Bangladesh

Roads and Highways Department

Project Information Memorandum

Improvement of the Hatirjheel-Rampura-Bonoshree Ideal School and College-Sheikherjaiga-Amulia-Demra Highway into 4-lanes (including link to Chittagong road intersection and access to Tarabo) through Public Private Partnership



February 2018

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This Project Information Memorandum (“PIM”) has been prepared by the Asian Development Bank (“ADB” or "Transaction Advisor") on behalf of and in consultation with the PPP Authority of Bangladesh (“PPPA” or "PPP Authority")) and the Roads and Highways Department (“RHD”) of the Ministry of Road Transport and Bridges of Bangladesh ("MRTB"). PPPA has engaged ADB to serve as the Transaction Advisor to PPPA and RHD in the development, structuring and tendering of the Improvement of the Hatirjheel-Rampura-Bonoshree Ideal School and College-Sheikherjaiga-Amulia-Demra Highway into 4-lanes (including link to Chittagong road intersection and access to Tarabo) through Public Private Partnership (”RAD” or the “Project”).

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Purpose of this Project Information Memorandum

The purpose of this PIM is to provide preliminary information to potential investors, contractors and financiers in respect of the proposed Project, and to solicit comments and feedback on key Project issues, the bid process and timing for the selection of the preferred bidder to implement the Project.

The feedback from this preliminary information and subsequent consultations with potential investors, contractors and financiers will help inform PPPA, RHD, and the Transaction Advisor in finalizing the terms of the Project structure and the timetable for the tender process.

Prospective investor, contractor and financier feedback is actively encouraged. In particular, PPPA and RHD are keen to receive investors', contractors' and financiers' thoughts and feedback on the following areas:

(i) Interest in participating in the Project;
(ii) Risks and concerns associated with the Project; and
(iii) Manner and timetable for the competitive tender process.

Executive Summary

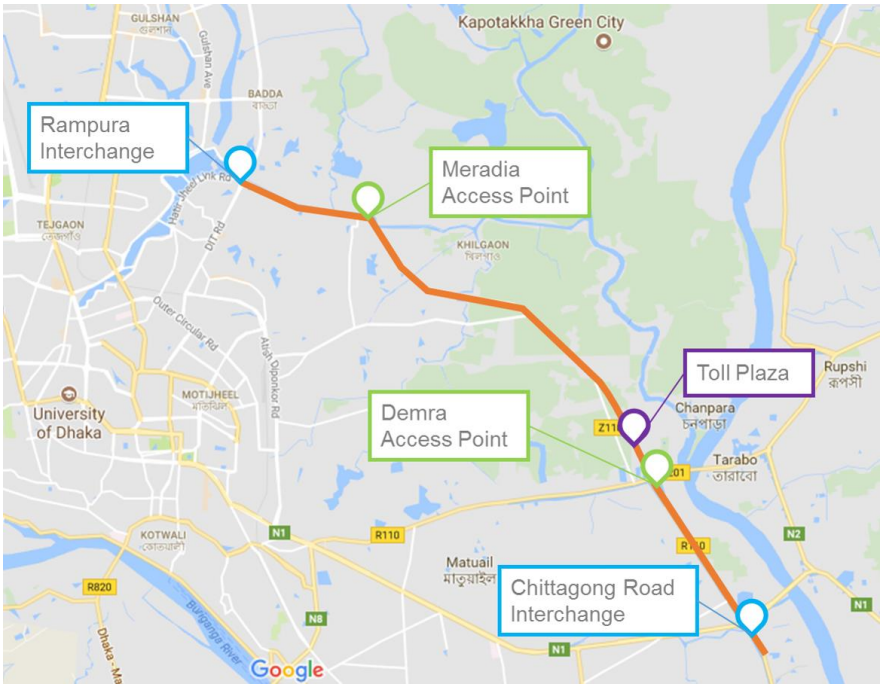
The Opportunity

With over 160 million people and a total land area of only 150,000 km^2, Bangladesh is the most densely populated large country in the world. Dhaka itself is the third most densely populated city in the world, with a population of 17 million people in the Greater Dhaka Area. Traffic in Dhaka has increased by 130% over the last decade. According to the IMF, Bangladesh's economy is one of the fastest growing major economies of 2016 in the world, with a rate of 7.1%.

The RAD is a key element of RHD's strategy for reducing congestion in Dhaka and providing connectivity between the city center and major inter-city highways to the eastern regions of Bangladesh, including to Chittagong and Sylhet which serve as major trade gateways for the country.

The 13.5-km access-controlled expressway that will comprise the RAD will make use of an existing road and will start at Chittagong Road (National Highway N1) and ends at Hatirjheel near Rampura Bridge Road (Figure 0.1). Based on a feasibility study conducted by WSP / MMM Group Limited of Canada ("MMM") on behalf of the PPPA and RHD ("Feasibility Study"), construction of the Project is expected to cost approximately 262 million US dollars. The access-controlled expressway will be partially elevated and partially at grade and will include two interchanges, one at each end of the road, and one or two intermediate access points.

Figure 1: Map of RAD Project



Given the significant level of traffic that is likely to be attracted to this route from the congested national highways N1 and N2, RHD has proposed that this Project is developed under the public private partnership ("PPP") model. The Project has been screened by the PPP Authority and received in-principle approval from the Cabinet Committee on Economic Affairs ("CCEA") on January 26, 2016.

RHD will invite interested private sector parties to pre-qualify for the opportunity to design, build, finance, operate and maintain the RAD. A compelling opportunity exists for leading consortia to:

- Provide a much-awaited road to relieve the congestion of traffic entering Dhaka, by developing a 13.5-km access-controlled expressway connecting National Highways N1 and N2 to the city center.
- Capitalize on Bangladesh's economic and urban growth by providing critical connectivity infrastructure for the country.
- Establish an early presence in Bangladesh's pipeline of PPP road projects.

