

PWCPL

Support to Capacity Building of Bangladesh Economic Zones Authority Project (under Private Sector Development Support Project)

March 16, 2019

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Confidential*

Bangladesh Economic Zones Authority



Final Report

Proposed Economic Zone at Jajira, Bangladesh





March 16, 2019

To

Mr. SM Nurul Alam

Project Director (Joint Secretary),
Support to Capacity Building of Bangladesh Economic Zones Authority
Bangladesh Economic Zones Authority

Sub: Support to Capacity Building of Bangladesh Economic Zones Authority Project (under Private Sector Development Support Project) - Pre Feasibility Study of Moheshkhali EZ, Feni Economic Zone, Shariatpur Economic Zone (Jajira), Gopalganj Economic Zone-2, and Jessore-2 Economic Zone

Dear Sir,

Greetings from PricewaterhouseCoopers Private Limited.

Through this letter, we are glad to submit the revised Final Report for the proposed Economic Zone at Jajira, Bangladesh. We have attempted to capture all sections mandated as per the agreed Terms of Reference for this project. This report also takes into cognizance the suggestions/ observations discussed with your good office and the World Bank.

We trust you find the report in order.

For any clarifications, please feel free to contact us.

Thank you.

Yours sincerely,



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Encl: Final Report

Disclaimer

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List of Abbreviations

Abbreviation	Full Form
ADB	Asian Development Bank
AMSL	Average Mean Sea Level
API	Active Pharmaceutical Ingredients
AQ	Air Quality
ASEAN	Association of South East Asian Nations
BBIN	Bangladesh Bhutan India Nepal
BBS	Bangladesh Bureau of Statistics
BDT	Bangladesh Taka
BEPZA	Bangladesh Export Processing Zone Authority
BEZA	Bangladesh Economic Zone Authority
BIDA	Bangladesh Investment Development Authority
BIWTA	Bangladesh Inland Water Transportation Authority
BMD	Bangladesh Meteorological Department
BOD	Biological Oxygen Demand
BOI	Board of Investment
BRRRI	Bangladesh Rice Research Institute
BTCL	Bangladesh Telecom Company Limited
CAGR	Compound Annual Growth Rate
CBR	California Bearing Ratio
CETP	Central Effluent Treatment Plant
CMP	Current Market Price
CPA	Chittagong Port Authority
CUL	Cash Compensation under Law
CWTP	Central Water Treatment Plant
Db(A)	Audible Decibel
DoE	Department of Environment
DPHE	Department of Public Health and Engineering
DSCR	Debt Service Coverage Ratio
ECA	Environment Conservation Act
ECC	Environment Clearance Certificate
ECR	Environment Conservation Rules
EIA	Environment Impact Assessment
EIRR	Equity Internal Rate of Return
ELSR	Elevated Level Service Reservoir
EMP	Environmental Management Plan
EPZ	Export Processing Zone
ETP	Effluent Treatment Plant

Abbreviation	Full Form
EXIM	Export Import
EZ	Economic Zone
F&B	Food & Beverages
FDI	Foreign Direct Investment
FMCG	Fast Moving Consumer Goods
FY	Financial Year
G2G	Government to Government
GDP	Gross Domestic Product
GIS	Geographic Information System
GoB	Government of Bangladesh
GTCL	Gas Transmission Company Limited
HDPE	High Density Polyethylene
HSIA	Hazrat Shah Jalal International Airport
HFL	Highest Flood Level
HT	High Tension
H&S	Health & Safety
ICT	Information and Communication Technology
IRR	Internal Rate of Return
ISA	Initial Site Assessment
ITC	International Trade Centre
JICA	Japan International Cooperation Agency
JV	Joint Venture
KEI	Knowledge Economic Index
KLD	Kilo Liter Per Day
KVA/MVA	Kilo Volt Ampere / Mega Volt Ampere
KwH	Kilo Watt Hour
LDC	Least Developed Countries
MACE	Mahindra Consulting Engineers Limited
MBR	Membrane Bio Reactor
MSA	Million Standard Axles
MSL	Mean Sea Level
MLD	Million Liters per day
MRSS	Main Receiving Sub-Station
MNCs	Multi-National Companies
MSW	Municipal Solid Waste
MT	Metric Tonne
MVA	Mega Volt Ampere
MW	Mega Watt
NAS	National Accounts Statistics
NOx	Oxides of Nitrogen

Abbreviation	Full Form
OSSC	One Stop Service Centre
POL	Petroleum Oil & Lubricant
PM ₁₀	Particulate Matter less than 10 micron size
PM _{2.5}	Particulate matter less than 2.5 micron size
PPP	Public Private Partnership
PPP	Purchasing Power of Parity
PUC	Pollution Under Control Certificate
PwC	PricewaterhouseCoopers Private Limited
QA	Quality Assessment
QC	Quality Control
QIIP	Quantum Index of Industrial Production
QIIP	Quantum Index of Industrial Production
RCC	Reinforced Cement Concrete
REB	Rural Electricity Board
RMG	Ready Made Garments
R&D	Research & Development
SBR	Sequencing Batch Reactor
SEZ	Special Economic Zone
SITC	Standard International Trade Classification
SME	Small & Medium Enterprises
SMI	Survey of Manufacturing Industries
SPM	Suspended Particulate Matter
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TBT	Tributyltin
TDS	Total Dissolved Solids
TEU	Twenty Foot Equivalent
ToR	Terms of Reference
TPD	Tonnes Per Day
TVET	Technical and Vocational Education and Training
UDC	Union Digital Centre
UNCTAD	United Nations Conference on Trade & Development
UNO	Upazila Nirbahi Officer
USD	United States Dollar
VAT	Value Added Tax
VFD	Variable Frequency Drive
VOC	Volatile Organic Compounds
WB	World Bank
µg/m ³	microgram per cubic meter

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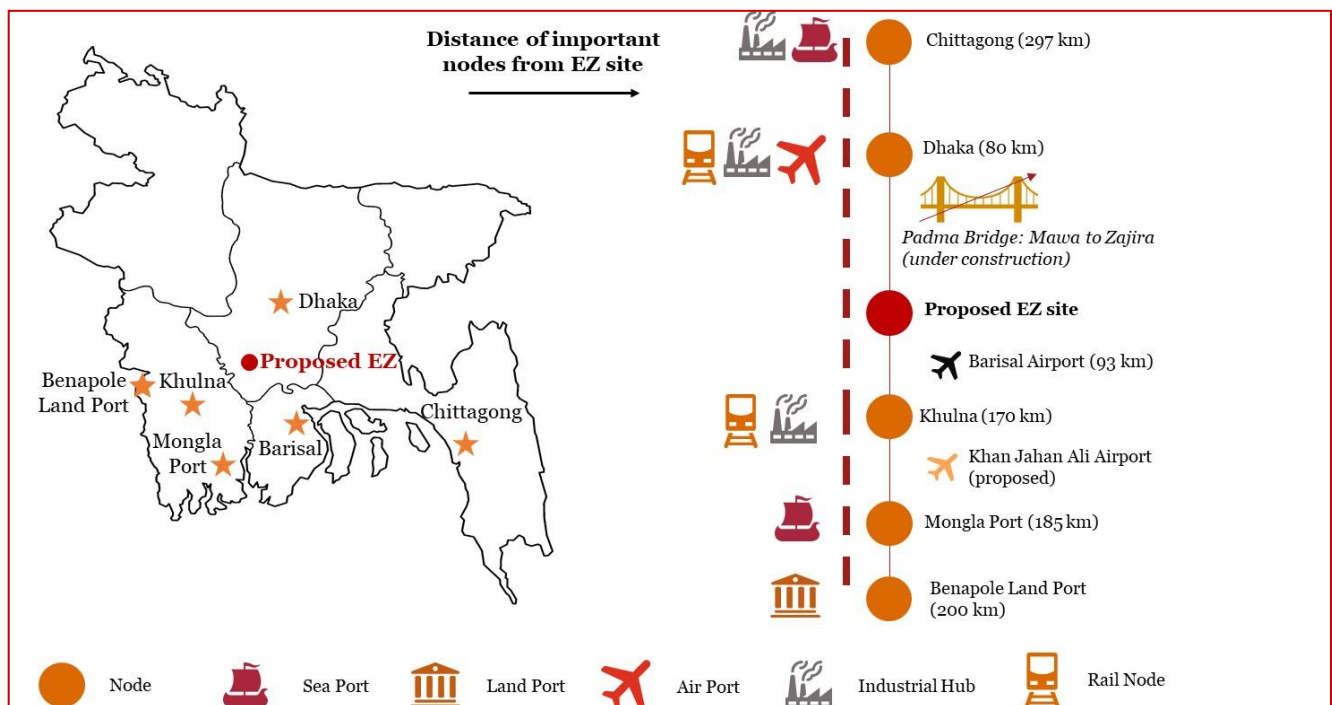
1. Executive Summary

