Government of the People's Republic of Bangladesh

Ministry of Housing and Public Works

Urban Development Directorate (UDD)

Preparation of Development Plan for Fourteen Upazilas

Package-04

(Saghata Upazila, District: Gaibandha; Sariakandi Upazila and Sonatala Upazila, District: Bogra)

FINAL SURVEY REPORT

TRAFFIC SURVEY
Of
Sonatala Upazila, Bogra

June, 2017

mepc **Modern Engineers Planners & Consultants Ltd.**

Letter of Transmittal

Ref No.: MEPC/UDD/2017/44   Date: 04.06.2017

To

The Project Director

"Preparation of Development Plan for Fourteen Upazilas" Project

Urban Development Directorate (UDD)

82 Segun Bagicha, Dhaka-1000.

Subject: Submission of the Final Traffic Survey Report of Sonatala Upazila, Bogra.

Dear Sir,

I have the pleasure to submit herewith the Final Traffic Survey Report of Sonatala Upazila, Bogra District under "**Preparation of Development Plan for Fourteen Upazilas Project**" Package No: 04 (Saghata Upazila, District- Gaibandha; Sonatala Upazila and Sariakandi Upazila, District- Bogra) for your kind information and further action.

Thanking you and assuring you of our best services.

Best Regards

…………………………………   …………………………………
(Engr. A. Sobahan)   **(Shamim Mahabubul Haque)**
Managing Director of MEPC   Team Leader, Package-4

Executive Summary

Transportation is a very important aspect of planning which has greater impact on development including land use or environment and thus it is very crucial for any plan preparation. Efficient and effective transportation is also a fundamental prerequisite for the people as well planned transportation system provides efficient movement of goods from one place to another. Thus, the assessment of the detailed features and characteristics of the transport infrastructure, mode and transport users of this Upazila is of very important for meeting the existing transport demand and the future challenges.

The Sonatala Upazila is located to the north about 35 km away from the regional center of Bogra district town in Bogra district under Rajshahi Division. The Upazila is bounded by Sariakandi and Gabtali Upazilas on the south and west, Dhunat upazila on the east, Shibganj upazila on the west and Saghata Upazila of Gaibandha district is on the north respectively.

It is learnt that the Upazila has total 387 kilometers road of which 131 pucca, and remaining 256 km are katcha with 463 bridges and culverts and included a local bus stand and a railway station. The Upazila has its road network and communication system with the Bogra district and other regional Upazila centers of Sariakandi and Saghata including other regional center of Bogra and Gaibandha district. Railway is also playing a vital role in the transportation of Sonatala Upazila. A large number of people use train to go other Upazilas and district towns.

During the survey, the survey team assessed the existing transportation and traffic management system though observation, discussion with the local people, Union Parishad members and transport users, passengers. A total of 105 passengers were interviewed of which 71.43% are male and 28.57% are female. Out of the total passengers interviewed 4.76% are within the age of 20, 22.86% are within the age group of 20-30, 50.48% are within 30-60 and about 21.90% are above the age of 60 years. The survey reviled that the origin of trip of 32.38% of the total passengers were originated from different places located within the union, 29.52% movement were originated from different places located within the Upazila, 35.24% trips were originated from different places located within district and 2.86% trips were originated from different places located outside the district. The survey reviled that the destination of 2.86 % of the total passengers were ended in different places located within the ward, 16.19% movement were ended in different places located within the Union, 27.628% trips were ended in different places located within Upazila, 45.71% trips were ended in different places located within the district and 7.62% trips were ended in different places located outside the district. The survey reviled that the purpose of about 20.95% of the total passengers were to commute and to go back and forth, 24.76% movement were business trips, 12.38% trips were for shopping, 20.0% trips were

for educational / school going, 16.19% trips social trips. It is evident that van and pick up are used mainly for carrying goods and commodities to relatively shorter distances within the ward, union and Upazila and on the other hand, bus, CNG and trucks are mainly used for a longer distance including Bogra, Gabtali and Dhaka, Rangpur, Joypurhat etc.

The survey results of the transportation and traffic management is expected to feed into the further analysis and interpretation in the process of preparing Master Plan for Sonatala Upazila.

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List of Abbreviations/Acronyms

ADT	:	Average Daily Traffic
ADTV	:	Average Daily Traffic Volume
BBS	:	Bangladesh Bureau of Statistics
CNG	:	Compressed Natural Gas
DLRS	:	Directorate of Land Record and Survey
GIS	:	Geographic Information System
ICA	:	Institute of Cultural Affairs
KM/km.	:	Kilometer
LGED	:	Local Government and Engineering Department
MEPC	:	Modern Engineers Planners & Consultants Ltd.
MoHPW	:	Ministry of Housing and Public Works
NGO	:	Non-Government Organizations
No.	:	Number
O-D	:	Origin-Destination
PCU	:	Passenger Car Unit
PRA	:	Participatory Rapid Appraisal
SPSS	:	Statistical Package for the Social Science
Sq. Ft.	:	Square Feet
Sq. Km.	:	Square Kilometer
Sq. M.	:	Square Meter
Sq. Mile	:	Square Mile
Tk.	:	Taka
ToR	:	Terms of Reference
UP	:	Union Parishad
UDD	:	Urban Development Directorate
UNO	:	Upazila Nirbahi Officer

CHAPTER ONE: INTRODUCTION

1.1 Background

Transportation is a very important aspect of planning which has greater impact on development including land use or environment and thus it is very crucial for any plan preparation. Efficient and effective transportation is also a fundamental prerequisite for city dwellers as well planned transportation system provides efficient movement of people and goods from one place to another. Thus, the assessment of the detailed features and characteristics of the transport infrastructure, mode and transport users of this Upazila is very important for meeting the existing transport demand and the future challenges.

It is recognized that having a series of datasets from the field are of most important for development planning of an area. Transportation is a significant feature of physical planning for urban and rural planning. Specially in a country like Bangladesh where transport sector becomes failure to meet up the demand of its growing population and faces acute problems such as traffic congestion, delay, accidents, insufficient pedestrian facilities, parking difficulties, air and noise pollution, inadequate transport facilities for the city dwellers, entry and exit of the town, etc. In such a situation, proper and well-organized road network with standard and available transport facilities is the prerequisite for healthy and prosperous future growth of urban and rural areas.

1.2 Objectives of the Survey

The main objectives of the proposed survey are to collect relevant information on the traffic and transportation system of the area including as follows:

- To know the existing transportation networks and facilities;

- To find out the scenario of average daily traffic, peak hour traffic and off-peak hour traffic;

- To know the pattern of traffic generation, traffic distribution and movement, major origin and destination points;

- To know the pattern of traffic generation and traffic distribution in regional context;

- To know the pedestrian flow in measuring the capacity of the road;

- To figure out the findings of PRA and Socio-economic survey.

1.3   Scope of the Survey

As spelt out in the TOR the scope of survey includes identification of transport network including road, water and railways, common mode of transport, existing traffic volume, road hierarchy, traffic pattern etc. in the area. The scope of works include traffic count survey, origin and destination survey, pedestrian survey, bus passenger survey, train passenger survey, regional transportation survey, physical condition of roads, main roads, intersections, bus terminals, railway routes, location of existing ghats, routes etc. and analysis of survey findings including preparation of reports for use in the planning stage.

CHAPTER TWO: APPROACHES AND METHODOLOGIES

2.1 Survey Methodology

The survey was conducted through administering different pre-designed format finalized in consultation with the Client (UDD). The formats were directed to collect traffic and transport information and data within the selected areas. The formats were designed considering the required parameters and variables covering all relevant sectors to be incorporated in the reports and in the proposed development plan of traffic and transports. Different formats used in the survey are attached in Annex part. The survey formats included

- Traffic Volume Count Survey;
- Origin and Destination Survey;
- Pedestrian Survey;
- Bus Passenger Survey;
- Train Passenger Survey;
- Regional Road Network Analysis.

2.2 Sampling Techniques

The initial sample size was determined by the following formula

$$n = \frac{z^2 pq}{d^2}$$ Where,

z is the normal variation and which has 1.96 for 95% confidence interval

p is the target proportion. In this case, we have assumed p= 0.5

p+q =1, therefore q=0.5

And d is the desired error which is 0.1.

(Cochran, 1963)

The initial sample size is therefore:

$$n_0 = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.1)}$$

= 96.04

These sample size was adjusted by using the following formula:

$$n = \frac{n_0}{1 + \dfrac{n_0}{N}}$$

Where n is requiring sample size and N is no. of Population of Upazila.

Here, Sonatala Upazila has the population of 167547. After applying the above formula, it is found that minimum 96 samples will be surveyed for each category of survey. Considering the formula, the sample size of traffic and transportation surveys has been determined.

2.3   Types of Survey Related to Traffic and Transportation

Based on the TOR the following categories of survey were identified to be conducted in the Upazila area.

Traffic Volume Count Survey

Traffic Volume is the number of vehicles crossing a section of road per unit time at any selected period. Traffic volume is used as a quantity measure of flow; the commonly used units are vehicles per day and vehicles per hour.

One of the fundamental measures of traffic on a road is the volume of traffic using the road in a given interval of time. It is also termed as flow and it is expressed in vehicles per hour or vehicle per day. When the traffic is composed of a number of vehicles, it is the normal practice to convert the flow into equivalent Passenger-Car Unit (PCU), by using certain equivalency factors. The flow is then expressed as PCUs per hour or PCUs per day.

This covers the different vehicles types including

   a. *Motorized vehicles like truck, bus, car/microbus, auto rickshaw and motorcycle, and*

   b. *Non-motorized vehicles including rickshaw/van, bicycle, animal/ push cart etc.*

Origin-Destination (O - D) Survey

Origin-destination (O-D) surveys provide a detailed picture of the trip patterns and travel choices of a city's or region's residents. These surveys collect valuable data related to households, individuals and trips. This information allows stakeholders to understand: Travel patterns and characteristics Measure trends Provide input to travel demand model development forecasting, and planning for area-wide transportation needs and services Progress in implementing transportation policies. In a transportation study, it is often necessary to know the exact origin and destination of the trips. It is not only necessary to know how many trips are

made, but also group these trips with reference to the zones of their origin and destination. This carried out through roadside interview of passengers covering the followings important aspects of transportation planning.

a) *Sex of passengers,*
b) *Age of passengers,*
c) *Origin of trip,*
d) *Destination of trip,*
e) *Purpose of trip,*
f) *Mode of travel of respondent,*
g) *Travel time and travel cost.*

Regional Transportation Network Survey

This was carried out through direct interview of drivers covering the followings important aspects of transportation planning.

a. *Trip going out,*
b. *Trip destination point,*
c. *Trip coming in,*
d. *Average number of passengers/ weight of goods carried by per mode.*

Pedestrian Survey

As pedestrian is an important element or a part of moving vehicle, it is necessary to know the pedestrian flow in measuring the capacity of road, that's why the traffic survey has included the pedestrian count. This covers the different vehicles types including

a. *Origin of trips,*
b. *Destination of trips,*
c. *Trip distribution pattern,*
d. *Purpose of trips.*

Bus Passenger Survey

This covers the different vehicles types including

a. *Purpose of travel,*
b. *Age group and age-sex distribution,*
c. *Distance of travel,*
d. *Trips per week.*

Train Passenger Survey

This covers the different vehicles types including

a. *Purpose of the trips,*
b. *Origin and Destination of the trips,*
c. *Trips per week,*
d. *Travel distance with travel time,*
e. *Travel distance with travel cost.*

2.4   Field Survey Approach

The consultant team conducted several visits within the area and identified major road linkages and also identified the major intersections and crossing points for conducting the proposed survey. The major intersection covered by survey is shown in Map 3.2. For conducting the survey, roads were selected as a main arterial or transit route within the area and vehicles/traffic were grouped as motorized vehicles and non-motorized vehicles.

2.5   Days and Hours of Traffic Survey

The survey was conducted at one location of each of the selected roads in a day and the location was selected considering the important section of the road. The count was conducted in both directions for successive 12 hour periods between 6 am to 6 pm.

2.6   Recording of Information

Manual method was used to record the traffic as it passes the selected location. Trained enumerators were deployed for counting and recording the data using tally-marking system. For accurate counting, a day was divided into 2 shifts of 6 hours each between 6 am to 12 pm, and 12 pm to 6 pm. Two groups of enumerators and a supervisor for each shift were deployed for uninterrupted counting of traffic.

2.7   Orientation and Training to the Survey Team

Day long orientation training were conducted by the consultant team at the site office located in the Upazila Centre so that all the traffic and transportation team members (see details in Annex-v) become well conversant with purpose and methodology of the whole survey work as well as their responsibilities of the work to perform the activities efficiently in the field. The following issues/aspects were discussed in the orientation training program:

- Objectives of the traffic and transportation survey;
- Methodology of the survey;

- Assigned duties and responsibilities of team members;
- Monitoring and quality control of the survey;
- Details of survey formats and tools;
- Techniques to be followed during the survey;
- Recording of data;
- Reporting to the respective survey supervisor.

2.8   Selection of Survey Procedure

Considering the aspect of TOR of the assignment and the transport characteristics of the study area, the following factors were considered for conducting the transportation survey;

- To find out the roads and river way condition, accessibility condition;
- To find out the pattern of traffic generation, traffic distribution, trip assignment, trend of growth to find out the congestion points and other transportation related problems.

2.9   Quality Control of Field Survey

A consultant team consisting of team leader, transportation planner/coordinator, supervisor and investigators were engaged for traffic survey and data collection. The consultant engaged 3 experience and trained coordinators for day to day supervision and monitoring of field survey works by the supervisors. The Transport planners worked as coordinator to coordinate the overall survey activities including maintaining liaison with the supervisors and enumerators for smooth and effective conduction of the survey

2.10   Survey Organization

The consultant organized a survey team headed by the team leader involving the transport planner. Team organization is shown in flow diagram below.
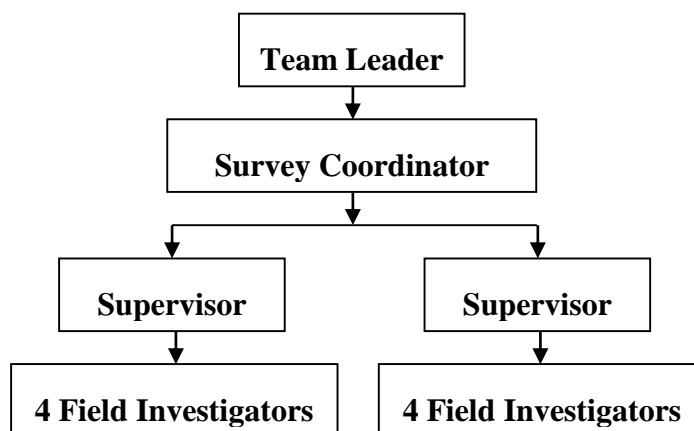
2.11   Data entry, analysis and presentation

Traffic count surveys were manually counted following tally marking system and recorded in the survey formats. All data including O-D survey and regional transportation survey were processed using SPSS software. All the responses of the respondent were coded systematically for easy entry of respondent's responses in the computer program for analysis and interpretation. The findings of the survey are presented in statistical tabular and graphical forms based on the requirement and objectives of the survey.

