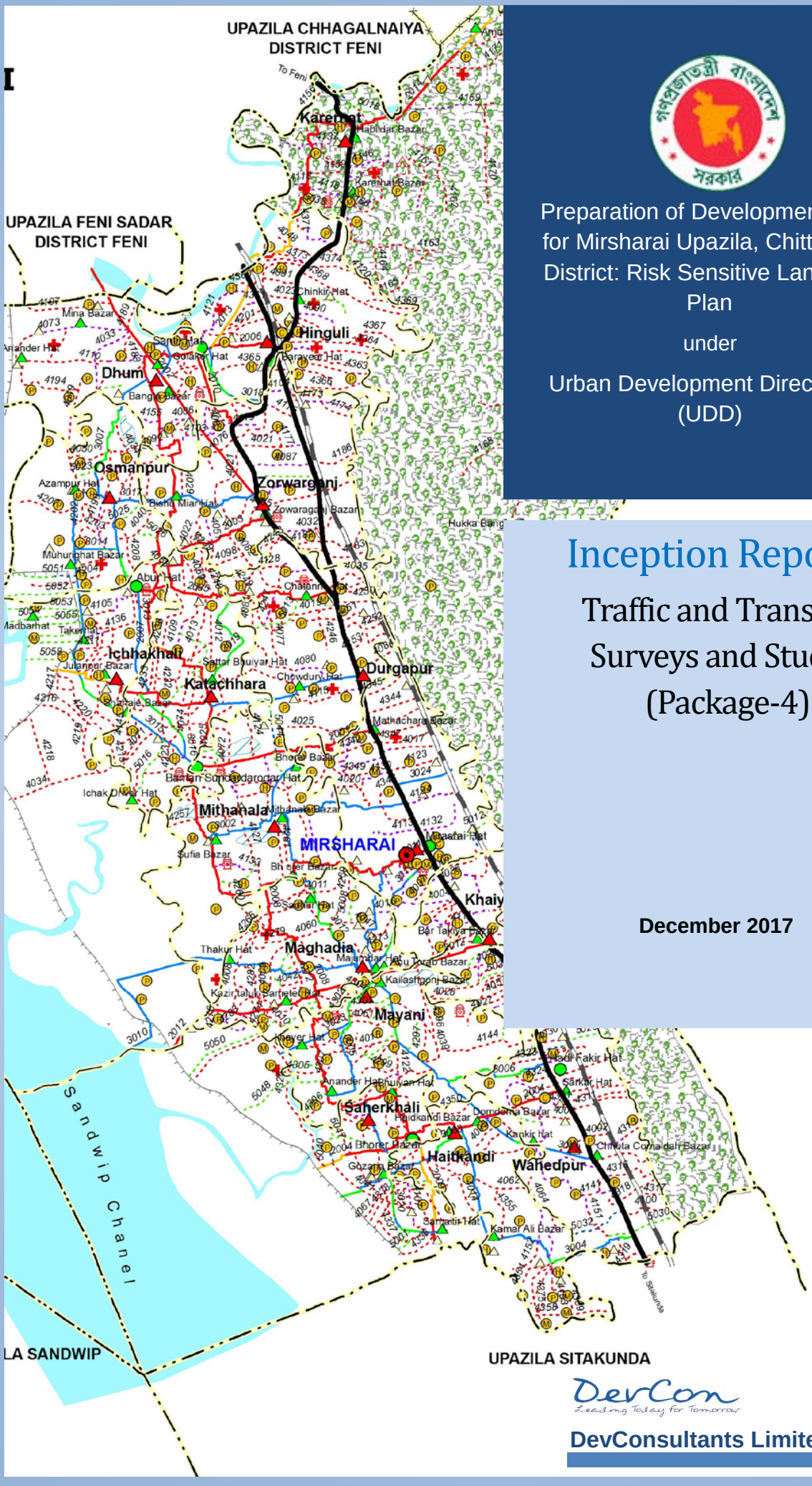

Preparation of Development Plan for Mirsharai Upazila, Chittagong District: Risk Sensitive Land Use Plan

under

Urban Development Directorate (UDD)

Inception Report

Traffic and Transport Surveys and Studies (Package-4)

December 2017

DevCon
Leading Today for Tomorrow

DevConsultants Limited (DevCon)

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EXECUTIVE SUMMARY

Mirsharai is a land of potentials and various development possibilities. With smooth communication by means of road, rail and waterways, it is an ideal location for economic cum industrial development. In addition, Mirsharai is blessed with abundance of natural resources and scenic beauties having hilly forest areas, hill streams and waterfalls of Chittagong Hill Tracts on one side and the Bay of Bengal on the other. The first multi-sector EZ in the country has also been under-construction within this very location. There are immense possibilities to develop Mirsharai as a modern industrial hub and a place of eco-tourism.

The success of developing Mirsharai as a tourist center and Special Economic Zone depends on the availability of modern amenities connected through a sustainable transportation system. For this, it is necessary to understand the present state of the transport system based on which a sustainable transportation system can be built for the future. Therefore, a thorough traffic study is on the existing road network is imperative. This will shed light on the recent state of transportation as well as provide information about its pros and cons and possibilities for future development. Through this transportation survey and studies, an improved transport system will be proposed which will be efficient, affordable and sustainable for the growth of Mirsharai Upazila.

Objectives of the Project

The main objectives of the project package is to develop a comprehensive computerized transportation planning tool (model). This model will be used to:

- Prepare integrated land use and transportation model for Mirsharai.
- Prepare disaster management plan for Mirsharai from the perspective of transportation.
- Develop new and improved affordable and effective transportation network for Mirsharai Upazila.

Scope of the Project

As per TOR, scope of services can be outlined as the following major tasks:

- Transport Surveys and Studies for the Project
- Database Preparation and Management
- Preparation of Development Plan of Mirsharai by Integrating Transportation Planning with Land Use and Disaster Management Plan.

Commencement of the Project

The contract for consultancy services between Urban Development Directorate (UDD), the Client and DevConsultants Limited (DevCon), Bangladesh, the Consultant, was signed on November 15, 2017. The total duration of the project is 4 (four) months.

The consultants, as per the requirement of the TOR, is submitting now the Inception Report for the project and the major portion of the report deals with the following:

Review of Relevant Reports

After discussion with UDD, the consulting team has identified the following documents to be relevant are those are required to be reviewed for this project:

Reports	***Published By***
Seventh Five Year Plan (FY2016 – FY2020): Accelerating Growth, Empowering Citizens	General Economics Division (GED) Planning Commission Government of the People's Republic of Bangladesh, Published in December 2015
Perspective Plan of Bangladesh (2010-2021): Making Vision 2021 a Reality	General Economics Division Planning Commission Government of the People's Republic of Bangladesh, Published in April 2012
Integration of Sustainable Development Goals into the 7th Five Year Plan	Support to Sustainable and Inclusive Planning (SSIP) Project General Economics Division (GED) Planning Commission Published in February 2016

The Chapter-4 reviews the reports/ plans listed above and presents the excerpts from the three major reports regarding the developing Bangladesh especially emphasizing aspects relating to transportation and particularly to this project.

Collection and Review of Relevant Data

The consultants, following the reconnaissance field visit have expedited to collect the relevant data from the secondary sources as much as possible and review those for integration in the transport planning for the particular project. The Chapter-5 deals with the review of the secondary database that is already collected and enlists those still to be acquired. Documents were collected and reviewed on the following major projects:

Projects:

- Mirsharai –Teknaf Marine Drive Road Project
- Cross-Border Road Network Improvement Project
- Dhaka Chittagong Expressway Project on PPP Basis
- Coastal Expressway from Shitakunda via Chittagong to Cox' Bazar
- Indo-Bangla Maitree bridge from Sabroom to Ramgarh
- Ramgarh Port
- Sitakunda/ Mirsharai Port
- Bay Container Terminal
- Construction of double line between Laksham-Chinki Ashtana, Mirsharai (JICA funded)-*On going*
- Modernization of 11 station's signaling system in between Chinki Astana, Mirsharai-Chittagong (EDCF)-On going

Data:

- Existing road network
- Growth center
- Rural market
- Administrative boundary
- Upazila and union headquarters

Statistics:

- Population
- Education
- Employment Status
- Household structure, Sanitation facilities and Drinking water facilities
- Health
- Commercial Activities
- Transportation Facilities
- Present Power Supply Situation and Telecommunication at Mirsharai

Traffic Survey Design

The report covers the requirements, methodology and preliminary planning for the traffic surveys requisite for this assignment. The objectives of the traffic survey are two folds. *Firstly*, it provides idea about the existing traffic demand available supply in the form of infrastructure and services. *Secondly*, it acts as the input for the travel demand forecasting model that is to be constructed as the output of the project which will enable UDD to analyze various traffic scenarios with respect to changed network as well as land use scenarios. The consultants have identified the following 5 types of surveys to be executed:

- Production-Attraction Survey
- Traffic Count Survey
- Origin-Destination (OD) Survey
- Travel Time Survey
- Stakeholder Interviews

The Chapter-7 elaborates the survey requirements along with the preliminary survey design to be approved by the Client.

Dr. Moinul Hossain
Team Leader

1 INTRODUCTION

1.1 Report Overview

This report prepared by DevCon covers literature review and survey design activities under the Traffic and Transport Surveys and Studies (Package-4) project. The report also presents a brief introduction of the mother project 'Preparation of Development Plan for Mirsharai Upazila: Risk Sensitive Land use Plan (MUDP)' itself; information of the project area i.e., Mirsharai Upazila, scope of services under this particular component and the work schedule and staffing arrangement to achieve the project goal and specific objectives step-by-step. This is to investigate and identify the demand and expectation of the local community as well as the government agencies and ensure integration with various ongoing/ proposed development projects in and around the study area to come up with a pragmatic and futuristic development plan for Mirsharai.

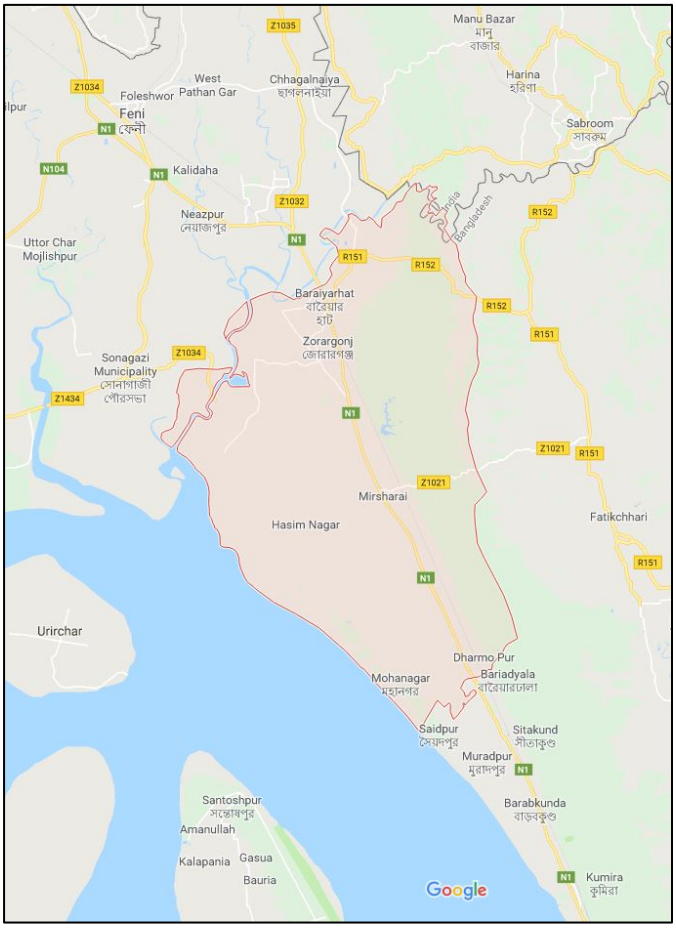
In short, the report will highlight the following:

- Project Objectives, Work Program & Personnel
- Review of the 7th Five Year Plan, National Perspective Plan and Sustainable Development Goals
- Review of the Available Data from Different Secondary Sources
- Traffic Survey Design
- Analysis of Findings of the Reconnaissance Survey, and,
- Analysis of Findings from Stakeholder Interviews

These highlights of the report are broken down into chapters as reflected in the table of contents.

1.2 Brief Background and Purpose of the Study

Mirsharai Upazila, located only 60km away from port city Chittagong, is a land of various development possibilities. It is surrounded by Feni District & the River Feni on the North, Sandwip Channel (connecting the Bay of Bengal) on West, Khagrachhari District on the North-East & Chittagong on the South. With smooth communication by all means of road, rail and waterways, it is a potential location for economic cum industrial development. In addition, Mirsharai is blessed with abundance of natural resources and scenic beauties having hilly forest areas, hill streams and waterfalls of Chittagong Hill Tracts on one side and the Bay of Bengal on the other. At the same time, Mirsharai is blessed with excellent geographical advantage making it a suitable location to establish a bay terminal for the Chittagong Port Authority. The work of establishing one of the largest Economic Zones (EZ) have also commenced in Mirsharai. These are the key drivers of change for the Upazila under study.



In tourism sector with holistic planning and establishment of easy accessibility, Mirsharai can be a great tourist attraction. Again the proposed Special Economic Zone would generate many industry related new activities including huge vehicular traffic on air, rail, road and water. This phenomenon would have both positive and negative impact on the socio-economic condition and existing land use pattern of the region. The proposed planning package would guide such probable changes in the socio-economic condition and land use pattern of the region and would also address the adverse impact of such changes by presenting a proposal for sustainable transportation system. Also, this project has been under taken to protect the region from depletion of its natural resources and character and for tourism development as well.

Furthermore, the success of developing Mirsharai as a tourist center and Special Economic Zone depends on the availability of modern amenities connected through a sustainable transportation system. For this, it is necessary to understand the present state of the transport system based on which a sustainable transportation system can be built for the future. Therefore, a thorough traffic study on the existing road network is imperative. This will shed light on the recent state of transportation as well as provide information about its pros and cons and possibilities for future development. Through this transportation survey and studies, an improved transport system will be proposed which will be efficient, affordable and sustainable for the growth of Mirsharai Upazila.

1.3 Objectives of the Project

The main objective of the project package is to develop a comprehensive computerized transportation planning tool (model). This model will be used to:

- Prepare integrated land use and transportation model for Mirsharai.
- Prepare disaster management plan for Mirsharai from the perspective of transportation.
- Develop new and improved affordable and effective transportation network for Mirsharai Upazila.

1.4 Scope of Services

The goal of the project is to prepare a development plan for Mirsharai Upazila. For this, it is necessary to understand the transportation network in the study area to be achieved through various traffic and transportation surveys which will eventually help to understand the transport network of the project area.

The survey firm is vested with the responsibility for the following activities:

- The firm shall conduct all necessary traffic and transport surveys and studies through digital system and collect all relevant data and information for the project and upload the collected data to website instantly through online communication device.
- Survey firm shall prepare working paper on the relevant fields under study and at the end of each month submit a report containing all information to be uploaded to website and ensure that all data and information are accessible to viewer.
- The firm shall be responsible for quality of data and information collected, data processing, cleaning and editing and presentation into tabular form.
- The survey firm shall provide all necessary assistance in gathering and procuring all relevant traffic and transportation related attribute and spatial data of relevant features within the project area, GIS database operation and management, analysis and preparation of maps and reports till completion of the project.
- Shall deliver all raw and processed data along with working papers containing guidelines for preparing the planning package as required by PD.
- The survey firm shall assist the UDD team members in preparation of final and all relevant reports till completion of the project.

For achieving the goal and objectives, the following sub-objectives need to be fulfilled (some of these will be the output of the other packages of the project running parallel to this package):

» To prepare a socio-economic geodatabase of the study area related to transportation modeling and land use planning.
» To prepare an inventory of existing land use of the study area using GIS and conduct survey to calculate the trip production-attraction rates for various land use.
» To prepare an inventory of road network as well as transportation system (road network, public transport facilities, options for non-motorized trips etc.) of the study area using GIS.
» To conduct a comprehensive household travel demand survey.
» To obtain values for various demographic and socio-economic indicators included in the model.
» To forecast the land value and land use as impacted by changes in transportation accessibility and policies.
» To collect detailed data on freight movement and develop travel demand forecasting models for freight.
» To simulate transportation operations in details at the project area.
» To simulate vehicular traffic flow to analyze and solve traffic bottlenecks.
» To estimate the risk, resilience and vulnerability of the network under general operating condition and even during extreme conditions.

1.5 Activities to Date

The following milestones have been achieved so far:

- The consultant has formed the team, setup office for the project as well as prepared the schedule of the project.
- The first kick off meeting was held with the client on Wednesday, November 22, 2017 at the head office of UDD and subsequently a series of meetings were held between the consulting team and the site office of UDD.
- The consulting team has paid a visit to the project site between 25th and 26th of November. During that time, they have collected these information/ data or performed the following activities:

    - Identified the major stakeholders. They are:
        - Roads and Highways Department (RHD)
        - Local Government Engineering Department (LGED)
        - Bangladesh Railway (BR)
        - Bangladesh Water Development Board (BWDB)
        - Bangladesh Economic Zone Authority (BEZA)
        - Bangladesh Export Processing Zones Authority (BEPZA)
        - Forest Department
        - Bangladesh Parjatan Corporation (BPC)
        - DC Office, Chittagong
        - UNO/ Land Office, Mirsharai
        - Pourashava Offices (Mirsharai and Baroiyarhat)

    - Had meetings with:
        - Project Director, in the UDD HQ (Dhaka),
        - UDD Mirsharai/ MUDP Officials, in Mirsharai
        - Representatives Forest Department and of BWDB, in Mohamaya
        - Honorable Mayor, Mirhsarai Pourashava (in presence of Councilors and SI, Mirsharai Thana)
        - Secretary to Honorable Mayor, Baroiyarhat Pourashava
        - Locals people throughout the project area

    - Consulting team has performed reconnaissance survey on the following sites:

Intersection	Growth center	Bazar	Tourist Spot
Baraiyerhat	Santir Hat	Abu Torab Bazar	Mohamaya Lake
Zorawargonj	Abur Hat	Azampur Hat	Khoyachhara Waterfalls
Chitanner	Baman Sunder Hat	Bishu Mia Bazar	
Mithachara	Mirsharai Hat	Haidkandi Bazar	**Project Sites**
Mirsharai	Hadi Fakir Hat	Domdoma Bazar	BEZA Economic Zone
Bara Takiya Bazar	Bhorer Bazar (Shaherkhali)	Mithanala Bazar	Muhuri Project Access
Sarkarhat		Sufia Bazar	Road
		Zorawargonj Bazar	
		Muhurighat Bazar	

- Compiling the aforementioned progresses, the consulting team has submitted the mobilization report on December 7, 2017.
- The consultant team has already received valuable comments from the client and prepared the responses about how they were addressed as accompanied in the inception report.
- All available secondary data were collected and reviewed for
- The consulting team has performed a thorough review on the available important literature (national policies and plans) related to transportation of the country and to this study on Mirsharai; and compiled the excerpts in Chapter 4 of this report.
- Finally, the consulting team has adopted the exact survey methodology and planning required to develop the travel demand forecasting model for this project.

