressed by the existing system. A successful community participation may promote the sense of ownership that will be needed for project sustainability on the long run. At the implementation stage, the representatives of the community groups may play an active role in marketing the PTMP and defending it, when and if needed. These groups can be reached out, organized and mobilized to hinder the PMTP implementation by any other actors, particularly when these groups are excluded, and their voices are undermined / neglected by the PMTP management.

» **Economic Reflections on the Local Market:**
The extent to which the PTMP project brings more social benefits to the different stakeholders of the public transportation services system will contribute significantly to shaping their preferences when comparing it with the existing one. These benefits may include the daily spending on travelling by different types of daily riders, the extent to which the new system (Proposed by PTMP) will make routine travelling smoother and less costly in terms of prices and time-saving. The existing public transportation system, constitutes of about 14 internal lines / routes and 19 external lines, providing its services through 245 vehicles for external trips and about 336 vehicles for internal trips, in addition to 182 small buses. The bulk of rides using the existing public transportation services are those travelling to the schooling and work services. In the absence of effective and efficient buses network, organized and properly managed terminals, adequate and safe transit stations most of the riders prefer using mixed or private taxis even with higher costs.
Introducing the three external - internal multimodal hubs and terminals (north, south and south-west hubs as suggest by the PMTFR document) (see figure provided below), for the purpose downsizing the number of private vehicles getting into the targeted urban areas may facilitate the moving more people to and from them, but will influence negatively the economic benefits of owners of the existing system and their drivers. Unless alternative strategies are introduced, the level of financial gains of these groups will be degraded significantly and, therefore, will be pushed to the organized resistance front that may use all possible means to defend their interests.
Other indirect economic consequences of the PTMP will be on reviving commercial sector due to the further facilitated travelling, with higher safety and lower expenses (particularly for local households). The multimodal hub terminals concept will enhance the temporary employment (through the construction process) and will provide more income-generation and employment opportunities inside the terminal facilities and around them. However, it is necessary to consider the adverse consequences on the local market economy and the need to be properly considered. This would be an essential component in the design of the PTMP implementation process, particularly for those businesses who will negatively influenced by the construction activities of the multimodal hub terminals and transit bus stations on the different internal routes. Financial compensation would be one of the options to address such adverse consequences.



» **Community Awareness:**

Implementing the PTMP within a poorly informed community about it (purposes, stages, losses and gains …. etc.) may turn it to be an easy target for mobilization by opponents or competitors, particularly through providing misleading information about it. Given the negative image of the public transportation in the eyes of the Palestinian local community, particularly the buses system that is lacking proper safety and health standards and the privately owned taxi system that is perceived of different types of abuse, the new system proposed by PTMP should be more cautious about the challenges would encounter its social feasibility (PTPFR, 2021).

Informing the community about the project in general, at the preparation phase, and updating people on its progress (through outreach campaigns or open access to an updated website … etc.) may be considered as a signal of respect, engagements, and minimizing the chances of victimizing the citizens from all walks of life. Given the chaotic situation of the existing system and the accumulative negative images (PTPFR, 2021) and backlashes that have been shaping the status of the public transportation in the Palestinian community, it would be a naïve practice to address the community consciousness on the basis of general ethic of respect. Any awareness raising efforts need to address specific and clearly defined conceptions either these were established based on few incidents and mistakenly generalized or based on proven track record of malpractices. Even though assuming that any improvement in the public transportation system will be better than maintaining the current status, it is important to aspire for reasonably descent system that addresses the community perception, misconceptions and would contribute to its development possibilities. Sharing the positive impacts / gains of the PTMP during the implementation, through live examples, may focus on the purposes of gaining community confidence as well as inspiring its members about the positive change it my bring to their lives. It would help them visualize the future gains of the project. However, applying creative strategies to approach the community awareness is highly recommended should the PTMP management looks for true confidence and support from the community which has been tired of, even bored by, the exposure to classical media platforms and campaigns.

» **Influx – Outflux Consequences:**

Influx and outflux is about the number of people travelling to and from the targeted areas (the urban area of Ramallah and Al-Bireh) as well as with it, and the number of vehicles they use in due process. Currently, about 194,000 residents from the targeted urban areas and about 113,000 people from outside these areas use the existing public transportation system. these people use the available public and private transportation means to meet their daily social needs that vary between schooling, reaching duty stations, seeking health services, and to less extent for engagement in social / cultural activities. However, it is important to notice that their preferences lean towards privately owned transportation and shared taxis over the public transportation means / buses even though the latter is cheaper than the former options.