2.12   Survey Data Processing

Using statistical software such as SPSS, data has been processed and presented into three forms/styles viz. tabular form, graphical and the textual/report form.

Passenger Car Units (PCUs) Equivalency Factors

The normal practice to convert the flow into common unit is Passenger Car Units (PCUs) by using certain equivalency factors. The flow is then expressed as PCUs per hour or PCUs per day.

No Passenger Car Units (PCUs) standard is available for using in such projects of Bangladesh. In deciding the equivalency factors of different types of vehicles, different study and practice guidelines have been reviewed, such as, Dhaka Integrated Transport Study, 1994 (DITS), Road Materials and standards study, 1994 (RMSS), British Practice and Indian Practice. After reviewing those common practice, the practices of ongoing relevant projects has also been considered. Through the literature survey, the PCUs for different vehicle have been decided that are most appropriate for an Upazila. However, the following values have been considered for PCUs of   Sonatala Upazila study (Table 2. 1).

Table 2. 1: Comparisons of different PCU Factors and Considered PCU

Vehicle Type	Recommended PCU Factor				PCU Factor Considered for the Project
	DITS 1994	RMSS 1994	British Practice	Indian Practice	
(A) Motorized					
1.Bus	2.50	3.00	3.00	3.00	3.00
2. Truck	2.00	3.00	2.00	3.00	3.00
3.Car/Jeep/Microbus	1.00	1.00	1.00	1.00	1.00
4.Autorickshaw		0.50	0.75		0.75
5.Motor cycle	0.30	0.75	0.75	0.50	0.75
6.Tempo/Easy Bike	0.50	0.75		1.00	0.75
(B) Non-Motorized					
1.Rickshaw/Van	0.80	2.00		2.00	2.00

Vehicle Type	Recommended PCU Factor				PCU Factor Considered for the Project
	DITS 1994	RMSS 1994	British Practice	Indian Practice	
2.Bicycle	0.20	0.50	0.33	0.50	0.50
3. Push Cart	4.00	4.00		3.00	4.00

Source: Field Survey, 2016

PCU= Passenger Car Unit

DITS=Dhaka Integrated Transport Study, 1994

RMSS=Road Materials and Standards Study, 1994.

CHAPTER THREE: EXISTING TRANSPORTATION NETWORKS AND FACILITIES

3.1   Location and Regional Setting of the Area

The Upazila is located to the north about 35 km away from the regional center of Bogra district town in Bogra district under Rajshahi Division. The Upazila is bounded by Sariakandi and Gabtali Upazilas on the south and west, Dhunat upazila on the east, Shibganj upazila on the west and Saghata Upazila of Gaibandha district is on the north respectively. The total area of Sonatala Upazila is 156.76 square kilometer with a total population of 167547. There are one Pourashava and 7 union centers with in the Upazila. The Jamuna and Bangali are the major rivers of the area. The location of the upazila is shown in the regional setting Map, Map 3.1.

According to the BBS population census, the population is about 167547. Main occupations are agriculture, business, retail & whole sellers, vehicle mechanic, rickshaw puller, masonry, government & non-government services, wage labor, trade & commerce etc. There are some saw mills and brick fields including other small-scale industries like rice/ flour mills, bakeries, ice factory within the area. Geographical location and the regional economic influence also put an importance of the area. The area is basically an agrarian basin and the major crops cultivated are rice, jute, wheat, vegetables etc. The Pourashava is almost an urban center and has been playing as a commercial center of the Upazila.

It is learnt that the Upazila has total 387 kilometers road of which 131 pucca, and remaining 256 km are kutcha with 463 bridges and culverts and included a local bus stand and a railway station. The Upazila has its road network and communication system with the Bogra district and other regional Upazila centers of Sariakandi and Saghata including other regional center of Bogra and Gaibandha district.

As this area has been developed on the both side of Bangali River and the river has been playing important role for its development and transportation. However, due to course of time the river transportation system is almost extinct and road transportation system has been developed. However, seasonal river transport is still used to transport specially goods and commodities.

Railway is also playing a vital role in the transportation of Sonatala Upazila. A large number of people use train to go other Upazilas and district towns. Moreover, this transportation system is also used to transport goods and commodities to other places.

Map 3.1: Regional Setting of Sonatala Upazila
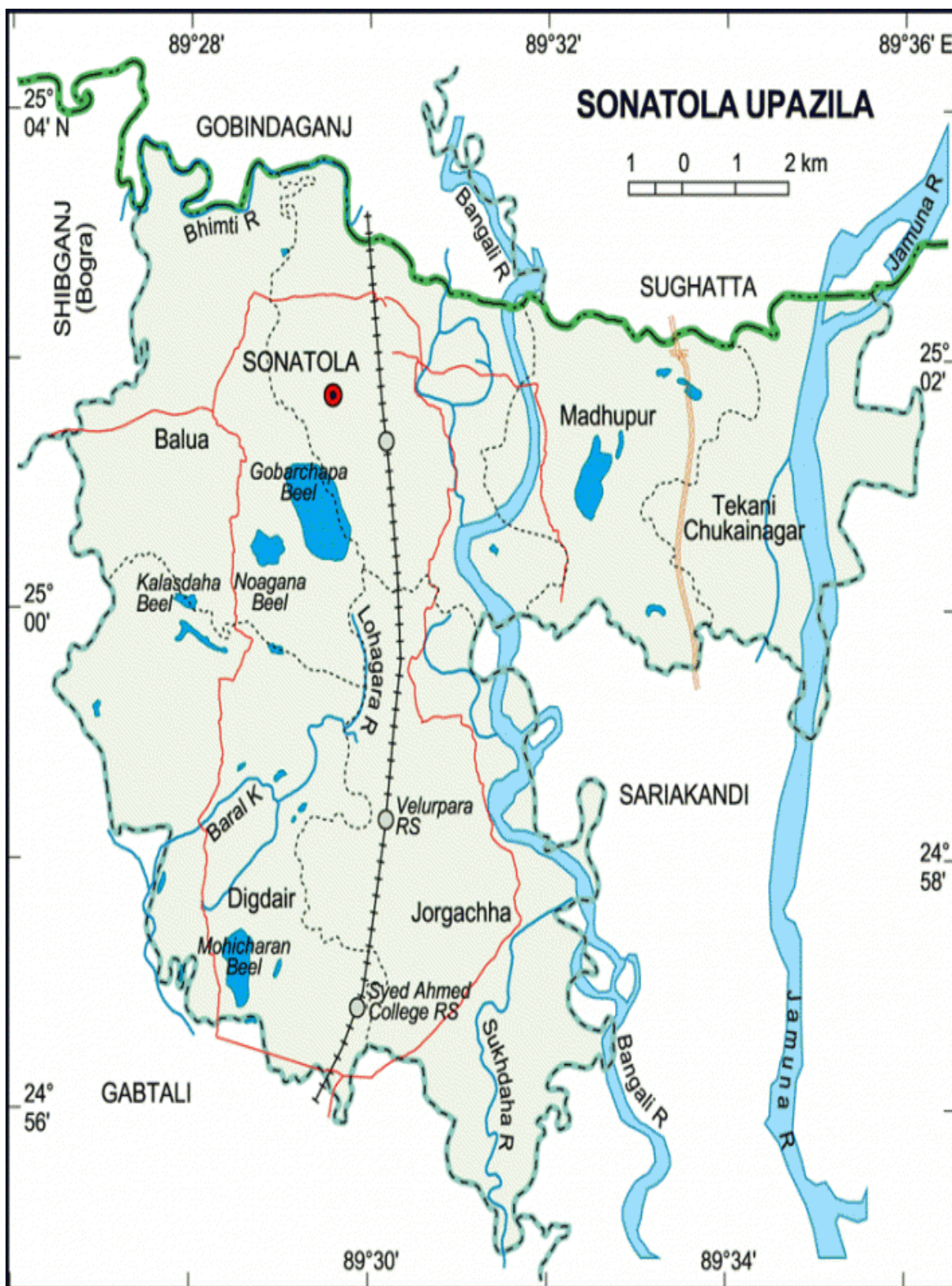
Source: Banglapedia

3.2   Regional Connectivity

The Upazila is located to the north about 35 km away from the regional center of Bogra district town in Bogra district under Rajshahi Division. The Upazila is bounded by Sariakandi and Gabtali Upazilas on the south and west, Dhunat Upazila on the east, Shibganj Upazila on the west and Saghata Upazila of Gaibandha district is on the north respectively. The Jamuna and Bangali are the major rivers of the area. The location of the Upazila is shown in the regional setting Map, Map-3.1. The Upazila has its road network and communication system with the Bogra district and other regional Upazila centers of Sariakandi and Saghata including other regional center of Gaibandha district.

As this area has been developed on the both side of Bangali River and the river has been playing important role for its development and transportation. However, due to course of time the river transportation system is almost extinct and road transportation system has been developed. However, seasonal river transport is still used to transport specially goods and commodities.

3.3   Existing Road Network

The existing major road networks of the Upazila with other regional centers are as follows and shown in the Map 3.1.

- ✓ Horikhali Bazar-Tekani Chukainagar-Pakulla-Sariakandi Road;
- ✓ Sonatala-Balua-Shibganj-Bogra Road;
- ✓ Sonatala-Gobindaganj-Jumarbari-Saghata Road;
- ✓ Sonatala-Jorgacha-Gabtali-Sariakandi Road.

Table 3.1: Road Classification (Pucca, Semi-pucca and Katcha) of Sonatala Upazila

Type of Road	Length (km)
Pucca	106
Semi-Pucca	15
Katcha	300
Embankment	8
Total	**429**

Source: District Statistics, BBS, 2011

Table 3.2: Road Classification (Village, Union and Upazila) of Sonatala Upazila

Type of Road	Length (km)		
	Earthen	Paved	Total
Village Road-A	128.65	22.82	151.47
Village Road-B	82.02	4.87	86.89
Union Road	30.99	68.47	99.46
Upazila Road	4.85	50.89	55.74

Source: LGED

Map 3.2: Major Road Linkages of Sonatala Upazila

Source: LGED
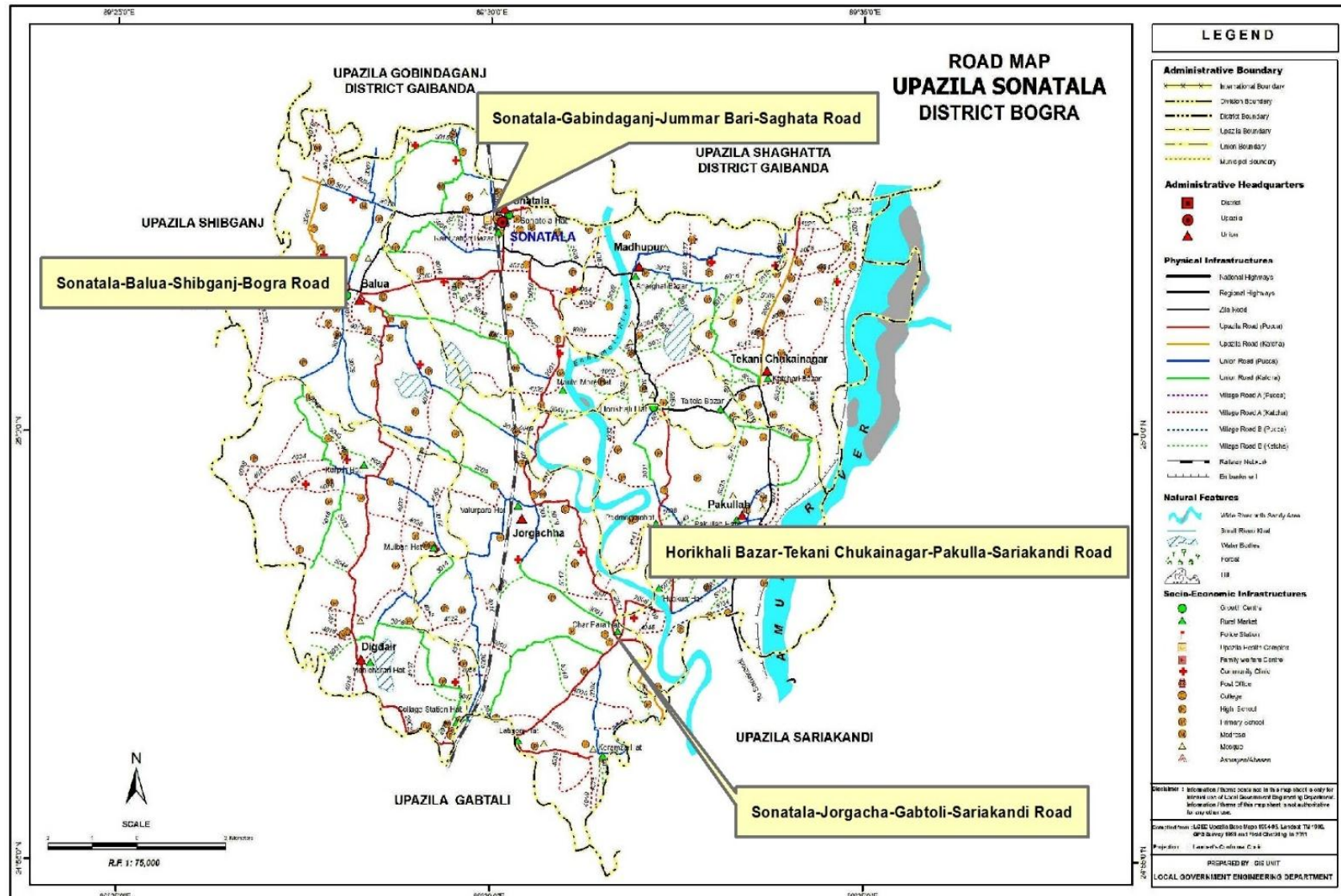
3.4   Inventory of Important Road in the Project Area

In this Upazila there are some important roads which connect some Unions of this Upazila and also connect some Unions of Saghata upazila. We have divided these roads into two categories whereas one is under Municipality and another is other than Municipality. The roads Under Municipality are-

- Madrasa Road
- Upazila Parishad Road
- Paurashava Road
- College Road
- Thana Road
- Station Road
- Ghorapir Bazar Road

The roads under other than Municipality are-

- Balua Haat-Korpur Haat Road
- Korpur Haat-Mulbari Haat Road
- Mohicharan Haat-College Station Haat Road
- Charpara Haat-College Station Haat Road
- Koromja Haat-Lotiganj Haat Road
- Charpara Haat-Velurpara Haat Road
- Horikhali Haat-Moulivi Moar Haat Road
- Horikhali Bazar-Ariar Ghat Bazar Road
- Kachari Bazar-Taltola Bazar Road.