2 PROJECT ADMINISTRATION

2.1 Consultants' Organization

The consultant team has been formed keeping in mind the type of works to be performed under this project and the amount of relevant experience needed for the task. Dr. Moinul Hossain is vested with the responsibility of the Team Leader. He has 15 years of professional experience in transportation planning and traffic engineering. He has experience in transport modelling, traffic management planning, traffic simulation by using ArcGIS compatible Transport Planning Software. He is also the local representative of Citilabs, USA, the developer of Citilabs CUBE, which is one of the leading transportation planning software products available in the market.

The Team Leader will be assisted by the other 2 (two) professionals i.e., Transport Survey Expert, Mr. Mizanur Rahman and Transport Survey Supervisor, Sultana Rajia. They all have required experience in their respective line of work and are well capable of performing the duties assigned on them. Ms. Rajia has received training from Citilabs on transportation modelling. The team will be assisted by the administrative or other support staff for the project. According to the characteristics of the designed surveys, a number of survey teams and a data entry team will be formed to work under the direct supervision of Transport Survey Expert and Transport Survey Supervisor. The whole team will work with the close coordination of the Project Director and will be overall assisted by the project management and coordination team of DevCon.

The consultant's organization for the assignment can be presented with the following diagram:

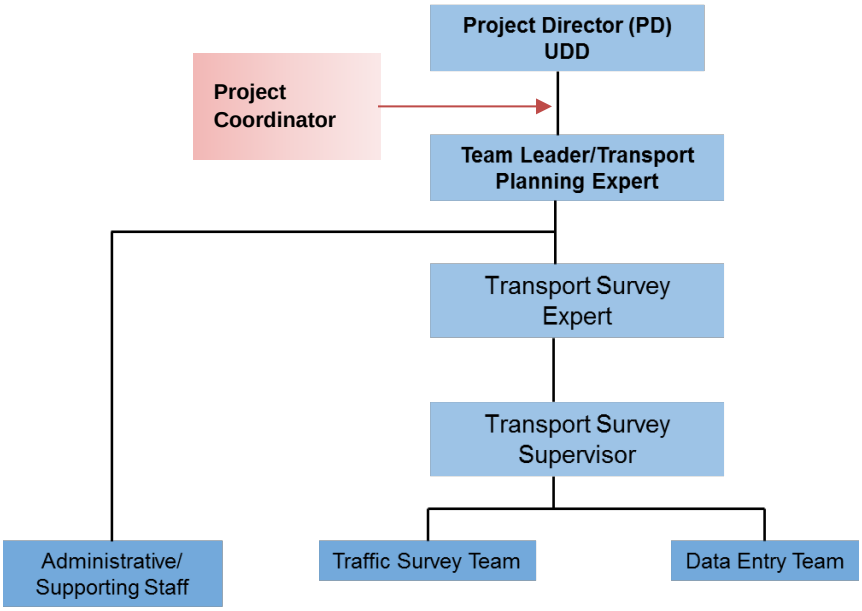


Figure 2.1: Consultant's Organization

2.2 Logistics and Support

In order to achieve the objectives as set out in the TOR and explained in the methodology of work, various logistics related to office accommodation, transport, computer facilities, and field survey equipment, support staff and various communication facilities are required. These facilities required for the project can be arranged for by DevCon. However, some counterpart facilities will essentially be ensured by the Client, such as-

- UDD will assist in communication and arrangement of meetings with various important stakeholders of the project
- UDD will issue letters for notice, permission and approval for performance of the survey and related field activities
- UDD will expedite collection of data from other government agencies as and when required

3 WORK PLAN AND STAFFING

3.1 Updated Work Plan

The consultants have been working as per the TOR scope of services and the work program suggested in the methodology. However, all measures have been taken to expedite the project activities and the first two reports have been submitted before stipulated time. This is for the purpose of preparing well for the traffic surveys and development of the travel demand model. The adjusted work schedule in connection with the actual work progress have been demonstrated in the following bar diagram:

No.	Activity	Months					
		M1	M2	M3	M4	M5	M6
TASK 1: MOBILIZATION AND PLANNING OF THE PROJECT							
TASK 1.1	Mobilization of Activities						
TASK 1.2	Startup Meeting and Planning for Surveys						
TASK 1.3	Reconnaissance Field Survey						
TASK 1.4	Project Design						
TASK 1.5	Submission of Mobilization Report						
TASK 2: EXISTING DATA COLLECTION							
TASK 2.1	Geo-physical Maps and Report Collection						
TASK 2.2	Assessment of Present Transport System						
TASK 2.3	Socio-Economic Data Collection						
TASK 2.4	Preparation and Submission of Inception report						
TASK 3: SURVEY ACTIVITIES							
TASK 3.1	Survey Preparatory Activities						
TASK 3.2	Traffic Surveys						
TASK 3.3	Preparation of Database						
TASK 3.4	Preparation and Submission of Draft Survey Report						
TASK 4: TRAFFIC DATA ANALYSIS AND ASSISTANCE IN POLICY MAKING							
TASK 4.1	Preparation of Working Paper						
TASK 4.2	Assistance to Project Team/Project Implementation Committee						
TASK 4.3	Submission of Interim Report						
TASK 5: ASSISTANCE IN OVERALL PLANNING FROM TRANSPORTATION PERSPECTIVE							
TASK 5.1	Preparation of 20 years Travel Demand Model						
TASK 5.2	Assistance in Overall Planning						
TASK 5.3	Preparation and Submission of Draft Final Survey Report						
TASK 6: REPORTING AND PRESENTATION							
TASK 6.1	Presentation to the Client and Obtaining Approval						
TASK 6.2	Preparation and Submission of Final Survey Report with Necessary Modification						
TASK 6.3	Progress Reporting						
TASK 6.4	Assistance in Publication and Web Development						

Continuous Task Intermittent Task Submission of Deliverables

3.2 Staffing Schedule

The project staffs have been mobilized right after the contract signing and the project activities were commenced along with the staff mobilization. The professionals engaged in the project will be working in the following schedule:

No	Name of Staff	Position		Staff-month input by month					Total staff-month input		
				M-1	M-2	M-3	M-4	M-5	Home	Field	Total
1	Dr. Moinul Hossain	Transport Planning Expert (Team Leader)	*[Home]*						-		4.00
			[Field]							4.00	
2	Md. Mizanur Rahman	Transport Survey Expert	*[Home]*						-		3.00
			[Field]							3.00	
3	Sultana Rajia	Transport Survey Supervisor	*[Home]*						-		3.00
			[Field]							3.00	
										TOTAL	**10.00**

4 REVIEW OF RELEVANT REPORTS

After discussion with UDD, the consulting team has identified the following documents to be relevant and required to be reviewed for this project:

Reports	*Published By*
Seventh Five Year Plan (FY2016 – FY2020): Accelerating Growth, Empowering Citizens	General Economics Division (GED) Planning Commission Government of the People's Republic of Bangladesh, Published in December 2015
Perspective Plan of Bangladesh (2010-2021): Making Vision 2021 a Reality	General Economics Division Planning Commission Government of the People's Republic of Bangladesh, Published in April 2012
Integration of Sustainable Development Goals into the 7th Five Year Plan	Support to Sustainable and Inclusive Planning (SSIP) Project General Economics Division (GED) Planning Commission Published in February 2016

The following sections present the excerpts from these reports that will have influence in proposing the road network as well as developing the travel demand forecasting model. It is to be mentioned that some parts of the text have been written in RED or ORANGE or have been *EMPHASIZED*. These parts of the review are to arrest the attention of the readers as they highly influence this Project.

4.1 Seventh (7TH) Five Year Development Plan

The Seventh Five Year Plan was prepared by General Economics Division (GED) under Planning Commission of Bangladesh. The Plan was published in December of 2015.

A major strategic challenge for the Seventh Five Year Development Plan of Bangladesh is to set investment priorities in a way that Bangladesh gets best results from its limited resources. This is an issue not only for optimally prioritizing public investment needs but also in picking right PPP friendly projects.

The transport infrastructure strategy for the Seventh Five Year Development Plan has been built on the lessons learned and experience gathered from the implementation of the Sixth Five Year Plan. There are some priorities in the plan as illustrated by Figure 4.1.

Figure 4.1: Priorities of Seventh Five Year Plan

From the above figure, it is clearly evident that Priority 2 and 3 will have direct impact on the project as Chittagong port is constructing a new terminal in Mirsharai. In addition, the Dhaka Chittagong 4-lane highway dissects the study area and this highway will provide connectivity to the Trans-Asian Highway project.

The key elements of the transport sector development for the Seventh Five Year Plan are:

- *Focus on Transformational Project and Timely*
- *Reinvigorating the Public-Private Partnership (PPP)*
- *Procurement Reforms*
- *Operational Efficiency*
- *Pricing Policies*
- *Transport Infrastructure Financing Strategy*
- *Institutional Reforms in Transport*

4.1.1 Government's Project in Seventh Five Year Plan

The Government has already identified the following high-priority projects for the transport sector. The projects marked with RED will have high influence and the ones marked with ORANGE will have moderate to high influence on this project:

- *Continue to repair, maintain, improve and expand existing roads on a priority basis*
- Construction of Padma Multipurpose Bridge to be completed by 2018
- Construction of a multi-lane tunnel underneath the river Karnaphuli in Chittagong

- *Conversion of nationally important highways into four lanes gradually*
- *Connect important economic activity hubs such as Payra Port and Economic Zones to National Highways.*
- *Continuation of investment to reform and modernise railways.*
- Construction of circular rail road track around Dhaka city.
- Construction of the 3rd Sea port at *Payra* in Patuakhali.
- Construction of a sea port and an LNG terminal at Moheshkhali
- Construction of third terminal at Hazrat Shah Jalal International Airport (HSIA)
- Construction of a new airport named Khan Jahan Ali Airport
- Feasibility study for construction of Bangabandhu Sheikh Mujib International Airport.
- Feasibility study for construction of a road-rail tunnel underneath the river Jamuna.
- Feasibility study for construction of Sub-way (underground railway) in Dhaka city
- Strengthen Fleet capacity while making Biman a profitable organisation by improving its management and enhancing the capacity of passenger transport.

While the Government has already identified the above high priority projects and initiated implementation, the following priorities are also considered as *transformational investments* for taking Bangladesh to a higher growth trajectory:

- *The development of a balanced 3R (Rail, River & Road) based multimodal transport infrastructure system.*
- Timely completion of critical transport links (roads, bridges, railways and river waterways) related to regional and multi-regional connectivity.
- *Provision of access controlled 'Backbone Road Network' considering strategically important national highways.*
- Combining inland water transport with the existing road transport system as well as ensuring a healthy road alignment.
- *Give priority to regional transport connectivity*
- *Improving on transport safety standards to reduce incidence of accidents by implementing safety audit periodically.*
- *Promoting and revitalizing tourism industries, an integrated land use and transport planning for all the potential water front sites viz. Cox's Bazar, Jaflong, Kuakata etc. should be adopted in an urgent basis.*
- *Reduction of maintenance frequency and thereby recurring cost of roadways, utmost attention should be given to make road infrastructure durable.*
- *Development of middle-income enabled quality infrastructures with high-speed mobility facilities.*
- *Strengthening Planning Commission's sectoral institutional capacity with strong planning wings in key infrastructure Ministries having highly qualified professional planners.*

4.1.2 Transport Infrastructure Strategy for the Seventh Five Year Plan

4.1.2.1 Roads, Highways and Bridges

The Road Transport and Highways Division has a vision to build sustainable, safe & quality road infrastructure and integrated modern mass transport system for achieving desired socio-economic development in the country. The targets of RHD has given in the following table.

Table 4.1: RHD Targets for the 7th Five Year Plan

Physical Activities	7th FYP Targets (FY2016-FY2020)
Construction of 4 lane roads	300 km
Construction of roads other than 4 lane	340 km
Improvement/ Rehabilitation of roads	2, 500 km
Construction of Flyover/ Overpass	7, 000 meter
Construction of Bridges/ Culverts	14, 800 meter
Reconstruction of Bridges/ Culverts	6, 800 meter

Regarding highways, the topmost priority is to convert important national highways *into four lanes.* The initial effort will focus on completing the ongoing highway projects; especially the u*pgrading of the Dhaka-Chittagong Highway* (*along with the double tracking of the railway connection*) *is of utmost importance*. The project has already been almost completed except for the three bridges along the way namely Kanchpur, Meghna and Gumti Bridges. The other strategies are:

- Improve road safety situation in the country by achieving 50 per cent reduction in road traffic accident fatalities by 2020.
- Gradually developing the *existing interrupted highways to uninterrupted arterial roads by adopting two-tiered access controlled layout configuration* for segregating mobility and accessibility functions of highways.
- *As at-grade junctions' dictates constructing interchange facility* that should increase overall capacity of the highways, besides highway widening at the major-major junctions.
- Towards achieving arterial roadway configuration by reducing carriageway side-frictions and conflicting usages of highway, strict roadside land use development and right of way (ROW) control policies should be adopted.
- Instead of raising the height of road network in coastal districts against sea level rise (SLR), better strategy would be developing coastal embankment/polder infrastructures as "Climate resilient" to save all sorts of assets within the protection area.
- Address the issue of road damage from overloading, the implementation of road damage monitoring system will be strengthened with enforcement of penalties for violation.

Urban Transport

The top priority is to lower urban road network congestion through appropriate investments as well as transport management. Like other successful metropolitan mega cities of the world, infrastructural development, maintenance, traffic enforcement, public transport operation, public utilities etc. there needs to be active consideration for bringing those under a strong unitary metropolitan authority.

For coordinated development of metropolitan cities and urban areas, like other countries consideration was given in the Plan to establishing an autonomous urban development authority (UDA). It was mentioned that in the absence of this type of development authority, major cities and urban areas of Bangladesh are growing unsustainably and haphazardly without any planned mass-transit infrastructure and mainly based on smaller sized vehicles. It is understood from this Plan that UDD can play an important role in filling up the gap and the success of Mirsarai project will bolster this claim.

The strategies of Seventh Plan regarding urban transport improvement are:

- *Developing a balanced multimodal system*.
- Adopting decentralization policy; it can be started with the gradual shifting of Garment Industries from the core areas.
- Emphasis should be placed on *efficient traffic management* to ease congestion.

- Mass transit oriented land use and transport development policies
- Focus needs to be on the development of signal free road network and *public transport infrastructures* (viz. dedicated bus lanes, passenger transfer facilities, bus bays, turnaround facilities, stopover terminals etc. which are now grossly missing)
- Besides reclaiming footpath, *adequate pedestrian friendly walking and crossing infrastructures* should be developed.

Rural Transport

The strategies for the development of the road system include updating of a Road Master Plan, adoption of a Rural Roads & Structures Maintenance Strategy, maintenance plan and according higher priority to maintenance over new construction, exploring technological options to construct quality roads with available construction materials, introduction of measures to stop overloading, adoption of procedures to maximize generation of employment for the poor, ensuring quality of construction, more involvement of Local Government Institutions (LGI) and ensuring utilization and maintenance of constructed facilities. All these strategies will be reflected in this Project.

Strategic Priorities of LGED for Rural Transport Development and Management

The First Priority will be to Double lane/Upgrade and maintain selected busier Upazila Roads (a list will be provided in this Project suggesting which roads should fall under this category to have a sustainable transportation system for Mirsharai), Union Roads that are being used by a large number of commercial vehicles including maintenance/rehabilitation of bridges/culverts in these roads. At the same time, connection with rural roads with railway and waterways will be given priority in order to promote and integrate multimodal transport system. Proper maintenance of the existing paved rural network will also be included in priority. **The Second Priority** will be to improve Upazila Roads, Union Roads and prioritized Village Roads including culverts/bridges which have strategic importance to connect road network, railway and waterway. Preparation of a Land Use Map to initiate planned development will also be included in the second priority. **The Third Priority** will be to improve Growth Centres and construction of 'ghat' facilities at Growth Centres located on the bank of inland waterways to ensure better integration of road and water ways and thereby stimulating the rural transport and trading system. Also, development of rural waterways will be included in the third priority. It is relevant to mention here that this Project will include plan on how to improve road facilities within or adjacent to the Growth Centres.