Changing global dynamics depict the tremendous growth prospect in Bangladesh and how this country is shaping up as an attractive investment destination. Country’s specialisation in Readymade Garments (RMG) sector is a success story for which Bangladesh has been able to effectively leverage its demographic dividend. However, the country has been over dependent on this sector and is not being able to diversify its export basket. Government of Bangladesh (GoB) envisages that organized industrialization in the country will be able to improve the country’s competitiveness thereby attracting more investments from global manufacturers across different sectors. The advent of the EZ model is expected to foster organized industrialization in the country with an impetus to manufacturing, which in turn shall promote investment inflow and employment generation. This is expected to increase contribution from other sectors to the export basket of Bangladesh.

GoB has adopted a proactive approach to promulgate investment within the country and foster organized industrialization. In tandem with this initiative, economic zone (EZ) regime ushered in, and Bangladesh Economic Zones Authority (BEZA) was conceptualized. BEZA is the nodal agency mandated for economic zone development in the country. BEZA in support with World Bank is implementing Private Sector Development Support Project (PSDSP) to upkeep pilot EZ projects under the new EZ regime.

As part of this endeavour, BEZA and the World Bank intend to undertake pre-feasibility studies of five economic zone locations spread across the country. This report captures pre-feasibility assessment of economic zone located at Jajira in Shariatpur district.

Figure 1: Location of the proposed EZ site



Proposed EZ is spread over an area of 532.14 acres and it is located in Jajira Upazila, Shariatpur district of Dhaka division. Economy of this district is primarily agriculture based with about 60.32% of total land under agricultural cultivation. Industries in this district are dependent on agricultural produces; industrial landscape in this district comprises husking mills, flour mills, saw mills, rice mills, wooden furniture etc. Shariatpur district, by virtue of its proximity to Dhaka, has access to major consumer markets and industrial hubs located in this country.

Operationalization of under-construction Padma Bridge would provide a major fillip to industries in Shariatpur as a direct road and rail connectivity would be established to major industrial hubs and consumer markets of Dhaka and Chittagong.

The EZ site is bordered by zilla road, Z8065 towards its east while zilla road, Z8012 lies about 1-2 km along site's western and southern boundary. Roads and Highways department of Bangladesh is undertaking upgradation of Z8012 to a regional highway. Currently, Z8065 is a single lane road having a width of 4.13 m, **widening of this road to two lane (7.3m width) could foster good last mile connectivity for the site and enable smooth movement of heavy vehicles.** These roads provide connectivity to industrial towns of Khulna, Jessore and Mongla.

Benapole Land Port (the busiest land port of Bangladesh) is located around 200 km away from the EZ site. This land port is also well connected with the EZ site through road network. Currently this land port experiences congestion and frequent delays in clearance of goods due to limited mechanization of goods handling facility and outdated data management system. However, works are underway to install equipment for mechanizing cargo handling. In addition, a pilot project has been undertaken to implement digitalization of records for improving data entry and record maintenance. These projects would enhance the efficiency of this land port. Other land ports in close proximity to this site include Darshana (~200 km) and Bhomra (~240 km) land ports.

Padma River flows near the EZ site at a distance of 2-3 km along site's northern and eastern boundary. The site is in close proximity to Shariatpur and Kaorakandi Ferry Ghat (located around 13 km from the EZ site location). These ferry ghats are equipped to handle movement of heavy cargo carrying vehicles and are well connected to different parts of Bangladesh and India through Padma and Meghna rivers. These ferry ghats could be accessed to transport goods and raw material through Inland Water Transportation. However, both Shariatpur and Kaorakandi ghats are currently not mechanized and are equipped to handle movement of only light and medium cargo or transportation of vehicles. **Post operationalization of Padma Bridge, these ghats could become redundant with respect to enabling movement of passengers. Possibility of upgrading these ghats** could be explored in order to leverage Bangladesh's extensive riverine network and transport goods across the country and even to India, which has an existing Protocol on Inland water transit and trade with Bangladesh. Moreover, **a river based jetty could also be developed on Majhirhat Ferry Ghat** around 2 km from EZ site. Currently, this ghat has capacity to handle movement of passengers across Padma River.

Mongla Sea Port is located at a distance of 185 km from the subject site. This port can be accessed for developing sea trade relationships with buyers and sellers of goods in other countries. Currently, this port has a draft of 4.9 – 6.1 metres which hinders large sea faring vessels from reaching the port directly. However, GoB is undertaking dredging exercise near this port to increase its draft and cater larger vessels. Infrastructure development projects such as construction of Khulna- Mongla railway line and improving road connectivity to the port are already in progress to boost cargo traffic at this port.

Nearest international airport to the EZ site is Hazrat Shah Jalal International Airport (HSIA) located at a distance of 80 km from the EZ site. This airport provides air transportation to both domestic and international passengers. Currently there is no direct road connectivity till the airport and a ferry needs to be availed to cross Padma River and reach HSIA airport. However, post operationalization of Padma River Bridge, direct road connectivity would be established to this airport. GoB is also in the process of finalizing the location for development of a green field international airport within 20 km of the EZ site. Feasibility studies for this airport is still ongoing. It is envisaged that once the location is finalized, this airport could be functional within the next 10 - 15 years. This airport would be better placed to international air transport to stakeholders of the EZ site in Shariatpur. Barisal airport is the nearest domestic airport located at around 93 km from EZ site.

Currently rail facility is not available in vicinity of the EZ site. Nearest available rail station is Kamlapur Station in Dhaka at a distance of 65 km from the EZ site. It also has an inland container depot to handle movement of containers which are imported or exported from Chittagong Sea Port. However, a railway line is under construction around 2-3 km from the EZ site. Naodoba rail station would be established in the vicinity of the project site. This rail node in turn shall connect the proposed EZ to other parts of the country such as Dhaka, Chittagong, Khulna, Mongla and Benapole land port. **Developing cargo handling facility at this upcoming station** would ease transport of goods to/from the EZ site through rail transport.

The EZ site is ideally located with respect to access to multiple modes of transportation which would support movement of men and material to/from the site location. Moreover, upcoming

projects like widening of Z8012, construction of Naodoba railway station and a green field airport in vicinity of EZ site would further strengthen the transport network in the region.