3.5   Existing Infrastructure

Bus Terminal

The bus terminal under this Upazila is known to local people is Sonatala Bus terminal. This bus terminal is located on the Station Mor adjacent to Sonatala Railway Station. In this terminal there can be remained around 12-16 buses. These buses follow two trip generations as Jumarbari-Sonatala-Mokamtala - Gobindaganj and Bogra – Mokamtala – Sonatola -Jumarbari. A photograph of Sonatala bus terminal is shown below.

Source: Field Survey, 2016

Plate 3.1: Sonatala Bus Terminal

Truck Terminal

There is no truck terminal in this Upazila.

Tempo/CNG Station

There is one Tempo Stand in this Upazila which is located beside the Station Mor. Apart of this Tempo Stand there are two CNG stand which is familiar to local people as Madrasa Mor CNG stand and Station Mor CNG Stand.

Source: Field Survey, 2016

Plate 3.2: Tempo Stand at Sonatala Station Mor

Source: Field Survey, 2016

Plate 3.3: CNG Stand at Sonatala Station Mor

Rickshaw/Van Stand

In this Upazila Van is very popular mode other than rickshaw to local people for the purpose of travelling one area to others. Every Union has at least two Van Stands in this Upazila. It is observed that most of the van stands are located on the roadside especially around bazaar/Haat areas.

Source: Field Survey, 2016

Plate 3.4: Van Stand at Madrasa Mor

3.6   Major On-going Road Project

LGED has been undertaken Operation and Maintenance, repairing and improvement activities of the following roads within the Sonatala Upazila.

- Balua Union Parishad - Ranirpara Bazar Road;
- Balua Union Parishad/GC Korpur Haat Road;
- Pakulla Union Parishad Charpara Bazar - Bablatola Road;
- Horikhali GC-Pakulla Union Parishad Miloner Para Road;
- Kamarpara Bridge-Sarjan Para GPS Road;
- Haat Koromja Dhulir Char Link Road (UZR);
- Sakua Haati High School Road;
- Digdair Union Parishad – Charpara Haat-College Station Road;
- Pakulla Union Parishad Taltola Bazazar - Radha Kantopur Road;
- Garamara - Kamar Para Road.

3.7   Railway

Sonatala has two railway stations. One is situated in the Paurashava center which is known as Sonatala Railway Station and another is located in the Digdair Union which is known as College Railway Station. These two railways are connected to Gabtali Upazila under Bogra District and Saghata Upazila under Gaibandha District.

Source: Field Survey, 2016

Plate 3.5: Sonatala Rail Station

Source: Field Survey, 2016

Plate 3.6: Meter Gauge Railway Station of Digdair Union

3.8   Water Way

Bangali River flows inside the Upazila. Brahmaputra River flows on the east side of Sonatala Upazila. As this area has been developed on the both side of Bangali River and other rivers such as; Jamuna river, Bhimti, Lohagara, Mohicharan, Neagan, Gobarchanpa beels etc. has been playing important role for its development and transportation. However, due to course of time the river transportation system is almost extinct and road transportation system has been developed. However, seasonal river transport is still used to transport specially goods and commodities.

CHAPTER FOUR: SURVEY FINDINGS

4.1   Identification of Critical Intersections/Road Networks

The road network of Upazila (shown in Map 4.1) was developed and established according to the needs and not in a planned way. Most of the cases road network is established after the development of infrastructure resulting poor layout of road network, narrow, pedestrian problem, utility services problem, emergency services problem etc. Unauthorized encroachments are common problems along the roadside and major road cross-sections.

4.1.1   Major Intersections and their Networks/Linkages

The major intersections within the Sonatala Upazila as identified during the survey and field visits are as follows and are shown in Map 4.1.

- ✓ Bank Mor
- ✓ Station 3 Matha Mor
- ✓ Madrasha Mor
- ✓ Horikhali Bazar
- ✓ Balua Bazar

4.1.2   Nature and Common Mode of Travel

It has been observed that, the town does not appear to demonstrate serious signs of traffic congestion. It is also observed that road side parking of vans, auto-rickshaw, loading-unloading of passengers on the road haphazard parking of transport are the main problems of the area. It is hard-headed that the main mode of transport within the Upazila is auto-rickshaw. Other mode of transport as intra Upazila transport could be identified as CNG, Bhatvati, van etc. Inter district and long route transport mode is mainly bus and train. The percentage distribution of common mode of travel is shown in Figure 4.1.

Transportation and traffic management survey reveals that there is no public or private bus service is available for internal movement of passengers within the Upazila. Intra Upazila traveling is mostly done through non-motorized transport like rickshaw van, etc. The dwellers also use 2/3 wheelers motorized transports like CNG, motor cycle, Bhatvati and van are used for carrying both passengers and goods.
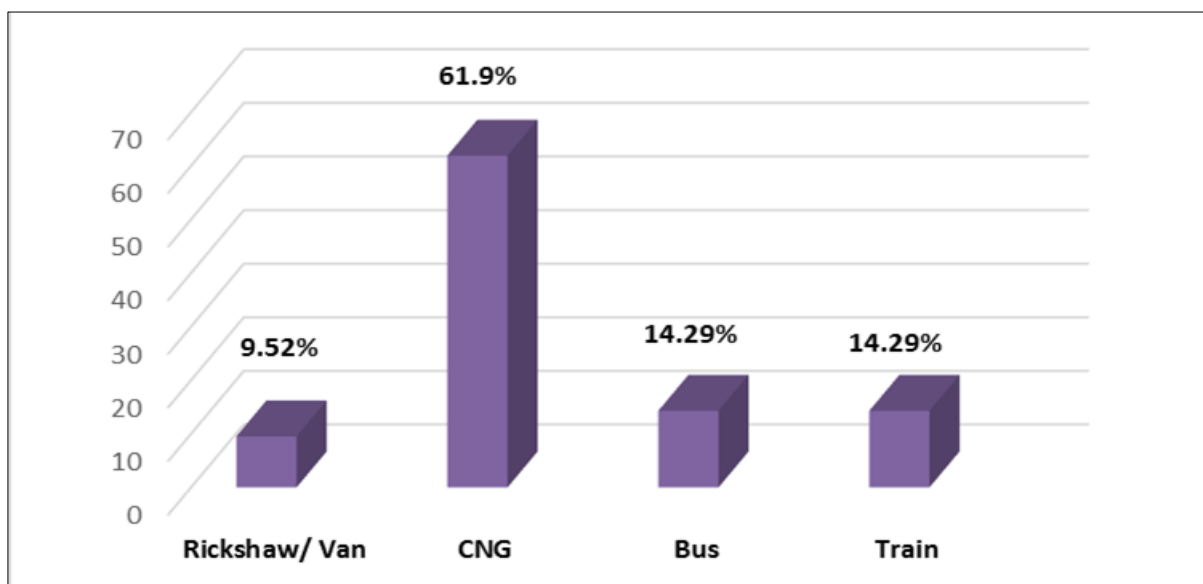
Source: Field Survey, 2016

Figure 4.1: Common Modes of Transport

4.1.3   Non-motorized Vehicle

Common non-motorized vehicles included rickshaw van and bicycle

4.1.4   Motorized Vehicle

Auto rick/ Tempo, Nasimon/Karimon, CNG, Jeep/car/Taxi, Micro/Pickup, Motor cycle, Bus/ Mini Bus, and truck.

4.2   Identification of River/Water Way Networks and Transport Facility

Water transport network of the Upazila has significant importance in carrying both people and goods. Trawler/Mechanized boats are used for carrying both passenger and commodity frequently. At present, as passenger water transport, one launch service per day from the existing launch terminal that is operated by private operator. Various types of trawlers and boats are plying for carrying goods and commodities and also passengers.

4.2.1   Major Water Way and their Linkages

Bangali River flows inside the upazila. Brahmaputra River flows through the eastern side of Sonatala Upazila. As this area has been developed on the both side of Bangali river and other rivers such as; Jamuna river, Bhimti, Lohagara, Mohicharan, Neagan, Gobarchanpa beels etc. have been playing important role for its development and transportation. However, in course of time the river transportation system is almost extinct and road transportation system has been developed. However, seasonal river transport is still used to transport specially goods and commodities.

Map 4.1: Major Intersections within the Sonatala Upazila
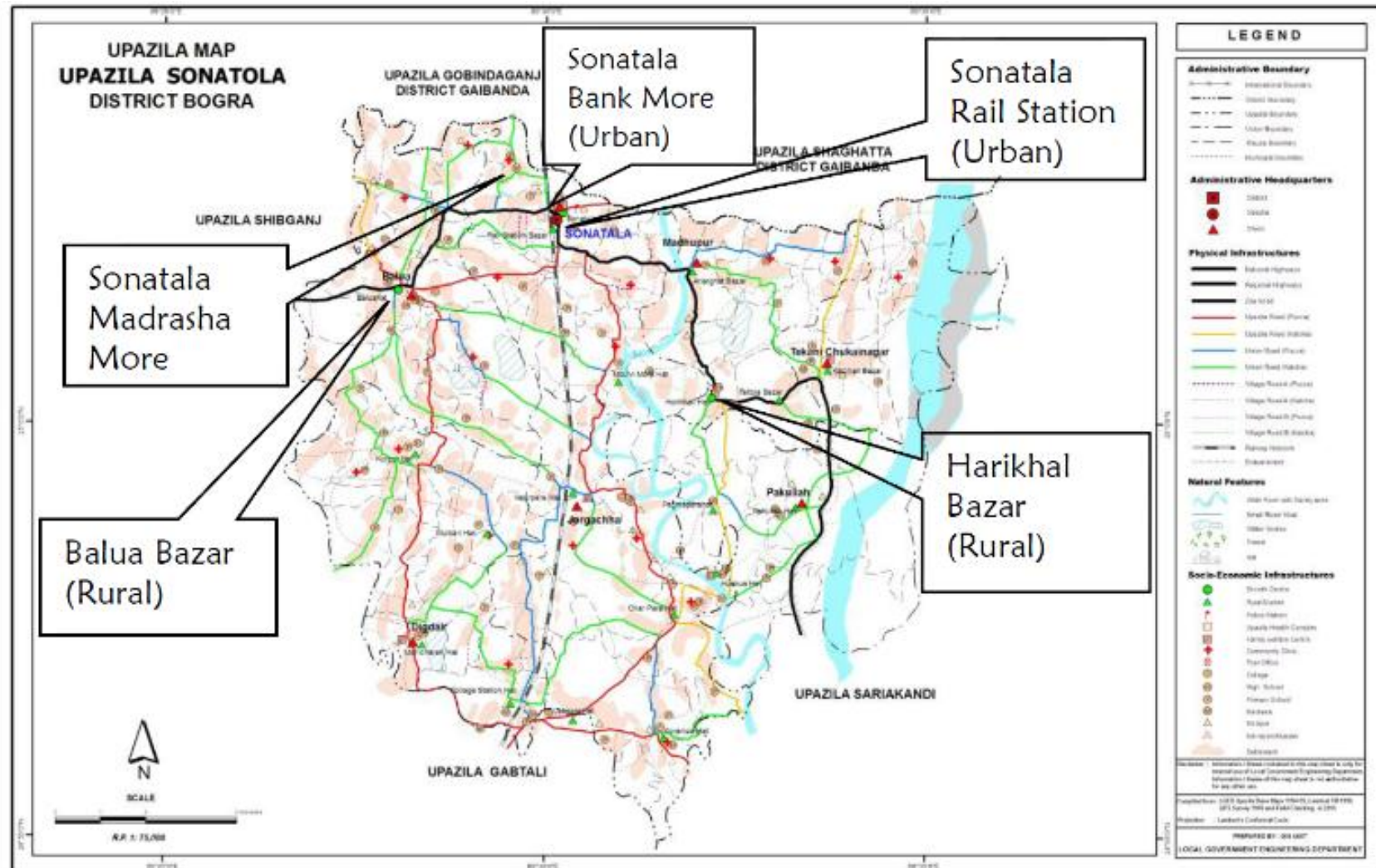
Source: LGED

4.2.2   Nature and Common Mode of Water Transport

Trawlers/Mechanized boats and local boats are the common mode of river transport in the water way.

4.3   Traffic Flow/Volume Survey at Major Intersections (Roadway links)

4.3.1   Major Critical Junctions/Intersections

The major critical junction/intersections points and their road linkages with in the areas are mainly the followings.

   a) Bank Mor Intersection (3 Matha mor) on Upazila to Bus Stand Road;

   b) Station Mor Intersection (3 Matha mor) on Stadium- Sonatala- Girls School Road;

   c) Madrasha Mor Intersection (3 Matha mor) Ghorapir- Thana road-Sonatala Road;

   d) Horikhali Bazar Intersection (4 Matha mor) on Horikhali- Tekani- Satbeki- Sonatala;

   e) Balua Bazar Intersection (4 Matha mor) on Sonatala- Mokamtaka- Kamarpara- Gabtali.

4.3.2   Intersections Wise Average Daily Traffic Volume

Traffic and transport management survey was conducted at five selected intersections as indicated above. These intersections comprise several important links that are the dominant traffic generating links of the area. Traffic volume survey locations are presented on Map 4.1. The surveyed intersections with their lane are presented in Figures and average daily traffic volume is presented in the following Tables.

Bank Mor Intersection is one of the major intersections on the Upazila- Bus stand road. The common modes of transport on this road are Auto-Van, Bhatvati, Nasimon/Karimon, CNG, Motor cycle, Bus/ Mini Bus and Truck among the motorized transport and Rickshaw, Rickshaw Van and Bicycle among the non-motorized transport. The daily average motorized traffic flow is 1088 and non-motorized flow is 459 and the total motorized and non-motorized traffic flow is 1447. The distribution of average motorized and non-motorized traffic passes through this junction point is presented in Table 4.1. It is observed that the major average traffic composition at this locations are auto rickshaw indicating 37.32%, motor cycle about 19.67%, Bhatvati 10.11% and CNG about 16.36% of the total motorized flow. Bicycle representing about 56.43% and rickshaw van representing 41.39% among the non-motorized flow and has been playing the significant role as the common mode of travel within the area.