Investment Highlights

Project is a high priority for Government of Bangladesh

- The Project received approval from the CCEA, chaired by the Prime Minister, to be implemented as a PPP on January 26, 2016. It is part of the PPP Authority's pipeline of key infrastructure projects for the country.
- The Government of Bangladesh ("Government") is focused on bringing bankable PPP projects to the market and has committed to provide adequate Government support to mitigate key risks and support the Project financially.
- The Project provides connectivity between the center of Dhaka, the fastest-growing megacity in the world[1], and Bangladesh's national highways N1 and N2. In addition, planned projects, including the upgrading of the Dhaka Bypass (under procurement) and the construction of the Dhaka-Chittagong Expressway (under preparation) are expected to connect with RAD and provide increased reach within Dhaka.
- High traffic projections supported by positive demographic and economic growth prospects. Strong fundamentals are driven by garment exports and rising private consumption.

[1] Source: World Bank, Dhaka: Improving Living Conditions for the Urban Poor - Bangladesh Development Series Paper No. 17

Project structure follows international best practices in road PPPs

- To attract the best foreign road developers and operators to Bangladesh, RHD has structured the Project using an availability payment structure wherein the Government takes market risk and makes payments to the Project Company for the provision of services.
- To make the project more attractive to international investors and lenders, the Government is also considering providing additional support to mitigate currency risk.

Limited land acquisition and resettlement needs: GoB already owns over 90% of the right of way

- The proposed alignment of the access-controlled expressway will mostly follow the existing road's right-of-way and almost all of the at grade right of way is already owned by the Government.
- The cost of land acquisition and resettlement will be funded by the Government in accordance with Government regulations and ADB social safeguard policies. Land acquisition and resettlement will be completed before financial close.

Bangladesh has an attractive pipeline of infrastructure and transport projects

- In addition to the RAD and Dhaka Bypass, approved road projects under the Public Private Partnership Programme include the Dhaka-Chittagong Expressway, the Flyover from Shantinagar to Mawa Road, and a second Padma Multipurpose Bridge at Paturia-Goalundo.
- RHD is currently working with PPPA to award the Dhaka Bypass project on a competitive basis. The project attracted interest from 11 potential bidders through its pre-qualification and shortlisting process and is now the subject of a competitive request for proposal process.
- RHD has an extensive track record of delivering complex transport infrastructure projects, including tolled roads and elevated structures. In the 20-year Road Master Plan signed in 2008, RHD committed to a programme of road construction and rehabilitation worth more than US$ 11.5 billion.

Robust PPP legal and institutional framework

- A Policy and Strategy for PPP was introduced in 2010 which improved the regulation of PPP projects and established an Office of PPP to promote PPPs. Subsequently, a PPP Act was enacted in 2015 aiming to facilitate the development of core sector public infrastructure and services.
- The PPP legal framework is considered to be comprehensive and enables a wide range of provisions to mitigate private sector risk[2]. Following the PPP Act, the institutional set-up improved as the Office of PPP became the PPP Authority under the Office of the Prime Minister with responsibilities including appointing advisors, developing and approving PPP contracts and a new PPP unit under the Ministry of Finance who approve Government funding to a PPP.
- A further significant improvement in institutional arrangements followed the Publication of the Procurement Guideline for PPP Projects in 2016, which sets out clear and comprehensive requirements for project preparation documents and clear and streamlined procedures for PPP procurement, including improved transparency of information to bidders.
- This generally supportive regulatory and institutional framework is reflected in the significant number of closed PPP projects including projects in the thermal power generation, social infrastructure, transport and ICT sectors.
- A list of 44 approved projects published by the PPP Authority indicates a promising PPP pipeline, which includes social infrastructure and transport in addition to a number of IPP projects published separately.

Open tender process supported by ADB and other international reputable advisors

- The Project will be procured through a competitive open tender open to international investors.
- The Government is supported by a team of international consultants led by ADB's Transaction Advisory Services team.

[2] Source: ADB, PPP Monitor-Presentation at 2017 ADB Annual Governor's Meeting

I. Background for the Project

A. Bangladesh

The People's Republic of Bangladesh (Bangladesh) is a South Asian country sharing land borders with India and Myanmar. The People's Republic of China, Nepal and Bhutan are also nearby. Dhaka is its capital and largest city, followed by Chittagong which has the country's largest port (carries over 90 percent of the country's sea-borne imports and exports and 1.5 million TEUs containers in 2010-11). With over 160 million people and a total area of only 150,000 km2, Bangladesh is the most densely populated large country in the world. Dhaka itself is one of the world's most populated cities, with a population of 17 million people in the Greater Dhaka Area. It is also the third most densely populated city in the world.

The market-based economy of Bangladesh is the 44th largest in the world in nominal terms, and 32nd largest by purchasing power parity; it is classified as one of the most promising emerging market economies by several independent parties. According to the IMF, Bangladesh's economy is one of the fastest growing major economies of 2016 in the world, with a rate of 7.1%. Dhaka and Chittagong are the principal financial centers of the country, being home to the Dhaka Stock Exchange and the Chittagong Stock Exchange respectively.

Bangladesh has an extensive and diversified transport system of roads, railways, inland waterways, two seaports, and civil aviation facilities. Roads carry over eighty percent (80%) of national passenger traffic, providing the backbone of the transport sector. However, existing infrastructure suffers from under-investment, and congestion within cities (primarily Dhaka and Chittagong, and on major highways) is a major constraint to the country's economic growth.

B. Brief History of Bangladesh's PPP Program

The 2010 Policy established a revised framework for the PPP program and introduced a number of key changes and innovations, including the establishment of the PPP Office which became operational in 2012.

The Bangladesh Public-Private Partnership Act No. 18 of 2015 ("PPP Act") was enacted with a view to facilitating the development of core sector public infrastructure and services on a PPP basis. A key aspect of the PPP Act was to reconstitute the PPP Office into the PPP Authority as an independent statutory organization within the Prime Minister's Office. The PPP Authority's role is to establish a robust policy framework and provide central co-ordination and monitoring for the implementation of PPP projects by Government agencies and ministries. The governance framework for the PPP Authority was also strengthened with the establishment of a Board of Governors, chaired by the Prime Minister.

A further significant improvement in institutional arrangements followed with the publication of the Procurement Guideline for PPP Projects, 2016 ("PPP Guideline"), which sets out clear and comprehensive guidelines for the identification and preparation of projects by the relevant Government agencies and for the procurement of PPP projects, on a transparent, and fair basis.