Site assessment indicates that proposed EZ has access to multiple sources for extracting power and potential to develop water supply. Gas network is not available at present, but is expected to be constructed in the future. Basic social infrastructure is available in this region for unskilled and semi-skilled labour. However, this region lacks in term of quality social infrastructure (residential, and academic facilities suitable for expats, executives and skilled human resources), which is available in Dhaka. Provisions have been made in the master plan to include adequate social infrastructure facilities that could serve the needs of skilled personnel and expats working in the proposed EZ.

In line with the identified transport infrastructure, access to utility and prevailing economy in the region of the proposed EZ, a framework of industry assessment has been formulated.

This framework takes into cognizance availability of factors of production (logistics, utility and manpower), agricultural & natural resources, and possible industrial linkages in site surrounding context. Based on the regional landscape and site intrinsic features, suitability of various industrial sectors have been assessed. Desk based study in synthesis with stakeholder consultations with domestic and foreign manufacturers indicate the following sectors as the potential industrial mix for the proposed EZ:

- Food & Beverages**
- Pharmaceuticals**
- Chemicals**
- Light Machinery, Equipment and Furniture**

Based on the above mentioned industrial mix, land demand forecasting using statistical projection techniques have been undertaken. Three scenarios have been considered viz. aggressive, base, and conservative. Assumptions related to industrial growth rates and investment inflow to the subject site have been varied as per the three scenarios elaborated below.

Base case assumes business as usual situation, where macro-economic parameters are indicating steady trend; industrial growth rates and investment inflow are denoting status quo situation. For aggressive case, it has been assumed that the macro-economic situation is showing an increasing pattern and higher investment inflow is envisaged. **Conservative case** assumes pessimistic situation, where macro-economic situations reflecting downward trend and investment inflow is reducing. Base case assumes as-is commencement of proposed infrastructure projects in this region, where as conservative case considers delay in commencement of infrastructure projects. **Aggressive case** considers infrastructure developments commencing prior to plan.

Demand forecasting projections indicate the following rate of industrial land uptake within the proposed EZ site.

Table 1: Industrial land uptake projections

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033 onwards
Conservative	5%	6%	16%	28%	37%	41%	47%	55%	64%	82%	100%
Base	10%	16%	34%	53%	71%	71%	86%	100%	100%	100%	100%
Aggressive	16%	29%	54%	83%	100%	100%	100%	100%	100%	100%	100%

Demand projection outlines that in conservative case, complete industrial space uptake would take place in 11 years. For base and aggressive cases, the same would be spread over 8 years and 5 years respectively.

For the purpose of demand forecasting, around 66% of the EZ site has been allocated for industrial purpose after taking into consideration development guidelines of BEZA and similar developments globally.

In line with the industries proposed to be established within the EZ site, conceptual demand forecasting and prevalent best industry practices, Master Plan, Off-site Infrastructure plan and On-site infrastructure plan have been prepared for the EZ site. Off-site infrastructure takes into consideration providing the external basic infrastructure facilities (such as power supply, water supply, and access road) to the doorstep of the site. Development of off-site infrastructure is the responsibility of BEZA. On-site infrastructure considers internal infrastructure components (such as internal road network, power substation, water conveyance system, effluent treatment facilities). Development of on-site infrastructure is the responsibility of the private developer.

The Master Plan has envisaged allocating around 71% of total land area as saleable (industrial land and support amenities including logistics zone).

There are 319 plots earmarked in the proposed master plan for different usage out of which 8 plots for support amenities, utilities etc. and balance 311 plots are demarcated for industrial use.

The project is planned to be developed across 3 phases with each phase having a duration of 2 years. In phase I – 219.16 acres will be developed, in phase II – 158.15 acres will be developed and the rest 152.29 acres will be developed in phase III.

To enable a smooth movement of vehicular traffic with the EZ site and to avoid traffic congestion, 1 entry/exit point has been proposed from the eastern boundary of EZ site till the nearest zilla road i.e. Majhirghat - Kazirhat road.

The proposed Master Plan has segregated the site into 4 zones viz. Industrial Zone, Logistics Zone, multi-facility complex, amenities & utilities, green spaces & walkways.

For master planning purpose, entire processing area has been considered as a single industrial zone having varied plot sizes. However, this zoning plan is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate the same.

Further to developing the best practice Master Plan, infrastructure plan has been developed for the EZ site in Jajira including the following –

Site filling – The average natural ground level for the proposed EZ is +7 m level. To avoid inundation during monsoon season, the land filling of +2 m above the existing natural ground level has been recommended.

Road – The total length of the road planned within EZ is 12,929 m. This comprises arterial (30 m) and primary (25 m) types of road network. Internal road network provides access to the industrial plots apart from providing access to areas having support amenities.

Power – Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, power demand for the proposed EZ would be about 59 MVA. This figure is indicative in nature and may vary based on on-ground implementation of the project. The private developer may undertake a separate industry assessment and master planning exercise in order to validate this figure. To cater to the above mentioned power requirements a main receiving substation of 132 /33/11 kV substation might be established on the site. Power to this substation can be availed from the existing 33 kV substation at Jajira at a distance of 5 km from the EZ site.

Water – Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, water demand for the proposed EZ would be about 18 MLD. This figure is indicative in nature and may vary based on on-ground implementation of the project. The private developer may undertake a separate industry assessment and master planning exercise in order to validate this figure. In order to meet the above mentioned water requirements, Padma River (in close proximity to this EZ), which is a perennial fresh water source could be tapped to meet the water requirements of the EZ site. Provision to establish infiltration gallery/well, collection well and pump house near the river basin at an approximate distance of 5 km from the site to supply water to EZ has been proposed. In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site has been considered, this drain would be connected to the agricultural lands in the north side of the site and River Padma to the east side of the site

Sewer System – Total sewage estimation of proposed EZ site is 12.8 MLD. Sewage Treatment Plant is proposed within the EZ site to treat the sewage water.

Storm Water Drain – In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site is considered. It has been planned to discharge the flow of the internal drain into nearby River Padma.

Solid Waste Management – The estimated total solid waste quantity for the proposed EZ is about 52.4 TPD.

Master plan and proposed infrastructure interventions in the proposed EZ necessitate the need for a social and environmental review to assess the impact arising from the development initiatives.

Social Review suggests that current use of the site area is predominantly agricultural with both double and triple crop cultivation taking place. Out of the 532.14 acres identified by BEZA for setting up the Economic Zone, 398.075 acres is privately owned, 62.13 acres is *Khas* land (government owned), 65.03 acres is alluvium land (government owned) and 6.905 acres has been identified as water body.

As per the ‘Conventional’ rule set by the law i.e. Cash compensation under law (CUL), cost of land acquisition is taken as 3 times the cost obtained from Assistant Commissioner (AC) land office for private land and 1 time the cost for government land or *Khas* land. Based on Govt. mouza rate, total cost of land acquisition is BDT 4.01 billion (i.e. USD 0.05 billion). Current market price (CMP) method through primary survey recommends that the cost of land acquisition is BDT 4.16 billion i.e. USD 0.05 billion (excluding registration cost and stamp duty).

Based on stakeholders consultation meeting, the total number of project affected persons (PAPs) are higher than 2000 directly and indirectly, thus a Resettlement Action Plan needs to be prepared for the PAPs.