Source: Field Survey, 2016

Plate 4.1: Bank Mor Intersection

Table 4.1: Daily Traffic Volume of Bank Intersection

Sl. No.	Type of Vehicle (Motorized)	Total	Percentage (%)	Sl. No.	Type of Vehicle (Non-Motorized)	Total	Percentage (%)
1	Auto Rickshaw/Van	406	37.32	1	Rickshaw	10	2.18
2	Bhatvati	110	10.11	2	Rickshaw/Van	190	41.39
3	Nasimon/Karimon	49	4.50	3	Bicycle	259	56.43
4	CNG	178	16.36	4	Bullock Cart	0	0.00
5	Jeep/car/Taxi	18	1.65	5	Push Cart	0	0.00
6	Micro/Pickup	49	4.50		**Total**	**459**	**100.00**
7	Motor cycle	214	19.67				
8	Bus/Mini Bus	13	1.19				
9	Truck	51	4.69				
Total		**1088**	**100.00**	**All Total**		**1547**	

Source: Traffic Survey, 2016

Station Mor Intersection is another major intersection on the Stadium- Sonatala- Girls School road. The common mode of transport of this road are Auto Rickshaw/Van, Bhatvati, Nasimon/Karimon, CNG, motor cycle, bus/mini bus and truck among the motorized transport and rickshaw, rickshaw van and bicycle among the non-motorized transport. The daily average motorized traffic flow is 839and non-motorized flow is 529 and the total motorized and non-motorized traffic flow is 1368. The distribution of average motorized and non-motorized traffic through this junction point is presented in Table 4.2. It is observed that the major average traffic composition at this locations are Auto rickshaw/van covering about 33.25%, motor cycle

covering 27.53% and CNG indicating 22.77% of the total motorized flow. Bicycle among the non-motorized flow representing about 51.61% and rickshaw van representing about 47.26% have been playing the significant role as the common mode of travel within the area.

Table 4.2: Daily Traffic Volume of Station Mor Intersection

Sl. No.	Type of Vehicle (Motorized)	Total	Percentage (%)	Sl. No.	Type of Vehicle (Non-Motorized)	Total	Percentage (%)
1	Auto Rickshaw/Van	279	33.25	1	Rickshaw	6	1.13
2	Bhatvati	35	4.17	2	Rickshaw/Van	250	47.26
3	Nasimon/Karimon	55	6.56	3	Bicycle	273	51.61
4	CNG	191	22.77	4	Bullock Cart	0	0.00
5	Jeep/car/Taxi	12	1.43	5	Push Cart	0	0.00
6	Micro/Pickup	12	1.43		**Total**	**529**	100.00
7	Motor cycle	231	27.53				
8	Bus/Mini Bus	11	1.31				
9	Truck	13	1.55				
Total		**839**	**100.00**		**All Total**		**1368**

Source: Traffic Survey, 2016

Source: Field Survey, 2016

Plate 4.2: Station Mor Intersection

Madrasha Mor Intersection is also a major intersection on the Ghorapir- Thana road- Sonatala Road. The common mode of transport on this road are auto rickshaw/van, Bhatvati, Nasimon/Karimon, CNG, motor cycle, bus/mini bus and truck among the motorized transport

and rickshaw, rickshaw van and bicycle among the non-motorized transport. The daily average motorized traffic flow is 1092 and non-motorized flow is 808 and the total motorized and non-motorized traffic flow is 1900. The distribution of average motorized and non-motorized traffic through this junction point is presented in Table 4.3. It is observed that the major average traffic composition at this locations are auto rickshaw indicating motor cycle 28.75%, auto rickshaw/van about 25.64% and CNG covering about 23.26% of the total motorized flow. Bicycle among the non-motorized flow represents about 51.49% and rickshaw van representing about 48.51% and have been playing the significant role as the common mode of travel within the area.

Table 4.3: Daily Traffic Volume of Madrasha Mor Intersection

Sl. No.	Type of Vehicle (Motorized)	Total	Percentage (%)	Sl. No.	Type of Vehicle (Non-Motorized)	Total	Percentage (%)
1	Auto Rickshaw/Van	280	25.64	1	Rickshaw	0	0.00
2	Bhatvati	51	4.67	2	Rickshaw Van	392	48.51
3	Nasimon/Karimon	79	7.23	3	Bicycle	416	51.49
4	CNG	254	23.26	4	Bullock Cart	0	0.00
5	Jeep/car/Taxi	30	2.75	5	Push Cart	0	0.00
6	Micro/Pickup	37	3.39		**Total**	808	100.00
7	Motor cycle	314	28.75				
8	Bus/Mini Bus	22	2.01				
9	Truck	25	2.29				
	Total	**1092**	**100.00**		**All Total**		**1900**

Source: Traffic Survey, 2016

Source: Field Survey, 2016

Plate 4.3: Madrasa Mor Intersection

Horikhali Bazar Intersection is also a major intersection on the Horikhali- Tekani- Satbeki-Sonatala road. The common mode of transport on this road are auto rickshaw/van, Bhatvati, Nasimon/Karimon, CNG, motor cycle, bus/ mini bus and truck among the motorized transport and rickshaw, rickshaw van and bicycle among the non-motorized transport. The daily average motorized traffic flow is 1051 and non-motorized flow is 681 and the total motorized and non-motorized traffic flow is 1731. The distribution of average motorized and non-motorized traffic through this junction point is presented in Table 4.4 It is observed that the major average traffic composition at this locations are auto rickshaw indicating 31.87%, Motor cycle indicating 26.36% and CNG covering about 24.07% of the total motorized flow. Bicycle among the non-motorized flow representing about 51.84% and rickshaw van about 42.14% have been playing the significant role as the common mode of travel within the area.

Table 4.4: Daily Traffic volume of Horikhali Bazar Intersection

Sl. No.	Type of Vehicle (Motorized)	Total	Percentage (%)	Sl. No.	Type of Vehicle (Non-Motorized)	Total	Percentage (%)
1	Auto Rickshaw/Van	335	31.87	1	Rickshaw	41	6.02
2	Bhatvati	61	5.80	2	Rickshaw/Van	287	42.14
3	Nasimon/Karimon	45	4.28	3	Bicycle	353	51.84
4	CNG	253	24.07	4	Bullock Cart	0	0.00
5	Jeep/car/Taxi	20	1.90	5	Push Cart	0	0.00
6	Micro/Pickup	14	1.33		**Total**	**681**	**100.00**
7	Motor cycle	277	26.36				
8	Bus/Mini Bus	14	1.33				
9	Truck	32	3.04				
	Total	**1051**	100.00		**All Total**		**1731**

Source: Traffic Survey, 2016

Balua Bazar Intersection is one of the major intersections on Sonatala- Mokamtaka-Kamarpara- Gabtali road. The common mode of transport on this road are Auto rickshaw/Van, Bhatvati, Nasimon/Karimon, CNG, Motor cycle, Bus/ Mini Bus and Truck among the motorized transport and Rickshaw, Rickshaw Van and Bicycle among the non-motorized transport. The daily average motorized traffic flow is 1316 and non-motorized flow is 908 and the total motorized and non-motorized traffic flow is 2224. The distribution of average motorized and non-motorized traffic passes through this junction point is presented in Table 4.5. It is observed that the major average traffic composition at this location is Motor cycle indicating 26.52%, CNG 26.29% and auto rickshaw 25.61% of the total motorized flow. Bicycle representing about 49.89% and rickshaw van representing 45.59% among the non-motorized flow and has been playing the significant role as the common mode of travel within the area.

Table 4.5: Daily Traffic Volume of Balua Bazar Intersection

Sl. No.	Type of Vehicle (Motorized)	Total	Percentage (%)	Sl. No.	Type of Vehicle (Non-Motorized)	Total	Percentage (%)
1	Auto Rickshaw/Van	337	25.61	1	Rickshaw	41	4.52
2	Bhatvati	69	5.24	2	Rickshaw Van	414	45.59
3	Nasimon/Karimon	76	5.78	3	Bicycle	453	49.89
4	CNG	346	26.29	4	Bullock Cart	0	0.00
5	Jeep/car/Taxi	29	2.20	5	Push Cart	0	0.00
6	Micro/Pickup	44	3.34		**Total**	**908**	**100.00**
7	Motor cycle	349	26.52				
8	Bus/Mini Bus	32	2.43				
9	Truck	34	2.58				
Total		**1316**	**100.00**	**All Total**		**2224**	

Source: Traffic Survey, 2016

Source: Field Survey, 2016

Plate 4.4: Balua Bazar Intersection

4.3.3   Average Daily Traffic Volume (ADTV) in the Major Intersections

The summary of the Average Daily Traffic Volume (ADT) volumes at 5 surveyed locations is presented in Table 4.6. The survey results exhibit that Balua Junction on Sonatala- Mokamtaka- Kamarpara- Gabtali road is the most important junction point having the highest ADT volume of 2224,Madrasha intersection on Ghorapir- Thana road- Sonatala Road is another important junction point having ADT volume of about 1900, Horikhali intersection on Horikhali- Tekani-

Satbeki-Sonatala having 1732, Station Intersection on Stadium- Sonatala-Girls School road having the 1368 ADT and Bank Intersection on Upazila to Bus Stand road having the lowest ADT of 647.

Table 4.6: Average Daily Traffic Volume

Name of Intersection/ Junction Point	Motorized Traffic	Non-Motorized Traffic	Total	Percentage (%)		
				Motorized	Non-Motorized	Total
Bank Mor Intersection	1088	459	1547	80.68	19.32	100
Station Mor Intersection	839	529	1368	61.33	38.67	100
Madrasha Mor Intersection	1092	808	1900	57.47	42.53	100
Horikhali Bazar Intersection	1051	681	1732	60.68	39.32	100
Balua Bazar Intersection	1316	908	2224	59.17	40.83	100
Total	**4820**	**3051**				

Source: Traffic Survey, 2016

4.3.4   Intersections Wise Average Hourly Traffic Volume

To find out total hourly discharging of traffic during the day, day long traffic survey has been conducted in each of the major junction point. The hourly distribution of traffic flow in each of the junction point is presented in following tables and Figures based on the survey findings.

The hourly traffic flow on the Upazila- Bus stand road at Bank Mor Intersection point is shown in Table 4.7. It is observed that hourly traffic volume on this road is higher during 9am to 10am and 10am to 11am ranging from 192 to 148 including both motorized and non-motorized traffic. It is also observed that hourly traffic volume on this road is higher during 4pm to 5pm and 5pm to 6pm having the total flow of 131 and 169 traffic including both motorized and non-motorized vehicles.

Table 4.7: Hourly Traffic Volume at Bank Mor Intersection

Traffic Flow (From-to)	Motorized Traffic	Non-Motorized Traffic	Total
6 am-7 am	65	22	87
7am- 8 am	92	20	112
8 am- 9 am	85	45	130
9 am- 10 am	134	58	192
10am- 11 am	103	45	148
11am- 12 pm	79	49	128
12pm- 1 pm	62	34	96

Traffic Flow (From-to)	Motorized Traffic	Non-Motorized Traffic	Total
1 pm- 2 pm	76	27	103
2 pm- 3 pm	84	42	126
3 pm- 4 pm	83	42	125
4 pm- 5 pm	98	33	131
5 pm- 6 pm	127	42	169
Total	**1088**	**459**	**1547**

Source: Traffic Survey, 2016

The hourly traffic flow on the Stadium- Sonatala- Girl School Road at Station Mor Intersection (3 Matha Mor) point is shown in Table 4.8. It is observed that hourly traffic volume on this road is higher during 9am to 10am and 11am to 12am indicating flow of 128 and 129 traffic including both motorized and non-motorized. It is also observed that hourly traffic volume on this road is higher during 4pm to 5pm and 5pm to 6pm having the flow of 139 and 178 including both motorized and non-motorized vehicles.

Table 4.8: Hourly Traffic Volume at Station Mor Intersection

Traffic Flow (From-to)	Motorized Traffic	Non-Motorized Traffic	Total
6 am-7 am	33	16	49
7am- 8 am	44	24	68
8 am- 9 am	58	29	87
9 am- 10 am	86	42	128
10am- 11 am	76	43	119
11am- 12 pm	82	47	129
12pm- 1 pm	67	54	121
1 pm- 2 pm	69	48	117
2 pm- 3 pm	79	25	104
3 pm- 4 pm	61	68	129
4 pm- 5 pm	82	57	139
5 pm- 6 pm	102	76	178
Total	839	529	1368

Source: Traffic Survey, 2016

The hourly traffic flow on the on Ghorapir-Thana Road- Madrasa Mor-Sonatala road at Madrasha Mor Intersection point is shown in Table 4.9. It is observed that hourly traffic volume on this road is higher during 10am to 11am and 11am to 12am indicating flow of 150 and 154 traffic including both motorized and non-motorized. It is also observed that hourly traffic volume on this road is higher during 4pm to 5pm and 5pm to 6pm having the flow of 258 and 290 including both motorized and non-motorized vehicles.

Table 4.9: Hourly Traffic Volume at Madrasa Mor Intersection

Traffic Flow (From-to)	Motorized Traffic	Non-Motorized Traffic	Total
6 am-7 am	39	26	65
7am- 8 am	55	25	80
8 am- 9 am	75	47	122
9 am- 10 am	75	54	129
10am- 11 am	85	65	150
11am- 12 pm	94	60	154
12pm- 1 pm	79	58	137
1 pm- 2 pm	90	71	161
2 pm- 3 pm	90	72	162
3 pm- 4 pm	109	83	192
4 pm- 5 pm	141	117	258
5 pm- 6 pm	160	130	290
Total	**1092**	**808**	**1900**

Source: Traffic Survey, 2016

The hourly traffic flow on the on Horikhali- Takani- Satbeki-Sonatala road at Horikhali Bazar Intersection point is shown in Table 4.10. It is observed that hourly traffic volume on this road is higher during 9am to 10am and 10am to 11am indicating flow of 161 and 154 traffic including both motorized and non-motorized. It is also observed that hourly traffic volume on this road is higher during 3pm to 4pm and 5pmto 6pm having the flow of 174 and 218 including both motorized and non-motorized vehicles.