Attributable in large part to these concerted efforts of the Government and the PPP Authority to establish a transparent and robust legal framework for the implementation of PPP projects, the Government has successfully implemented PPP projects in the social infrastructure, transport and ICT sectors. Bangladesh's PPP project pipeline has now grown to forty-four projects with an estimated capital value of over fourteen billion US dollars spread across multiple sectors. More than half the value stems from the RHD and the MRTB. Consequently, the country now has a strong pipeline of road PPP projects to develop in the coming years.

C. The Grantor – Roads and Highways Department of the Ministry of Roads and Bridges

The Roads and Highways Department (RHD) was created in 1962 when the old 'Construction & Building organization was split into 2 separate bodies (the other being Public Works Department). RHD is responsible for the construction and the maintenance of the major road and bridge network of Bangladesh. Since the Department was established the size of the major road network in Bangladesh has grown from 2,500 kms to the present network of 20,866.36 kms. Bangladesh's Road Program

RHD and ADB are currently cooperating in the implementation of the South Asia Sub-regional Economic Cooperation (SASEC) program that promotes regional cooperation in the transport, trade facilitation, and energy sectors between Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka. The following road projects in Bangladesh are part of the SASEC: (i) completion of Dhaka–Chittagong National Highways (N1); (ii) Construction of new four-lane Katchpur, Megna, and Gomti Bridges (N1); (iii) Construction of the new Padma Bridge and immediate approach roads (AH1); (iv) Four-laning of roads between Benapole and proposed new Padma Bridge (AH1); (v) Four-laning of Joydevpur–Elenga–Hatikamrul–Rangpur–Burimari and/or Banglabandha National Highway (N4, N5); (vi) Four-laning of Dhaka (Katchpur)–Narsingdi–Sarail–Sylhet–Tamabil National Highway (N2) (vii) Four-laning of Paturia–Nabinagar; and (viii) Construction Dhaka–Chittagong Expressway. N1 and N2 are roads that connect to RAD, with RAD providing direct connectivity between these roads and central Dhaka.

II. The Project Site

A. Overview of the Existing Road

Existing Carriageway & Geometrics

The existing road is a standard two-lane highway (two lanes of 3.65 m width each) with earthen shoulders on either side. In general, the horizontal and vertical alignment is satisfactory except for some sections such as at Staff Quarter (Km 3+00) and near Ideal School where improvement to the existing horizontal alignment is required. The right-of-way is not demarcated. There is significant industrial activity in the section from Staff Quarter to N1 highway. There are different pavement cross-sections along the existing road.

Cross-roads

There are numerous driveway-type cross-roads along the project alignment that provide access to local residential, industrial, and commercial properties. There are 6 local roads and at least 36 local driveway access roads crossing the project alignment. However, there are numerous unauthorized side-road approaches connecting with the existing road alignment. Most of these access roads will need to be serviced by the proposed service roads of the project. Other than on the regional highway R110, the traffic volume on most of these local access roads is low.

Bridges and Structures

There are two major high-level bridges (each approximately 36 m in length) that provide both the hydraulic opening and also serve as an underpass for local cross-road. There are also two existing box culverts. All structures were found to be in good condition. No major cracks or settlements were visible in the superstructure or substructure.

Existing Geology

The native material is sandy-silt with traces of clay on the northern side of the project corridor. Soil type and gradation appears to be suitable for widening the roadway. The current embankment fill is composed of sandy silt. No visible soil subgrade related failure or settlement is observed. The new embankment fill will however require to be engineered to ensure maximum compaction. Problem with embankment also comes with local access roads, intersections and driveways that are constructed without meeting RHD standards; these will have to be removed.

Existing Pavement

The existing pavement condition varies from good to poor condition. The existing pavement is a 2-lane carriageway with Asphaltic Concrete wearing course. The asphalt layers' thickness

ranges from 50 to 95 mm. The existing pavement base, sub-base, and sub-grade thickness also varies considerably from one section to another. The existing earthen shoulder has been damaged almost everywhere. No major slope stability failure was observed.

B. Overview of Right of Way

The right-of-way of the existing road is owned by the Government of Bangladesh. While the majority is owned by RHD, some sections are also owned by the Bangladesh Water Development Board (BWDB), Dhaka Water and Sewage Authority (WASA), and the Dhaka City Corporation. RHD is responsible for ensuring that the entire project right-of-way will be provided, free and clear, for project use. The cost of land acquisition and resettlement will be funded by the Government in accordance with Government regulations and ADB social safeguard policies and it will be completed before financial close.

The proposed alignment will generate three likely impacts due to land acquisition: (i) loss of assets, including land, residential, and commercial structures; (ii) loss of livelihood and income opportunities'; and (iii) collective loss of common properties. An estimated 484 structures on the proposed alignment will be affected by the project.

Land Acquisition

Preliminary assessments indicate that 25.465 hectares of additional land will be required outside of the existing right-of-way for the road expansion. Most of the land are Government-owned. Privately owned-land will be acquired following Government regulations and ADB involuntary resettlement safeguards to ensure that compensation will be at replacement costs.

Resettlement and Rehabilitation

A structure survey was undertaken which indicates that majority of the structures (54%) are temporary (i.e., made of tarpaulin and bamboo mat). The owners primarily operate small businesses such as selling flowers, fruit, tea and fish. Semi-permanent commercial is the next major category of impacted structures. These are mainly made of tin and wood, including for floors and roofs. The structures are mainly used as car workshops, hotels, and stationery shops. About one fifth of the structures are encroachers or non-tilted occupants. There are also 6 community properties (such as mosques, a majhar, and a school) and 6 government structures (including a food warehouse, a police station, and a fire station). In line with Government policy and ADB involuntary safeguards, the displaced persons will be eligible to compensation at replacement cost for the structures, livelihood restoration support, and other special assistance.

III. Technical Parameters

A. Overview of Technical Framework

This PIM provides potential Applicants with a broad-based perspective of the engineering and traffic-related aspects of the project. The basis for this perspective is the Feasibility Study Report (FSR) prepared by MMM & WSP, as mentioned earlier. Relevant sections of the FSR shall be made available to the pre-qualified Applicants at the RFP stage. The Concessionaire shall prepare the Detailed Project Report (DPR) for the project; however, the minimum technical Project Design and Operation & Maintenance (O&M) performance parameters shall be stipulated in the draft PPP Contract accompanying the RFP document.