The key factors shaping such preferences may include, but not limited to, the time consumed in the trip, the low sense of personal and social safety, the missing hygiene standards, the gender-blind environment within buses, and poor / no attention to needs of persons special needs like pregnant women, women accompanied with children, elderly, and PwDs.

Reaching out specific destinations on regular and timely basis may also constitute a critical concern for most users of buses travelling every day to their schools, health centers, and duty stations on fixed times. These segments occupy the transportation system over specify times during the day and cause the rush hours and traffic congestions. An effective and efficient alternative transportation system may succeed in transforming the bulk of riders to use adequately qualified public transportation system, which may lead to an increase the influx, outflux and the number of internal riders as well as decreasing the number of private cars that are currently in use. This will free up more space inside the crowded centers for other benefits including social and commercial activities. This may lead to safer streets and pedestrians' lanes, less congestion.

This will need a competitive advantage in the proposed system including the strict and intensive schedules, maximum safety, minimized trip time, healthy environment, in addition to attractive facilities used during the waiting time. The key point for the PTMP to consider is the increase in the influx and outflux of the riders while decreasing the influx and outflux of the travelling means the people use to reach their destinations.

» **Interests of Marginalized Groups and Remote Communities:**

Persons with special needs, including persons with disabilities, my constitute a varying percent between 2.5% and 7.5% of the population of the urban area of Ramallah and Al-Bireh. However, this percent is by and large forced to use the privately owned transportation means because the existing public transportation is not qualified to accommodate the needs of this segment of the population. This applies to technical / mechanical designs of the vehicles as well as the psychosocial safety of the riders who might be subject to disrespect by other riders while no protection provided by the driver of any other parties. Taking the needs of these groups into consideration doesn't fall under the economic returns necessarily as much as being under the social responsibility of the public transportation system, which is a key factor in shaping the community attitude, the public image and status of the system.

The other dimension that may add more value to the economic returns and community satisfaction of the new system is the extent to which it provides wider coverage to mobility needs of the remote areas out of the urban centers and the underserved enclaves within the boundaries of the main cities. PTMP may need to consider the capacity of the proposed system to link these communities to the urban centers to access the different types of services at affordable time and cost. Otherwise, the public transportation system will remain as a key factor for marginalization of these groups and local communities.

- **Personal / social Safety:**
  The personal / social safety is a key concern for individuals, families and small groups when travelling through the existing public transportation. Safety, in this context, covers a wide range of issues. It includes, and not limited to, physical safety that may be exposed to harmful accidents and health through communicable diseases, as well as psychosocial safety that might be caused by all forms of harassments. People who are more likely concerned about safety factors include mainly women, children, elderly and persons with disabilities. Apparently, when these people need to travel (as individuals, families or groups) the private cars / taxis are considered safer even through bearing higher costs. Switching the preferences of these groups would not be possible without providing compelling proof that the alternative transportation means are sufficiently safer and cost-efficient option. It may be switched when the PTMP takes into consideration a variety of factors such as the specifications of the travelling vehicles offered by the PTMP, their internal space and safety conditions, the surveillance and protection policies and procedures, the affordable costs, strict travelling schedules and the customers-come-first policy.

- **Local Governance System and Controls:**
  Applying all measures that one may suggest providing safe and cost-efficient trips through public transportation means would require a comprehensive set of laws, policies and procedures as well as a safeguarding system including qualified human resources (HR) / manpower. Relevant literature suggest that local government authorities may be considered as the implementing system of all relevant laws, policies and procedures. In the Palestinian context, other actors may be important to consider such as the civil police, ministries of transport, tourism, local governance.

- **Conflicts of Interests within public Transportation (PT) sector:**
  The main actors in the existing transportation system (public and private) would turn to a source of stubborn resistance to the PTMP implementation, which may jeopardize the likelihood of its feasibility. The material and direct threats to the interests of the people involved in this sector constitute a substantial driver to their organized resistance. Early on, these people should be approached and constructive dialogue / negotiations to be launched in order to accommodate their interests, expectations and needs. The purpose of such approach may range between info sharing, through occasional consultations, to systematic engagement in the designing and implementing the PTMP. In this process, various actors and stakeholders need to be involved, particularly those representing the governmental actors and those involved in the rule of law.