Table 4.10: Hourly Traffic Volume at Horikhali Bazar Intersection

Traffic Flow (From-to)	Motorized Traffic	Non-Motorized Traffic	Total
6 am-7 am	37	25	62
7am- 8 am	58	26	84
8 am- 9 am	77	35	112
9 am- 10 am	115	46	161
10am- 11 am	93	61	154
11am- 12 pm	89	60	149
12pm- 1 pm	87	65	152
1 pm- 2 pm	94	63	157
2 pm- 3 pm	95	42	137
3 pm- 4 pm	87	87	174
4 pm- 5 pm	97	75	172
5 pm- 6 pm	122	96	218
Total	**1051**	**681**	**1732**

Source: Traffic Survey, 2016

The hourly traffic flow on the on Sonatala - Balua Bazar- Mokamtala-Kamarpara-Gabtali Road at Balua Bazar Intersection point is shown in Table 4.11. It is observed that hourly traffic volume on this road is higher during 10 am to 11am and 11am to 12 am indicating flow of 193 and 182 traffic including both motorized and non-motorized. It is also observed that hourly traffic volume on this road is higher during 3 pm to 4 pm and 5pmto 6 pm having the flow of 235 and 266 including both motorized and non-motorized vehicles.

Table 4.11: Hourly Traffic Volume at Balua Bazar Intersection

Traffic Flow (From-to)	Motorized Traffic	Non-Motorized Traffic	Total
6 am-7 am	46	15	61
7am- 8 am	64	41	105
8 am- 9 am	99	52	151
9 am- 10 am	115	60	175
10am- 11 am	113	80	193
11am- 12 pm	108	74	182
12pm- 1 pm	106	86	192
1 pm- 2 pm	115	98	213
2 pm- 3 pm	137	93	230
3 pm- 4 pm	132	103	235
4 pm- 5 pm	136	85	221
5 pm- 6 pm	145	121	266
Total	1316	908	**2224**

Source: Traffic Survey, 2016

4.3.5   Peak Hour Total Traffic Volume

Based on the survey findings, it is observed that the traffic flow is highest in the morning period of 9am to 10am and 10am to 11am and evening period of 4pm to 5pm and 5pm to 6pm. It is therefore, the morning Peak hour is considered from 9am to 11am and evening peak hour is considered from 4pm to 6pm. The rest of the time periods are considered as off peak hours. The results of the peak hour traffic volume both in terms of the combined traffic numbers are shown in Table 4.12.

Table 4.12: Peak Hour Traffic volume

Traffic Junction Point	Peak hour Period	Peak hour Time	Motorized Traffic	Non-Motorized Traffic	Total
Bank Mor Intersection	Morning Period	9 am to 10 am	134	58	192
		10 am to 11 am	103	45	148
		Total	**237**	**103**	
	Evening Period	4 pm- 5 pm	98	33	131
		5 pm- 6 pm	127	42	169

Traffic Junction Point	Peak hour Period	Peak hour Time	Motorized Traffic	Non-Motorized Traffic	Total
		Total	**225**	**75**	
Station Mor Intersection	Morning Period	9 am- 10 am	86	42	128
		11am- 12 pm	82	47	129
		Total	**168**	**89**	
	Evening Period	4 pm- 5 pm	82	57	139
		5 pm- 6 pm	102	76	178
		Total	**184**	**133**	
Madrasha Mor Intersection	Morning Period	10am- 11 am	85	65	150
		11am- 12 pm	94	60	154
		Total	**179**	**125**	
	Evening Period	4 pm- 5 pm	141	117	258
		5 pm- 6 pm	160	130	290
		Total	**301**	**247**	
Horikhali Bazar Intersection	Morning Period	9 am- 10 am	115	46	161
		10am- 11 am	93	61	154
		Total	**208**	**107**	
	Evening Period	3 pm- 4 pm	87	87	174
		5 pm- 6 pm	122	96	218
		Total	**209**	**183**	
Balua Bazar Intersection	Morning Period	10am- 11 am	113	80	193
		11am- 12 pm	108	74	182
		Total	**221**	**154**	
	Evening Period	3 pm- 4 pm	132	103	235
		5 pm- 6 pm	145	121	266
		Total	**277**	**224**	

Source: Traffic Survey, 2016

PCU of Bus Stand Mor

Table 4.13: Peak Hour Traffic Volume at Bus Stand Mor of the Sonatala Paurashava

Day	Links at Bus Stand Mor	Peak Hour	Time	Motorized					Non-Motorized				Total Motorized	Total Non-Motorized	Grand Total	PCU
				Truck	Bus	Car/ Microbus	Auto-Rickshaw	Motor-cycle	Rickshaw	Bicycle	Animal Push Car	Van				
Hat Day	Bank Mor	Morning	10am-11am	3	0	2	37	8	2	12	0	0	50	14	64	39.96
	Bank Mor-Madrsha Mor	Evening	5pm-6pm	0	0	0	59	19	17	13	0	0	78	30	108	64.54

Source: Traffic Survey, 2016

Table 4.14: Off-Peak Hour Traffic Volume at Bus Stand Mor of the Sonatala Paurashava

Day	Links at Bus Stand Mor	Peak Hour	Time	Motorized					Non-Motorized				Total Motorized	Total Non-Motorized	Grand Total	PCU
				Truck	Bus	Car/ Microbus	Auto-Rickshaw	Motor-cycle	Rickshaw	Bicycle	Animal Push Car	Van				
Hat Day	Bank Mor	Morning	6am-7am	3	0	2	19	7	1	8	0	0	31	9	40	27.89
	Bank Mor-Madrsha Mor	Evening	6pm-7pm	3	2	5	15	9	3	10	0	0	34	13	47	39.05

Source: Traffic Survey, 2016

4.4   Origin - Destination Survey (Roadway)

Origin Destination survey was conducted on passengers of passenger vehicle in the 5 selected locations of Bank Mor Intersection, Station Mor Intersection, Madrasha Mor Intersection, Horikhali Bazar Intersection and Balua Bazar Intersection. The passengers' origin and destination point are considers based on the passenger movement from one mahalla/ward to others mahallas/ward which indicated the movement within the Upazila and also outside the Upazila for different purposes. This section mainly described the findings of passenger's interview regarding the origin, destination and purpose etc. of the trips.

4.4.1   Sex Wise Distribution of Passenger

A total of 105 passengers were interviewed of which 71.43% are male and 28.57% are female and sex wise distribution of passengers is shown in Table 4.15.

Table 4.15: Sex Wise Distribution of Passengers

Sl. No.	Types of respondent	No. of Passenger	Percentage (%)
1	Male	75	71.43
2	Female	30	28.57
Total		**105**	**100.00**

Source: Traffic Survey, 2016

4.4.2   Age Wise Distribution of Passengers

Out of the total passengers interviewed 4.76% are within the age of 20, 22.86% are within the age group of 20-30, 50.48% are within 30-60 and about 21.90% are above the age of 60 years. Age wise distribution of passengers including male and female is shown in Table 4.16.

Table 4.16: Age Wise Distribution of Passengers Based on Sex

Sl. No.	Age Group	Number of Passengers	Percentage (%)
1.	Up to 20	05	4.76
2.	20-30	24	22.86
3.	30-60	53	50.48
4.	60+	23	21.90
	TOTAL	**105**	**100.00**

Source: Traffic Survey, 2016

4.4.3   Origin of Trips

The survey revealed that the origin of trip of 32.38% of the total passengers were originated from different places located within the union, 29.52% movement were originated from different places located within the Upazila, 35.24% trips were originated from different places located within district and 2.86% trips were originated from different places located outside the district. Origin wise distribution of passengers is shown in Table 4.17.

Table 4.17: Origin of Trip

Sl. No.	Origin of Trip	Number of Passengers	Percentage
1.	Within Ward	6	5.71
2.	Within Union	28	26.67
3.	Within Upazila	31	29.52
4.	Within District	37	35.24
5.	Outside of the District	3	2.86
	TOTAL	**105**	**100.00**

Source: Traffic Survey, 2016

4.4.4   Destination of Trip

The survey revealed that the destination of 2.86 % of the total passengers were ended in different places located within the ward, 16.19% movement were ended in different places located within the Union, 27.628% trips were ended in different places located within Upazila, 45.71% trips were ended in different places located within the district and 7.62% trips were ended in different places located outside the district. Destination wise distribution point of passengers is shown in Table 4.18.

Table 4.18: Destination Point of Trip

Sl. No.	Destination of Trip	Number of Passengers	Percentage
1.	Within Ward	03	2.86
2.	Within Union	17	16.19
3.	Within Upazila	29	27.62
4.	Within District	48	45.71
5.	Outside of the District	08	7.62
	TOTAL	**105**	**100.00**

Source: Traffic Survey, 2016

4.4.5   Purpose of Trips

The survey revealed that the purpose of about 20.95% of the total passengers were to commute and to go back and forth, 24.76% movement were business trips, 12.38% trips were for shopping, 20.0% trips were for educational/school going, 16.19% trips social trips. Purpose wise distribution of passenger's movement is shown in Table 4.19.

Table 4.19: Purpose of Trip

Sl. No.	Purpose	Number of Person	Percentage (%)
1.	Work/Commute	22	20.95
2.	Business	26	24.76
3.	Shopping	13	12.38
4.	Education	21	20.00
5.	Social	17	16.19
6.	Recreation	6	5.71
TOTAL		**105**	**100.00**

Source: Traffic Survey, 2016

4.4.6   Type of Modes/Transport Used

The survey revealed that 9.52% of the total passengers were used Rickshaw van to complete their trips, 61.90% of the total passengers were used CNG to complete the trips. 14.29% used bus and 14.29% used train for travel. The distribution of passenger based on travel mode used for trips is shown in Table 4.20.

Table 4.20: Mode of Travel of Respondent

Sl. No.	Mode of Travel	Number of respondent	Percentage (%)
1.	Rickshaw/ Van	10	9.52
2.	CNG	65	61.90
3.	Bus	15	14.29
4.	Train	15	14.29
TOTAL		**105**	**100.00**

Source: Traffic Survey, 2016

4.4.7   Total Travel Time

The survey revealed that about 63.81% trips took below one hour, about 16.19% trips were completed within 1-2 hours indicating 3.81% trips were completed within 5 hours. The distribution of passenger based on travel time for trips is shown in Table 4.21.

Table 4.21: Total Travel Time

Sl. No.	Travel Time (Hour)	No. of Passenger	Percentage (%)
1.	Bellow 1	67	63.81
2.	1-2	17	16.19

Sl. No.	Travel Time (Hour)	No. of Passenger	Percentage (%)
3.	2-3	15	14.29
4.	3-4	2	1.90
5.	4-5	0	0.00
6.	5+	4	3.81
TOTAL		**105**	**100.00**

Source: Traffic Survey, 2016

4.4.8   Average Travel Cost

From the Origin and Destination survey it has been observed that people are moving to different destinations for different purposes which included within the ward, union, Upazila, district and outside district.

The survey revealed that about 16.19% passengers incurred taka up to 20 to complete the trip, about 64.76% passengers incurred taka 20-50 to complete the trip and about 5.71% passengers incurred taka 50-100 to complete the trip and only 1.90% traveler incurred more than taka 200 for the trip. The distribution of passenger based on travel cost incurred for trips is shown in Table 4.22.

Table 4.22: Total Cost

Sl. No.	Travel Cost (TK.)	No. of Passenger	Percentage (%)
1.	>20	17	16.19
2.	20-50	68	64.76
3.	50-100	6	5.71
4.	100-150	8	7.62
5.	150-200	2	1.90
6.	200+	4	3.81
TOTAL		**105**	**100.00**

Source: Traffic Survey, 2016

4.5   Regional Transport Study

Regional linkages of the area with other regional centers, large cities and other growth and commercial centers and transportation network are the best indicators for its growth and development. The consultant team conducted study on the road linkages of the area with other areas and origin and destination survey of different fright trips. Major road linkages and survey finding are presented in the following sections.

4.5.1   Trip Generation

It is evident that van and pick up are used mainly for carrying goods and commodities to relatively shorter distances within the ward, union and Upazila and on the other hand, bus, CNG and trucks are mainly used for a longer distance including Bogra, Gabtali and Dhaka, Rangpur,

Joypurhat etc. Table 4.23, Table 4.24, Table 4.25 and Table 4.26 shows the origin and destination of freight vehicles.

Table 4.23: Trip Going Out

Sl. No.	Type of Mode	Number	Percentage (%)
1.	Bus	20	4.26
2.	Truck	00	0.00
3.	Train	00	0.00
4.	CNG	450	95.74
TOTAL		**470**	**100.00**

Source: Traffic Survey, 2016

Table 4.24: Trip Distribution Point

Sl. No.	Destination to Outside	Number	Percentage (%)
1.	Within Upazila	150	31.91
2.	Within District	300	63.83
3.	Within Region	20	4.26
4.	Within Country	00	0.00
TOTAL		**470**	**100.00**

Source: Traffic Survey, 2016

Table 4.25: Trip Coming in

Sl. No.	Type of Mode	Number	Percentage (%)
1.	Bus	20	4.26
2.	Truck	00	0.00
3.	Train	00	0.00
4.	CNG	450	95.74
TOTAL		**470**	**100.00**

Source: Traffic Survey, 2016

Table 4.26: Average No. of Passengers/Weight of Goods

Sl. No.	Passenger/Goods	Number	Weight (Ton)
1.	Bus	40	00
2.	Truck	00	00
3.	Train	00	00
4.	CNG	06	00

Source: Traffic Survey, 2016

4.6   Pedestrian Survey

4.6.1   Survey Intersection or Points

As pedestrian is an important element or a part of moving vehicle, it is necessary to know the pedestrian flow in measuring the capacity of road, that's why the traffic survey has included the pedestrian count. The maximum number of pedestrian passes through Sonatala-Mokamtala link (91 no.) and lowest number of pedestrian found in Horikhali-Tekani Chukainagar link (only 14 no.).

Pedestrian interview survey has been conducted for 1 day (August 8, 2016) in some selected locations such as Sonatala Bazar teen Matha Mor, Horikhali Bazar Teen Matha Mor, Korpur Bazar Char Matha Mor And Balua Haat Bazar Mor. The survey was accomplished by enumerators who were locally recruited and adequately oriented and trained by an experienced coordinator.