B. Conceptual Design

The conceptual design for the RAD Expressway was developed using the baseline information reported in the pre-feasibility study prepared by the RHD. A 2-lane service road (one-way / two-way) was included as an integral part of the design. Where possible, the use of existing the 2-lane facility was made as the service road alignment with necessary modification. All the existing cross-drainage structures including bridges were retained as part of the conceptual design, as part of the service road. Portions of the RAD Expressway were conceptualized as an elevated structure to minimize land acquisition as well as to facilitate free-flow traffic conditions. However, no elevated structure can be built on top of the existing roadway alignment in the section between Hatirjheel and the Ideal School, where the RAD Expressway therefore is at-grade. This conceptual design is a feasibility-level exercise and does not address the design elements that are typically incorporated in a DPR. Lastly, irrespective of the forecast design traffic volume, the number of lanes for the proposed toll facility has been kept at 2-lanes in each direction (i.e. a 4-lane divided highway).

C. Design Standards

Design standards for national roads are defined in Bangladesh (RHD standards cover all aspects of alignment and structures). However, some innovative cross-section design concepts were introduced to minimize the requirement for land acquisition and to create greater safety standards to accommodate higher exposure of truck traffic for the corridor, especially in the selection of median width and the provision of a service road / NMT facility in the at-grade section.

D. Highway Geometry

Key features adopted for the geometric design included improvement of the horizontal alignment where sub-standard horizontal curves exist. Safe sight distances have been

provided for in the design to improve the visibility at the at-grade intersections, for service roads, horizontal/vertical curvatures and bridge locations. Lane configurations have been improved to allow a full access-controlled facility and to provide a safe and free flow of traffic. Some key geometric design elements include the following:

- Acceleration and deceleration lanes
- Service roads at the ground level
- Bus-bays on the service roads
- Pedestrian crossings (overpass/ underpass) in the at-grade section
- Shoulder rumble strips for alerting the driver (for improved safety) in the at-grade cross section
- Wider shy-distances for the elevated structure
- Lighting for the entire corridor
- New Jersey concrete barrier median
- Service road and RAD Expressway segregation with appropriate fencing in the at-grade section
- On-ramp Toll plazas

E. Pavement

The objective of pavement design is to select the most economical pavement thickness and layer composition that will provide a satisfactory level of service for the designed period for the at-grade section as well as the service roads. The conceptual-stage pavement design is based on the survey of the existing road conditions, traffic analysis, available geotechnical and pavement data, available sources of construction materials, recent soil investigation data at or near Shitalakhya Bridge at Narayangonj, and the general geomorphology and hydrology within the project area. General pavement design standards and procedure was as per the "AASHTO Guide for Design of Pavement Structures, 1993"; the design pavement thickness was further cross-checked with the Indian Roads Congress (IRC) "Guidelines for the Design of Flexible Pavements" (IRC: 37-2012). The overlay thickness has been estimated in accordance with the IRC's "Guidelines for Strengthening of Road Pavements using Benkelman Beam Deflection Technique" (IRC: 81-1997). The use of recycled materials from the existing road pavements has been proposed for the service road pavement. Provision of

adequate camber for effective drainage has been made in the pavement design. Stabilized base and sub-base are considered as the alternative to conventional granular bases in this project. The use of modified bituminous binders has also been considered.

The pavement design for the at-grade portion of the RAD are kept consistent (as minimum design standard requirement) with the RHD design standard for the National Highway System. The pavement design standard for RHD regional highways is proposed for the service road pavement. The minimum pavement design for the project is presented in the table below.

Table 1: Minimum Pavement Design

Serial	Layers	Description	Thickness (mm)
01.	Wearing Course		50
02.	Binder Course		60
03.	Bituminous Base Course		80
04.	Aggregate Base Type I	100% MDD CBR > 100%	150
05.	Aggregate Base Type II	98% MDD CBR > 80%	200
06.	Sub-base	98% MDD CBR > 40%	250
07.	Improved Sub-grade	98% MDD CBR > 8%	300
08.	Sand Sub-grade	95% MDD CBR > 8%	300

The pavement design was carried out using the traditional AASHTO method as per the Bangladesh Pavement Design Guide published by RHD in April, 2005. This is based on both the AASHTO design guidelines from the USA and the corresponding ORN 31 publication by the UK's Transport Research Laboratory. A check was then undertaken using CIRCLY which is a multi-layer, linear elastic design method originating in Australia, but which has worldwide application. Due to higher truck volume, the estimated loads of some 149 million ESALs for the main carriageways are well in excess of this value and the method was therefore not applicable.

Designed pavement layers for the service road and the at-grade section of the expressway are presented in the following table.

Table 2: Designed Pavement Layers (Service Road and At-Grade Section)

Design Loading & Pavement Layer	At-Grade Section	Service Road
10-year Design Loading [ESAL x 10^6]	150.0	2.5
DBS - Wearing Course [mm]	50	50
DBS - Base Course [mm]	145	-
Aggregate Base Type I [mm]	225	200
Aggregate Base Type II [mm]	200	-
Sub-base [mm]	225	275
Improved Subgrade [mm]	300	300
Fill Height	Varies	varies

F. Structures

The design standards for bridges in Bangladesh include the RHD Bridge Design Standards and the LGED Bridge Design Manual.

G. Typical Cross-Sections

The typical cross-sections developed for the project for the at-grade and elevated sections of the RAD expressway are presented below.