It is suggested that a detailed social impact assessment (SIA) along with Resettlement Action Plan (RAP) should be undertaken to assess the social impact on the affected people, and devise social management plan to mitigate the impacts of the land acquisition.

Environmental Review formulates Environment Management Plan (EMP) to mitigate adverse impact on the environment due to development of EZ. This EMP envisages precautions needed to be taken by the developer during pre-construction, construction and operation phases along with regular monitoring of environmental impacts. Fixed cost of implementing the EMP has been estimated to be **BDT 36.8 million (i.e. USD 0.45 million)**.

Basis the master planning and environmental management plan, the cost estimate of developing the EZ site is expected to be around **BDT 6,704.9 million i.e. USD 74.4 million**. This is the total hard cost for development of infrastructure in the proposed EZ. Estimated project cost is tentative in nature and may vary during on-ground implementation.

Taking into consideration the cost of developing the EZ site and expected revenue that would be generated from the EZ site a financial model has been developed in order to assess the feasibility of developing this EZ site by a PPP developer and expected returns have been calculated for the private developer who would be undertaking the construction and operation of this economic zone.

This model calculates the return under all the three different scenarios outlined during demand forecasting exercise. The expected returns for the developer are as shown below –

Table 2: Returns to the developer from Jajira EZ

Parameters	Conservative Case	Base Case	Aggressive Case
Project IRR	9.1%	11.3%	12.6%
Equity IRR	6.8%	10.2%	14.5%

The interest rate of debt has been assumed to be 10% for the purpose of constructing the financial model, as per the prevailing lending rates in Bangladesh. Considering the rate of interest, the returns being generated from the project is decent for the developer under the current parameters assumed for constructing the financial model.

Project structuring exercise has been undertaken to evaluate different options that could be considered to make the project returns more attractive. It has been found that if the private developer is able to get funding for the project from multi-lateral agencies or raise external commercial borrowings at low interest rates. The returns from this project stands to become attractive for the private developer. Considering private sector efficiency and better access to diversified resources, **project structuring option through a private developer appears to be a better option with respect to the other project structuring options.**

In addition to the financial modelling, an economic modelling exercise has also been undertaken to evaluate the economic benefits accrued from this project. Financial analysis (or Financial IRR) estimates the return accruing to the project operating entity (EZ developer), whereas Economic Internal Rate of Return (EIRR) estimates the return on the investment to the national economy. Economic analysis is essential to develop a rationale for Government of Bangladesh to support the development of the proposed EZ and illustrates the measure of the accrued economic benefits. A good EIRR would also assist the private developer in making a good case to be able to avail concessional loans.

Three scenarios have been considered for the purpose of EIRR calculation viz. conservative, base, and aggressive. Details of these scenarios are outlined in the demand forecasting exercise. Base case Economic Internal Rate of Return (EIRR) has been calculated as 16.17%, which indicates that the project is providing good returns economically. In conservative case, the project generates 12.86% economic return which is fair. Aggressive scenario indicates that the economic return of the project is 18.89%, which is attractive in nature.

Based on the area, location attributes, stage of development, macroeconomic parameters, and subscription tariffs a bench-marking exercise has been undertaken with the intention of assessing the competitiveness of the proposed economic zone vis-a-vis other similar developments in the region or emerging economies.

The benchmarking exercise has assessed various parameters such as commercial terms, infrastructure availability, labour cost, distance from trade gateways, etc. for similar developments. This analysis not only provides the relative competitiveness of the proposed economic zone but also synthesises the key learnings from each of these zones. For the purpose of benchmarking of the proposed EZ site with other competitors at the same development stage, a total of 6 economic zones/ industrial parks have been shortlisted at local, regional, and global levels. These 6 economic zones/ industrial parks are spread across countries such as India, Cambodia, Nigeria, Bahrain and Bangladesh.

Benchmarking exercise suggests that the EZ site at Jajira is competitive with respect to factors such as availability of standard factory buildings, land lease rates, water tariff and labour cost. Manufacturers in the EZ site would enjoy good access to sea port and rail network, thus enabling smooth logistics of bulk cargo through water and rail routes. Upon operationalization of rail line over Padma Bridge, proposed EZ would have access to rail network connecting Mongla Port with Dhaka and Chittagong. Power tariff in Bangladesh is relatively high due to paucity of electricity in the country as Bangladesh has to rely upon import of coal to generate electricity. Lack of ready-made social infrastructure in proximity to EZ could act as a hindrance to attract skilled human resources especially the expatriates. However, as stated in the Master Planning section, a land parcel dedicated for development of support amenities has been allocated where social infrastructure like residential units, vocational training centre, retail outlets and healthcare facility can be developed within the EZ site. One Stop Service facility has still not been fully implemented by BEZA, although GoB has approved the OSS Act. Competing EZs have an already established OSS facility which could incentivize investors to set up their manufacturing units in such EZs.

2. Introduction

The objective of this chapter is to picture a broad overview of this engagement. At the onset, a need assessment of organized industrialization in Bangladesh context has been carried out. This further deep dives into the salient features of the engagement in light of economic zone development programme towards validating the growth agenda of Government of Bangladesh (GoB).

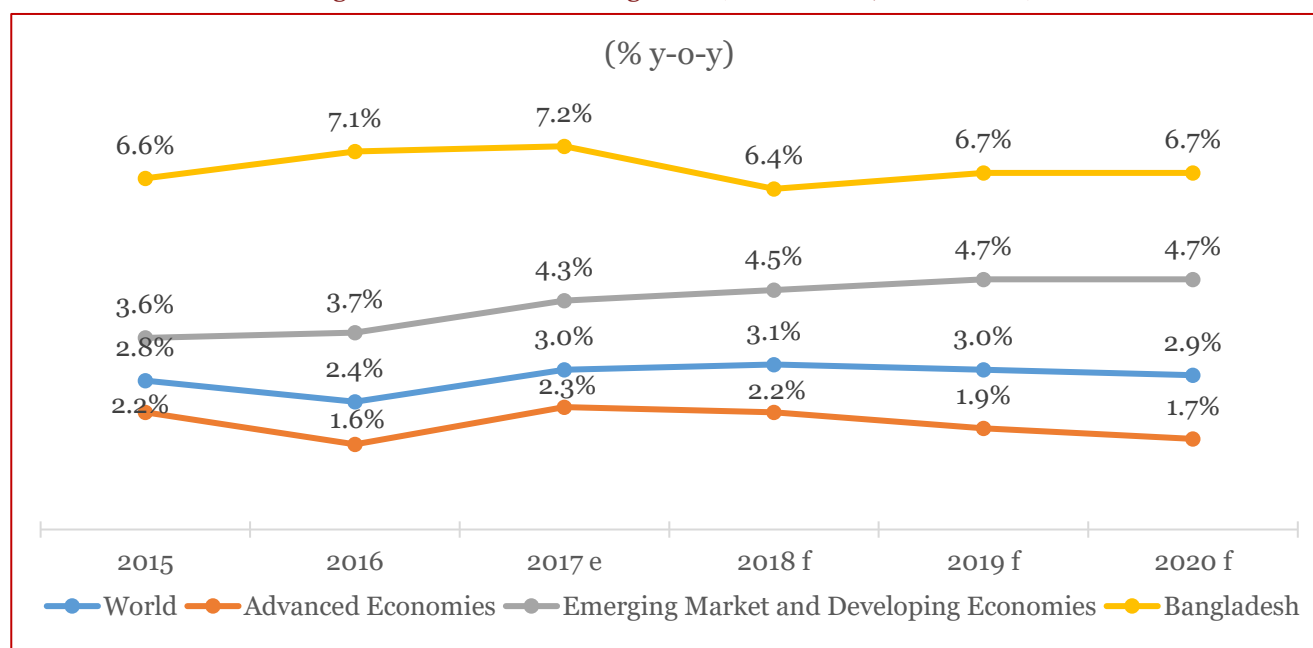
2.1. Bangladesh – Need for organized industrial growth

Recent economic and investment trends indicate a **gradual shifting of economic prowess from large economies to emerging markets**. Owing to rising cost of operation and cost of manpower in the developed economies, global production centers are moving towards Asian region.