The major strategies suggested by the Seventh Five Year Plan are as follows:

- The rural infrastructure development/improvement will be planned and implemented based on the findings of Effect/Benefit/Impact/feasibility studies carried out in respect of rural infrastructure development projects of LGED
- A guideline for investment prioritization and selectivity will be developed and calculation of economic rate of return will be adopted to guide the major investment decisions.
- Rural Road Master Plan of LGED will be updated. The updated Master Plan will be followed for infrastructure development projects covering Upazila and Union roads including bridges/culverts, bridges/culverts on village roads and development of growth centres/markets, ghats and Union Parishad HQ etc.
- For sustainability of rural infrastructure, adequate maintenance system and a viable funding mechanism based on local resources and emphasizing local participation and ownership will be arranged
- Since the requirements for maintenance are increasing, the Government and the local bodies will make special efforts to fully fund these needs and LGED will make continuous efforts to improve maintenance efficiency and ensure local participation.

The main targeted priorities for rural road development and maintenance during the 7th Plan will include the following:

- Improvement of the Upazila Road (5000 Km).
- Double lane/Widening/ Up gradation/Rehabilitation of selected Upazila /Union Roads that needs up-gradation being used by a large number of commercial vehicles (10000 Km)
- Improvement of road safety engineering at junctions of LGED roads with National Highways
- Improvement of the selected Union Road. (8000 Km)
- Improvement of prioritized Village Road (12000 Km)
- *Re-construction/Double lane* of Bridges and Culverts on *Upazila Road*, *Union Roads* (12000 Meter) being used by a large number of commercial vehicles
- Construction of Bridges and Culverts on Upazila Road, Union Roads (140000 Meter)
- Construction of Bridges and Culverts on prioritized Village Road (50000 M)
- *Development of Growth Centres and Rural Markets* -1200 Nos
- Construction of all remaining Union Parishad Complexes (1900 Nos)
- Extension of Upazila Complexes (400 Nos)
- Construction and rehabilitation of Cyclone Shelters and killas (1238 Nos)
- Land Use Planning and Management Project in the Upazillas of Bangladesh
- Development of Growth Centre centric Urban centres in selected Upazillas of Bangladesh-300 Nos
- Improvement of road safety engineering in rural roads to minimize road accidents.
- Periodic and Routine maintenance of Paved and Herring Bone Bond (HBB) roads & structures on rural roads

Strategies for Improvement in Rural Transport

The strategies to meet the above priorities include the following:

- The development strategy for the rural transport will be reoriented for efficient external access through optimal integration of road and inland water transport and off-road internal accesses;
- Improvement in resource mobilization will be made through introduction of user charges and fees by the agencies in all areas of transport and for all use of transport network;
- Provision of required incentive packages for the private sector for greater participation will be ensured, not only in transport services, but also for infrastructure building
- Identification and implementation of preventive, emergency and post-disaster mitigation measures will be made.
- Adequate care will be taken while developing transport network and service so that these do not cause environmental pollution and affect ecological balance.
- Attention will be given to improve transport safety standards including specific attention to women safety in all means of transportation with a view to substantially reducing the incidence of accidents.
- National standard for road design, geometry and loading capacity will be set, especially for the rural roads connecting the upazilas with zila.

Hence, it can be observed that the suggestions for a new road network and improvements of the existing one for Mirsharai, as supposed to be proposed by the Project, will need to be coordinated with LGED, RHD and the City Authorities as the outcome needs to be reflected on Rural Road Master Plan, the plans for RHD to improve connectivity with LGED roads and the existing master plans of the cities.

4.1.2.2 Railways

The Government places special emphasis on railway communication, as it is cheaper, safer and fuel-efficient and this will continue in future. The core objectives and targets for the railway sector for the Seventh Plan are summarized in Table 4.2.

Table 4.2: Seventh Plan Railway Objectives and Targets

Goal/ Objectives	Actions	Specific targets
Expand and improve railway system to provide safer, better, environment friendly & less expensive transport facilities to the national and international traffic to increase its market share. Increase its market share from 4% to 15% in freight transport, 10% to 15% in container transport between Dhaka-Chittagong Port and 4% to 10% in passenger transport	Expansion of railway network to expand rail operations	Undertake construction of 856 kilometer of new rail track
	Double tracking of important sections and gauge unification to overcome operational bottlenecks	Undertake dual gauge double tracking of 1110 kilometer
	Rehabilitate/upgrade existing rails for improved speed and safety	Undertake rehabilitation of 725 km of existing rail track
	Construction of railway bridges and other infrastructure for operational improvement.	Undertake construction of rail bridges, improvement of level crossing gates and improvement of other infrastructure
	Procure new locomotives to improve service quality	Purchase 100 new locomotives, 1 locomotive simulator and 4 relief cranes.
	Procure new coaches for passenger comfort	Purchase 1120 passenger coaches and rehabilitate 624 coaches.
	Upgrade railway workshops and maintenance	Procure modern maintenance equipment
	Improve rail speed and safety	Upgrade rail signal for 81 stations
	Improve rail efficiency	Strengthen railway management
	Improve railway finances	Eliminate operational deficit through price increases and operational efficiency gains.

The railway expansion program is based on the following strategic considerations:

- Shortening the Dhaka –Chittagong rail distance.
- Double tracking of all major railway corridors by phases.
- Developing a full access controlled right of way as well as capital intensive grade separated measure to make level crossing free allowing segregated rail corridor and thereby ensuring operation of commuter trains in urban areas. Emphasis would be given to higher frequency and speed without affecting the roadway capacity.
- Strengthening South Asia regional and Trans-Asian railway connectivity.
- Modernization of train (Electric Traction System), improving the speed and efficiency to move the containers to and from the hinterland more efficiently and thereby to make the railway profitable
- Priority would be given to connect large EPZ/SEZ mouth ICDs and thereby to develop market oriented container transport friendly new railway infrastructures.
- In the long run for even distribution of traffic load, urban contribution of railway in terms of carrying commuter traffic needs to be increased by adopting two-tier railway system i.e. sub-urban and urban rail. Urban rail network needs to be developed by including the circular rail.

Along with routine and regular activities/ projects/ programmes, the following major/remarkable projects are underway to be implemented during Seventh Five Year Plan;

- Construction of Single Line Duel Gauge Railway Track from Dohazari to Cox's Bazar via Ramu and Ramu to Gundhum near Myanmar Border.
- Padma Bridge Rail Link Project (Dhaka-Mawa-Bhanga- Jessore)

- *Construction of Double Track Standard Gauge Railway Line from Dhaka to Chittagong via Comilla/ Laksam (expressway)*
- Construction Modern Railway Workshop at Rajbari.
- Construction of Double Line (Duel Gauge) Railway Track between Joydebpur-Iswardi sections;
- Construction of Bangabandhu Railway Bridge (2nd) over the River Jamuna;
- Construction of Railway line from Khulna to Mongla Port with feasibility Study; and
- Construction of Dual Gauge Double Rail Line and Conversion of Existing Rail Line into Dual Gauge between Akhaura and Laksam.

Hence, the strategies outlined suggest heavy rail based development in this Project area. Also, some of the priority projects listed above pass through the Project area.

As part of the above strategy, the construction and reconstruction of 441 km rail line is already under way. To make railway communication between Dhaka and Chittagong more efficient, the Government has taken initiatives to upgrade Dhaka-Chittagong corridor into double lines.

4.1.2.3 Port Infrastructure

While there has been improvement in Chittagong Port container handling efficiency, further efforts are needed to increase efficiency in line with good international practice. To this end, during the Seventh Plan, priority would be given to:

- Reducing port induced semi-trailer truck traffic by developing wider intermodal rail and river connectivity.
- Developing the Chittagong Port as “Climate resilient” against sea level rise (SLR) and land subsidence potential.
- Maintaining and improving the navigability of the channel through capital dredging and regular maintenance dredging
- Increasing container handling capacity through expansion of terminal/yard facilities, acquisition of modern container handling equipment and procurement of harbour crafts and vessels to ensure improved operating system.
- Setting up ICDs/CFS by the Public/Private sector at all potential cargo distribution centres across the country to decongest the port.
- Involving private sector in port management and port development infrastructure on BOO/BOT/PPP model for which a clear, reliable and transparent policy guideline is to be approved by the Government
- Improving institutional capability in training, planning, safety and environmental management control in the port.

In relation to this, CPA has already completed the task of preparing a Master Plan, conduct the feasibility study for the Bay terminal and also award the tender to conduct the feasibility study of a port in Mirsharai. All these projects will have impact on this Project and the analysis will consider the traffic being generated from these projects.

4.2 National Perspective Plan

The National Perspective Plan was prepared by General Economics Division (GED) under Planning Commission. The report was published in April, 2012.

The 'Vision 2021' aims at developing Bangladesh into a resourceful and modern economy through efficient use of information and communication technology. The Perspective Plan provides the road map for "Making Vision 2021 a Reality" through accelerating the growth and laying down broad approaches for eradication of poverty, inequality, and human deprivation. A brief summary of "The Perspective Plan" on Transport Sector has been discussed which is as follows.

4.2.1 Transport for the Future-Vision

The vision of the perspective plan is to establish a safe, low cost, modern and technologically dependable, environmentally friendly inter-modal transport system with a view to reducing the financial cost and time for both commercial traffic, cargo and for public transportation.

4.2.2 Policy Objectives

The main objective of the perspective plan is to develop an efficient, sustainable, safe and regionally balanced transportation system in which various modes complement each other, interface appropriately and, where possible, provide healthy competition to each other. The broad policy objectives are as follows:

- *Meeting the transport demand generated by higher rate of growth of GDP.*
- Introduction of modern technology for increasing capacity and improving quality and productivity.
- Development of the two sea ports.
- Establishment of effective railway linkages between the east and west zones of the country.
- *Re-orientation of the development strategy for rural transport for efficient external access through optimal integration of road and inland water transport and off-road internal accesses.*
- *Development of some of the critical inter-modal transport network that will allow the connectivity of neighbouring countries to the two sea ports of Bangladesh.*
- Participation in global and regional transport connectivity initiatives that will help develop the land route links between South Asia and East Asia through Bangladesh.
- Improvement in resource mobilization through introduction of user charges and fees.
- Provision of required incentive packages for the private sector for ensuring greater participation not only in transport services, but also for infrastructure building.
- Transport development strategy framework will be broadened by incorporating the vital urban transport dimension starting with improvement in transport services of greater Dhaka city.

Adequate care will be taken while developing transport network and service so that these do not cause environmental pollution and affect ecological balance.

4.2.3 Sub-Sectoral Goals, Objectives and Strategies

4.2.3.1 Roads

The primary road network consists of national highways, regional highways and zila roads (former Feeder Road Type A) which is constructed and maintained by RHD. The other roads – upazila roads, union roads and village roads –serve mainly rural areas, and are constructed and maintained by the Local Government Engineering Department (LGED).

The long-term goal of the perspective plan is to *develop a safe, cost effective, efficient and sustainable system of land transport that facilitates economic development through the movement of people, goods and services throughout the country.*

Strategies

- *Upgradation and maintenance of the existing roads relative to new road construction through removing backlog and strengthen capabilities in all the fields of road maintenance.*
- Routine and periodic maintenance programmes will be drawn up by concerned authorities.
- *National Highways should receive priority attention to ensure a high level of service, safety and quality.* The Dhaka-Chittagong Highway (NH1) is to become a six-lane road while the *other highways should gradually become four-lane by 2021*. These roads can form part of the *regional road network*, as well as the *Trans-Asian Road network* facilitating trade between Bangladesh and neighbouring countries.
- Ensuring balanced development across the country, there should be an adequate number of east-west connections.
- *Improvement of the road connectivity with neighbouring countries through various regional cooperation forums*

4.2.3.2 Urban Transport

The aim of urban transport development is to improve transport and traffic infrastructure so as to meet existing and potential demands, and developing an integrated and balanced system in which *all modes (motorized and non-motorized) can perform efficiently and each mode can fulfil its appropriate role in the system.* The main objective of urban transport policies should be to support sustainable urban development.

4.2.3.3 Rural Transport

It is important to give attention to ways that the rural transport infrastructure, particularly the physical infrastructure, can support rural economies. Roads, waterways, or both serve most of rural markets and growth centres. Upazila roads (formerly, Feeder Road Type B) connect growth centres to the RHD road network or to the upazila headquarters or connect one growth centre with another. Union roads connect union headquarters with the upazila headquarters, and local markets with each other, while village roads connect villages and farms to local markets and union headquarters. All these roads, along with waterways, are important for the efficient functioning of rural markets. Access to markets will encourage improvements in market facilities.

The long-term goals of the perspective plan with respect to rural roads *are (i) to provide all-weather access to all growth centres, all union parishad complexes, most rural markets and other rural service delivery centres, and (ii) to improve rural accessibility to facilitate agricultural production and marketing.* The strategies may be adoption of a *Rural Road Master Plan and Maintenance Plan* with priority accorded on *maintenance over new construction*, and more involvement of LGIs in ensuring utilization and maintenance of constructed facilities.

4.2.3.4 Railways

The vision of the Perspective Plan is to expand and improve the railway system to provide safer, better, a more environmentally friendly and cost-effective transport facility to national and international traffic through establishing international rail links for *regional/sub-regional connectivity* and Trans Asian Railway (TAR), e-governance, introduce modern technology such as metro rail in Dhaka and undertake *modernization of signalling system to ensure safety*.

Strategies

- *Rehabilitate, upgrade/improve and replace old-aged infrastructures* and rolling stocks to reduce journey time, improve the service quality and to build the image of railway as a safe and reliable means of transport.
- Augmentation of line capacity along selected corridors, acquiring modern locomotives, coaches and wagons.

- Increasing market share in freight transport, in container transport between Dhaka-Chittagong Port and in passenger transport.
- Organizational reforms introducing a modern financial management system, improved maintenance and operational system and human resource development.
- Connect the Capital City with Cox's Bazar, Mongla Port, Tungipara, Barisal, Chittagong Hill Tracts and other areas where rail network does not exist.

- *Improve Commuter Train Services to provide better urban transport facilities to the daily passengers* around Dhaka, Chittagong, Rangpur, Dinajpur, Parbatipur, Nilphamari, Sylhet etc.
- Improve efficiency and cost recovery.

4.2.3.5 Ports and Shipping

The Maritime transport sector is critical to the economic development of Bangladesh. The objective of the perspective plan is to *promote efficient, effective and internationally competitive port and shipping facilities to enhance international trade and exports*.

Strategies

- Maintain and improve the navigational channel through capital dredging and regular maintenance dredging.
- *Develop efficient inland distribution of container traffic by road, rail, and inland water transport to relieve the congestion and long travelling time at Chittagong Port.*
- Expansion of terminal/yard facilities and improvement of operations through the acquisition of modern container handling equipment and procurement of harbour crafts and vessels.
- Urgent establishment of ICDs/CFS at all potential cargo distribution centres across the country.
- PPP in port management and port development infrastructure through a BOO/BOT model using a clear, transparent policy guideline.
- Improve institutional capability for training, planning, safety, and environmental control.

4.2.3.6 Multi-Modal Transport

Multi-modal transport has the potential to reduce transport expenditure and time. The modes should be integrated, and the communication system should be improved to facilitate tracing the vehicles and sharing information among different stakeholders, such as importers/exporters, port authority and shippers.

4.3 Sustainable Development Goals (SDGs)

The report was prepared by General Economics Division (GED) under the Support to Sustainable and Inclusive Planning (SSIP) Project under Planning Commission. The report was published in February, 2016.

There are 17 Sustainable Development Goals with 169 associated targets. The goals are as follows:

Sustainable Development Goals (SDGs)
Goal 1: End poverty in all its forms everywhere
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3: Ensure healthy lives and promote well-being for all at all ages
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5: Achieve gender equality and empower all women and girls
Goal 6: Ensure availability and sustainable management of water and sanitation for all
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10: Reduce inequality within and among countries
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12: Ensure sustainable consumption and production patterns
Goal 13: Take urgent action to combat climate change and its impacts[1]
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Among these goals the Consultant team finds out some targets which may be related to the project. Some these targets are fully/partially aligned with the *"Seventh Five Year Plan"*

Targets of the Sustainable Development Goals (SDGs)

Goal 1: End poverty in all its forms everywhere
Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day
Target 1.a: Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions
Goal 5: Achieve gender equality and empower all women and girls
Target 5.c: Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

Target 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Target 8.1: Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries

Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

Target 8.3: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

Target 8.9: By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture' and products

Target 8.a: Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade- Related Technical Assistance to Least Developed Countries

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being with a focus on affordable and equitable access for all

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage

Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particularly for women and children, older persons and persons with disabilities

Target 11.a: Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning

Target 11.b: By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels

Goal 12: Ensure sustainable consumption and production patterns

Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Target 16.6: Develop effective, accountable and transparent institutions at all levels

Target 16.7: Ensure responsive, inclusive, participatory and representative decision- making at all levels

Target 16.10: Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Target 17.11: Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020

Target 17.16: Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

Target 17.17: Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

4.4 Conclusion

The literature review has presented the excerpts from three major reports regarding the developing Bangladesh especially emphasizing aspects relating to transportation and particularly to this project. From this discussion, it is also highlighted the components, strategies and priorities that fall in tandem with the aim and objectives of this Project. The final travel demand forecasting model and its suggested sustainable transportation system plan will reflect all these issues highlighted in the literature review.

5 COLLECTION AND REVIEW OF RELEVANT DATA

Apart from conducting literature review on major documents related to the Project, substantial amount of secondary data were also amassed for this project. The following subsections lists the relevant data sources and the description of data that the consulting team found to be relevant for this project.