Figure 2: Cross-section (At-grade Section)

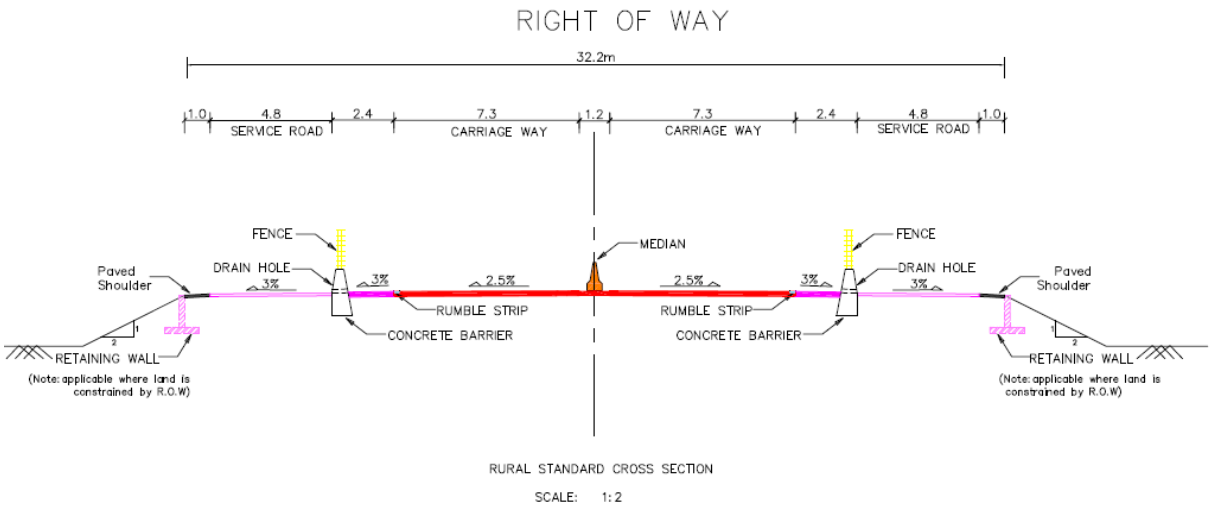
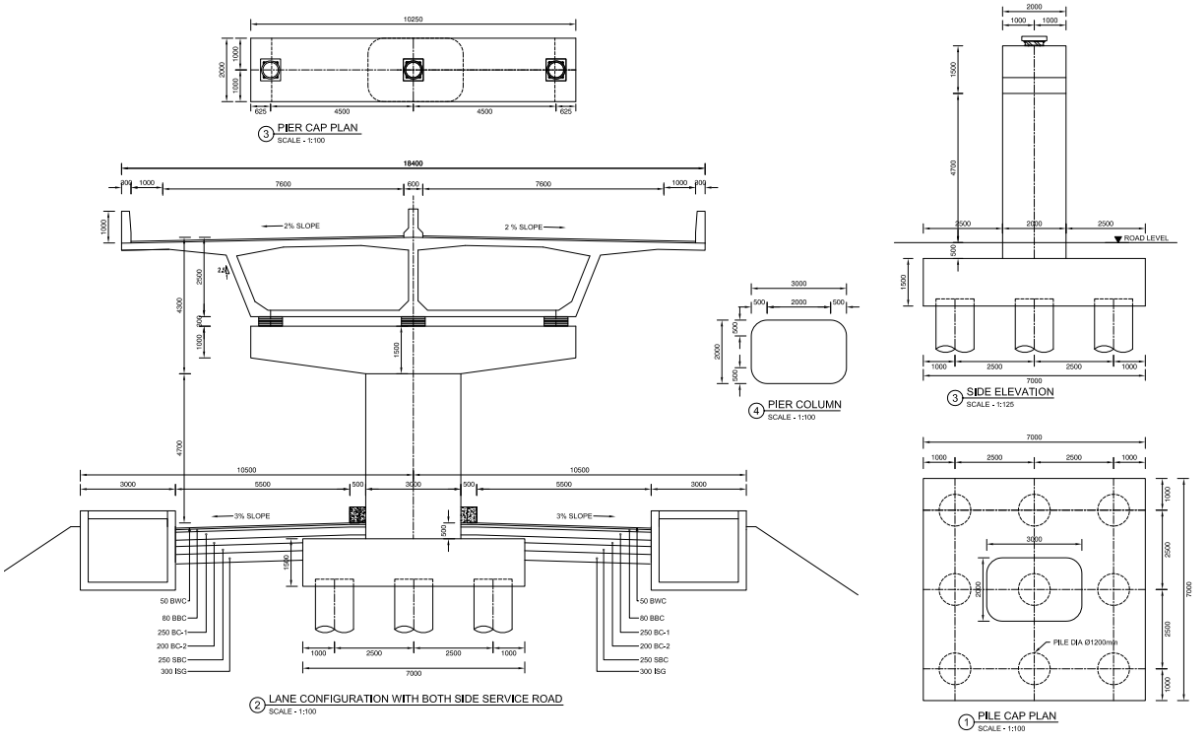


Figure 3: Cross-section (Elevated Section)



H. Hydrological Study

The project area is situated in the eastern part of the capital city, Dhaka, and falls under the north-eastern hydrological region of Bangladesh. The project road lies in a floodplain and is close to the Bay of Bengal. The surface water hydrology around Dhaka is complex. The existing road alignment map with the river system is shown in the figure below. The hydrology of the existing Road (Rampura-Amulia) is dependent partly on the Balu River to the east and the Dholian River to the west and north. The topography of the surrounding area has been constantly changing due to rampant land filling by real estate developers and it is envisaged that the floodplains of the Balu and Dholian rivers would be further progressively encroached by land-filling activities. Considering the present land filling trend and future urbanization, the water levels in both the Balu and Dholian rivers will rise. With the rising of the water level of the surrounding rivers and heavy, intensive rainfall in the project area, the finished road level of the at-grade section and service road needs to be accordingly determined. Hence, an accurate estimation of high water level design within the study area is critical. Additional inflows to the system originate from Balu, which drains a small catchment to the west of Lakhya. The Balu and Dholian River joins the downstream of the Buriganga Confluence. The drainage of the surrounding areas is mostly dependent on the water levels of the peripheral rivers.

I. Cost Estimates

Cost estimates have been prepared on the basis of current prices of materials, plants & equipment, and labour. Market prices of imported materials have also been considered where required, using the RHD schedule rate analysis guidelines. The calculation and analyses for unit rates of various items of work has been carried out using the "Standard Data Book for Roads and Bridges" developed by the IRC and the RHD guidelines. The cost estimates are consistent with a feasibility study in their accuracy.

The following major elements have been considered in the feasibility-level cost estimates:

- Preliminary items and general site facilities
- Earthworks for the embankments
- Structural works
- Pavement works
- Ancillary road works
- Contingencies

The preliminary estimated project cost for the RAD Expressway Project is US$ 262 Million.