As per World Bank reports, after dip in the past, global GDP growth is estimated to have picked up from 2.4 percent in 2016 to 3 percent in 2017.¹ This upturn is broad-based, with growth prospects improving in more than half of world's economies. As per World Bank estimates, global economy is expected to grow at a steady rate of ~3 percent on a year on year basis.

This is conducive for global trade and commerce, especially for the Emerging Market and Developing (EMD) economies which generally depend on exports for their GDP growth. **Among the EMD economies, it is expected that Bangladesh will sustain its healthy growth rate at above 6 percent on the back of its robust export sector and investment in infrastructure.**

Figure 2: Global Real GDP growth (e- estimated; f-forecasted)



Source: World Bank database

Above figure indicates how real GDP growth rate of Bangladesh has outperformed EMD and world's average. **Bangladesh, strategically located adjacent to the neighboring large economies of India and China has embarked into an ambitious journey of industrial development and economic progress.**

On the global economic radar, Bangladesh has long been overshadowed by its larger neighbors in the region, India and China. However, with a population exceeding 160 million, Bangladesh has been steadily building its economic strength and is now emerging as an attractive frontier growth market in South Asia. This presents a

¹ <http://www.worldbank.org/en/publication/global-economic-prospects>

sizeable opportunity for organizations seeking to expand their global footprint and further establish a presence in the South Asia region.

This stable growth rate in recent times is an outcome of investment friendly policy push from GoB, and significant infrastructure augmentation across the country. Bolstered by these initiatives, Bangladesh is poised to shape up as manufacturing hub. **Various global accolades indicate the confidence expressed by the global agencies on the economic development of the country.**

- The growth potential of the economy has led to Bangladesh's inclusion in the 'Next 11' of Goldman Sachs.²
- The country being considered as the next Asian Tiger Economy.³
- Bangladesh was also included in the 'Frontier Five' economies by JP Morgan.⁴ It indicates impressive economic and investment potential.
- Credit rating agency Standard & Poor has awarded Bangladesh a credit rating of BB-,⁵ indicating long term stability.
- Bangladesh was also ranked 22nd in AT Kearney Global Services Location Index,⁶ which analyses and ranks countries for outsourcing worldwide based on financial attractiveness, people skills and availability.
- Economy of Bangladesh was the 34th largest economy in the world in 2016 in GDP PPP (Purchasing power parity-2016) terms.⁷
- In Ease of Doing Business Index (2018), Bangladesh has improved its overall Distance to Frontier score. It has also made notable improvement along the parameter 'getting electricity'.

Bangladesh had effectively leveraged its attractive demographic dividend and low cost of operation (including low cost of manpower) to emerge as one of the largest exporters of Ready Made Garments (RMG). RMG sector has been the cornerstone of Bangladesh's growth story, so much so that RMG industry accounts for more than 81 percent of Bangladesh's export basket.⁸ Such high dependency on RMG sector for exports symbolizes all that is good and not so good for Bangladesh's economy. **While, Bangladesh's dominance in RMG can be painted as a success story for the country which has effectively utilized its abundant pool of human resources, it also reveals that Bangladesh has not been able to diversify its export basket.** Bangladesh's export basket is four times more concentrated in a few individual product lines than the average of a developing country. The contribution of new products, identified by the six-digit level of Harmonized System of trade classification, to the overall export growth between 2005 and 2015, was less than 5 percent for Bangladesh in comparison to 78 percent for Malaysia, 42 percent for Vietnam, 32 percent for China, 25 percent for China and 20 percent for India.⁹

The world economy has increasingly become less predictable and is dictated by technological innovations which are disruptive in nature. In such a dynamic business environment, it has become imperative for Bangladesh to diversify its product mix and to hedge the risks associated with any particular sector. In order to reduce the high dependency of its economy on the textile and RMG sector, Bangladesh needs to address its infrastructure, energy and urbanization bottlenecks by chalking out a strategy to create a holistic environment for organized industrial growth. **Organized industrial growth will not only help in improving the country's competitiveness but will also attract more investments from manufacturers across the world.**

In order to carve out a strategic roadmap towards organized industrialization in the country, GoB has come up with the concept of economic zone (EZ) development. The advent of EZ model is expected to foster investment inflow and employment generation, which in turn will boost the overall socio-economic condition of the country.

² <http://www.goldmansachs.com/our-thinking/archive/archive-pdfs/brics-book/brics-chap-13.pdf>

³ <http://www.thefinancialexpress-bd.com/2015/12/17/6199>

⁴ <http://bangladesh.nlembassy.org/doing-business/bangladesh-economy.html>

⁵ https://en.wikipedia.org/wiki/List_of_countries_by_credit_rating

⁶ <http://www.prnewswire.com/news-releases/at-kearney-releases-2016-global-services-location-index-gsli-300201927.html>

⁷ World Bank Growth Indicators- GDP current in PPP basis

⁸ <http://www.dhakatribune.com/business/2018/02/01/ready-industry-4-0/>

⁹ <http://www.thedailystar.net/supplements/building-modern-economy/revitalising-exports-1536607>

2.2. Project Overview

As a key part of its growth strategy, GoB, with the support of the World Bank is implementing the Private Sector Development Support Project (PSDSP) to support pilot EZ projects under the new EZ model. The project will support viability and will promote the removal of barriers and constraints faced by the private sector, which hinders their participation in developing EZs in Bangladesh. This project will support creation of serviced industrial land and use of good social and environmental practices. GoB intends to pay special attention to supporting international commercial practices and good governance to attract public-private partnerships in –

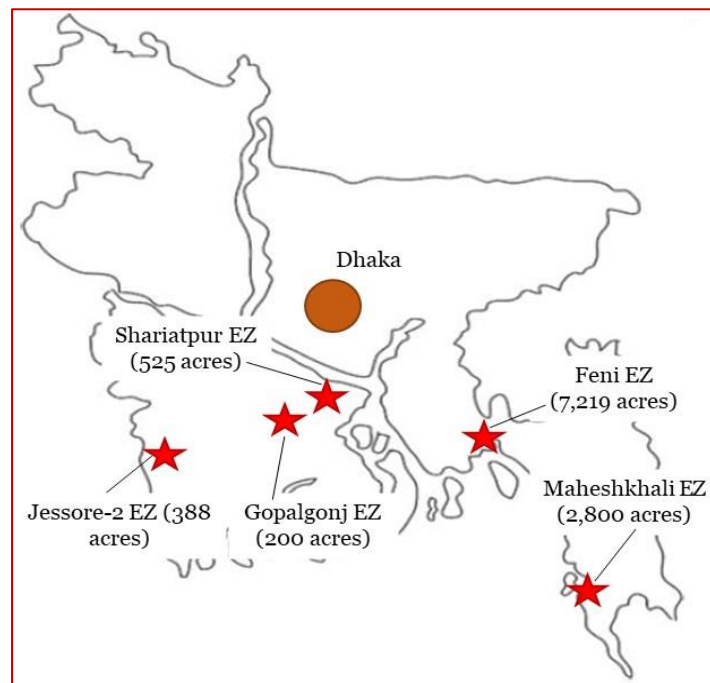
- i) Zone Development
- ii) Service and/or Management provision
- iii) A strong emphasis on environmentally and socially-compliant manufacturing

A strengthened institutional framework will also be supported through policy advice and capacity building to help accomplish the above objectives.