5.1 Collection of Geo-physical Maps and Relevant Reports

5.1.1 Government's Future Projects

Road Network

Projects	Source
Mirsharai –Teknaf Marine Drive Road Project	Report on Sustainable Transport System: A Road to Development (Ministry of Road Transport and Bridges Road Transport and Highways Division)
Cross-Border Road Network Improvement Project	
Dhaka Chittagong Expressway Project on PPP Basis	
Coastal Expressway from Shitakunda via Chittagong to Cox' Bazar	Website of CDR International

Mirsharai –Teknaf Marine Drive Road Project

The proposed Mirsharai-Teknaf Marine Drive is a route along the sea shore which will connect Asian Highway network as well as India, Myanmar and China especially Kunming. The route passes beside the largest sea port of Bangladesh and the largest ship breaking yard of the world. The project road will contribute to the development of tourism in the area and facilitate regional connectivity. It is now under construction and it is directly connected to the *Economic Zone of Mirsharai.*

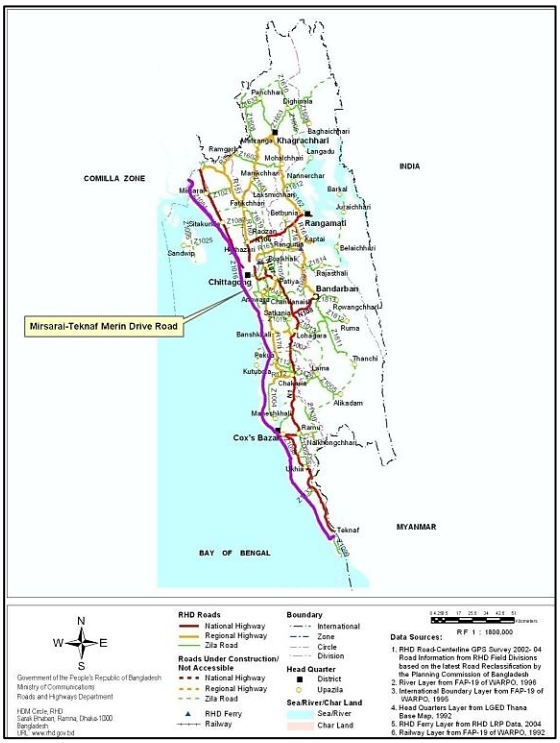


Figure 5.1: Mirsharai-Teknaf marine drive

After completion of this road the connectivity with Mirsharai will be improved and economic development will be flourished in home and abroad.

Cross-Border Road Network Improvement Project

RHD has plan to take upgrading of Ramgarh-Heako-Baraiyarhat road section project to establish improved connectivity between Bangladesh and North-East Indian states. The proposed commencement of civil work is January 2019 and the completion of civil work is December 2021.

The project will be implemented through RHD under Ministry of Road Transport and Bridges in order to build a reliable and efficient cross-border road network among neighboring countries. This road will coincide with Asian Highway 1 and 41 and also a part of Bangladesh-Bhutan-India-Nepal Motor Vehicle Agreement planned corridor.

This project will improve the connectivity of Mirsharai with North-East Indian states and make the area an important industrial hub and also improve the eco-tourism.

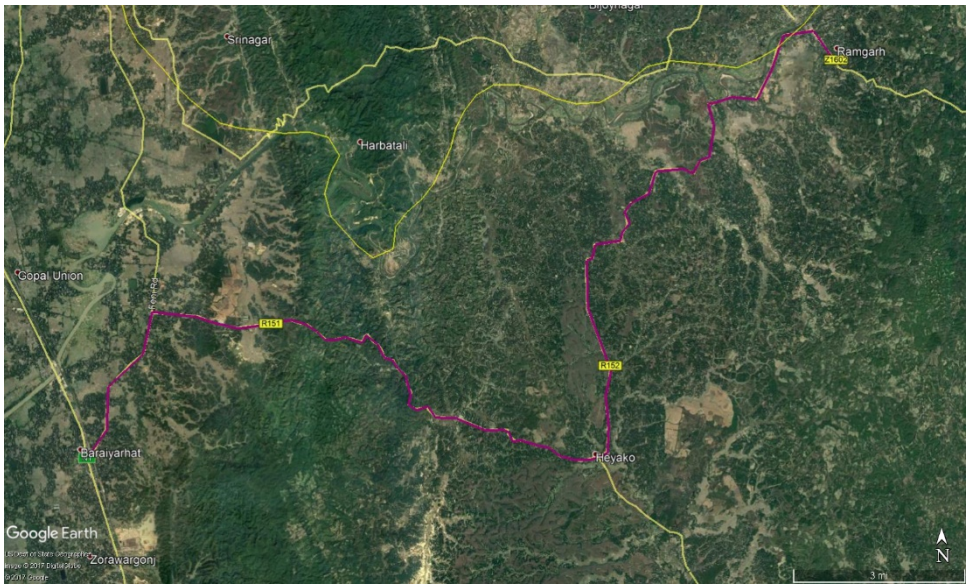


Figure 5.2: Alignment of Cross-Border Road

Dhaka Chittagong Expressway Project on PPP Basis

The project aims at construction of a 217 kilometers expressway along Dhaka-Chittagong corridor on public private partnership basis. The expressway is proposed to be constructed parallel to National Highway, N1. When the expressway will be completed and opened the development of Mirsharai will be flourished, land use pattern will change, congestion will be reduced, regional, national and international road connectivity will be improved. Mirsharai EZ will also be benefited.

Figure 5.3: Part of the Proposed Dhaka-Chittagong Expressway

Coastal Expressway from Shitakunda via Chittagong to Cox' Bazar

As part of the feasibility study for the Marine Drive Expressway and Coastal Protection Works CDR International, in cooperation with DevConsultant from Bangladesh, was appointed to carry out the Preliminary Environmental Impact Assessment for China Harbour Engineering Company (CHEC). Through this project, the Bangladesh Government intends to improve the accessibility of the Southeast region of Bangladesh along with an improvement of the flood safety. Nowadays, the area is moderately accessible which hampers the economic development of the region, comprising of

the Chittagong and Cox' Bazar districts. The area is characterized as hilly area with relatively short rivers where the coastal low-lying delta planes are affected by tidal waves and river flooding, which frequently damage households and vital infrastructure.

The alignment of the Expressway runs from Shitakunda via Chittagong to Cox' Bazar. The total length of the trajectory is about 170 km in total and includes approximately 100 bridges and 80 km of coastal protection works. The proposed roads will be a dual four-lane carriageway of 21.6 m in width, with a bituminous road surface. It will become a national trunk road upon its completion.

Positive impacts of the project are i) increase of the flood safety ii) the creation of employment opportunities during construction iii) better economic opportunities for local business and iv) unlocking of the hinterland for socio-economic development.

This expressway directly connects the Mirsharai Paurashava and overlap with the Mirsharai-Teknaf marine drive

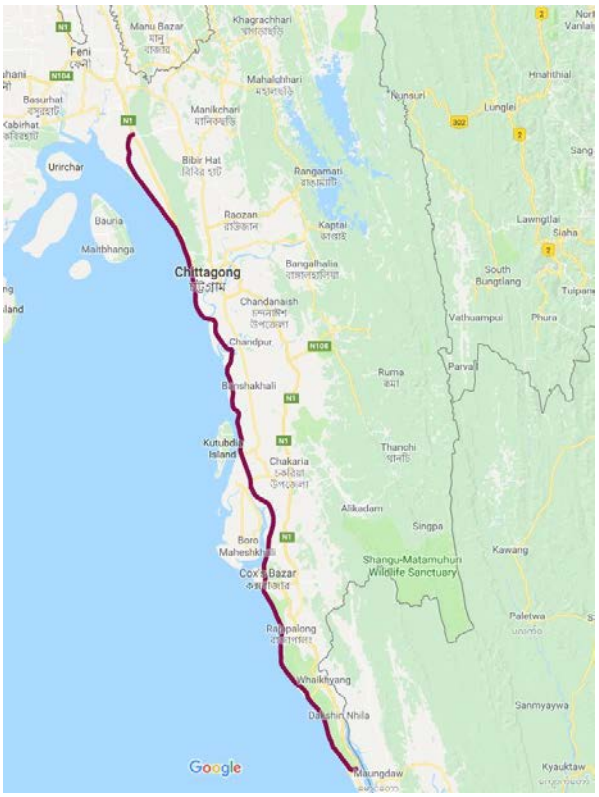


Figure 5.4: Coastal Expressway

Bridge

Projects	Source
Indo-Bangla Maitree bridge from Sabroom to Ramgarh	Dhaka Tribune, Published on October 11, 2017 at 01:56 pm, written by Shilajit Kar Bhowmic

Indo-Bangla Maitree Bridge from Sabroom to Ramgarh

The construction of the Indo-Bangla Maitree Bridge from Sabroom to Ramgarh is currently in full swing. National Highway Infrastructure Development Corporation Limited (NHIDCL), a nationalized company of the Indian government is supervising the complete project. The India-Bangladesh Maitree Bridge, is a 180m long four-lane approach road construction project that was implemented bilaterally between the two countries. The bridge will connect Sabroom, a border town in southern Tripura with Ramgarh in Bangladesh, which will allow India to use Chittagong as a "port of call." The route will provide a significant road link to India's north-eastern states, and facilitate greater trade and exchanges between the two countries.

Figure 5.5: Location of Sabroom to Ramgarh Bridge

Ports and Bay Terminal

Projects	Source
Ramgarh Port	Bangladesh Land Port Authority (BLPA)
Sitakunda/ Mirsharai Port	Chittagong Port Authority
Bay Container Terminal	The Daily Star and the Strategic Masterplan for Chittagong Port (ADB)

Ramgarh Port

The government has decided to establish three new land ports in Chittagong Hill Tracts (CHT) to ensure smooth and efficient trade with India and Myanmar. The ports will be built at Ramgarh in Khagrachhari, Gundam in Bandarban and Tegamukh in Rangamati. Among these ports Ramgarh will establish trade connection with India's Tripura state.

Ramgarh port will be connected with Mirsharai Upazila by the Ramgarh-Heako-Baraiyarhat road section. This will make a positive effects in export-import business for Mirsharai and Economic Zone of BEZA.

Figure 5.6: Location of Ramgarh Port

Sitakunda/ Mirsharai Port

To meet the challenges of globalization and liberalization of world trade and economy, Chittagong Port Authority has undertaken many ambitious projects to enhance the capacity of Chittagong Port, improve efficiency and quality of services and also develop adequate facilities to turn itself into a world class regional port.

Bangladesh has planned to construct an Economic Zone in Feni-Mirsharai area. To establish that zone a port or terminal is very important. Moreover that port/terminal will be an intermediate port/terminal helping the services of Chittagong Port Authority. The proposed location is in and around Sitakunda Upazila near Mirsharai. The total area of the port will be 28 square kilometers. The proposed port/terminal will be able to handle more containers and bulk cargos and decrease the pressure on Chittagong Port.

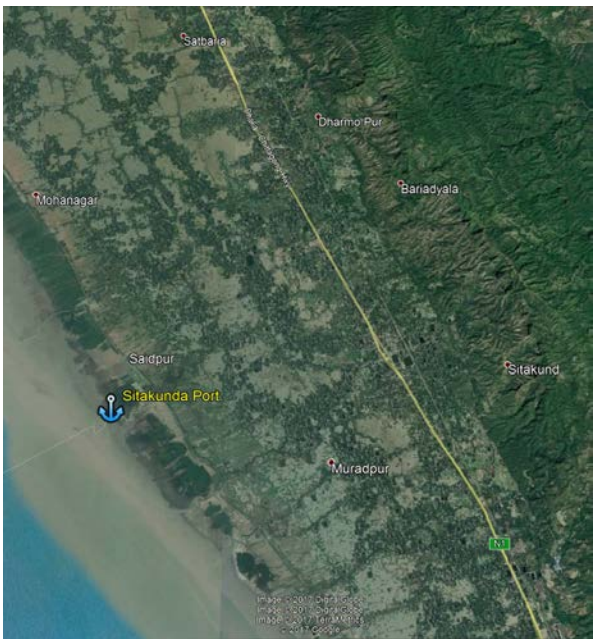


Figure 5.7: Location of Sitakunda Port

Bay Container Terminal

The new terminal named Bay Terminal on Patenga coastline with all modern port facilities to mobilize port activities and reduce transportation cost is now in top priority list of Prime Minister Sheikh Hasina. The government has initiated a move to construct a bay container terminal with the Indian credit to enhance the capacity of Chittagong Port, which will reduce congestion at the port. An 11km char had emerged about some 800 meters off the coast. It was not visible before 1990 and a channel was also created there where the sea depth in some areas is up to 10 meters. The possible footprint of the new Bay Terminal, measuring up to 2,500m quay length and up to 1,000m depth of land is also already shown on the figure above. This would lead to a total area of up to around 250ha.

Figure 5.8: Location of Bay Terminal

The outer anchorage of the Chittagong Port is also near the area where sea depth is up to 12 to 13 meters. The feasibility study to construct the terminal is ongoing by a German Company and the Chittagong Port Authority (CPA) intends to open the terminal in 2021 after the completion of 1st phase works. The distance of Chittagong Port from the outer anchorage is now 15km and this distance will come down to only 1km once the terminal is set up. Again, the capacity of the anchoring ships will be increased from present 19 ships to an estimated 35 ships at a time.

Railway

Projects	Source
Construction of double line between Laksham-Chinki Ashtana, Mirsharai (JICA funded)-*On going*	Master Plan, Bangladesh Railway Authority
Modernization of 11 station's signaling system in between Chinki Astana, Mirsharai-Chittagong (EDCF)-*On going*	

Construction of double line between Laksham-Chinki Ashtana, Mirsharai

The construction work of 61 kilometer railway track doubling between Laksham and Chinki Astana on Dhaka-Chittagong section is a sub-project of Dhaka-Chittagong Railway Development Project. The main objective of this sub project is to increase the line capacity of Laksam-Chinki Astana section for efficient train operation and to meet fast growing freight and intercity passenger traffic. There also will be the scope for laying broad-gauge lines too.

Figure 5.9: Future Double Line Track from Laksham-Chinki Astana

Modernization of 11 stations' signaling system in between Chinki Astana, Mirsharai-Chittagong

Eleven railway stations will be remodeled under this project. This project includes: Design, Supply, Installation, Testing, and Commissioning of Computer based Interlocking Color Light Signaling System and Related Works & Services at eleven (11) Stations of Chinki Astana-Chittagong Section.

5.1.2 Feasibility Study Report for Mirsharai Economic Zone, Bangladesh Economic Zones Authority (BEZA)

Proposed Transportation System

The Figure 5.10 shows the proposed transport network of Mirsharai Economic Zone

Approach/ Access road: Two approach/access roads has been suggested in EZ plan. One is from Dhaka-Chittagong old highway, with the intersection to the highway at Borotakiya Bazar, distance from Borotakiya Bazar to the site is about 9.30 Km, and another approach/access road is from Zorawargonj intersection to Muhuri Project Embankment. The distance from Zorawargonj to Muhuri Project Embankment is about 7 Km. BEZA suggests to extend the road up to 4-lanes. According to BEZA there are some possibilities and constraints of the existing two access roads.

4-lane highway Construction: There is also a proposal to connect the EZ with the Port Link Road in Chittagong by constructing a new 4-lane highway on the existing BWDB dike/Embankment Road, by improving it. It will also be constructed if the demand for industries rises higher and there is a need for a direct alternative connection to the Chittagong Port and Chittagong City. The following figure shows the transportation system proposed for Mirershorai EZ.

Port/Jetty: A jetty will be established to transport coal directly to the proposed 600MW coal-fired power plant. A channel route is proposed to connect this site with the deep sea, in order to import coal.

Rail access: Closest rail station at Borotakiya RS from Chittagong railway station is available and it may be used in future for rail connectivity to EZ.

5.1.3 Data Collection from Local Government Engineering Department (LGED), Bangladesh

In Mirsharai upazila there is Upazila pucca and katcha road, Union pucca and katcha road, Village road. Dhaka-Chittagong National Highway, Regional Highway and Zila road connect the Mirsharai with other district. The Consultant Team collects the following database from LGED in both GIS format and hard copy. The Figure 5.11 represents the road network of Mirsharai with other features.

- Existing road network
- Growth center
- Rural market
- Administrative boundary
- Upazila and union headquarters

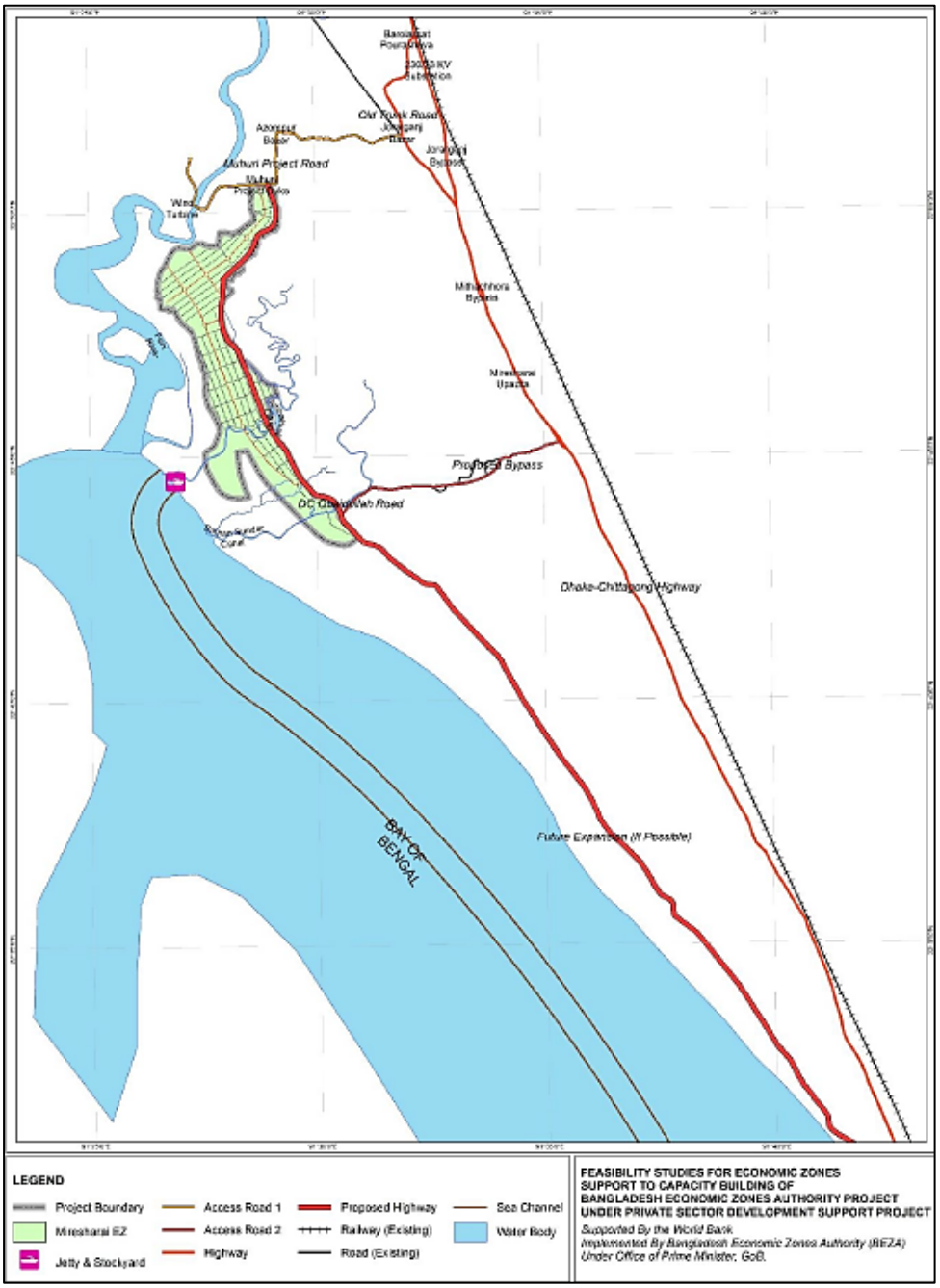


Figure 5.10: Proposed Transportation Network for Mirershorai EZ

Figure 5.11: Existing Road Network of the Study Area

Source: LGED

5.2 Collection of Basic Statistics: Present Activities

5.2.1 Population

Total population of Mirsharai upazila is 3, 98,716 and total household size is 79,545. Population density of the upazila, 826 persons per square kilometer. Urbanization rate of the upazila is 7.83%. Table 5.1 represents the area, households, population and density of the project area.