Table 3: Preliminary Estimated Project Cost

Description	Cost Item (BDT crore)
Subtotal Hard Costs	1,794.99
Subtotal Soft Costs (Design & Engineering + Traffic Management)	223.20
Subtotal Developer Costs (Independent Eng. + Legal + Developer)	53.00
Subtotal Costs (BDT crore)	2,071.19
Meradia Interchange	22.82
Total Costs (BDT crore)	**2,094.01**
Total Costs ($ millions)	**$261.75**

Source: WSP / MMM

IV. Traffic Forecast

A. Backdrop

In the past fifteen years, Bangladesh's Gross Domestic Product (GDP) growth rate has remained high at 5-7% per year, dropping only one year to four percent in 2002. Human development accompanied this growth, with key social indicators like life expectancy, literacy, per capital food consumption, and percentage of people below the poverty line improving significantly in the past decade.

Bangladesh has become one of the world's largest ready-made garment exporters (RMG). The sector now accounts for 13 percent of the country's GDP, and 75% of its exports. Other top export commodities include knitwear, agricultural products, frozen food (fish and seafood), jute and jute goods, and leather. The import commodities, in turn, include machinery and equipment, chemicals, iron and steel, textiles, foodstuffs, petroleum products and cement. The efficient movement of these goods into and out of the country is the key to the country's economic success story.

Dhaka is connected to two important cities; Chittagong in the south-east and Sylhet in the north-east, through two major National Highways – the N1 and N2. The major flow of traffic is on the National Highway N1 (Dhaka-Chittagong), N2 (Dhaka-Sylhet-Bhutan), N3 (Dhaka-Joydebpur-Mymensingh), N4 (Joydebpur-Tangail), N8 (Dhaka-Mawa-Barishal), N301, and N105. Presently, most of these arterial highways pass through Dhaka city, thereby causing significant congestion in the capital, particularly in the southern part of Dhaka. The proposed four-lane RAD expressway is expected to provide a free-flowing connection to these heavily-trafficked corridors by not having to go through the congested city.

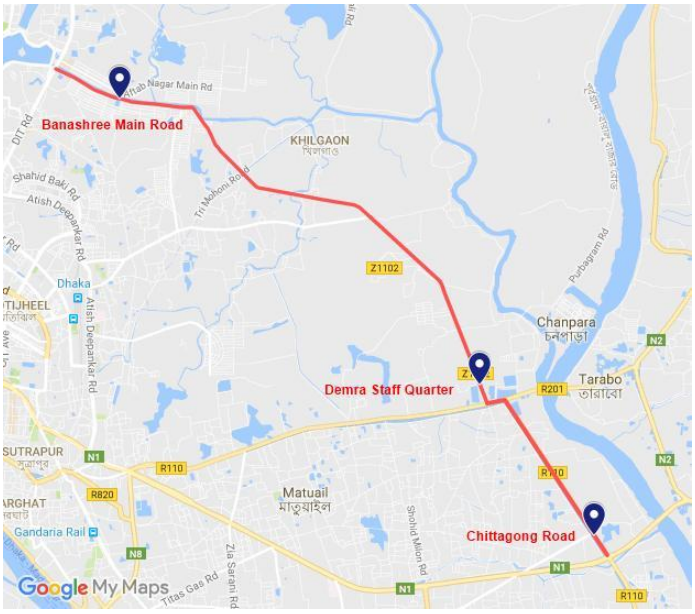
The traffic analysis is limited to Average Daily Traffic (ADT) and not the Annual Average Daily Traffic (AADT). In Bangladesh, there are no permanent traffic counters to establish AADT from the ADT. The RHD also mentions ADT in their traffic data reporting.

B. Daily Traffic Count

A 24-hour bi-directional classified traffic volume count survey was conducted from 0:00 AM to 11:59 PM at three locations (Banashree Main Road, Demra Staff Quarter and Chittagong Road). The 24-hours traffic counts were recorded during October 2016. The locations were selected based on the potential locations of toll plaza, intersections and the entry-exit points of other roadway links along the RAD corridor. The location of 24-hours counting stations are

illustrated in Figure 4.

Figure 4: Location Counting Stations



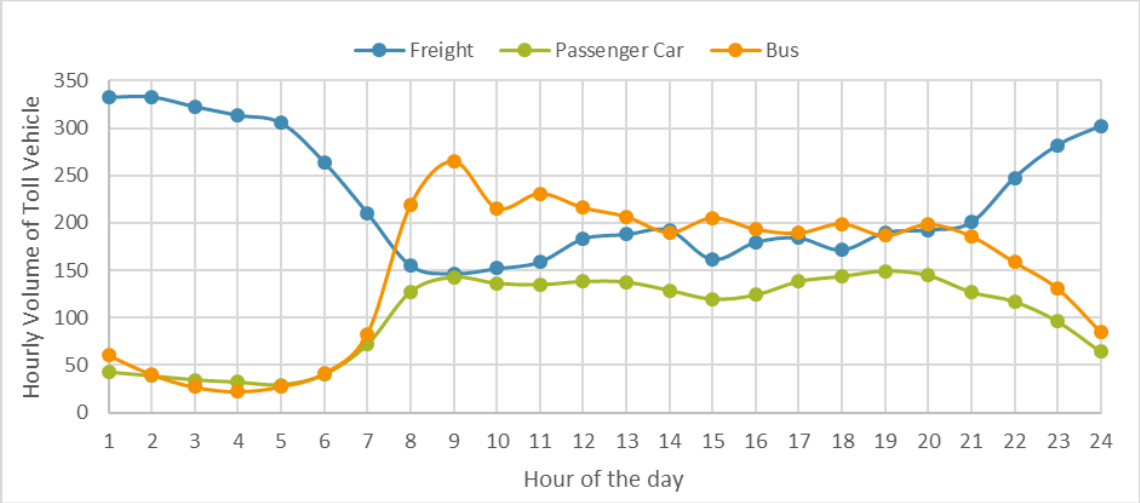
The table below shows the comparison of the RHD and the Project Vehicle Classification for the purpose of the traffic study:

Table 4: Vehicle Classification

RHD Classification	Project Classification
Heavy Truck	Lorry
Medium Truck	Truck/Covered Van
Light Truck	
Utility	
Large Bus	Bus
Minibus	
Microbus	Car/Microbus/Jeep
Car/Taxi	
Baby-taxi and Tempo	CNG/Auto Rickshaw
Motor Cycle	Motor Bike
Bicycle	Others
Cycle Rickshaw and Van	
Cart	

Traffic counts show that the current road is utilized throughout the day and night, with passenger vehicles primarily using it during the day and trucks using the road during the night (Figure 5).