- **Attraction, Supporting Services and Maintenance:**
  It is expected that when the PTMP provides attractive facilities and supporting services that the regular rides may need while travelling through public transportation system, which are not provide by the existing transportation system, may influence positively the perceptions and attitudes of the public and encourage them to buy-in and use it promptly. For example, providing commercial services, rest spaces, recreational services, touristic information centers, surveillance spots, ticketing windows…. etc., may promote the utility of the proposed system in the PTMP.

4.6.2. The Typology of the Main Variables

The typology the identified variables will reflect the (i) the **weight of significance** (1=low, 2=medium, and 3=high), (ii) the **'no-action' consequences'** adversity (1=minimum resistance, 2=moderate resistance, and 3=sever resistance), and (iii) the **realistic purpose** of remedial action (1=avoid resistance, 2=mitigate

resistance, and 3=gain support). The following table illustrates the proposed typology of the abovementioned and defined variables:

Table 14: Proposed Typology of Defined Variables

	Variable	Weight of Significance	'No-Action' Consequences	Realistic Purpose
1	Community Participation	**2**	**2**	**1 & 3**
2	Economic Reflections on the Local Market	**1**	**1**	**2 & 3**
3	Community Awareness	**1**	**1**	**1 & 3**
4	Influx – Outflux Consequences	**2**	**3**	**2**
5	Interests of Marginalized Groups and Remote Communities	**2**	**1**	**1 & 3**
6	Personal and Social Safety	**3**	**2**	**1 & 3**
7	Local Governance System and Controls	**3**	**2**	**2**
8	Conflicts of Interests within public Transportation (PT) sector	**3**	**3**	**2**
9	Attraction, Supporting Services and Maintenance	**2**	**2**	**1 & 3**

4.7. Mitigation Strategies

The main strategies that are suggested to manage the different variables affecting the social feasibility of the PTMP project are classified under three main levels; the hardware, the software, and the organizational level (PTPFR, 2021). The first is concerned with the project physical infrastructure aspect of the PTMP design (for which no strategies will be suggested), the second is concerned with the information dissemination and awareness raising as well as community engagement, while the third one is concerned with the organization structure of the project including the manpower involved in its implementation.

- **Hardware Strategies**:
  - No strategies suggested under this level

- **Software Strategies:**
  - Stakeholder Analysis and Social Dialogue Strategy
  - Community Engagement Strategy
  - Awareness Raising and Marketing Strategy
  - Grievance System
  - Secondary Gains and Incentives Strategy
  - Market Economy Enhancement Strategy

- **Orgware Strategies:**
  - Establishing Social Development Unit (staffing)
  - Coordinator

    - Two community workers
    - Media specialist
- Establishing Community Representation Steering Committee
- Establishing grievance treatment unit ((head of unit and two social development officers (male and female))

However, these strategies need to be operationalized through detailed action plans. Since suggesting such detailed plans can be conceived as premature idea, the consultant, alternatively, will suggest a general framework for the possible actions to be considered should these strategies are approved at later stage.

Table 15: Recommended Actions Framework (Social Feasibility)

Proposed Strategies	Purpose	Main Task	Timeframe	Tools	Roles and Responsibilities	Estimated Cost (US$)
Software Strategies:						
Stakeholder Analysis and Social Dialogue Strategy	Identify the challenges and opportunities for successful implementation of the project and propose mitigation actions to address them	Planning (identifying the participants, developing tools, preparing implementation plan … etc.)	Preparation phase of the ICUD project		Social Development Unit	20,000
		Conducting the data collection plan		• Individual interviews • Focus groups	Social Development Unit	
		Reporting			Social Development Unit	
Community Engagement Strategy	• Enhance the community ownership of the project and its outcomes • Enhance the project sensitivity and responsiveness to the community needs and expectations	Establish a community representation body	Preparation and implementation phases	• Consultative meetings. • Town Hall Meetings	Social Development Unit	10,000
		Develop regular and cost-efficient notification channels	Implementation phase	• Regular electronic newsletter • Social media accounts • Regular public meetings	Social Development Unit Media Unit	
		Establish an effective grievance management system	Implementation phase	• Grievance workflow system • Electronic (online) grievance platform. • Face-to-face negotiation platform	Social Development Unit	