The PSDSP consists of public sector portion of investment in land, infrastructure and services for a number of pilot EZs established under the new EZ law. The PSDSP will support transformative investments beyond already established sectors. A key outcome of this program is a contribution towards zoned industrialization, which will enable Bangladesh to maximize its growth benefits of agglomeration and ease the increasing urban congestion. More importantly, the project will enable new sources of growth, where investor interests have already been noted.

To support GoB’s commitment to develop EZs in Bangladesh. BEZA intends to undertake five independent pre-feasibility studies for setting up Economic Zones in the locations as shown in the figure below –

Figure 3: Site Location of proposed EZs



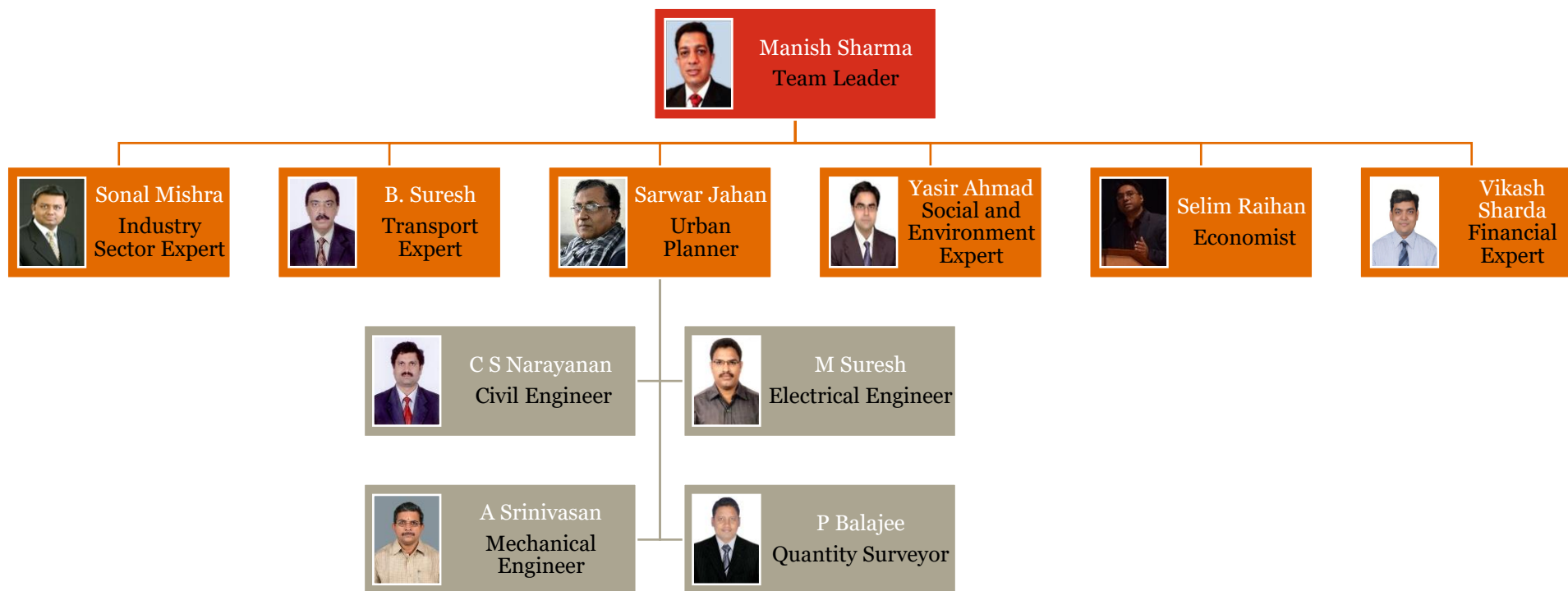
This report aims at pre-feasibility assessment of proposed economic zone at Shariatpur (Jajira) spread over an area of ~532 acres

2.3. PwC's Team of Experts

In consideration of the deliverables required during the course of this engagement, PwC has formed a team of experts with **significant experience in the required areas of focus**. Through cross sectoral experience in handling projects of various types, our experts are well versed in the areas where expertise is required for this engagement: **Feasibility Studies, Industry Assessment, Demand Forecasting, Competition Benchmarking, Transport Assessment, Master Planning, Financial & Economic modelling, and Environment and Social Review**.

The proposed team of experts demonstrates our qualifications and capabilities in executing the engagement. The organogram depicting the experts for various key positions is elucidated below, their detailed CVs have been duly submitted as a part of PwC's proposal on 8th June, 2017, under Form Tech-6.

Figure 4: Team of Experts



2.4. Project Timeframe

In conformance to this engagement's Terms of Reference, following deliverables will be submitted to BEZA as per the schedule laid out in the below table –

Table 3: Schedule of Deliverables

Deliverable	Description	Timeline	Status
D1	Inception Report	At 15-day milestone	Inception Report Submitted
D2	Draft Interim Report	At 3-month milestone	Final Interim Report submitted
	Presentation workshop to discuss findings of Interim Report		
	Final Interim Report		
D3	Draft Final Pre-Feasibility Study Report	At 6-month milestone	Draft Final Pre-Feasibility Study Report submitted
	Presentation workshop on finding of Draft Final Pre-Feasibility Study		
D4	Final Pre-Feasibility Study Report	At end of the project	Final Pre-Feasibility Study Report submitted
	Deliverable submitted		
	Deliverable to be submitted in the future		

Legend:

D1: Inception Report

D2: Draft Interim Report, Presentation on Key Findings & Final Interim Report

D3: Draft Final Pre-Feasibility Study, Presentation on Key Findings

D4: Final Pre-Feasibility Study

The activities covered under this assignment will be scheduled in a manner so that all tasks to be executed are in sync with each other, thus ensuring an organized and sequential flow of activities. A detailed timeframe has been previously submitted under Section 3.2 of the Inception Report dated, 8th February, 2018.