Table 5.1: Area, No. of Households, Population and Population Density of the Project Area

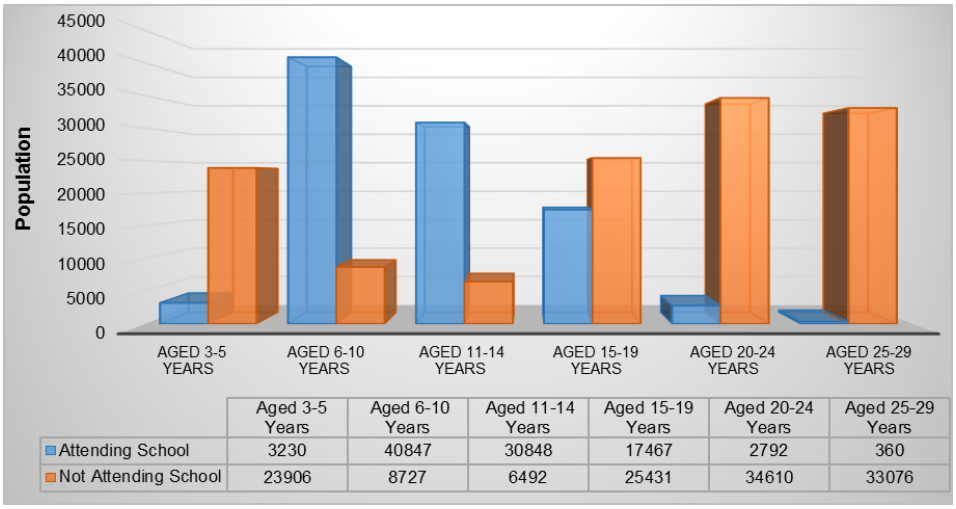
Paurashava/Union	Area (ac)	No. of Households	Population	Population density (per sq. km.)
Baroiyarhat Paurashava		2399	11602	
Mirsharai Paurashava		3507	16218	
Dhum	5587	3419	16770	742
Durgapur	3742	4351	21128	1395
Haitkandi	3271	3700	19051	1439
Hinguli	4562	5889	29133	1578
Ichhakhali	15754	5205	27980	439
Karerhat	39144	7362	35467	224
Katachhara	3446	4366	23596	1692
Khaiyachhara	1483	4879	23423	3903
Mayani	4590	3549	18285	984
Mirsharai	2816	3164	16828	1477
Mithanala	5338	4445	23109	1070
Maghadia	2626	4832	23406	2203
Osmanpur	5034	3046	14645	719
Saherkhali	8609	3049	16912	485
Wahedpur	4682	4752	24981	1319
Zorwarganj	5517	7631	36182	1621

Source: BBS, Population Census, 2011, Community Series: Chittagong

5.2.2 Education

Education rate: 52.01% (Aged 7+ population)

- School-going students: 95544 (3-29 aged)
- Government primary schools: 145
- Government registered primary schools: 23
- Community primary schools: 14
- Private unregistered primary schools: 12
- Primary School attached with high school: 1
- Private high schools: 44 (including 5 girls' schools)
- Kindergarten schools: 12
- Madrasas: 24 (1 women's madrasa)
- Independent Abtedia madrasas: 17
- Private degree colleges: 3
- Intermediate colleges: 2 (1 girls' college)
- Textile engineering college: 1



	Aged 3-5 Years	Aged 6-10 Years	Aged 11-14 Years	Aged 15-19 Years	Aged 20-24 Years	Aged 25-29 Years
Attending School	3230	40847	30848	17467	2792	360
Not Attending School	23906	8727	6492	25431	34610	33076

Figure 5.12: Distribution of population by age group and school attendance

The literacy rate of Mirsharai is 52.01%. Mainly primary and secondary education rate is high than university level. After higher secondary level the number of students is become lower (see the Figure 5.12). That means the tendency to receive higher education among people of the Upazila is low. When the upazila will be developed and the economic zone will be operational more employment opportunities will be created which will lead to higher incomes for the youth and also for adult, and this will lead to the expectation toward the contribute to higher attendance levels of children including girls at schools leading to overall higher education for all.

5.2.3 Employment Status

The project area is predominantly agriculture-based and partly fisheries-based. Main occupations of the upazila are: agriculture 34.06%, forestry 2.23%, agricultural labourer 15.86%, wage labourer 3.39%, commerce 10.8%, service 16.89%, fishing 1.32%, transport 2.37% and others 11.26%.

Turning to the employment status, it appears that mainly male population are involved in employment sector rather than female. Women are predominantly engaged in the household work. Of those not having jobs, the number of women is higher than that of men which indicates that women's domestic labor may not be counted in the labor force. The employment status clearly shows (See Figure 5.13 and Figure 5.14) that the majority are dependent on agriculture related activities. The number of people in the service sector is almost one third of the number who are involved in agriculture. The very low number of people employed in industry is due to lack of opportunity.

Figure 5.13: Employment Status of Mirsharai Upazila

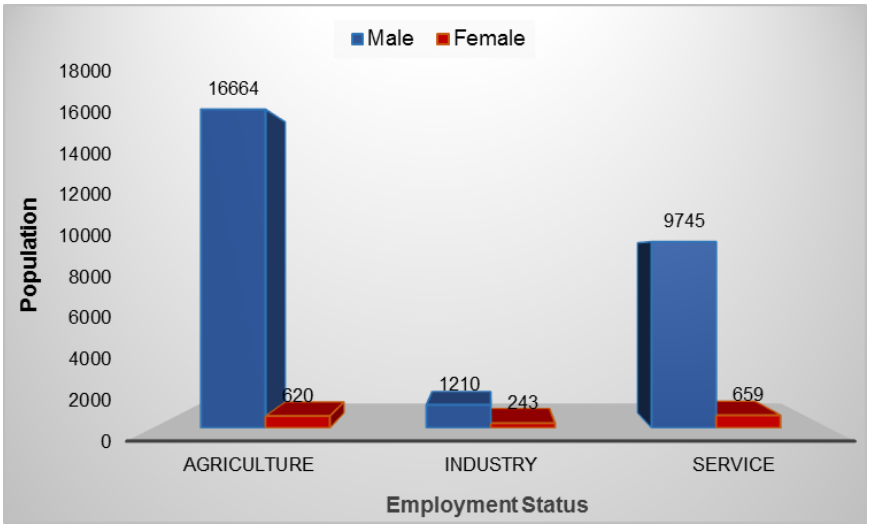


Figure 5.14: Employment Status based on Employment Sector

With the improvement of Mirsharai upazila, development of economic zone and tourism sector employment opportunities for people of Mirsharai will be generated and also provide them a better socio economic status and thus, empowerment especially for women.

The EZ which alone will generate 532,440 job opportunities, will not only change the scenario of the Upazila but also that of the neighboring Upazilas and will contribute to a reduction in migration to the large cities such the capital, Dhaka and the nearby mega-city of Chittagong. This locality is expected to become a new hub for business the service sector with all urban facilities.

5.2.4 Household structure, Sanitation facilities and Drinking water facilities

The household pattern, sanitation facilities and behavior shows a grim picture of poverty. Most of the households have kutcha houses in the upazila. A very low percentage of households have pucca houses. The number of people using proper sanitary toilets is small, most people have non-water sealed sanitary ones. Sixty percent of households have non-sanitary toilets and 22% have non-sanitary toilets in the upazila. Again 94% people use tube-well for drinking water purpose. This information is important for the project as it provides insight into the economic status of the Mirsharai dwellers.

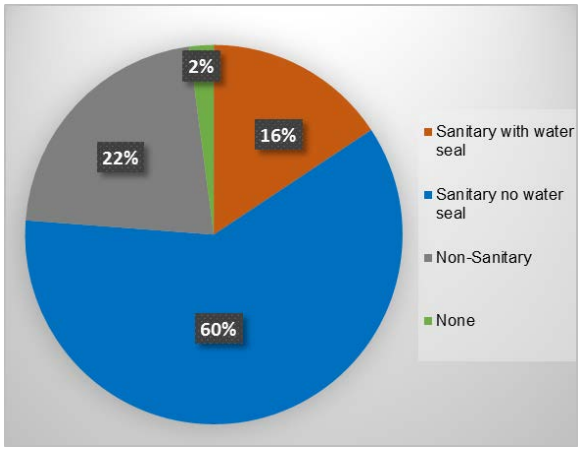


Figure 5.16: Sanitation Facilities of Mirsharai Upazila

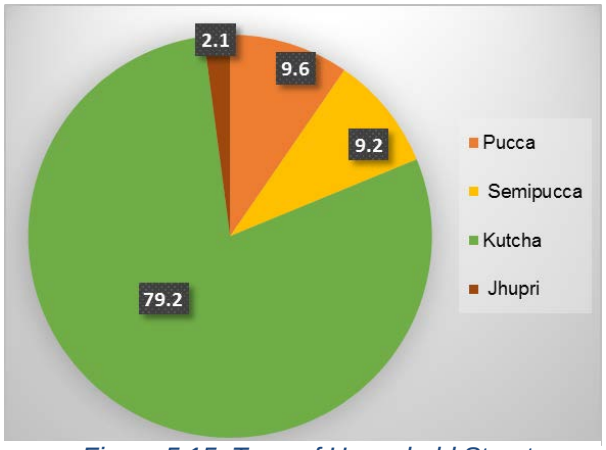


Figure 5.15: Type of Household Structure

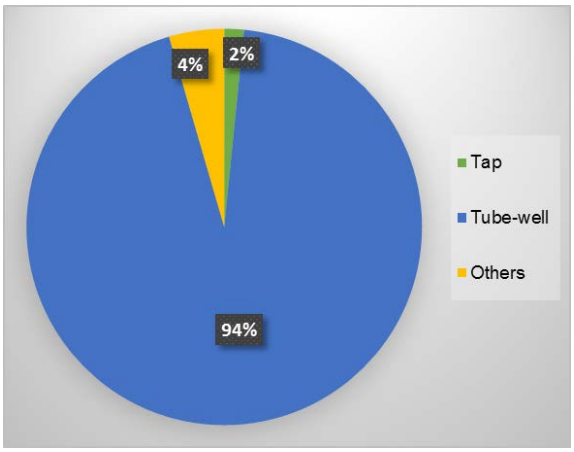


Figure 5.17: Drinking Water Facilities in Mirsharai Upazila

5.2.5 Health

There is one 50 beds Upazila hospital in the Mirsharai upazila. Besides it there are 14 family welfare centres, 7 union health centres, 3 private clinics and one mother and child welfare center.

The data on occupations, education and household types give an idea of the locality. From these variables, it can be said that the area is impoverished and not many well-off families live in the area. But at the Upazila Headquarters there are several structures and buildings and institutions but established in an unplanned manner. Also, the data explains the low private vehicle ownership and high dependencies on public transport by the local people.

5.2.6 Commercial Activities

Manufacturing Facilities: Carpet industry, pipe mill, ice factory etc. Cottage industries consists of weaving 903, goldsmith 110, blacksmith 100, potteries 100, bidi 4, tailoring 250, wood work 150, bamboo work 200 and sanitary 20.

Markets, Hats, Bazars and Fairs: Hats and bazars are 30, most noted of which are Mohajan Hat, Abu Torab Bazar, Kamar Ali Bazar, Boro Daroga Hat, Karer Hat, Baroia Hat, Shantir Hat, Jorarganj, Mithachara, Fakir Hat, Abur Hat and Bamonsundar Daroga Hat; fairs 5.

5.2.7 Transportation Facilities

Existing Roads: Pucca 193 Km, semi pucca 119 Km and mud road 1500 Km; railways 16 Km; waterways 11 nautical mile. Traditional transport are palanquin, Shampan boat and bullock cart. These means of transport are either extinct or nearly extinct.

Existing Modes: The conventional public transport services are only available in Mirsharai along the Dhaka-Chittagong highway. Within the Paurashava/Union/Village, unconventional modes of transport – mainly auto rickshaws, easy bikes and leguna serve as para transit. Rickshaws are also predominant just like throughout Bangladesh. Even along the Dhaka-Chittagong highways, alongside conventional buses and mini-buses, a substantial number of leguna were seen in operation.

5.2.8 Present Power Supply Situation and Telecommunication at Mirsharai

Power supply

At present, electricity is supplied to the area by the Rural Electrification Board (REB) by 11 KV line connected to REB's 33 KV sub-station at Mithachara, capacity 20 MVA. But it can only deliver 10MW due to the limited power supply. Grid supply in the area is not available now. Some Solar Home systems are available.

Telecommunication

Upazilla Exchange is connected by Optical Fibre Links (OFC) to the Chittagong main Exchange.

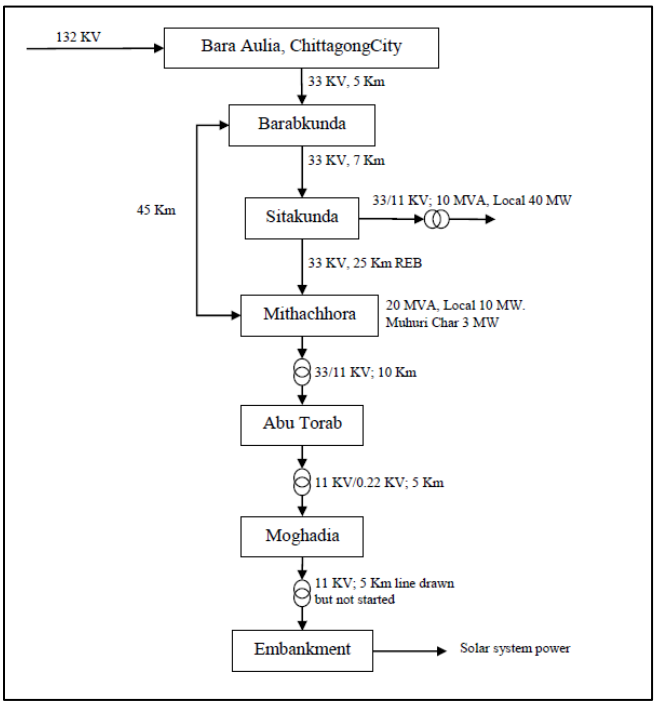


Figure 5.18: Present Power Supply Situation of Mirsharai

5.3 Review of the Available Data

The consultant team are reviewing all data that are available at hand and will collect other necessary reports and documents from the concerned entities. From the review of the data as briefed in the Aection 5.1, the following projects taken by the government directly or indirectly link with the study area:

- Mirsharai-Teknaf Marine Drive Road Project
- Cross-Border Road Network Improvement Project
- Dhaka Chittagong Expressway Project on PPP Basis

- Coastal Expressway from Shitakunda via Chittagong to Cox' Bazar
- Indo-Bangla Maitree Bridge from Sabroom to Ramgarh
- Functioning of the Proposed Ramgarh Port in Khagrachhari
- Sitakunda/ Mirsharai Port (CPA)
- Bay Container Terminal (CPA)
- Construction of double line between Laksham-Chinki Ashtana, Mirsharai
- Modernization of 11 station's signaling system in between Chinki Astana, Mirsharai-Chittagong

These project interventions have been marked and linked with the proposed tentative road network for the Mirsharai Upazila in the Figure 5.19: Government's Projects and Consultant's Proposed Tentative Road NetworkFigure 5.19

5.4 Additional Data Requirement

The additional data requirements are highlighted in Chapter 7 and the data will be collected through survey and from meetings with the stakeholders. Chapter 7 outlines in detail the data collection methodologies to be followed in this Project.

Figure 5.19: Government's Projects and Consultant's Proposed Tentative Road Network

6 ANALYSIS OF RECONNAISSANCE SURVEY FINDINGS

6.1 Identified Problems and Possible Solutions

A detailed description of the surveys along with their methodologies is presented in Chapter 7. Following are the probable problems that the survey team may encounter along with the plausible solutions.