Awareness Raising and Marketing Strategy	Enhance the community support for the project and keep it well informed about its progress	Media coverage campaign	Inception and implementation phase	• TV and Radio presentations • TV and Radio spots • Billboards	Media Unit	20,000
		Educational public meetings and individualized field visits	Implementation phase	Standardized ppp. Round-table consultations	Media Unit	
Secondary Gains and Incentives Strategy	Preparation: designing RFP for neighborhoods development initiatives	Designing grants policy and mechanisms	Implementation	Standardized ToR and technical specification documents	Social Development Unit Media Unit Engineering Department Finance Department	500,000
	Launching	Opening the door for applications, selection and negotiations		Advertisements through local community government units and organizations	Social Development Unit Media Unit Engineering Department Finance Department	
	Implementation	Contracting and implementing approved initiatives		Awards delivery process and implementation activities with proper media coverage	Social Development Unit Media Unit Engineering Department Finance Department	
	Evaluation and Reporting	Impact assessments		According to prepared ToRs	Social Development Unit Media Unit	

					Engineering Department Finance Department	
Market Economy Enhancement Strategy	Preparation: designing RFP for individual / personal business funding initiatives.	Designing RFPs	Implementation	Awards delivery process and implementation activities with proper media coverage	Social Development Unit Media Unit Engineering Department Finance Department	300,000
	Launching	Assessment, negotiations and final selections.			Social Development Unit Media Unit Engineering Department	
	Awarding	Handing awards and implementing initiatives			Social Development Unit Media Unit Engineering Department Finance Department	
	Evaluation	Impact assessment			Social Development Unit Media Unit Engineering Department Finance Department Finance Department	

Orgaware Strategies:						
Establishing Social Development Unit (staffing)	Hiring qualified staff for social development and media units	Preparing jobs descriptions	Inception and implementation phases		Social Development Unit	180,000
		Advertising			Media Unit	
		Contracting			Social Development Unit	
Establishing Community Representation Steering Committee	Promote community engagement throughout the project lifetime	Develop needed ToR and selection procedures and plan	Inception and Implementation phases.	Consultative meetings with community leaders and activists	Social Development Unit Media Unit	10,000
		Selection and advertisement		• Ads through local government units and civil society organization • THM	Social Development Unit Media Unit	
		Engagement		Regular meetings with progress reports and media coverage as necessary.		
		Monitoring & Evaluation		According to specific ToRs		

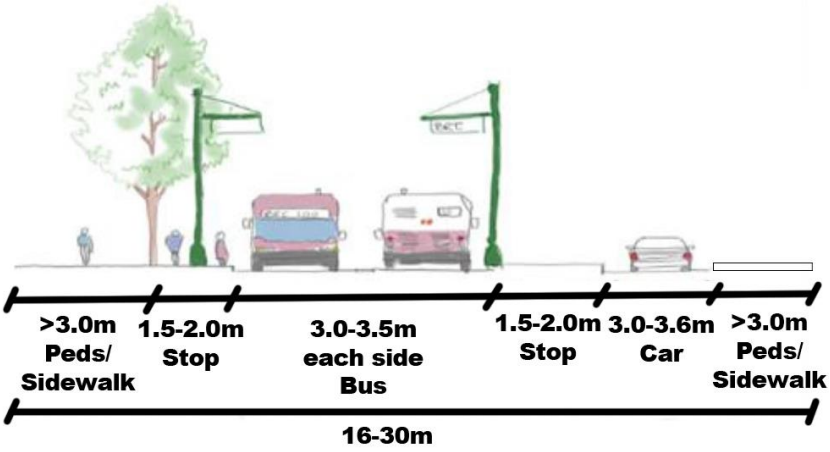
Appendix 1: Public Transportation Lines Distribution among the Proposed Terminals.