Figure 5: Traffic Daily Distribution



C. Section-wise Average Daily Traffic (ADT) Volume

The section-wise ADT was estimated from the average of 24-hours counts where available and the distribution of bi-directional traffic at the major junctions established from turning movement calculations. Table 5 gives the bi-directional section-wise ADT along the corridor.

Table 5: Average Daily Traffic per Section

Section	AB	BA	Total ADT	Average ADT
Banashree - Meradia	15,140	16,080	31,220	
Meradia - Staff Quarter	11,440	11,870	23,310	
Staff Quarter - Demra Circle	15,400	12,540	27,940	25,860
Staff Quarter - N1	10,620	13,830	24,450	
Staff Quarter - N2	14,230	8,160	22,390	

Segment-wise Traffic Volume along the corridor (AB – from Dhaka, BA – towards Dhaka)

For traffic demand/model analysis, the vehicle types were aggregated into four broad categories of Freight, Bus, Passenger Cars and Others. The components of these classes are listed in the table below.

Table 6: Vehicle Categories (Traffic Demand Model Analysis)

Freight	Bus	Passenger Car	Others
Large Truck/Lorry	Large Bus	Sedan Car	CNG
Medium Truck	Minibus	Microbus	Auto rickshaw
Small Truck	Staff Bus	SUV	Motorcycle
Covered Van	School Bus		Human Hauler
Utility Vehicle			Tempo
			NMTs

Components of Aggregated Vehicle Class

The table below gives the breakdown of section-wise daily traffic volumes by aggregated vehicle class.

Table 7: Average Daily Traffic per Section by Aggregated Vehicle Class

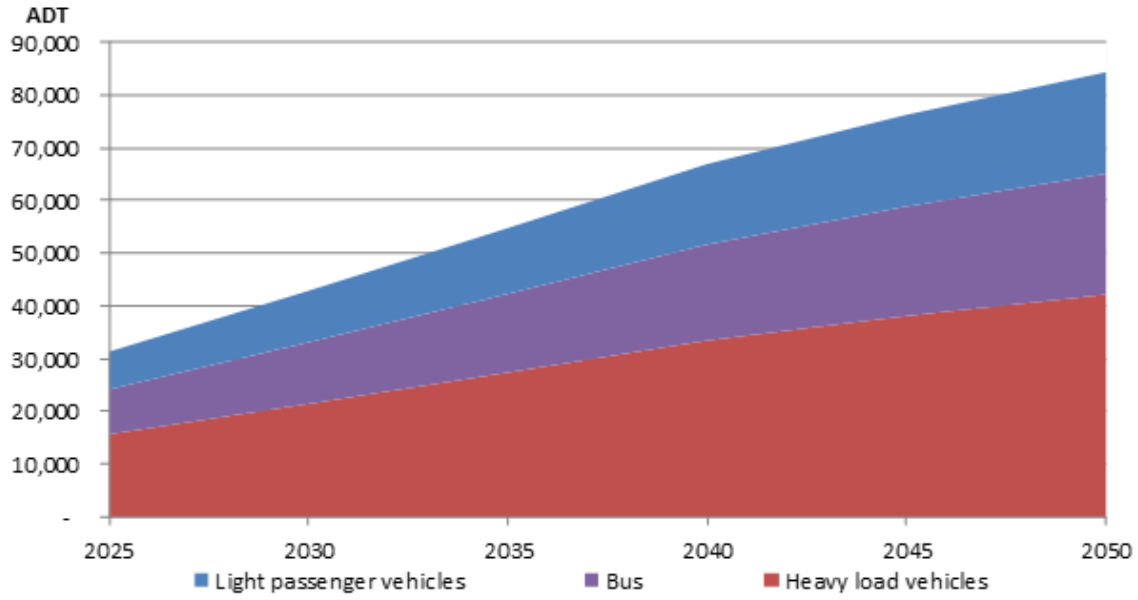
Section	Passenger Car	Bus	Freight	Others	Total
Banashree - Meradia	9,190	1,470	4,630	15,930	31,220
Meradia - Staff Quarter	4,550	1,130	7,400	10,230	23,310
Staff Quarter - Demra Circle	4,380	2,260	7,640	13,660	27,940
Staff Quarter - N1	1,350	400	4,040	18,660	24,450
Staff Quarter - N2	3,780	4,860	7,480	6,270	22,390

Section-wise Daily Traffic (both direction) by Aggregated Vehicle Classes

D. Traffic Projections

Traffic projections were made for the horizon year using an origin-destination matrix based network model. Figure 6 presents the traffic figures by vehicle type. The projected ADT in 2035 is about 55,000.

Figure 6: Traffic Projection by Vehicle Type



V. Concession Structure

A. Legal Framework for Concession

The PPP Act provides the legal framework for a contracting authority to undertake a PPP project by entering into a partnership contract ("PPP Contract") for construction of any infrastructure or the rehabilitation of existing infrastructure and for the financial participation of the Government in PPP projects, for example, by way of the payment of availability payments. The PPP Act and the PPP Guideline also provide the legal framework for the preparation, approval, tendering and implementation of PPP projects.

The Project will, therefore, be implemented by the RHD as a PPP project under the PPP Act and the PPP Guideline. In accordance with the PPP Guideline, the Project has been endorsed by the MRTB, screened by the PPP Authority and granted in-principle approval by the CCEA and the Feasibility Study has been carried out to test its overall viability and to finalize its scope. The next phase of the process under the PPP Guideline is the bidding phase.

B. Concession Structure

The Project will be implemented using a design-build-finance-operate-maintain (DBFOM) structure. As a DBFOM scheme, the Project Company will be required to construct the access-controlled expressway and assume construction-related risks arising from cost overruns, delays, and other performance risks connected with construction. Once the access-controlled expressway is commissioned satisfactorily, the Project Company will be required to operate and maintain the access-controlled expressway pursuant to the terms of the PPP Contract. The road will be transferred to RHD upon the expiry or termination of the PPP Contract.