Production Attraction Survey: In this survey, the survey team needs to conduct household survey to obtain information about trip production. It may be difficult to get access to households without permission from the community. The consulting team will work with the local community, i.e., the Wards, to get the activities endorsed so that the survey team gets easy access and cooperation from the households selected as samples. Similar support will also be required to collect information on trip attraction from the locations with commercial interest.

Traffic Count and OD: The survey team will conduct count study in several locations. It will be logistically more compatible to select local people, preferably university or college students, as the enumerators who will be trained by the consulting team. At the same time, the safety and security of the surveyors on field also require to be ensured. The consulting team identifies the Origin-Destination survey to be associated with the highest level of complexity as it requires stopping vehicles on road and asking them questions related to their Origin and Destination. It is highly recommended in the text books to conduct this survey with direct assistance from the traffic police department. Hence, necessary arrangements are needed to be made. It is important to mention here that the consulting team has already discussed the issue with the Mayor of Mirsharai pourashabha who eventually introduced the consulting team with a relevant police officer.

With active support from UDD, it is expected that the other surveys that will be conducted will not have any substantial problems associated with them.

6.2 Results of the Consultation Meeting

Separate meetings with major stakeholders, i.e., municipal authority, LGED, RHD, UNO office, representatives of different communities that can directly be impacted from transportation planning were identified during the reconnaissance survey. In individual meetings, the objectives of the project were explained to obtain their remarks, the public demand, specific development needs and opportunities with available alternative options in the study area. Although in general, organizing FGDs are beyond the scope of a reconnaissance survey, considering the time constrains, FGDs were organized with the identified major stakeholders only. The objective of this first FGD was to introduce the project to the community, reconfirm the selected locations of interest that need to be investigated, obtain support from on-site through the local community while planning in project office in Dhaka and gain assurance of cooperation from the community. Meetings that took place already are:

- Start-up Meeting with Project Director, in the UDD HQ (Dhaka),
- Meeting with UDD Mirsharai Officials, in Mirsharai
- Meeting with Forest Department and representatives of BWDB, in Mohamaya Lake
- Meeting with Honorable Mayor, Mirhsarai Pourashava (in presence of Counsilors and SI, Mirsharai Thana)
- Meeting with Secretary to Honorable Mayor, Baroiyarhat Pourashava
- Discussion with locals, throughout the project area
- Follow-up Meeting with Project Director, in the UDD HQ (Dhaka)

The notes of the abovementioned meetings and discussions are attached in **Appendix-A**. The consultants have considered all the issues as brought about in the meetings and the future transport network is being planned in an integrated manner. However, the follow up meeting with the PD was crucial and the actions taken to address his valuable remarks are as follows:

Remarks from the Project Director	*Actions Taken*
The Project Director, Mr. Akhtaruzzaman shared his remarks on the submitted 'Mobilization Report'.	*Those remarks were well noted and the Mobilization Report were updated accordingly for final submission.*
In case of road design standard, the PD said that the study area has both jurisdictions (roads) of both LGED and RHD. The tentative road network outlined in the report is mostly under the jurisdiction of LGED. Therefore, he suggested the consultant team to consider the LGED road standard as well for network design. If it is necessary to follow the RHD standard then the consultant team must discuss with LGED and later propose a logical road design standard for Mirsharai.	*The consultants will propose the most pragmatic transport solution. However, the administrative and jurisdictional issues will be dealt with during the coordination meeting among different authorities.*
The PD discussed with the team about the future land use provisions alongside the future road network and improved land use of the contained (pocket) areas in between old and new alignments.	*The proposed road network and the model will be prepared accordingly.*
In Chinki Astana railway station, more passengers and goods are loaded and unloaded than Mirsharai. PD asked the team to exploit all possible road connectivity to the tourist spots from the station. He also inquired about how the tourist spots can be accessible for aged persons and what facilities can be provided for them.	*This will be done during the upcoming field trip to the project sites especially to the tourist spots.*
BEZA proposed a railway connectivity to EZ through the Bara Takiya. PD asked the consultant to study the feasibility of the connection. He also told the team to consult with BEZA and BR about their future plans for Mirsharai.	*The Stakeholder Interview section in Chapter 7 elaborates the important issues for discussion with BEZA. The road network will be proposed following a thorough review of the available data, the meeting with BEZA and after collection of the updated layout EZ.*
As Mirsharai is close to the Bay of Bengal, it should be ensured through the plan that people can easily access the sea beach at the toe end of the EZ Site and necessary road connectivity should be provided during the planning.	*During the next field visit, the consultants will inspect such possibilities.*
PD also suggested that the linkage between BISIC and EZ must be ensured in future road network plan.	*During the next field visit, the consultants will find a possible solution to this.*
Honourable Prime Minister of Bangladesh, Sheikh Hasina, promised that a Tourism City will be developed by centring the Mohamaya Lake in Mirsharai. PD asked consultant team to design future road network for tourist spots considering this vision for tourism development.	*Further information is required on this matter and will be collected from the Stakeholder Interviews.*

Mr. Akhtaruzzaman, PD, said that major regional connectivity should be shown in a map.	*The improved regional connectivity will be shown in the final plan.*
PD also asked the consultant team to find out, after reviewing all policies and proposals of different government plans and projects, all the gaps of existing road network and those estimated in different sectoral development plans. He also told to review the study report on "The Bay of Bengal Industrial Growth-Belt (BIG-B) Initiative, JICA" for better understanding of the regional and national connectivity with the Mirsharai.	*The report is to be collected from UDD and further review will be made.*

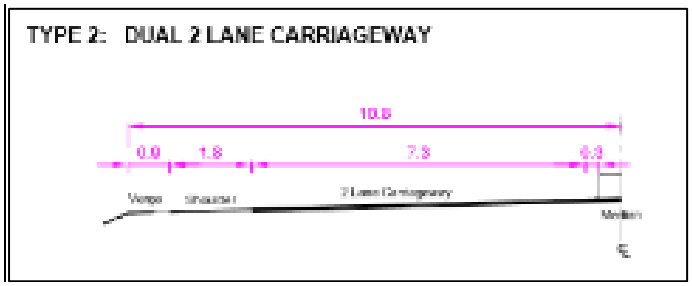
6.3 Prospects of Development/ Possible Road Network

After compiling the data and information gathered during the reconnaissance survey, the consulting team ran several brain storming sessions to come to the conclusion that a sustainable transportation system in Mirsharai will vastly depend on strict enforcement of a land use plan. The consultants broadly divided the study area into four parts– i) the BEZA, ii) the model town to be proposed by UDD at the outskirt of BEZA with Mirsharai at its east, iii) the existing habitation of Mirsharai, and, iv) the eco-tourism zone located at the east of the Dhaka-Chittagong highway. The proposed sustainable transportation plan for the next 20 years will be based on the idea that each of these zones will be able to entertain their internal traffic demand with their internal transportation network. There will be semi access controlled roads connecting between each of these roads with the sole purpose to cater for the inter zonal traffic. Finally, each of these zones will have direct connectivity to the Dhaka-Chittagong highways. The consulting team also believes that it is imperative that the land use adjacent to the proposed transportation network is strictly maintained so that each component of the proposed network can retain its functional classification.

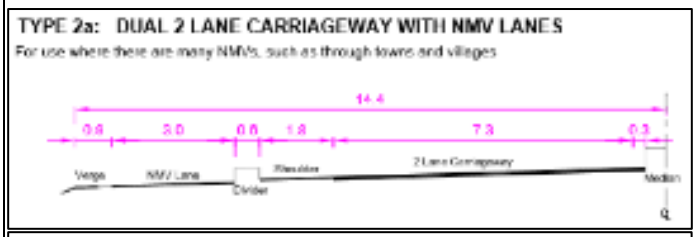
The possible future road network for Mirsharai proposed by the consultant team also recommends two flyovers connecting Mirsharai to Khagrachari and Fatikchari without hindering the operation of the Dhaka-Chittagong highway. Rail connectivity with the Upazila and with Economic Zone will be proposed after discussion with the Bangladesh Railway authority. For connecting the tourist spots walking/ bi-cycle trail has also been proposed along the railway. The Figure 6.1 represents the possible future road network of Mirsharai.

The consultants have studied the design standards of both RHD and LGED, and the capacity of different classes of the two road authorities. After a thorough review of the same and considering the requirement of the future traffic the newly proposed roads are based on three RHD design standard (Type 2, Type 2a and Type 3a) as presented below:

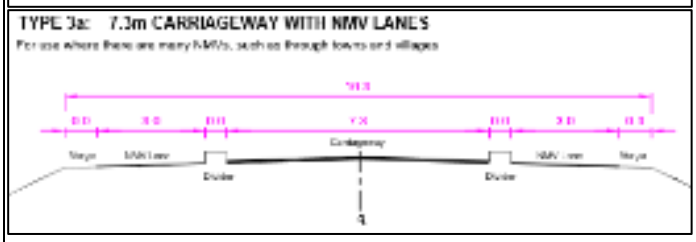
- Road Type 2: Maximum capacity: 4500 PCU/hr.



- Road Type 2a:
  - For use where there are many NMVs, such as through towns and villages
  - Maximum capacity: 4500 PCU/hr.



- Road Type 3a
  - For use where there are many NMVs, such as through towns and villages
  - Maximum capacity: 2100 PCU/hr.



It is to be mentioned here that the consultants acknowledge that most of the roads within the project area are under the jurisdiction of LGED. At the same time, the national plans summarized in this inception report suggest that seamless connectivity should be provided between the economic zone and the national highway. Acknowledging that, for the development of the travel demand forecasting model, the consulting team will be evaluating both LGED (category 3 and 4 as shown in the table below) and RHD standards. The LGED standards are governed by the peak hour PCU as presented with Table 6.2.

Table 6.1: Geometric Design Standards (LGED)

Design Type	Carriageway (m)/ (ft)	Hard shoulder (m)/ (ft)	Verge (m)/ (ft)	Crest Width (m)/ (ft)
8	3.0/ 10	0.0/ 0	1.25/ 4	5.5/ 18
7	3.7/ 12	0.0/ 0	0.90/ 3	5.5/ 18
6	3.7/ 12	0.0/ 0	1.8/ 6	7.3/ 24
5	3.7/ 12	0.9/ 3	0.90/ 3	7.3/ 24
4	5.5/ 18	0.0/ 0	2.15/ 7	9.8/ 32
3	5.5/ 18	1.2/ 4	0.95/ 3	9.8/ 32

Table 6.2: Traffic Criteria for Design of Roads (LGED)

Design Type	Peak hour maximum passenger car units (PCU)	Daily commercial vehicles maximum (trucks and buses)
8	(90)	50
7	(130)	100
6	(210)	200
5	(290)	300
4	530	600
3	800	

Note: For types, 5, 6, 7 and 8 the criterion should be daily commercial vehicles. For types 3 and 4 criterion should be peak hour PCU's.

The consulting team will be evaluating the traffic demand during peak hours from BEZA by comparing the land area and traffic demand from Dhaka EPZ as BEZA is currently under construction and there is no traffic to and from it at this moment. Afterwards, it will be tested whether the design criteria are satisfied by the traffic demand. If not, then the consulting team will recommend following RHD standards. For demonstration purpose only, in this inception report, RHD standards have been followed to explain the proposed future road network. The final model

will evaluate both RHD and LGED standards by calculating the LOS for various stages of the project and provide a plan to gradually upgrade the standards of the existing road network.

6.3.1 Network Connectivity with BEZA

Interchanges/ Flyovers (marked as dark red circle)

Two flyovers at Baraiyar Hat (Hinguli) and Mirsharai has been proposed to avoid the congestion of these two important intersections.

East-West Highways Connecting Dhaka-Chittagong Highway (RHD Road Type 2a) (marked as dark pink line)

- These roads will connect the Economic Zone (EZ) and the Model Town of Mirsharai with the Highway.
- These roads will be heavily access controlled and North-South local traffic movement will be allowed only at intersections where North-South major highway intersects with these roads.
  The proposed road links are:
    - Baraiyar Hat-Santir Hat-Golaker Hat-Azampur Hat
    - Zorwargonj-Bishu Miar Hat-Osmanpur-Azampur Hat-Murhrighat Bazar-Embankment (Already been proposed by BEZA as access road to EZ)
    - Mirsharai-Mithanala Bhorer bazar-Embankment
    - Khaiyachara-Abu Torab Bazar-Kazir Taluk-Embankment which is now under construction

These all roads will be connected to encircled road of the proposed model town of EZ.

Marine Drive Connection

The existing embankment road is proposed as marine drive road from Mirsharai-Teknaf which is now in under construction.

Rail Road

Proposal of possible rail road connection will be planned after the discussion with Bangladesh Railway Authority.

6.3.2 Network Connectivity within Mirsharai

East-West Highways Connecting Dhaka-Chittagong Highway (RHD Road Type 2a) (marked as blue line)

- These are proposed to connect Mirsharai local traffic to Dhaka-Chittagong Highway
- Also, these routes will be used by the passenger traffic to access EZ of BEZA
  The proposed road links are:
    - Chowdury Hat-Katachara-Julanpur Bazar-Embankment
    - Wahidpur-Domdoma Bazar-Haidkandi-Embankment
    - Boro Darogar Bazar-Kamar Ali Bazar-Samaitir Hat-Embankment

North-South Highways (RHD Type 2a) (marked as medium coral light color line)

- These roads will form artery for the local traffic generated from Mirsharai and destined to various parts of Mirsharai where trip length is high
- Through these roads local traffic will cross the East-West roads connecting Economic Zone.
  The proposed roads are:

- Kamar Ali Bazar-Samaitir Hat-Gozaria Bazar-Anander Hat-Khayer Hat-Kazir taluk-Thakur Hat-Sufia Bazar-Ichak Driver Hat-Shahaje Bazar-Julanpur Bazar-Abur Hat-Bishu Miar Hat-Bangla Bazar-Golaker Hat
- Chaitanar Hat-Chowdhury Hat-Mithanala Bazar-Mithanala Bhorer Bazar-Shadhur Hat-Abu Torab Bazar-Haidkandi Bazar-Kamar Ali Bazar.

East-West Highways Connecting North-South Highways (RHD Road Type 2) (marked as red color line)

- These roads will be connected with the North-South roads to increase mobility of local traffic Proposed links are:
  - Chitanner hat-Abur hat
  - Chowdhury hat-Katachara-Shahaye Bazar
  - Mithanala Bazar-Sufia Bazar
  - Hadi Fakir Hat (opposite side)-Bhuiya hat-Anander hat

6.3.3 Network Connectivity with Tourist Spots

Walkway/Bi-cycle Trail (marked as gray color line)

- A paved walkway or bi-cycle trail (10 feet) has been proposed parallel to the railway track from Mohamaya Lake to Khoiyachhara and other waterfalls so that tourists can easily access the sites and enjoy the beauty of the village site.

2 Lane Undivided Road Connectivity (RHD Road Type 3a) (marked as dark green color line)

- These roads will connect Mohamaya Lake and Khoiyachhara and other waterfalls with Dhaka-Chittagong Highway
- Speed will be limited to ensure the slow movement of vehicles

Figure 6.1: Tentative Future Road Network of Mirsharai Upazila

7 TRAFFIC SURVEY DESIGN

The objectives of the traffic survey are two folds. *Firstly*, it provides idea about the existing traffic demand available supply in the form of infrastructure and services. *Secondly*, it acts as the input for the travel demand forecasting model that is to be constructed as the output of the project which will enable UDD to analyze various traffic scenarios with respect to changed network as well as land use scenarios. The following sub sections elaborate the survey requirements along with the survey design.

7.1 Survey Requirement and Types

According to the TOR, the consultant team will be responsible to construct a 20-year prediction model for transportation of the project area. A simple four-step travel demand-forecasting model will be constructed with the survey data that will determine the travel demand on the future road network of Mirsharai Upazila.

To estimate the future traffic demand on the future road network of Mirsharai the following surveys will be conducted:

PRODUCTION-ATTRACTION SURVEY

This will comprise production from the households' daily trips survey and attraction to the commercial land use and will contribute to the trip generation.

TRAFFIC COUNT SURVEY

The traffic count reflects the base year demand in terms of categorized traffic volume.

ORIGIN-DESTINATION (OD) SURVEY

The OD facilitates identifying final Traffic Assessment Zones (TAZ), demand for different external and internal zones, as well as directional distribution at different intersections.

TRAVEL TIME SURVEY

The travel time study produces the generalized travel cost matrix and determines the shortest routes for different OD pairs.

STAKEHOLDER INTERVIEW

The stakeholder interviews involves stakeholders from different concerned entities, the community truck, bus and UCMs, assisting in identifying the transportation modes and the users of the proposed road network. This will enable in designing future transportation network as well as services around this network which can be constructed, operated and maintained sustainably.

These surveys will input in different steps of the travel demand model in the following manner:

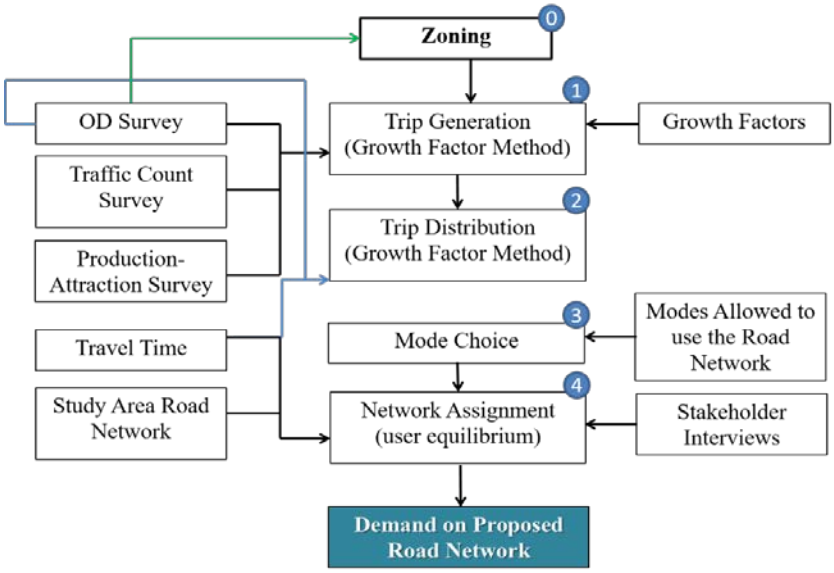


Figure 7.1: Flow Chart of Steps of Travel Demand Forecasting

7.2 Methodology of the Surveys

The methodology adopted for the surveys to be conducted are characterized by the properties of the existing roads and traffic, and will be as follows:

7.2.1 Production-Attraction Survey

For the survey, the study area is to be divided into a number of zones (internal TAZ).