Distribution of PT Lines per Terminal and the Approximate Number of Vehicles

PT Line	No. of Taxis	No. of Small Buses	No. of Big Buses
North Station			
Aboud	9	0	0
Abu Shkheidem	6	0	0
Ajjoul / Rawabi	5	0	0
Al Mazra Al Sharqia	8	0	0
Al Mazra Gharbieh	11	1	0
Al-Bireh –Al Jalazoun - Jefna	40	6	0
Al-Mughair	5	0	0
Al-Nabi Saleh - Beit Rima - Deir Ghassaneh	20	0	0
Aroura – Ebwin –Al Mazari – Jiljilia-Ebwein	23	3	0
Atara	6	0	0
Bedia / Al Zawieh	6	0	0
Birzeit	93	3	3
Bittin	6	0	0
Deir Al Sudan	6	1	0
Deir Ballout	2	0	0
Deir Debwan- Burqa	5	6	0
Deir Jareer – Al Tibeh	15	3	0
Deir Nitham/Aboud	0	2	0
Dura – Ein Sinia	5	0	0
Ein Yabroud	6	0	0
Jenin	24	0	0
Kubar	11	0	0
Kufur Al Deek	5	1	0
Kufur Malik	6	0	0
Nablus	97	6	6
Qabalan	2	0	0
Qalqilia	16	1	0
Qarawat Bani Zeid/Kufur Ein	11	2	0
Rammoun	6	0	0
Sahqba - Shabtin	5	0	0
Salfit	11	0	0
Silwad-Deir Jareer-Ramoun	0	4	0
Sinjil	7	3	0
Tubas	0	2	0
Tulkarm	24	4	2
Turmusaia/Abu Falah	13	0	0

Sub-Total	**515**	**48**	**11**
South Station			
Jericho	41	0	0
Abu Deis	57	0	0
Anata– Shufat	20	2	0
Beir Nabala / Al-Jeeb / Al-Jadeeda	19	0	0
Beit Anan	6	0	0
Beit Daqqo	4	0	0
Beit Iksa	0	1	2
Beit Surik	0	5	0
Bethlehem	24	0	2
Biddo	19	0	0
Hebron	53	2	0
Jericho	16	3	0
Jerusalem	0	4	2
Kufur Aqab-Qalandia-Al Ram	130	0	0
North West Jerusalem – Beit Anana	0	6	0
Qatanna	16	3	0
Yatta	8	0	0
Sub-Total	**413**	**26**	**6**
West Terminal			
Rantis	7	0	0
Alluban Al Ghabri	4	0	0
Beit Liqia	0	9	0
Beit Sira	5	0	0
Beit Ur - Safa	13	0	0
Beituniya	80	5	2
Betillo – Deir Ammar – Jmala	8	2	0
Bit Ur Fouqa- AlTireh	2	2	0
Deir Abu Mashal	0	6	0
Ein Areek – Deir Ibzeegh	0	7	0
Ein Qinia	4	0	0
Kharbatha Al Misbah	13	0	0
Kharbtaha Al harithia – Deir Qiddis	5	0	0
Kufur Nimeh / Bileen	17	0	0
Nileen – Al Media	6	3	0
Qibia – Budrus	3	5	0
Ras Karkar/Al-Janibieh	0	5	0
The Seven Villages	0	5	0
Sub-Total	**138**	**40**	**2**

Appendix 2: Schemes of Options for Segregated Bus Lanes



a. Segregared Bus Lanes on Right or Left Side

b. Single Bus Lane on Right or Left Side

c. Segregated bus Lanes in the Middle of the Road

Appendix 3: Environmental Screening of Subprojects

(A) IMPACT IDENTIFICATION

Section A – Basic Information
Project Title: Comprehensive Public Transportation Master Plan for the Urban Area of Ramallah Al-Bireh
Project Sector: Transportation
Duration:
MDLF officer:
Environmental Specialist: Dr Amer EL-Hamouz

Has the subproject a tangible impact on the environment?	There will be an impact during terminals construction.
What are the significant beneficial and adverse environmental effects of the subproject?	Beneficial impact: (1) will improve the image of the public transportation system, (2) more environmental friendly system.
Does the subproject have any significant potential impact on the local or affected communities?	It may have an impact during construction.
What impact has the subproject on the human health?	A positive impact as it will reduce the green-house gases emission as a result of using BRT system instead the conventional transportation system.