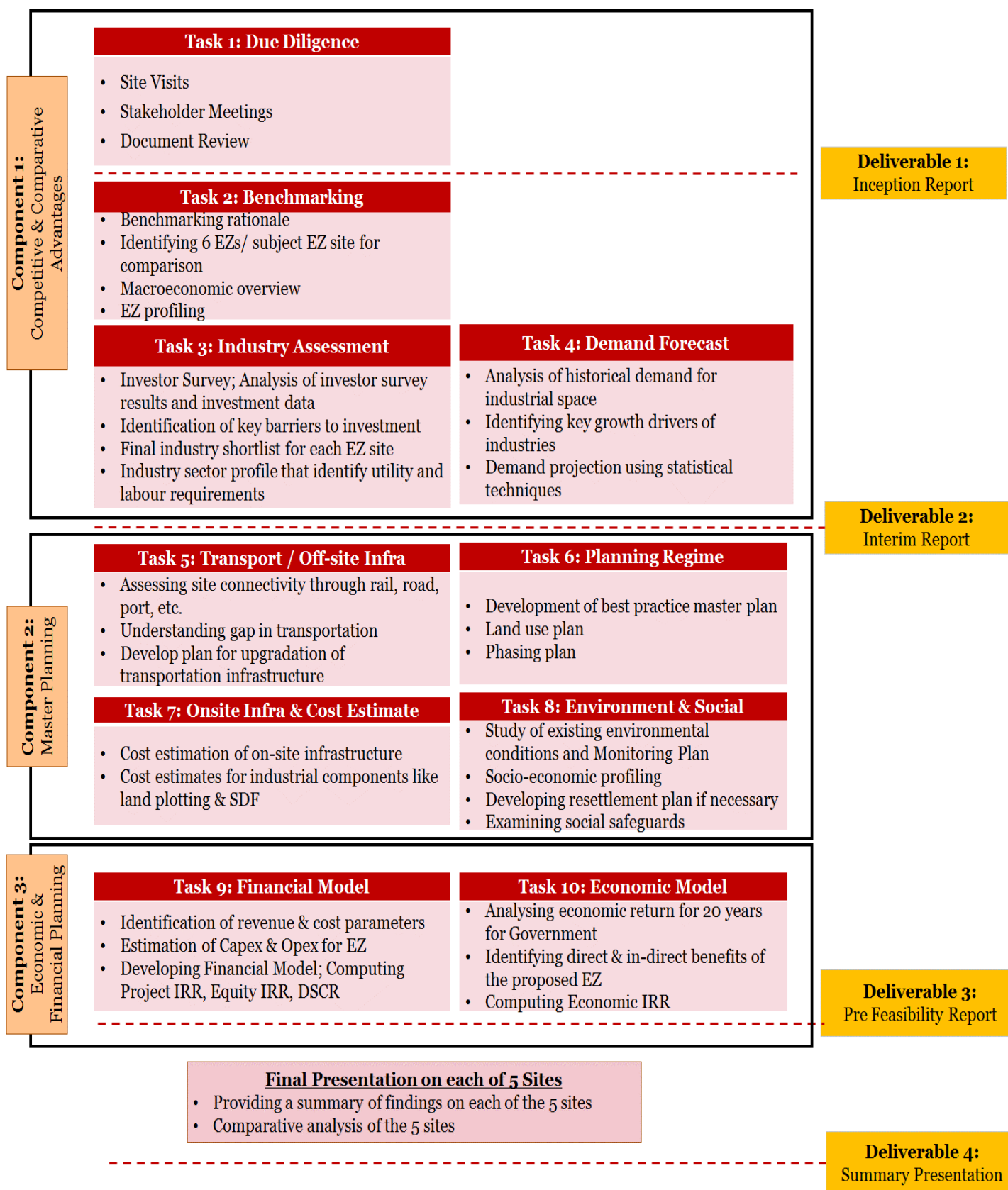
Next section elaborates detailing about the key activities/ tasks to be undertaken under each of the deliverables.

2.5. Outline of the Engagement

A detailed outline of the Terms of Reference and approach have been previously submitted as part of the Inception Report dated, 8th February, 2018.

Figure in the next page captures a concise outline of the engagement as per the Terms of Reference –

Figure 5: Tasks covered under current engagement



2.6. Description of Site Location

The proposed EZ is located in Jajira Upazila, Shariatpur district of Dhaka division. Dhaka division, located at the central part of the country is economically most affluent division of Bangladesh and it houses capital city of the country, Dhaka. Dhaka division contributes to ~30% of overall GDP of the country and it houses various industrial powerhouses.¹⁰ Almost all the leading conglomerates of Bangladesh are registered in Dhaka. Dhaka division has 13 districts, Shariatpur is one of these.

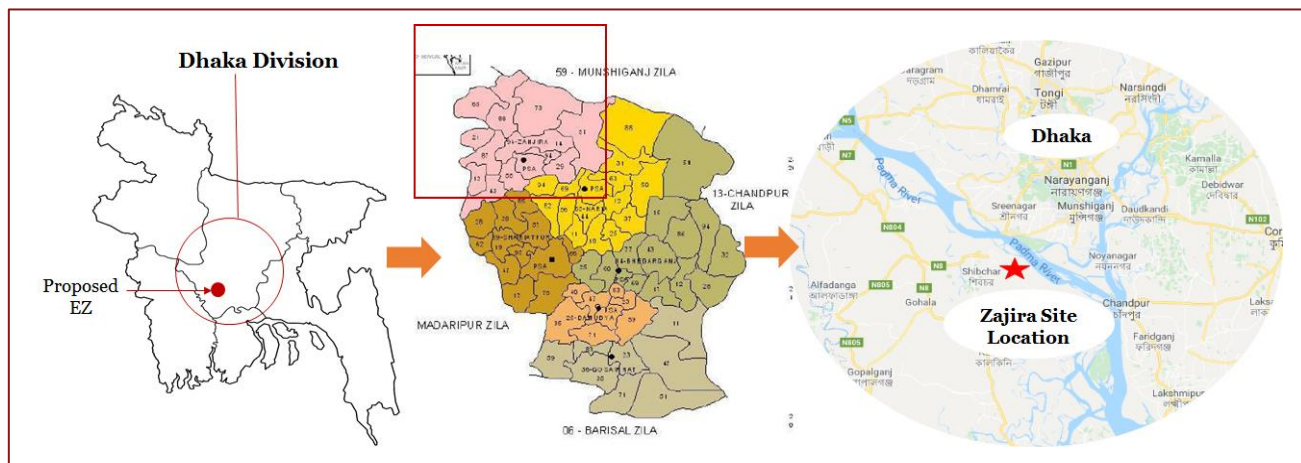
Shariatpur district is located on the south-western side of Dhaka division and it has close proximity to Padma River. It is surrounded by the following districts:

- Munshiganj- North
- Chandpur-East
- Barisal- South
- Madaripur- West

Shariatpur district comprises of 6 upazilas; proposed EZ is located in Jajira upazila.

As per Housing and Population Census 2011, Shariatpur district has overall population of 1,154,824 with around 48% male and 52% female. Linear projection techniques indicate that in 2017, overall population of Shariatpur district could be ~1,206,076; and population of Jajira upazila could be ~204,692.

Figure 6: Jajira Site Location (Dhaka Division-Shariatpur District-Jajira Upazila)



Source: Google Map and PwC Analysis

Shariatpur experiences a moderate climate throughout the year with average annual rainfall of 2105 mm and temperature ranging from 37.8°C during summer to 12.6°C during winter.¹¹ Such a warm and moist climate creates a conducive environment for agricultural growth in the region resulting in the economy of Shariatpur being predominantly agricultural. Such a climate could support development of agro based and food processing industries in the region and also promote manufacturing activities which caters to the need of the farming community.

2.6.1. Economic Profile of Shariatpur District

Currently, major population of Shariatpur district is engaged in agriculture, fish rearing and animal husbandry. Although few people also work in small industrial units like rice, flour and oil mills. Students who obtain higher education, migrate to cities like Dhaka and Chittagong due to lack of industrial development in the region.

¹⁰ Planning Commission- Lagging Regions' Study

¹¹ Shariyatpur District website, <<http://www.shariyatpur.gov.bd>>

However, creation of an economic zone in Jajira could enable a transformation in the social profile of the area as local people would be willing to take up blue collared jobs, which are financially better rewarding than agriculture.

The primary economy of Shariatpur is agro based, with about 56.75% of total land under temporary or permanent cultivation, as per Bangladesh District Statistics, 2011. The industries in this district comprise rice mill, saw mill, wheat mill, cold storage, oil mill, bamboo & cane industry, wooden furniture etc.