Production Survey will be done mainly by the interview on households. The interviews will concentrate on the daily trip behavior- average travel time, mode choice behavior, cost of travel, time of travel including the basic information such as no. of family members, age, gender, income level etc. The sample size for the survey will be 20 to 30 families randomly chosen in each Zone.

Attraction Survey will be carried out focusing on the commercial activities within each zone. The commercial places of interest can be large farms, industries, offices/ business institutions, growth centers etc. For this particular study area, the proposed EZ and the tourist spots are major points of attraction. The survey will incorporate the factors like floor space, location, number of attracted people etc.

7.2.2 Traffic Count Survey

External Traffic Count

This will be executed at the entry-exit points of Mirsharai Upazila and shall be located on the roads providing national/ regional connectivity. This count will be done for 8 hours, divided into peak and off peak hours, at each location based on RHD vehicles categories. The results will be compared with the RHD counts at similar locations and the 8 hour count data will be projected into 24 hour count data.

Internal Traffic Count

This count will be done at major intersections within the study area at peak of the day and for 2 consecutive hours. Since the internal routes lack private vehicles and large ones such as Bus, Trucks, Lorries etc. the survey will concentrate mainly on unconventional modes/ para transit

vehicles, NMVs etc. The reconnaissance survey revealed that there is almost no presence of private cars on the local roads though a substantial number of motorcycles were observed.

7.2.3 Origin-Destination Survey

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. The information that are collected from the OD survey are: land use of the zones of origin and destination, household characteristics of the trip making families, time of the day when the journeys are made, trip purpose and mode of travel. Origin is the place where trip begins and destination is the place where trip ends.

For the purpose of the project, External and Internal OD Surveys will be undertaken at the same survey stations as that of the External and Internal Traffic Count Surveys. The duration and vehicle category for the surveys will be also matching with the count study. Text books recommend that in case of the External OD Survey, the data is to be collected stopping every 10th vehicle of each category which will enable the modeler to have access to information on 10% of the flow data. However, considering the large volume and speed of traffic on national and regional highways, the consulting team understands that it may not be possible to stop more than 5% of the traffic on busy Dhaka-Chittagong highway. However, 10% sample size may be achieved for the regional highways, such as, R151 (Baraiyerhat-Karerhat-Heako-Narayanhat-Fatikchhari (Haidchokia) Road) and Z1021 (Mirsarai-Fatikchhari (Narayanhat) Road). On the other hand, 10% of the passing traffic during the Internal Count Survey will be interviewed for Internal OD Survey. It was noticed during the reconnaissance survey that the internal count sites mostly have CNGs and other unconventional modes of transport along with NMVs and motorcycles. Also, it was noticed that most of the CNGs operate as para transits where a group of people will ride them having same trip OD. These such vehicles will be directly interviewed and their occupancy will be counted. The following figure shows a sample OD survey setup.

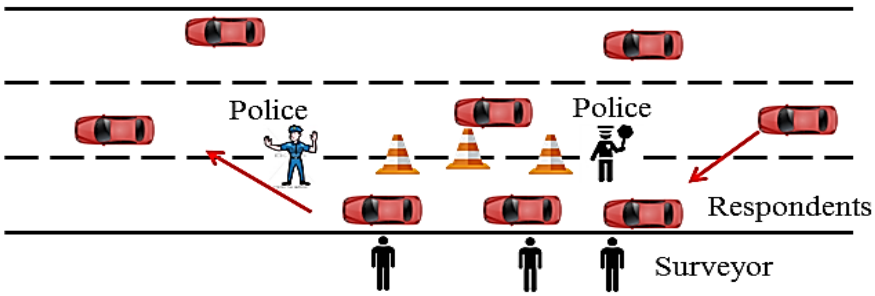


Figure 7.2: Sample O-D Survey Setup

7.2.4 Travel Time Survey

A number of major routes will be selected for the survey and the survey will be conducted following the 'Average car technique'; where vehicles (typically a commonly available sedan car) having PCU value equal to 1 are driven through the traffic stream at average speed and travel time for each link of each route are calculated. The following steps will be followed during the survey:

The steps followed were as follows:

- For each route, each day one passenger car will be dispatched from one end of the route at specified time.
- Drivers will be instructed to drive at the speed of the average traffic stream.

- Each route will be divided into nodes (nodes may be intersection or specific landmarks) and links (section between two intersections or landmarks), or only route will be considered to find out continues travel time depending on the circumstances.
- Drivers will be presented with printed sheets containing the names of the nodes and instructed to note down the time 'after' crossing each node/note down the time traveling the entire route.
- Drivers will be instructed to ensure that they will not make any stops while traversing a route. All stops for re-fueling, refreshment, etc. will be performed after the driver have been reached one end. Special arrangements will be made with gas stations to ensure that the vehicles do not have to queue to refuel.
- Each route will be covered once (working days only) and the study period will be fixed by the consultant.

7.2.5 Stakeholder Interviews

From the preliminary reconnaissance, it was apparent that the following stakeholders are required to be consulted to prepare an acceptable sustainable transportation system. Apart from UDD, the client, the name of the stakeholders along with their power and potential are listed below:

- **RHD:** The Project is dissected into several areas by Dhaka Chittagong highway as well as regional roads connecting Khagrachari, Fatikchari or regional roads under construction to be connected to the proposed Economic Zone. Hence, any modifications recommended for these roads are to be proposed after consultation with RHD.
- **LGED:** The local roads in Mirsharai are now under the jurisdiction of LGED. The Project is expected to propose several modifications on these roads, which includes, expansion, intersection treatment, pavement quality improvement, better connectivity with RHD roads, etc. The consulting team has explored the road design guidelines by both LGED and RHD and feels that some of the proposed network changes may require upgrading LGED roads to RHD standards. Hence, discussion with both RHD and LGED will be required.
- **Bangladesh Railway (BR):** Two projects of BR has been under construction in Mirsharai Upazila namely:
    - Construction of 61 kilometer double line between Laksham-Chinki Ashtana, Mirsharai: The main objective of this sub project is to increase the line capacity of Laksam-Chinki Astana section for efficient train operation and to meet fast growing freight and intercity passenger traffic.
    - Modernization of 11 stations' signaling system in between Chinki Astana, Mirsharai-Chittagong: This project includes Design, Supply, Installation, Testing, and Commissioning of Computer based Interlocking Color Light Signaling System and Related Works & Services at eleven (11) Stations of Chinki Astana-Chittagong Section.

  The Consultant team will discuss with BR authority for more information regarding their plans.

- **Pourashavas and Wards:** Mirsharai Upazila is composed of 2 Pourashavas- Mirsharai and Baraiyarhat; and 18 wards. It is important to discuss and coordinate with the Pourashava Authorities before planning the transport system with the proposed integrated road network for the study area. In addition, their support will be needed in preparing the master plan of their jurisdiction areas and they are the stakeholder who need to be well informed about the traffic surveys in order to obtain local support as much as possible. The mayors and their subordinates have already declared their willingness to cooperate their level best during execution of the survey and that can assure all logistic supports such as Land Acquisition etc. required for construction of new roads and widening of the existing. In the previous encounter, they have already expressed their points of interest in the existing road network to improve overall

connectivity, mobility and accessibility and have accompanied the consultant team to visit important places within Mirsharai.

- **BEZA:** The proposed Economic Zone is a vital factor in the socio-economic development of the study area. Thus, discussion with the EZ authority, BEZA and their technical team/ consultants is crucial for developing the transport network for Mirsharai. The consultant team will arrange meetings with BEZA HQ and Mirsharai EZ officials to collect basic layout and the number of commercial activities that they will be serving. This will help forecasting the traffic generating from the proposed EZ and include those in the demand model.
- **Department of Forestry:** A major component of the Project is to provide sustainable traffic in the forest area of Mirsharai which is blessed with scenic beauties such as Mahamaya Lake and an array of twelve fountains which have high potential to become major tourist attractions. During the reconnaissance survey, it was understood that the Department of Forestry has major plans in transforming the whole area into a touristic site. The consulting team expects that the tourist spot will attract people not only from outside but also from the housing areas which will be feeding the Economic Zone with workforce. Hence, in order to provide necessary accessibility within the touristic location as well as to and from the tourist location, it is imperative to know about the plans of the Department of Forestry.
- **Parjatan:** Similar information will be sought from Parjatan if they have any short or long term plans to conduct any development projects around the natural habitat of Mirsharai.
- **Local Para transit unions:** It was revealed during the consultation with the city authority during the reconnaissance survey that the CNGs, Easy Bikes and Legunas that operate in the Project site are run by local para transit unions. It is necessary to understand the business model, policy as well as their operational method to represent the existing public transport scenario within the study area. Also, the Project expects to propose public transport solutions for the future years. Therefore, it is necessary to discuss with the local para transit unions.
- **Others:** During the aforementioned meetings, it is not unlikely that some other stakeholders will be identified who have major stakes in the Project. Accordingly, appointments will be arranged and they will be consulted.

7.3 Preliminary Plan for Surveys

In line with the adopted methodology for each survey, the following plan is considered for execution of the surveys:

Production-Attraction Survey

For *Production-Attraction Survey,* the study area has been divided into 16 zones. Other than these sixteen zones the rest of the zones are to be considered as external zones. The zones are as follows:

Zone 1: Karerhat
Zone 2: Hinguli
Zone 3: Dhum
Zone 4: Zorawargonj
Zone 5: Osmanpur
Zone 6: Durgapur
Zone 7: Katachhara
Zone 8: Ichhakhali
Zone 9: Mirsharai
Zone 10: Mithanala
Zone 11: Shaherkhali
Zone 12:Maghadia
Zone 13: Khaiyachhara
Zone 14: Mayani
Zone 15: Wahedpur
Zone 16: Haitkandi

Traffic Count and OD Surveys:

For *External Vehicle Count and OD Surveys,* **four locations** have been chosen to pick the all traffic that enters and exists the Mirsharai from different locations of the country. And for *Internal Vehicle Count and OD Surveys,* **six locations** have been identified to observe the internal traffic movements of Mirsharai Upazila.

Table 7.1: Tentative External and Internal OD and Vehicle Count Survey Locations

External Survey Locations	Internal Survey Locations
Rup Nogor Filling Station	Janata Super Market
Baraiyar Hat Bus Stand	Muhuri Project Road
Stadium/Nasru Medicine Center	Thakur Dighi Bazar
Boro Darogar Hat	Mirsharai Paurashava HQ
	Bara Takiya Bazar
	Sarkar Hat

Note: All these locations are tentative. The Consultant team will finalize the exact locations after the second visit of Mirsharai and after discussing the Project Director.

Travel Time Survey

Furthermore, **seven routes** have been selected for travel time survey. Table 7.2 presents travel time routes showing important landmarks.

Table 7.2: Tentative Travel Time Survey Routes

Route No.	***Route Name (including links and landmarks)***
Route 1	Janata super market-Santir Hat-Golaker Hat-Bishu Miar Hat-Abur Hat-Sattar Bhuiyar Hat- Baman Sundardarogar Hat GC-Sufia Bazar-Kazir Taluk Sameter Hat-Khayer Hat-Anander Hat-Bhuiyan Hat-Shaherkhali Bhorer Bazar GC-Haidkandi Bazar-Kamar Ali Bazar-Boro Daragar Hat
Route 2	Bangla Bazar-Osmanpur road-Azampur Hat-Muhurighat Bazar-BEZA Embankment
Route 3	Intersection of Zorawargonj-Borburia ghat road and Muhuri project road (M. Rahman Store)-Bishu Miar Hat-Azampur Hat
Route 4	Thakur Dighi Bazar-Chowdhuri Hat-Julanpur Bazar-Takerhat-Muhurighat Bazar-BEZA Embankment
Route 5	Mirsharai Paurashava HQ-Mithanala Bhorer Bazar-Sufia Bazar-Baman Sundardarogar Hat GC-Shahaje Bazar-Julanpur Bazar-Takerhat Bazar
Route 6	Bara Takiya Bazar-Abu Torab Bazar-Kazir Taluk Sameter Hat-BEZA Embankment
Route 7	Sarkar Hat-Domdoma Bazar-Haidkandi Bazar-Shaherkhali Bhorer Bazar Growth Center-BEZA Embankment

It is to be mentioned here that during the reconnaissance survey, GPS machine was kept turned on, and on several locations synchronized photos were taken while driving on the routes mentioned above in Table 7.2. During the main survey, similar strategies will be followed and the combined results will be presented.

Figure 7.3 represents the tentative survey locations for traffic count and O-D surveys and the routes for travel time survey in designated colored lines.

7.4 Tentative Survey Schedule

It is evident from the earlier subsections that the survey activities will comprise 5 different types of surveys. However, the vehicle count and OD surveys can be operated at the same locations and same time. For execution of the surveys a 5-day program has been developed keeping in mind the time constraint for the whole assignment. Again, another field visit is planned to finalize the survey design before actually mobilizing the surveyors to field. The next visit will confirm the exact survey locations, logistic requirements i.e.; number of vehicles, number of enumerators and supervisors needed for each station, survey related equipment and facilities they will require etc.

The schedule of the surveys can be as follows:

Sl.	Task	Duration	Day				
			D-1	D-2	D-3	D-4	D-5
1	Preparatory Activities	1 day					
2	Production-Attraction Survey	4 days					
3	External Count & OD Survey	2 days					
4	Internal Count & OD Survey	2 days					
5	Travel Time Survey	3 days					
6	Stakeholder Interview	4 days (intermittent)					

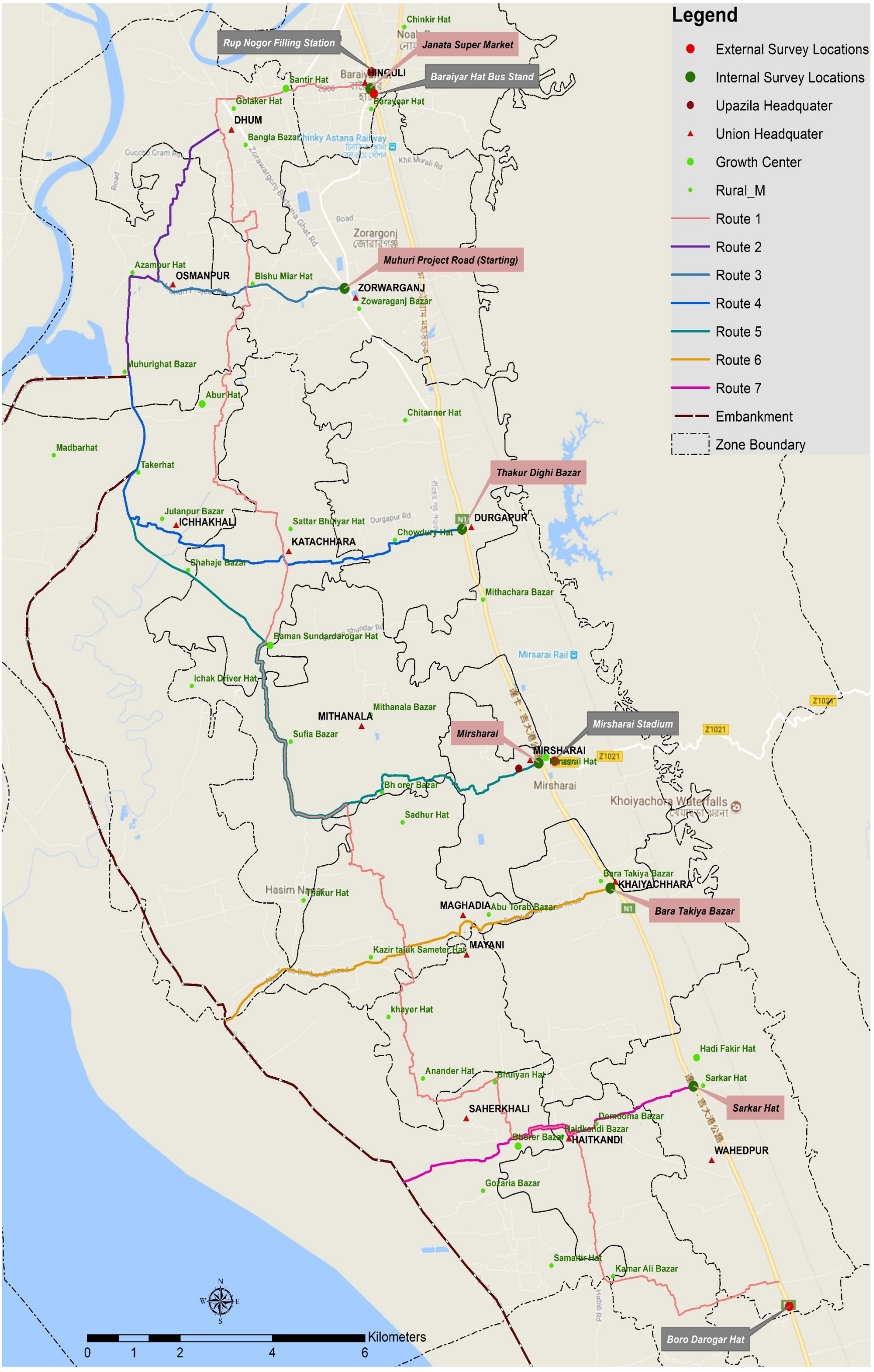


Figure 7.3: Tentative Survey Locations and Travel Time Survey Routes of Mirsharai Upazila

8 NEXT ACTIONS

The consulting team is at present preparing for the onsite survey to accomplish the data collection as outlined in Chapter 7. However, the final dates of the survey will be selected after UDD approves the survey methodology. Arrangement of logistics will be made accordingly. At the same time, the consulting team has already commenced the work of preparing the travel demand forecasting model. The consulting team is using **Citilabs CUBE ver. 6.4.2** to develop the model and in this regard, the consulting team has already coded the network for the existing traffic condition. Once the data are collected, the consulting team will analyze those, convert those to be entered into CUBE format and develop the model accommodating various future scenarios. Also, the survey data will be collated, checked and corrected for preparation of the database and the raw database (full or in parts) data will be submitted to the Client for their review and comments in the form of Interim Report, the next report in line.