For the efficiency of the survey work, a standard format has been prepared by the assigned consultants considering all relevant issues such as about their purpose of journey; their origin and destination; travel distance, etc. The pedestrian count on the basis of link has summarized below:

Table 4.27: Summary of Pedestrian Count at Hat/On Day and Non Hat/Off Day

Intersection/ Link Road	Link Name	Pedestrian/Hour	
		Hat Day/ On Day	Non Hat Day/ Off Day
Sonatala Bazar	Sonatala-Jumarbari	72	26
	Sonatala-Horikhali	26	16
	Sonatala-Mokamtala	91	35
Horikhali Bazar	Horikhali-Sonatala	35	19
	Horikhali-Saghata	46	18
	Horikhali-Tekani Chukainagar	31	14
Korpur Bazar	Korpur -Balua Haat	82	38
	Korpur-Gabtali	51	23
	Korpur -Mokamtala	65	36
	Korpur-Sonatala	56	39
Balua Haat	Balua Haat-Korpur	44	26
	Balua Haat-Mokamtala	43	27
	Balua Haat-Sonatala	61	22
Total		**654**	**324**

Source: Traffic Survey, 2016

Source: Traffic Survey, 2016

Plate 4.5: Surveyors Conducting Pedestrian Survey

Map 4.2: Major Trip Distribution Point from O-D Matrix of Sonatala Upazila
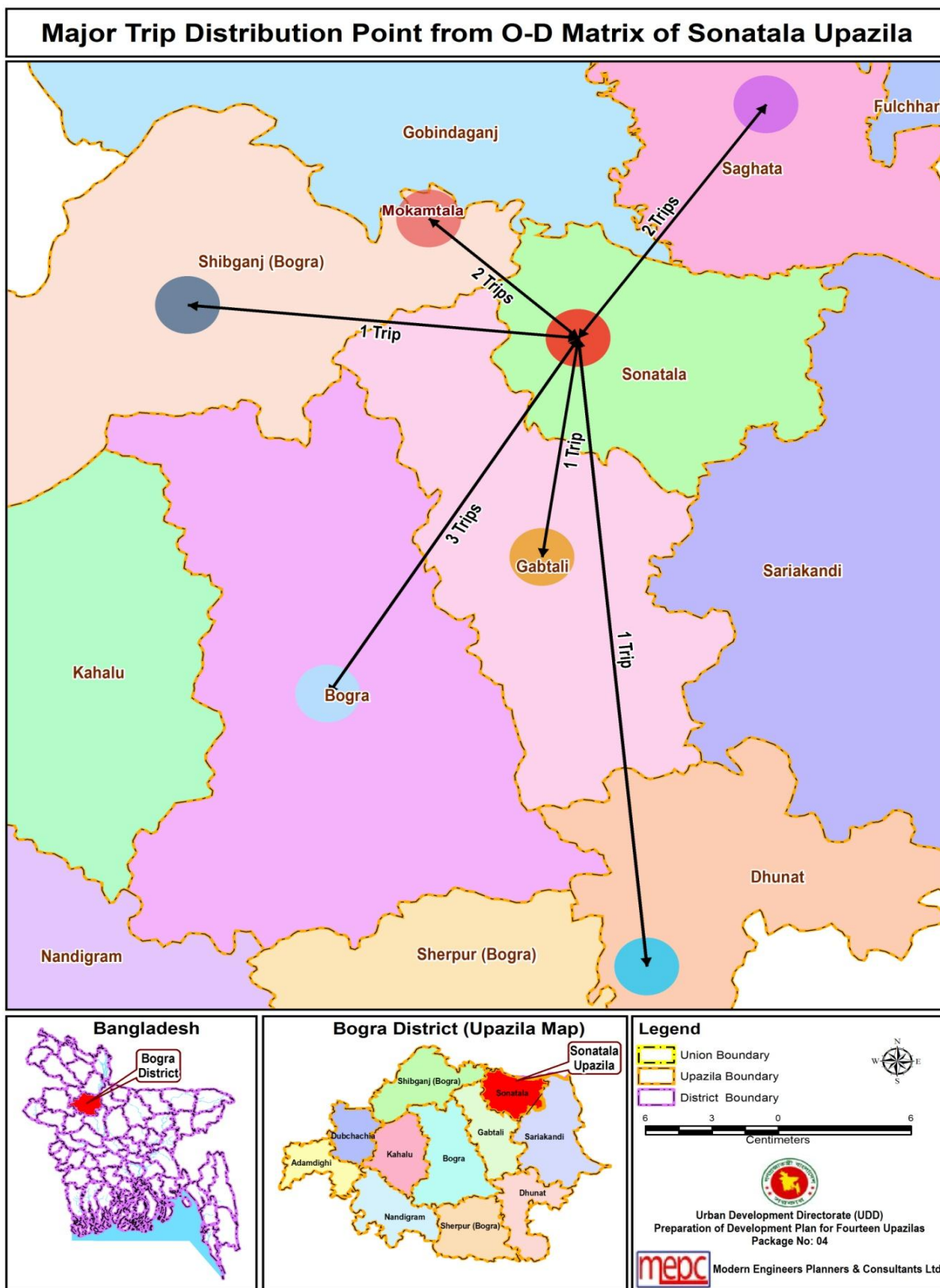
4.6.2   Origin-Destination (O-D) Pedestrian Survey Findings

Origin-Destination (O-D) Pedestrian Survey has conducted in important nodes of the study area. Major findings of Origin-Destination (O-D) Pedestrian Survey are described in the following paragraphs.

4.6.3   Trip Distribution Pattern

The O-D survey has been conducted on 40 trips of both motorized and non-motorized vehicles. Within all the trips passes over the Upazila have originated and distributed within Sonatala and Bogra Sadar. The rest of the trips go to the other places such as Gabtali, Mokamtala, Shibganj, Jumarbari and Dhunat through Sonatala. Table 4.28 shows the O-D matrix of surveyed trips from one place to another.

Table 4.28: Origin and Destination (O-D) Matrix

Destination / Origin	Sonatala	Bogra Sadar	Gabtali	Mokamtala	Shibganj	Jumarbari	Dhunat	Total(Trips)
Sonatala	0	3	1	2	1	2	1	10
Bogra Sadar	3	0	0	0	0	0	0	3
Gabtali	1	0	0	0	0	0	0	1
Mokamtala	2	0	0	0	0	0	0	2
Shibganj	1	0	0	0	0	0	0	1
Jumarbari	2	0	0	0	0	0	0	2
Dhunat	1	0	0	0	0	0	0	1
Total	**10**	**3**	**1**	**2**	**1**	**2**	**1**	**20**

Source: Traffic Survey, 2016

4.6.4   Purposes of Trips

From the survey it is observed that around 25% of the trip are generating for work purpose, 35% for business purpose, 10% for shopping, 5% for recreation, 5% for educational purpose and rest 20% for social purposes. The following figure shows the purpose of trip of the people.

Purpose of Trips

Percentage	Work/Commute	Buisness Related	Shopping	Education	Social	Recreation
	25	35	10	5	20	5
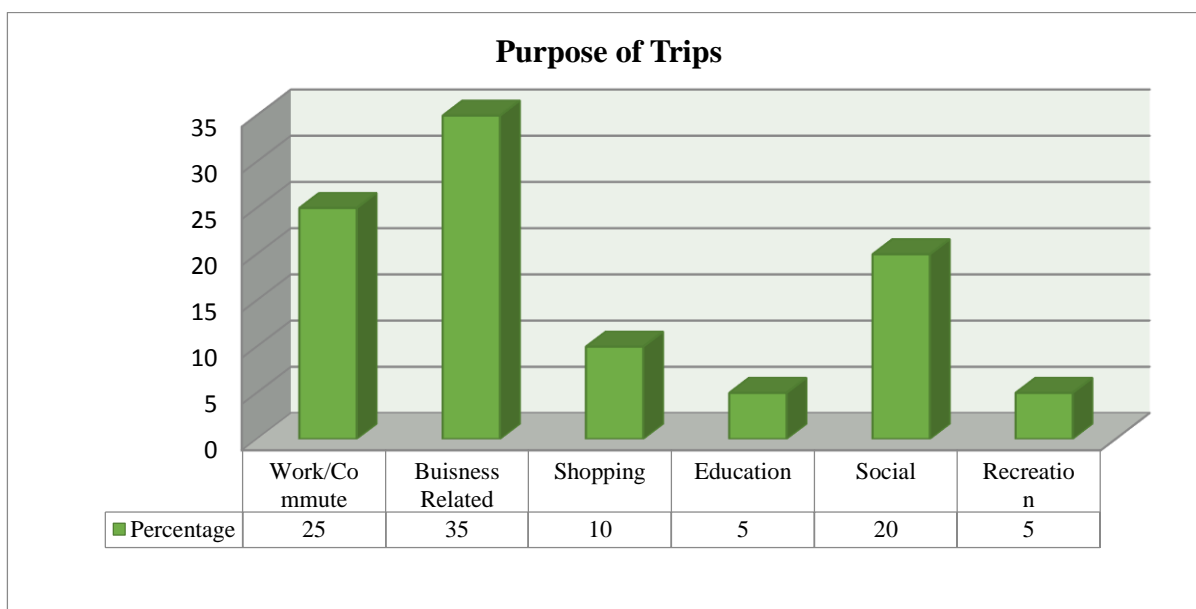
Source: Traffic Survey, 2016

Figure 4.2: Purposes of Trips

4.6.5   Trips Starts and Ends Places

Within all trips most the trips start and ends at residence and then workplace and then social purpose. Details of types of place start and end points have shown in the Table 4.29.

Table 4.29: Types of Place Start and End Points of Trip in Percentage

Type of place	Trip Staring Point		Trip Ending Point	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Residence	17	42.5	15	37.5
Workplace	11	27.5	11	27.5
Shopping	6	15.0	8	20
School/College/University	2	5.0	5	12.5
Social	3	7.5	1	2.5
Recreational	1	2.5	0	0
Total	**40**	**100.0**	**40**	**100.0**

Source: Traffic Survey, 2016

4.7   Bus Passenger Survey

Bus Passenger Survey was conducted to know the pattern of travel of bus passenger of Sonatala Upazila. Bus Passenger Survey has conducted at the Bus Station of Sonatala where the enumerators were able to get information within short time (1 day). The survey was accomplished by 5 enumerators who were locally recruited and adequately oriented and trained by an experienced coordinator.

4.7.1   Purpose of Travel

From the survey it is observed that people are travelling by bus mainly for business (35%), Work (25%), Social (20%) and shopping (10%) Purposes.

Purpose of Travel by Bus Passenger

	Work/Commute	Buisness Related	Shopping	Education	Social	Recreation
Percentage	25	35	10	5	20	5
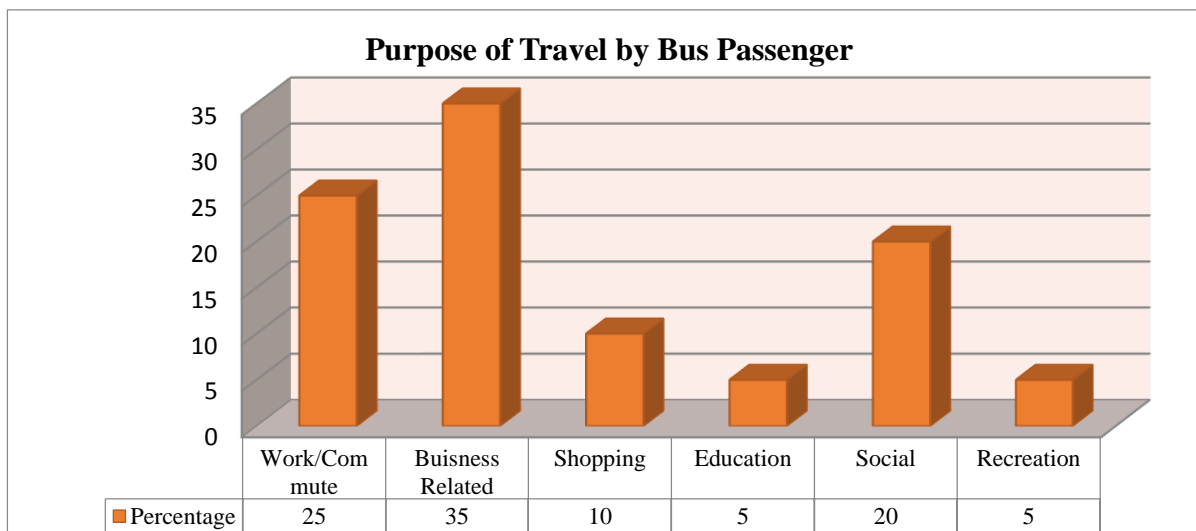
Source: Traffic Survey, 2016

Figure 4.3: Purposes of Travel by Bus Passenger

4.7.2   Age Group and Age Sex Distribution

From the survey it is observed that within all male bus passenger 23% are 21-25 years age group, 29% are at 31-35 years age group, 24% are 41-45 years age group and rest are in different categories. About 73% of the passenger is male.