(B) MITIGATION MEASURES

What alternatives to the subproject design have been considered and what mitigation measures are proposed?	Different scenarios were investigated. The environmental impact of subprojects were investigated and presented under impact identification section of this report.
What lessons from the previous similar subprojects have been incorporated into the project design?	N/A
Have concerned communities been involved and have their interests and knowledge been adequately taken into consideration in subproject preparation?	Technical report is prepared for the subprojects. Meetings with stakeholders were carried out

(C) CATEGORIZATION AND CONCLUSION

Conclusion of the environmental screening:

1. Subproject is declined
2. Subproject is accepted X

If accepted, and based on risk assessment, subproject preparation requires:

1. Completion of the Environmental Management Checklist
   For subprojects of sector X

2. Environmental Review, including following the approved Environmental Management Plan for sector.

Environmental Management checklist

Municipality: **Ramallah- Al-Bireh Urban Area** Project Name: **Comprehensive Public Transportation Master Plan for the Urban Area of Ramallah Al-Bireh**					
#	**Impact to check**	**Yes**	**No**	**Remarks**	**Safeguards / Mitigation measure/s carried on**
1	Noise/alarm generation	X		During construction only	See mitigation actions
2	Dust spreading out	X		During construction only	See mitigation actions
3	Odor emission		x		
4	Traffic problems (hindering, detours, closure …etc.)	X		During construction only	See mitigation actions
5	Solid Waste Services problems	X		Not that much and during construction	
6	Sewerage Services problems		X		
7	Water Services problems		X		
8	Green cover negatively affected		X		
9	Pedestrians' safety endangered		X		
10	Electricity services problems		X		
11	Landscape / aesthetic element/s deteriorated		X		
12	Natural Resources negatively affected		X		
13	Biodiversity & Wildlife threatened		X		
14	Recreational sites negatively affected		X		
15	Heritage and archaeological sites negatively affected		X		
16	Agricultural activities negatively affected		X		
17	Industrial utilities negatively affected		X		
18	Workers safety and health considered		X		
19	Workers commitment to OHS (vests, gloves, HD wearing apparel ….. etc)				Health and safety management plan will be prepared
20	Working machines suitability			N/A	
21	Additional Impact (Add it)	X		It is expected that the existing owners of the transportation service will resist the implementation of such Project	Preparation of Stakeholders engagement plan

Municipality: **Ramallah- Al-Bireh Urban Area** Project Name: **Comprehensive Public Transportation Master Plan for the Urban Area of Ramallah Al-Bireh**					
				Land Purchase	Resettlement management plan
22. Comments: All above negative impacts will be during construction activities. There a need to purchase land for the three suggested terminals. At this stage of project, it is recommended to make more scooping of the environmental impact of the project and once the project is approved there is a need to carry out a full Environmental Impact Assessment study with all its related components such as "Stakeholders Engagement Plan" and "Health and Safety Plan" resettlement framework as well as health and safety.					
23. Recommendations: It can be concluded that all environmental impact of the subproject can be easily mitigated if scooping is carried out properly.					

Appendix 4: Concept Scope of Work of the Detailed Feasibility Study

The project (PTMP) should be subjected to a detailed feasibility analysis before it is implemented. This covers the three major aspects: Financial Feasibility, Environmental Impact Assessment, and Social Impact. The scope of work in such a study is highlighted.

a. Financial Feasibility

Introduction: for the public transportation system to be feasible, it should be able to generate revenues. This depends to a great extent of the ridership (existing and attracted). It is common around the world for such a system to receive various types of government subsidies, particularly at the early years of the project, till the system picks up and becomes successful and be able to attract more ridership to be able to generate sufficient revenues to outweigh its costs. Therefore, the detailed study will address such issues.

The components to be included in the financial feasibility are:

- **Invested Capital**, which includes:
  - Vehicle depreciation as a percent of vehicle's value per year over the estimated life time of the vehicle.
  - Cost of Capital, which includes invested capital and the effective annual interest rate on invested capital.
- **Fixed Operating Cost**, which includes:
  - Drivers' salaries including benefits
  - Salaries of the mechanics including benefits
  - Salaries of administrative personnel and supervisors including benefits
  - Other administrative expenses as a percent of variable cost + maintenance + personnel
  - Fleet insurance based on the fleets specifications and cost
- **Variable Operating Costs**, which includes:
  - Electricity charging based on the fleets specifications
  - Tires, new tires, and rethreading based on the fleets specifications
  - Lubricants, motor, batteries, transmission, differential, and grease based on the fleets specifications
  - Maintenance per year based on the fleets specifications
- **Revenues**, which include:
  - Number of passengers on annual basis based on the existing actual passengers and the prediction for the coming periods
  - Fare per passengers based on the estimation of passengers' growth trend in the coming periods
- **Return on investment**, which includes:
  - Return on investment as a percent on the invested capital

b. Environmental and Social Assessment

Introduction: The project (PTMP) should be subjected to an environmental/social screening in order to prevent execution of project with significant negative environmental impacts. The purpose of "environmental/social screening" is to get a preliminary idea about the degree and extent potential environmental impacts of a particular activities of the project, which would subsequently be used to assess the need for further environmental/social assessment.