9 CONCLUSION

The main purpose of the project is to develop land use integrated new and improved affordable and effective transportation network for Mirsharai Upazila using modern transportation modelling software after a thorough traffic survey carried out in the project area. To fulfill the purpose, Urban Development Directorate (UDD), the Client has taken initiatives and vested DevConsultants Limited (DevCon), Bangladesh with the responsibilities of required consultancy services. On the way of the mission and up to submission of the Mobilization Report, the consultants have finalized the project start up activities, identified the secondary sources for data collection, the stakeholders and ongoing as well as future projects having impact on the study area, conducted reconnaissance survey and carried out meetings with a number of stakeholders in Mirsharai. In addition, a preliminary transportation network has also been proposed combining all these data and information.

Since the submission of the Mobilization Report, the following progresses have been made:

- After submission of the mobilization report, the clients received comments from UDD which substantially assisted in how to move forward. A summary of the comments/ suggestions and the actions taken to address those can be found in Section 6.2.
- The consulting team has conducted a comprehensive literature review on the existing literature and documents which are relevant to the Project. The three major documents which were reviewed include– Seventh Five Year Plan (7th FYP), National Perspective Plan and Sustainable Development Goals (SDGs). Excerpts from these reports that were directly related to the Project were summarized and presented.
- The consulting team has prepared a comprehensive list of available secondary data to be useful to the Project along with mentioning their sources. Based on that, the further survey requirements were identified and justified.
- The consulting team has identified the types of survey required for the travel demand forecasting model, determined the location of survey and proposed the methodologies to be followed for each of the study.

In Chapter 8, the direction in which the Project will move forward is also laid out.

Appendix A: Notes of the Consultation Meetings

Notes of Start-up Meeting with Project Director (MUDP), UDD

Location: Urban Development Directorate (UDD) HQ, 82, Segunbagicha, Dhaka- 1000.
Date & Time: Wednesday, November 22, 2017; 11:00 am

Present:

Ahmed Akhtaruzzaman, Project Director (MUDP), UDD
Ahsan Habib, Asst. Planner & PM (MUDP), UDD
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) This was the first meeting that took place between the UDD officials and the team members of DevCon, thus the participants of the meeting introduced themselves.

2) The Project Director, Mr. Akhtaruzzaman briefly described the nature of the project, its goal and UDD's approach towards the MUDP. He also pointed out the development opportunities of Mirsharai Upazila considering the two important aspects of (i) Economic Zones and EPZ those are being constructed by BEZA and BEPZA; and (ii) Tourist Spots on the South-Eastern part of Mirsharai.

3) With the help of a printed GIS map of Mirsharai and the road network map LGED, PD identified the access road to the EZ sites that is already under construction by RHD along the Abu Torab Bazar road previously owned by LGED. He also added that this alignment has some drawbacks such as:
   - The has a number of sharp bents since the road is being constructed on the same alignment as that of the previous, it will reduce driving comfort, increase chances of accidents and limit the average speed of vehicles
   - An important canal is being filled up for the construction of the road, which will in turns cause drainage problem in the surrounding area,
   - The alignment passes through an important marketplace (Abu Torab Bazar) and thus there will be traffic congestion on the access road near the built up area; this will result in a long travel time.

   Considering the above, Mr. Akhtaruzzaman emphasized on proposing alternative access routes to the Economic Zones

4) The PD asked the consultants to exploit all possible options and propose a multi-modal transport network for the study area with both improved local and regional connectivity; taking into account the rail connectivity, waterways and even MRT. He also mentioned a direct connectivity from the EZ sites to Shonagazi, Feni can be established.

5) The consultants were asked to visit the tourist spots and propose better access to the spots and direct connectivity in between different ones, and innovative but practical ideas for introduction of modern facilities for tourists such as safety for hiking, ropeway etc.

6) The PD also sought solution for keeping road transport operational within the Mirsharai city area during the recurring seasonal flush floods.

7) The consultant team members shared the reconnaissance tour program with UDD counterparts when Mr. Ahsan Habib discussed the consultants about the important checkpoints (of Mirsharai) to visit during reconnaissance, make arrangement for logistic support (including issuance of letter) and initiated communication with one of the Mayors and the local representatives of UDD in Mirsharai who would assist the survey team in field.

8) At last, the PD requested the consultant team members to arrange a demonstration of the Transport Modelling Software that will be used in this project.

Notes of 1st Meeting with UDD Officials in Mirsharai Office

Location: MUDP Project Office (UDD), Mirsharai.
Date & Time: Saturday, November 25, 2017; 11:00 am

Present:

Md. Saifur Rahman, Planner, UDD
Md. Monir Hossain, Nokshakar
S M Saidul Islam, Nokshakar
Md. Shahinur Rahman, Nokshakar
Md. Nazrul Islam, Nokshakar
Renu Miah, Rekhakar
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) The Team Leader (TL) introduced the team with the UDD local representatives and started the meeting,

2) Using the maps already prepared in consultant's Dhaka office, the TL discussed purpose of the reconnaissance field visit and places to visit to obtain the remarks and suggestions from the local staff,

3) The UDD officials shared their views regarding the field visit and recommended important locations to visit and helped fine tune the tour program. They also assigned two persons- Mr. Monir and a local volunteer to be with the team and provide all necessary logistic support and guidance throughout the tour.

4) It was also assured that the traffic survey team during the thorough field surveys would get local community support as much as needed, and introduced the team with the Co-founder of the 300-member strong local student association, USAM.

5) On request of the TL and as per earlier instruction of the PM (UDD), Mr. Ahsan Habib; Mr. Saidul Islam arranged an appointment with the Honourable Mayor (Mirsharai Pourashava) Mr. Gias Uddin at the day's end.

Notes of Meeting with USAM (University Students Association of Mirsarai)

Location: MUDP Project Office (UDD), Mirsharai.
Date & Time: Saturday, November 25, 2017; 11:30 am

Present:

Md. Nahid Mahamood, Co-founder, USAM
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) Mr. Nahid, the Co-founder of University Students Association of Mirsharai introduced himself with the transportation consultants and briefly described the visions & activities of their group.

2) Upon sharing the purpose of the reconnaissance, Mr. Nahid confirmed that as a local resident of Mirsharai, he can take the team to all the sites to visit within the available time and suggested the best route plan for the visit.

3) The TL briefed about the nature and extent of the traffic surveys to be carried out under the Package-4 assignment and asked how the local community could assist in that. In response, Mr. Nahid mentioned their association has 300 active members ready to provide any voluntary field support during the surveys and being students of various universities and colleges, they could also take part in the survey activities as well.

Notes of Meeting with Mayor, Mirsharai Pourashava

Location: Mirsharai Pourashava Office, Mirsharai.
Date & Time: Saturday, November 25, 2017; 4:00 pm

Present:

Md. Gias Uddin, Hon. Mayor, Mirsharai Pourashava
Ward Councillors of 2 wards
Sub-inspector, Mirsharai Thana
Md. Monir Hossain, Nokshakar (UDD)
S M Saidul Islam, Nokshakar (UDD)
Md. Nahid Mahamood, Co-founder, USAM
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) The Mayor in spite of his other activities managed time for the meeting with the consultant team and a number of other important city persons were present in the discussion. The formal introduction was done by the UDD representatives present in the Mayor's office.

2) The Team Leader shared his observations after visiting various places of significance within the Mayor's jurisdiction and most importantly the EZ sites. After that, he sought suggestions from the Mayor for possible road network improvement and his visions regarding Mirsharai.

3) In response, the Mayor had the following remarks:

- The proposed access road from Bar Takiya towards Mirsharai EZ may create huge traffic congestion in the area. Also, there are 4 large/ small markets/ GCs which will understandably be affected due to widening of the road. Again, the zigzag geometry of the road creates difficulties. Moreover, the existing canal, which contains the floodwater, is being filled up. Instead of the extension of this road Mayor proposed to extend road Mithachara to EZ via Baman Sundar Hat GC. He also added that the surrounding area of that alignment is mostly vacant- devoid of any notable development and will not require much resettlement work and land acquisition is very much possible to widen the road up to 100 feet.
- The Fatikchhari road (Z1021) from Mirsharai is too narrow and encroached by bazars, shops and residential buildings. These developments are mostly in unplanned, which makes the situation worse. Moreover, this is the only road toward the Fatikchhari. Mayor has the interest to widen this existing road and improve the connectivity between two Upazilas.
- It is very significant to widen and straighten the RHD regional road R151 (Hinguli-Kararhat-Ramgarh Rd.) which connects the Ramgarh Land Port and there are about 42 nos. of bridges that need to be rehabilitated or reconstructed.
- There is a proposal of construction of a new canal from Mohamaya lake towards the EZ that is waiting for the ECNEC approval
- The area under his jurisdiction especially Ward nos. 11, 12 and 13 suffer from flooding and waterlogging; the Mayor required solutions to solve the problem and stated that the roads within this area need to be raised.
- In reply, of the TL's query, the Mayor mentioned about an available space for possible terminal of the public transports.

4) The Team Leader noted all the comments from the Mayor and promised to evaluate these options while planning the road network for Mirsharai.

5) The meeting ended with a nice arrangement of Lunch by the Mayor and followed by photo session and tea.

Notes of Discussion at Mohamaya Eco Park, Mirsharai

Location: Mohamaya Eco Park, Mirsharai.
Date & Time: Sunday, November 26, 2017; 10:00 am

Present:

Md. Gholam Kabir, Forest Beat Officer, Forest Department
Tour Operator, Mohamaya Eco Park
Representatives of BWDB
Person in-charge, Parking Area, Mohamaya Eco Park
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) Mr. Kabir, representative of the Forest Department took the team to points of interest within the Eco Park and briefed about different facilities like food, accommodation, connectivity, recreational activities etc. for the tourists.

2) It was noted that the recreational activities such as boating, kayaking, fishing, kayaking etc. including the parking area; are leased to private parties on yearly basis. The leasing is done and managed by the Department of Forest. However, the rates for the tourists vary from season to season and are different for the local indigenous people living nearby.

3) The local representatives of the BWDB stated that the lake's discharge is controlled by a sluice gate built and operated by BWDB, and there are boats reserved for the department which the survey team could use if required.

4) The FBO also mentioned that there is a proposal for development of the Mohamaya Eco Park submitted to ECNEC for budget allocation which will comprise various touristic facilities improvement such as Ropeway, Cable car, Cottage etc.

5) The parking area in-charge told the team that the Eco Park has insufficient parking facility. During the off season the tourist cars are limited but during the season, it is multiplied many times and they cannot accommodate all the vehicles coming to the spot. The surplus vehicles then take place in the access road which is also very narrow and create congestion.

Notes of Wrap up Meeting at UDD Field Office, Mirsharai

Location: UDD Field Office, Mirsharai
Date & Time: Sunday, November 26, 2017; 12:30 pm

Present:

Md. Saifur Rahman, Planner, UDD
Md. Monir Hossain, Nokshakar, UDD
S M Saidul Islam, Nokshakar, UDD
Md. Shahinur Rahman, Nokshakar, UDD
Md. Nazrul Islam, Nokshakar, UDD
Renu Miah, Rekhakar, UDD
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) The reconnaissance survey team was invited for lunch to the MUDP Project Office at Mirsharai, and a short discussion took place following lunch.

2) The Team Leader shared his observations from the reconnaissance up until then and briefed the UDD officials about the next actions and preliminary planning for the traffic survey. He also sought their assistance when the team visits Mirsharai next for detailed planning and surveys. In addition, he expressed the need for an office and housing space for the survey supervisors and enumerators to visit Mirsharai for survey purpose.

3) Mr. Saidul and Mr. Monir confirmed that they will assist in finding a rental accommodation for office and housing in the earliest and that they will arrange for any local support and logistics, which might be required during execution of the traffic surveys.

4) Mr. Monir then arranged an appointment with the Mr. Foyz Ahmed, Secretary to the Mayor of Baroiyar Hat Pourashava with the Mayor not being at the station.

5) The discussion ended with tea and handshakes.

Notes of Meeting with Baroiyar Hat Pourashava

Location: Baroiyar Hat Pourashava Office, Mirsharai
Date & Time: Sunday, November 26, 2017; 3:00 pm

Present:

Mr. Foyz Ahmed, Secretary to Mayor
3 nos. of other staff of the office
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) The meeting was brief and started with a formal introduction among participants. Mr. Foyz greeted the team with snacks and tea and started the discussion.

2) As the Team Leader described the nature and objectives of the assignment, the Secretary shared his following remarks in accordance with the vision of his Mayor:

- The regional road (R151) is desired and proposed to be widened up to 4 lanes to accommodate higher volume of traffic when the land port and the EZ are fully operational
- A Flyover is envisioned across the Hinguli intersection carrying the traffic from the EZ towards the land port in Ramgarh
- Two options could be there for accessing the EZ sites; which are (i) Hinguli-Santir Hat-Dhum-Azampur Hat-Muhurighat Bazar-EZ Embankment; and (ii) Zorwarganj-Bishu Miar Hat-Azampur Hat-Muhurighat Bazar-EZ Embankment
- A 247 crore worth project is already in place for establishing direct connectivity with Noakhali over the sluice gate through Shonapur Road which will reduce 50km of distance to that if the highway is taken
- Widening is required for the municipal (LGED) roads to eradicate traffic congestion
- The Zorwarganj-Borburia Ghat Road can be reconstructed and made operational with a bridge across the river Feni to connect with the national highway bypassing the Hinguli intersection, Santir Hat and Baraiyar Hat GCs.

3) The Team Leader took notes of the comments from the secretary and promised to consider all these options while planning.

Notes of Tea Stall Meetings

Location: Various locations, Mirsharai
Date & Time: November 25-26, 2017; 10:00 am-3:00 pm (intermittently)

Present:

Local people at different locations, Mirsharai
Md. Monir Hossain, Nokshakar, UDD
Md. Nahid Mahamood, Co-founder, USAM
3 nos. of other staff of the office
Dr. Moinul Hossain, Team Leader, DevCon
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) The UDD officials took active part in setting up the discussions and briefed the locals about the MUDP Project after introducing the consultant team.

2) These meetings held at various locations of the existing road network with local people as available.

3) The output of such discussions were mainly key information regarding nearby growth centres, markets, available modes of transport and other important places for the road network.

4) The local people shared the facilities they already enjoy and the problems encountered in road communication.

5) The Team Leader welcomed the demands of the public regarding the improvement of the transport facilities.

Notes of Follow-up Meeting with Project Director (MUDP), UDD

Location: Urban Development Directorate (UDD) HQ, 82, Segunbagicha, Dhaka- 1000.
Date & Time: Wednesday, December 13, 2017; 12:00 pm

Present:

Ahmed Akhtaruzzaman, Project Director (MUDP), UDD
Ahsan Habib, Asst. Planner & PM (MUDP), UDD
Yarun Nesa Khanam, Asst. Planner (MUDP), UDD
Sultana Razia, Transport Survey Supervisor, DevCon
Hamim Ahmed, Project Coordinator, DevCon

1) The Project Director, Mr. Akhtaruzzaman shared his remarks on the submitted '*Mobilization Report*'.

2) In case of road design standard, the PD said that the study area has both jurisdictions (roads) of both LGED and RHD. The tentative road network outlined in the report is mostly under the jurisdiction of LGED. So he suggested the consultant team to consider the LGED road standard as well for network design. If it is necessary to follow the RHD standard then the consultant team must discuss with LGED and later propose a logical road design standard for Mirsharai.

3) The PD discussed with the team about the future land use provisions alongside the future road network and improved land use of the contained (pocket) areas in between old and new alignments.

4) In Chinki Astana railway station more passengers and goods are loaded and unloaded than Mirsharai. So, PD asked the team to exploit all possible road connectivity to the tourist spots from the station. He also inquired about how the tourist spots can be accessible for aged persons and what facilities can be provided for them.

5) BEZA proposed a railway connectivity to EZ through the Bara Takiya. PD asked the consultant to study the feasibility of the connection. He also told the team to consult with BEZA and BR about their future plans for Mirsharai.

6) As Mirsharai is close to the Bay of Bengal, it should be ensured through the plan that people can easily access the sea beach at the toe end of the EZ Site and necessary road connectivity should be provided during the planning.

7) PD also suggested that the linkage between BISIC and EZ must be ensured in future road network plan.

8) Honourable Prime Minister of Bangladesh, Sheikh Hasina, promised that a Tourism City will be developed by centring the Mohamaya Lake in Mirsharai. PD asked consultant team to design future road network for tourist spots considering this vision for tourism development.

9) Mr. Akhtaruzzaman, PD, said that major regional connectivity should be shown in a map.

10) PD also asked the consultant team to find out, after reviewing all policies and proposals of different government plans and projects, all the gaps of existing road network and those estimated in different sectoral development plans. He also told to review the study report on *"The Bay of Bengal Industrial Growth-Belt (BIG-B) Initiative, JICA"* for better understanding of the regional and national connectivity with the Mirsharai.