Whilst the final details will be contained in the PPP Contract to be issued to shortlisted bidders at the request for proposal stage, some characteristics of the intended structure for the PPP Contract are as follows:

- Parties. The parties to the PPP Contract will be: (1) The President of the Peoples' Republic of Bangladesh represented by the Ministry of Road Transport and Bridges acting through the Roads and Highways Department as the Contracting Authority; and (2) a special purpose vehicle incorporated in Bangladesh by the preferred bidder as the Project Company.
- Concession period. The concession period will be 25 years, including a 4-year construction period.
- Rights and obligations of the parties. As described in part (C) below.

- Right of way. The necessary right of way will be granted to the Project Company by way of a lease agreement with a term equivalent to that of the PPP Contract.
- Project Company revenues. The Project Company will receive an availability payment from the Contracting Authority, in consideration of it making the road available in accordance with the terms of the PPP Contract. The PPP Contract will set out the service and performance parameters and key performance indicators, with deductions to the availability payment applied for a failure to satisfy the key performance indicators.
- Toll rates. Given that market risk is borne by the Government, the Contracting Authority will reserve the right to set the toll pricing policy and toll charging mechanism and to vary such policy and charging mechanism from time to time.
- Foreign exchange risk. Availability payments will be partially indexed to the exchange rate of the Bangladesh taka against the US dollar, based on a structure to be defined in the PPP Contract.
- Other terms. The PPP Contract will include other terms usual for a PPP Contract and/or required under the PPP Act, including permits and licensing requirements, the appointment of an independent engineer, hand back obligations, protection for force majeure, changes in law, and other relief events, provision for the execution of a funders' direct agreement, defined events of default and provision for the payment of compensation on termination.
- Governing law. The laws of Bangladesh.
- Dispute resolution. A tiered dispute resolution procedure will be set out with the final stage comprising referral to arbitration.

C. Rights and Obligations of RHD and the Project Company

It is intended that the PPP Contract will require the Project Company to undertake the following obligations and entitle the Project Company to the following payments:

- Design, build, and finance the construction of a 4-lane access controlled expressway covering the entire length of the project and a 2-lane service road which will be free to use;
- Operate and maintain the existing road and the service road during construction and operate and maintain the 4-lane access controlled expressway after construction for a period of 21 years;
- Collect tolls on behalf of RHD using cash based and electronic means;
- Receive revenues based on a semi-annual availability payment from the Contracting Authority for providing the service of operating and maintaining the access controlled

expressway, subject to meeting key performance indicators which will be defined in the PPP Contract;

- Receive revenues from advertising and other ancillary sources, as may be allowed within the RAD right of way; and
- Turn over the RAD in good condition to RHD at the end of the concession period in accordance with the hand back obligations set out in the PPP Contract.

It is intended that the Contracting Authority's obligations shall include the following:

- Assist the Project Company in securing necessary Government approvals and other consents for the Project;
- Upon the commencement of construction, grant the Project Company the right-of-way, free and clear of encroachments, by way of a lease agreement;
- Upon the commencement of construction, turn over the existing road (on an as is where is basis) to the Project Company for use in the Project;
- Following construction of the access-controlled expressway, operate and maintain the service road during the remaining concession period;
- Make semi-annual availability payments to the Project Company, subject to the satisfaction of key performance indicators which will be defined in the PPP Contract; and
- Set the toll pricing policy for the access-controlled expressway.

VI. Procurement Process

A. Legal Basis for Procurement Process

The tender process for the Project will follow the two-stage bidding process set out under the PPP Act and the PPP Guideline. The two-stage bidding process comprises a request for qualification ("RFQ") stage and a request for proposal ("RFP") stage. In accordance with the objectives of the PPP Guideline, the procurement process for the Project will promote transparency and fairness while maximizing the potential for successful selection of a preferred bidder to implement the Project.

B. Participation in the Procurement Process

Parties that wish to receive the RFQ will be required to register with the Contracting Authority and the PPP Authority.

Bidders who submit an application at the RFQ stage and if shortlisted, a proposal at the RFP stage, may comprise a single entity corporation or business organization or a consortium. Consortium must include a lead member which will be required to hold at least 26% of the shares in the Project Company and to be the largest shareholder. The lead member is also required to be the EPC contractor. Other members of the consortium are required to hold at least 10% of the shares in the Project Company. The O&M contractor may be a nominated contractor and will not be required to be a consortium member nor a shareholder in the Project Company.

C. Procurement Process

The figure below summarizes the different steps involved in each stage of the procurement process for the Project.

Stage 1: RFQ stage

- Interested parties register
- RFQ issued to registered entities
- Pre-application meeting held
- Submission of applications
- Applications evaluated on the basis of legal, technical and financial pre-qualification criteria in the RFQ
- Pre-qualified bidders shortlisted on the basis set out in the RFQ
- Shortlisted bidders notified

Stage 2: RFP stage

- RFP draft PPP Contract issued to shortlisted bidders
- Pre-proposal meeting held
- Submission of technical and financial proposals
- Technical proposals evaluated on the basis of the criteria in the RFP
- Financial proposals of those bidders who satisfy the technical requirements are evaluated
- Letter of award issued to preferred bidder
- Signing of the PPP Contract

VII. Indicative Timetable

Item		Expected Completion
February (2018)	-	Formal launch of RFQ process
		Pre-application meeting
April	-	Deadline for submission of RFQ applications
	-	Notice of shortlisted bidders
May	-	Release of RFP documents including the draft PPP contract
	-	Pre-proposal meeting
September	-	Submission of technical and financial RFP proposals
November	-	Letter of award
	-	Signing of PPP Contract

VIII. Transaction Team and Contact Information

RHD and PPPA have engaged the services of ADB as the lead transaction advisor to develop and structure the PPP model for the Project, and conducting the competitive tender for the Project. ADB retained WSP / MMM Group to develop a feasibility study for the Project. ADB has also retained Ashurst as international legal counsel and Syed, Ishtiaq, Ahmed & Associates (SIAA) as Bangladesh legal counsel to provide specialist legal services to support the advisory process. All parties have extensive experience in structuring PPP projects in the road sector, including on past and ongoing projects in Bangladesh.

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