Percentage of Male Bus Passengers

- 16-20 Years
- 21-25 Years — 23%
- 26-30 Years — 12%
- 31-35 Years — 29%
- 36-40 Years — 12%
- 41-45 Years — 24%
- 0%
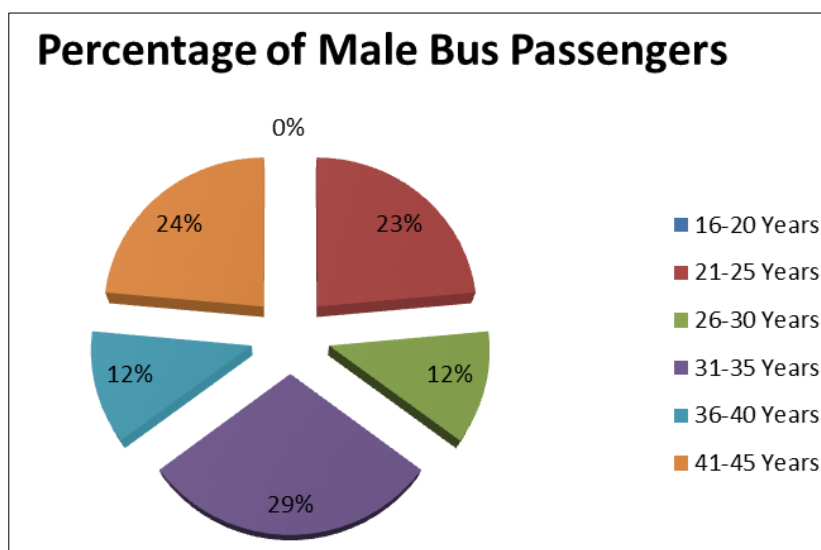
Source: Traffic Survey, 2016

Figure 4.4: Percentage of Male Bus Passenger
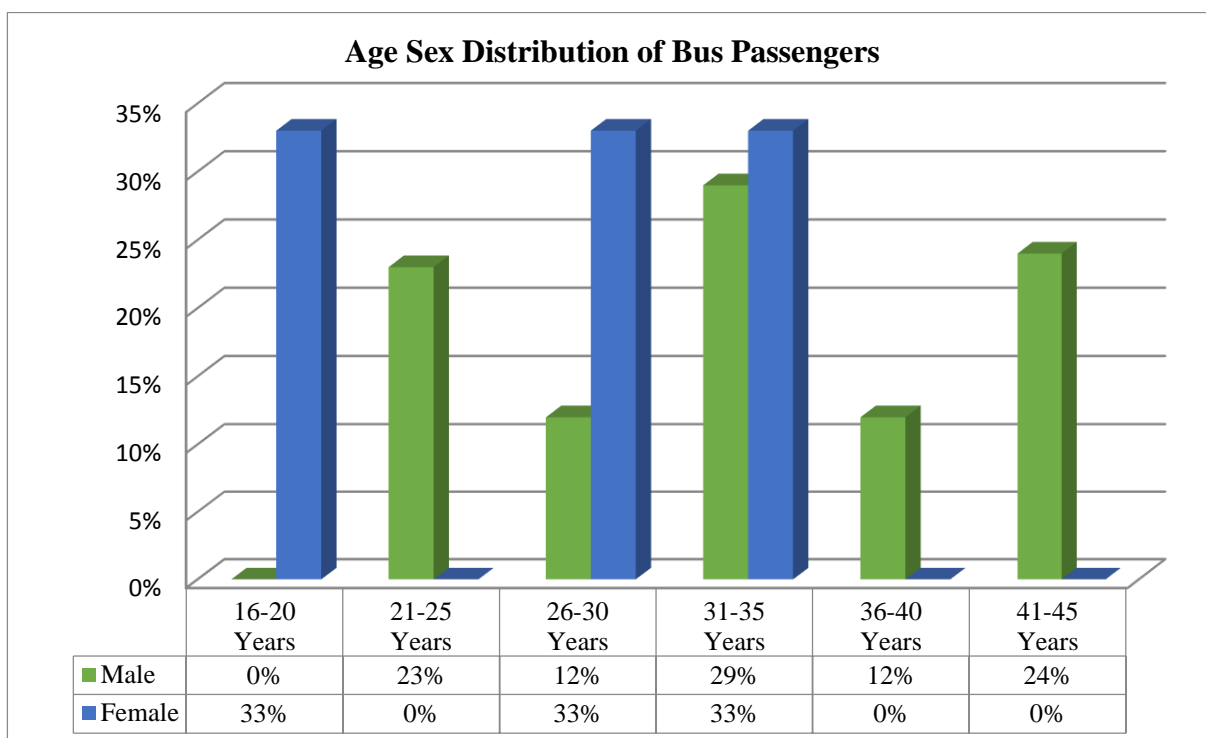
Source: Traffic Survey, 2016

Figure 4.5: Age Sex Distribution of Bus Passengers

4.7.3   Distance of Travel

Passengers are mainly travelling above 5 km distance through bus. Only 16% passengers are travelling by bus to go for 6-10 km distance. About 26% passenger travel for 11-15 km and 21% passenger travel for 21-25 km.
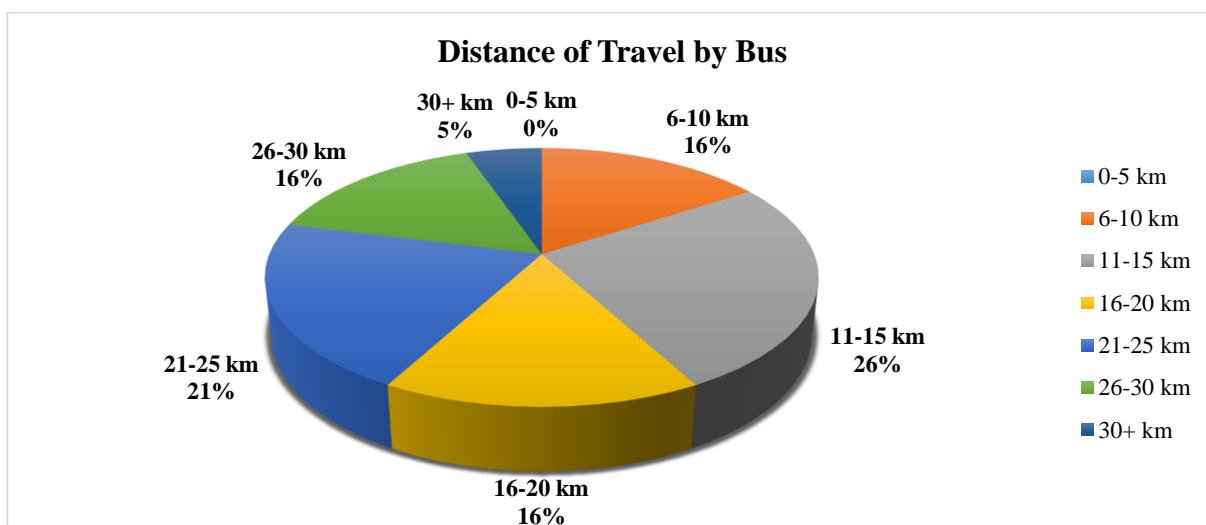
Source: Traffic Survey, 2016

Figure 4.6: Distribution of Travel by Bus

4.7.4   Number of Trips

Most of the passenger made 1 to 2 trips per week (about 55%) and other people basically travelled in different regions on haphazard interval (about 30%). 15% passengers do not travel frequently.

Number of Trips per Week by Bus Passengers

	Not Frequently	1-2	3-4	5-6
Total	15.00%	55.00%	10.00%	20.00%
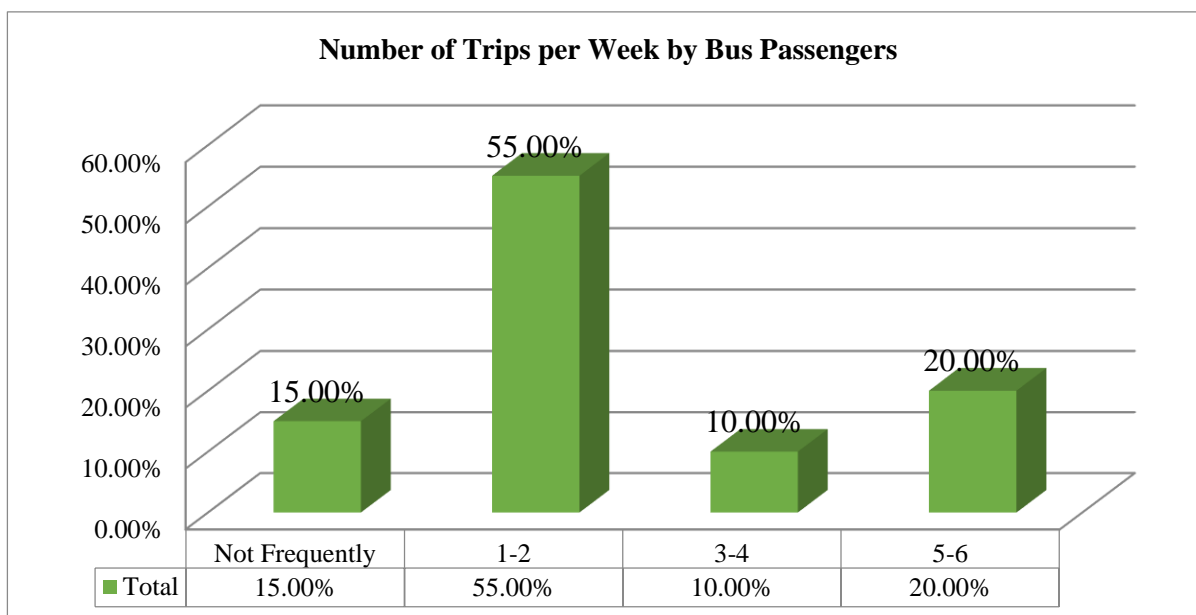
Source: Traffic Survey, 2016

Figure 4.7: Number of Trips per Week by Bus Passengers

4.8   Train Passenger Survey

Train passenger survey has been carried out to find out peoples' view, their problems and suggestions about their used mode train. Interview has been conducted on passengers on Sonatala Railway Station. The survey was accomplished by 1 enumerator who is locally recruited and adequately oriented and trained by an experienced coordinator.

The survey results have been described below.

4.8.1   Age of the Respondents

From the survey it is observed that within all male train passenger 20% are 21-25 years age group, 30% are at 26-30 years age group, 30% are at 31-35 years age group and rest of the groups are above of 35 years.
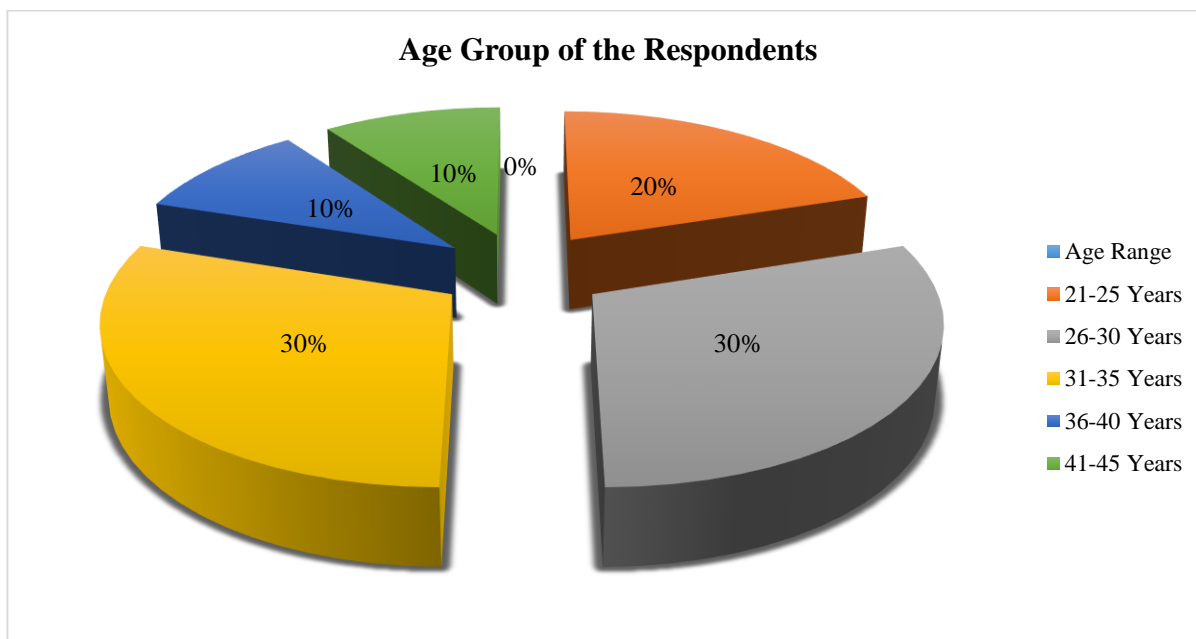
Source: Traffic Survey, 2016

Figure 4.8: Age Group of the Respondents

4.8.2   Purpose of the Trips

Train passenger interview survey result depicts that almost 40% of the respondents' travel for work/commute purpose which is chased by business (30%) and social (30%) purposes.
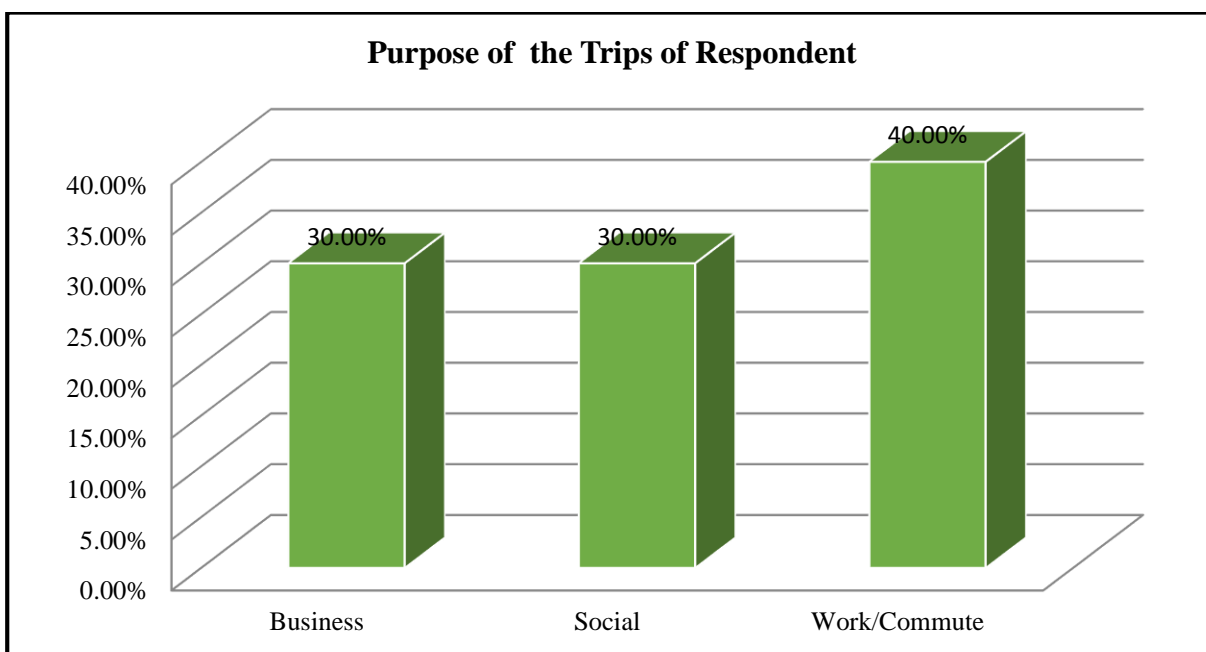
Source: Traffic Survey, 2016

Figure 4.9: Purpose of the Trips of Respondent

Source: Traffic Survey, 2016

Plate 4.6: Surveyors Conducting Train Passenger Survey

4.8.3   Origin and Destination of the Trips

Table 4.30 shows the origin and destination location of the passenger's trips. Here, peoples move from different areas and their trips also ends at various destinations.