The environmental and social screening process will be used to determine the nature of environmental and social assessments. The environmental/social screening will provide a rapid assessment of the project characteristics, its beneficiaries, the socio-economic dimensions of the area, and its potential environmental/social impacts and risks. The results of the environmental/social screening will determine whether or not a sub-project requires further environmental and social assessment, including Environmental and Social Impact Assessment (ESIA), and Resettlement Action Plan (RAP).

The environmental/social screening would involve: (i) reconnaissance of the project areas/routes and their surroundings; (ii) identification of the major project activities; and (iii) preliminary assessment of the impacts of these activities on the ecological, physic-chemical and socio-economic environment of the project surrounding areas.

Based on the above findings, then an Environmental and Social Management Plan (ESMP) will be prepared. This ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during the implementation and operation of a project to eliminate adverse environmental and social risks and impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the mitigation measures, responsibilities for Planning, implementation, supervision and monitoring. Hence, the following environmental management plans describe how an action might impact the natural environment in which it occurs and set out clear commitments from the person taking the action on how those impacts will be avoided, minimized and managed so that they are environmentally acceptable and ESMP is targeted to exclude the deterioration of the environment during the implementation of plannedactivities

Mitigation measures which will effectively address potential risks and impacts and implementation and monitoring responsibilities for mitigation measures are identified

The following contents are for the ESMP study:

i. Executive Summary: This section will provide at least contents of the ESMP, its purpose and needs, a non-technical summary of the project objectives, brief project activities descriptions, brief non-technical description of significant findings and recommendations to minimize environmental and social management impacts. The executive summary should be able to read on its own, outlining both the ESMP

and the main conclusions

ii. Description of the Project and Description of the Receiving Environment: This section will provide at least a brief description of the project, including maps showing the project location, roads, villages and cities where the project located, communities, boundaries …etc. and where the project located, parcel map of the surrounding project area. It would also include information such as general layout of the proposed routes. Baseline information shall be presented well to understand the nature and the scale of each impact.

iii. Legal and Institutional Framework: This section will provide the relevant national environmental and social policies and regulations and the doners standards and identify the gaps and gaps-filling measures.

iv. Environmental and Social Base Line: assemble, evaluate and present the environmental and social data as related to the project. The data will be acquired from field survey, interviews, consultation, available reports and studies, etc. to identify the critical information to the potential impacts and for development of mitigation measures. The environmental and social description should be concise and focused on those environmental and social sectors where potential impacts of the project can be expected.

v. Environmental & Social Impacts and Mitigation measures: list, model and describe all relevant potential environmental and social impacts during the project life cycle. Within the ESMP, clearly mention the human resources with their responsibilities and roles to consider, monitor, implement and comply with the ESMP for this project. For each phase of the project; the ESMP should identify the responsible parties, (contractor, MoT, MoLG, EQA, etc.) to comply with the project's ESMP requirements.

vi. ESMP Budget and Schedule: The consultant shall present the budget required to implement the ESMP of the project. This should be through preparing a breakdown table presenting the budget required for each action with the unit rate and the total expected budget. In addition, the table should present the time schedule where the action will take place to implement.

vii. Monitoring Plan: The ESMP shall include a detailed monitoring plan to help, track and assess the interventions set in the mitigations of each environmental parameter throughout the life-cycle of the project. The monitoring plan will also consist of costs estimates of the proposed monitoring measures, the key parties/institutions that are proposed to be responsible to undertake the monitoring as well as the oversight responsibilities for correct implementation of the monitoring function and implementation of the mitigation measures.

viii. Institutional Arrangements, Responsibilities and Capacity Building Requirements: The consultant shall develop the institutional arrangement for supervising project impacts, monitoring of contractors' performance and reporting of environmental and social matters. The consultant will identify the capacity of project's proponent in conducting the environmental and social management and monitoring. Identify any gaps in the proponent environmental and social system and the existing staff and define the capacity building needed to ensure that the proponent has the staff, skills, equipment and system to implement the project ESMP.

ix. Public Consultation and Stakeholder Engagement: conduct consultations with project's surrounding communities, relevant stakeholders and affected people.