Table 4.30: Origin and Destination of the Trips

Trip Begin	Trip Ending						Total Number of Trip Begin	Total Number of Trip Ending
	Bonarpara		Mohimagong		Sonatala			
	Number of Trip Begin	Count of T_Ending	Number of Trip Begin	Count of T_Ending	Number of Trip Begin	Count of T_Ending		
Adamdighi	0	0	0	0	1	1	1	1
Bonarpara	0	0	0	0	1	1	1	1
Kahalu	0	0	0	0	2	2	2	2
Mohimagong	0	0	0	0	1	1	1	1
Nasratpur	0	0	0	0	1	1	1	1
Santahar	0	0	0	0	2	2	2	2
Sonatala	1	1	1	1	0	0	2	2
Total	**1**	**1**	**1**	**1**	**8**	**8**	**10**	**10**

Source: Traffic Survey, 2016

4.8.4   Trips per Week

Most of the passenger made 1 to 2 trips per week (about 30%), 3 to 4 trips per week (about 10%) and other people basically travelled in different regions on haphazard interval (about 60%).
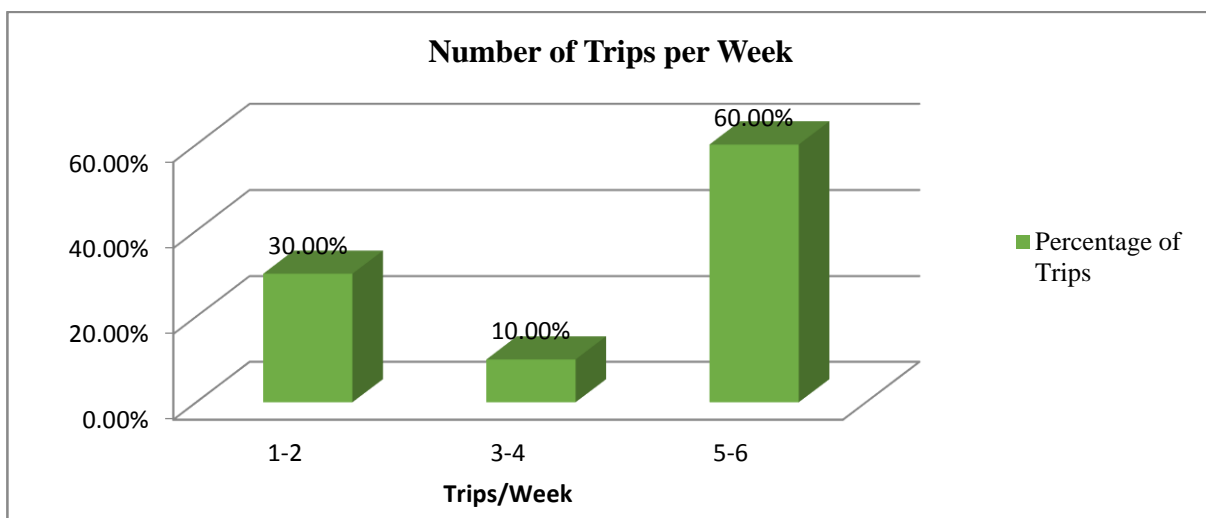
Source: Traffic Survey, 2016

Figure 4.10: Number of Trips per Week

4.8.5   Travel Distance with Travel Time

Travel distance with travel time is shows in Table 4.31.

Table 4.31: Travel Distance with Travel Time

Travel Distance (km)	Travel Time in Minutes							Total	
	≤10	11-20	21-30	31-40	41-50	51-60	61-70	Number	%
Less than 10 km	0	1	0	1	0	0	0	2	20
10-20 km	0	0	0	2	0	0	0	2	20
21-30 km	0	0	0	0	0	0	0	0	0
31-40 km	0	0	0	0	0	0	0	0	0
41-50 km	0	0	0	1	1	0	0	2	20
51-60 km	0	0	0	0	1	0	0	1	10
61-70 km	0	0	0	0	1	2	0	3	30
More than 70 km	0	0	0	0	0	0	0	0	0
Total	**0**	**10**	**0**	**40**	**30**	**20**	**0**	**10**	**100**

Source: Traffic Survey, 2016

4.8.6 Travel Distance with Travel Cost

Travel distance with travel cost is shows in Table 4.32.

Table 4.32: Travel Distance with Travel Cost

Travel Distance (km)	Travel Cost in Taka						Total	
	≤5	6-10	11-15	16-20	21-25	>25	**Number**	**%**
Less than 10 km	2	0	0	0	0	0	2	20
10-20 km	1	0	1	0	0	0	1	10
21-30 km	0	0	0	0	0	0	0	0
31-40 km	0	0	0	0	0	0	0	0
41-50 km	0	0	2	0	0	0	2	20
51-60 km	0	0	0	1	0	0	1	10
61-70 km	0	0	0	1	2	0	3	30
More than 70 km	0	0	0	0	0	0	0	0
Total	3	0	3	2	2	0	10	100

Source: Traffic Survey, 2016

CHAPTER FIVE: FINDINGS FROM PRA, SOCIO-ECONOMIC AND PHYSICAL FEATURE SURVEY

5.0   Findings from PRA, Socio-Economic and Physical Feature Survey

5.1   PRA Survey

Based on PRA findings obtained in forms of resource maps, problems and potentials Venn diagrams, and development needs workshops of seven unions of Sonatala Upazila and nine wards of Sonatala Pourashava need to be incorporated in the preparation of development plan for Sonatala Upazila. However, these findings need to be examined by and matched with technical analysis of data gathered from other sectoral surveys designed under the current project. It is evident from PRA findings that most of unions are flood prone, affected by river erosion, and lack necessary road, health services, income generation activities, and necessary educational institutions. Local people believe that their major potentials include many particularly unemployed people, agricultural land and produce, and two rivers that can be utilized for the comprehensive development of this Upazila. The residents of Sonatala municipality reported common problems, such as, poor drainage system, inadequate street lighting, the need for electricity, the problem of gas and water supply along with health and educational development. The participants of PRA sessions think that their jurisdictions have potentials that can be used for the remedy of their problems if development schemes are undertaken for short, medium and long-term with adequately allocated budget (Source: PRA Survey, 2016).

5.2   Socio-economic Survey

Satisfaction Level on the Road: The survey reflected that only 15.8% of the total respondents are found very satisfied with the existing provision of service facilities of road, 47.70% are satisfied, the service is acceptable to 6.80% respondents and unsatisfactory to 28.70% respondents with the provision of service delivery systems of the Pourashava (Table 5.1).

Table 5.1: Satisfaction Level on the Road

Sl. No.	Satisfaction Level	Number	Percentage (%)
1.	Very Satisfactory	175	15.8
2.	Satisfactory	530	47.7
3.	Acceptable	75	6.8
4.	Unsatisfactory	319	28.7
5.	Not Known	12	1.1
Total		**1111**	**100.0**

Source: Traffic and Transportation Survey, 2016

5.3   Physical Feature Survey

Issues to be Given Priority for the Area: The survey reflected that Rural Road Development, Upazila road developments, Protection of Riverbank/Canal Dredging, Establishment of Government School and College, Increase of Public Awareness Program, Increase of Social Security Program are the most important issues to be given priority in the areas representing opinion of about 86.68%, 66.88%, 29.25%, 36.18%, 64.36% and 69.76% respondents respectively (Table 5.2).

Table 5.2: Issues to be given Priority for the Area

Sl. No.	Priority Area	Number	Percentage (%)
1.	Upazila Road Development	743	66.88
2.	Up gradation of Drainage System	614	55.27
3.	Protection of Riverbank/Canal Dredging	325	29.25
4.	Kitchen Market Development	477	42.93
5.	Drinking Water Supply	272	24.48
6.	Rural Road Development	963	86.68
7.	Play Field	376	33.84
8.	Establishment of Government School and College	402	36.18
9.	Increase of Public Awareness Program	715	64.36
10.	Increase of Social Security Program	775	69.76

Source: Physical Feature Survey, 2016.

CHAPTER SIX: FINDINGS AND WAY FORWARD

6.0   Findings and Way Forward

6.1   Findings

During the survey, the survey team assessed the existing transportation and traffic management system though observation, discussion with the local people, Union Parishad members and transport users, passengers. The major findings of observation and discussions are presented below.

- The overall road condition within the Upazila is not so much satisfactory. Most of the roads are semi pucca and katcha and pavement condition is poor.

- Water transport network has significant importance in carrying both people and goods. There are about 100–150 mechanized engine boats plying in the river and the surrounding areas to transport fish, rice, wood and other goods.

- Rail Way network has also significant importance in carrying both people and goods. There are about 100-150 mechanized engine boats plying by train.

- No public or private bus service is available for internal movement of passengers within the area.

- Intra Upazila traveling is mostly done through CNG, motor bike, rickshaw, van, etc.

- Motorized vehicles are generally used both for intercity and intra city movement. Buses are commonly used for intra city travel.

- Different types of freight vehicles are available in locality such as truck, pickup, van, trawler etc. Among these, van is most common freight vehicle in this locality. These freight vehicles carry various types of goods and commodities such as rice, brick, wood, raw materials, vegetables, fishes etc.

6.2   Way Forward

The survey results of the transportation and traffic management has become the basis for further analysis and interpretation in the process of preparing master plan for Sonatala Upazila. Care should be taken not only to the conditions of the roads and vehicles but also to the traffic management. The following are the specific recommendations in relation to the survey findings of transportation and traffic management:

- Planned road network system should be proposed in the plan;

- Places of Bus, truck, tempo and rickshaw stands should be set aside in the proposed land use plan;

- New route development proposals should addressing regional connectivity.

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ANNEXURE

Annexure-I: Format of Traffic Volume Count Survey

Preparation of Development Plan for Fourteen Upazilas Project																
Package 04																
Urban Development Directorate																
24 hours Traffic Count Survey (6 am to 6 am)																
Name of Upazila:																
Name of Union/Ward:						Traffic Count Survey				Day Type			Weekly Hat day	Non Hat day	
Name of Road:						Surveyor Name:				Day	Weather	Season			
Road Type:						Survey Date:									
Survey Location:																
Hours	Motorized Vehicle									Total MV	Non-Motorized Vehicle					Total NMV
	Auto-Rick/Van	Batbati	Nasimon/ Karimon	CNG	Jeep/ Car /Taxi	Micro/ Pickup	Motor-cycle	Bus/ Minibus	TrucK		Rickshaw	Rickshaw Van	Bi-cycle	Bullock Cart	Push Cart	
6am to 6pm																

Annexure-II: O-D Survey Questionnaire

Preparation of Development Plan for Fourteen Upazilas Project

Package 04

Urban Development Directorate (UDD)

Roadside Interview Survey (O-D Survey) Questionnaire

Time: Every half an Hour Interval (24 hours clock)

Name of Upazila: Date: ………………………….

Route Name: Hours counted: **Start …………**am/pm,   **Finish ………….**am/pm

Traffic Direction: From ………………………………….to……………………………………

A. Vehicle Type:

1. Truck   2. Bus   3. Car/Pickup/Jeep/Motorbus   4. Auto Rickshaw/Tempo   5. Motorcycle   6. Rickshaw/Van   7. Bicycle

B. Where did your trip begin?   City/Town..

C. What type of place is your trip start point?

1. Residence   2. Workplace   3. Shopping   4. School/College/University   5. Social   6. Recreational

D. Where did your trip end?   City/Town..

E. What type of place is your trip end point?

1. Residence   2. Workplace   3. Shopping   4. School/College/University   5. Social   6. Recreational

F. What was the purpose of your trip?

1. Work/Commute   2. Business related   3. Shopping   4. Education   5. Social   6. Recreation

G. How many people were in the vehicle including the driver?   No. of people..............................

H. Any comments on Transportation?

Name of Enumerator: ………………………………………   Name of Supervisor: ………………………………………………….

Signature of Enumerator: ………………………………………   Signature of Supervisor: ………………………………………...

Annexure-III: Pedestrian Interview Survey Questionnaire

Preparation of Development Plan for Fourteen Upazilas Project

Package 04

Urban Development Directorate (UDD)

Roadside Interview Survey (O-D Survey) Questionnaire

Name of Upazila : ....
Date : …………………………….
Time of Interview : ....
Location of Interview point : ....

A. Present Address of the respondent

B. Sex: (a) Male (b) Female

C. Age:
1. Below 15   2. 16-20   3. 21-30   4. 31-40   5. 41-50   6. Above 51

D. Where did your trip begin? years ....Years ....Years ....Years ....Years ....

E. Where did your trip end point? ....

F. What was the purpose of your trip?

1. Work/Commute   2. Business related   3. Shopping   4. Education   5. Social   6. Recreation

G. Total distances of the trip? .... (In k.m.)

Name of Enumerator: ....   Name of Supervisor: ....…………
Signature of Enumerator: …………………………..   Signature of Supervisor: ...…………………………

Annexure-IV: Questionnaire on Regional Transportation Network System

Urban Development Directorate
**PREPARATION OF DEVELOPMENT PLAN FOR FOURTEEN UPAZILAS
(PACKAGE: 04): UDD**

Questionnaire on Regional Transportation Network System

Name of Upazila   : ....
Date of survey   : ………………………….

A. *Information of trip <u>going out from study area</u> to other region (upazila/district)*
   1) Type of Mode (Bus/Truck/Train/Water way):

   (Response will be collected from every mode)
   2) Name of trip destination point (Upazila/District):
   3) No. of trips per day (hour basis)
   4) Average no. of passengers carried by per mode (per trip):
   5) Types of goods carried by per mode (per trip):

B. *Information of trip <u>coming into study area</u> from other region (upazila/district)*
   1) Type of Mode (Bus/Truck/Train/Water way):

   (Response will be collected from every mode)
   2) Name of trip origin point (Upazila/District):
   3) No. of trips per day (hour basis)
   4) Average no. of passengers carried by per mode (per trip):
   5) Types of goods carried by per mode (per trip):
   6) Stoppage area inside the upazila area.

Annexure-V: List of Members in Traffic and Transportation Survey

Sl. No.	Name	Number	Activities
1	**Transportation Expert** Md. Sayedur Rahman Khan	1	Planning, preparation of questionnaire and overall supervision of the survey activities and subsequent report preparation
2	**Planner** Md. Maksudur Rahman	1	Training, and supervision of field level activities
4	Mahbubur Rahman Linkon	1	Data base format preparation and supervision of data entry activities
5	**Survey Coordinator** • Mahbubur Rahman Linkon • Tapas Kumer Roy • Shawon Barua	3	Field level vigilance and provide training to the enumerators
6	**Enumerators**	16	Field Survey
7	**Data Entry Operators**	10	Data Entry in SPSS and Analysis and presentation in tabular form