Nearest industrial belts are in:

- (i) Barisal district (comprising industries like pharmaceuticals, cement, food and beverages) and
- (ii) Munshiganj district (comprising industries like textile, chemicals, garments, cement etc.).

Industries in these industrial belts could serve as good markets and source of raw material for the proposed EZ. It is also expected that agro based economy of Shariatpur district may provide supply of raw materials for food processing related industries at the proposed EZ.

Detailed economic and industrial profiling of the site surrounding region is undertaken in industry assessment chapter.

2.6.2. Site Surrounding Features

Districts in vicinity of the proposed EZ site location are Munshiganj in the north, Barisal in the south, Chandpur in the east and Madaripur in the west. Industrial development has taken place in Barisal and Munshiganj districts.

Key location attribute of the project site is its central location, which makes it suitable to cater to the domestic demand for goods and services.

Project site is located at a distance of around 80 km from Dhaka; it can be accessed via Dhaka-Mawa highway and ferry crossing from Mawa ghat. Currently travel time from Dhaka to the proposed EZ location takes around 5-6 hours depending on the time it takes to cross the Padma River on ferry. However, construction of Padma Bridge is in progress in close vicinity of the proposed EZ location. On operationalization of this bridge, travel time across Padma River is expected to come down. This will result in the proposed EZ site having easy and fast access to manpower, material, as well as Bangladesh's biggest consumer hub in Dhaka.

2.6.3. Location Reconfirmation

The proposed EZ site is located towards the North-Western part of Shariatpur district. Basis site visit, site location and site demarcation details have been reconfirmed. The same have been captured in the table below –

Table 4: Proposed EZ Site Information

Parameters	Details
Site co-ordinates	222195.509 Easting & 2586981.245 Northing 223573.164 Easting & 2586762.172 Northing 223608.135 Easting & 2585062.890 Northing 222200.010 Easting & 2585365.284 Northing
Site boundaries on East	Canal, Jalmahal (fishing land), Mazirhat-Kazirghat Road (Z8065)
Site boundaries on West	Settlements , agricultural activity
Site boundaries on North	Canal, Proposed Eco- park buffer zone near the approach of Padma Bridge
Site boundaries on South	Settlements, Jajira bazar
Total area of the site	532.14 Acres
Privately owned land	398.075 acres
Government land/ <i>Khas Land</i>	62.13 acres

Parameters	Details
Government land/ Alluvium land	65.03 acres
Waterbody	6.905 acres
Expansion potential	<p>Basis preliminary assessment, proposed EZ is surrounded by the following:</p> <ul style="list-style-type: none"> • Jajira Market- South • Canal and Environmental Buffer Zone- North • Agricultural and settlements- West • Zilla Road - East <p>Basis discussion with local inhabitants, it was understood that expanding the proposed EZ could be possible on western side. However, this is subjected to land survey.</p>

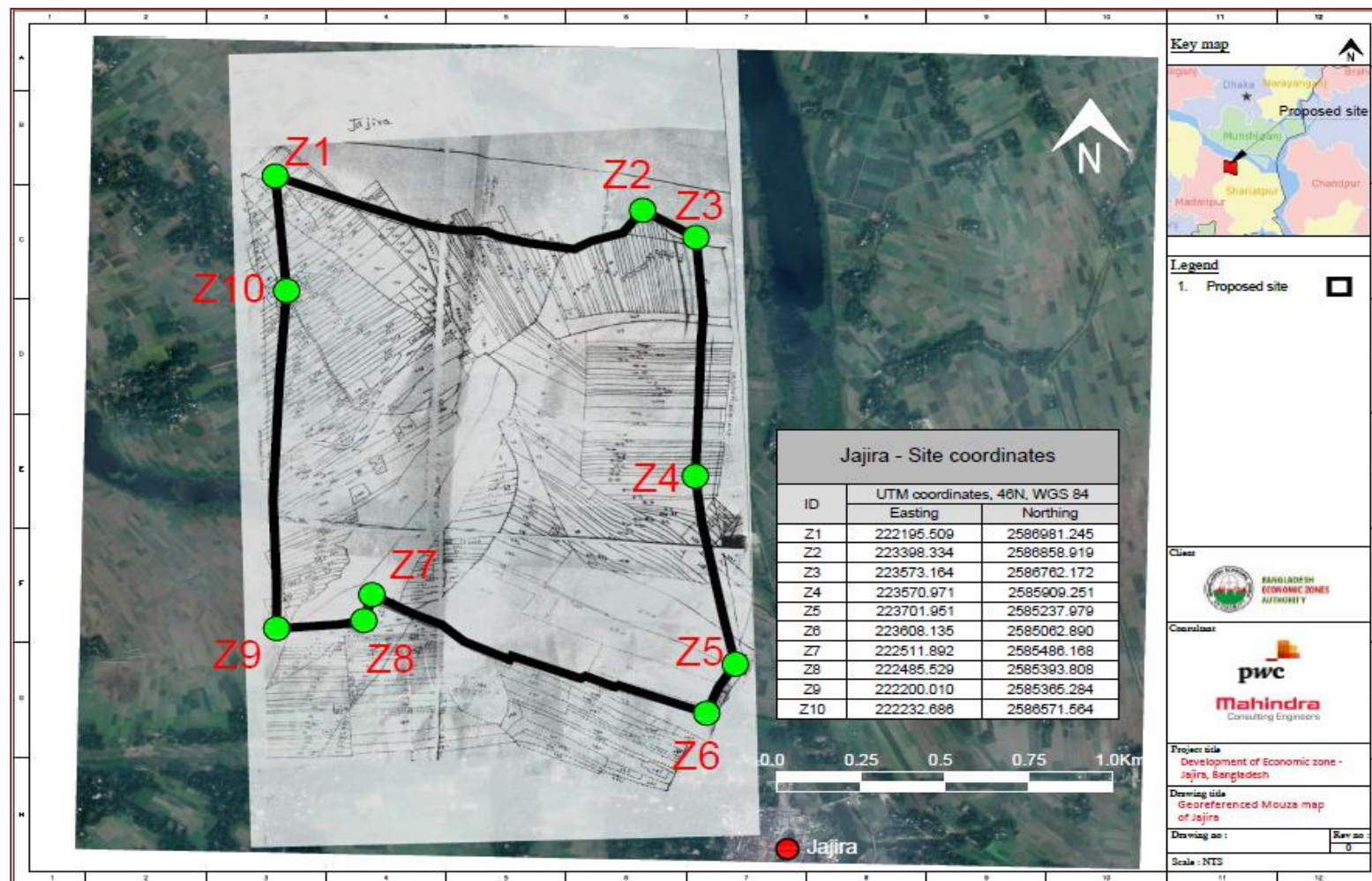
Source: Information obtained from Site visit and MACE Analysis

On analysis of the proposed EZ site location, it can be observed that the site is ideally positioned to cater to consumers in Dhaka, as well as industrial belt in Barisal, and Munshiganj. Its demography offers a readily available pool of labor who can be trained to take up blue-collared jobs in the EZ. Also, setting up of the EZ can reverse the trend of migration of educated young people from the Shariatpur to other parts of the country.

Basis discussions with UNO office and the local surveyors, we were informed that there is an expansion possibility of the project site towards western side; in the future, based on industrial space demand. Expanding of this EZ site can be considered as a second phase development activity, after assessing the land uptake for the current area. Any decision regarding site expansion should be based on feasibility studies and topography survey.

Figure in the next page elucidates the site boundary superimposed on mouza map.

Figure 7: Site Boundary superimposed on Mouza Map

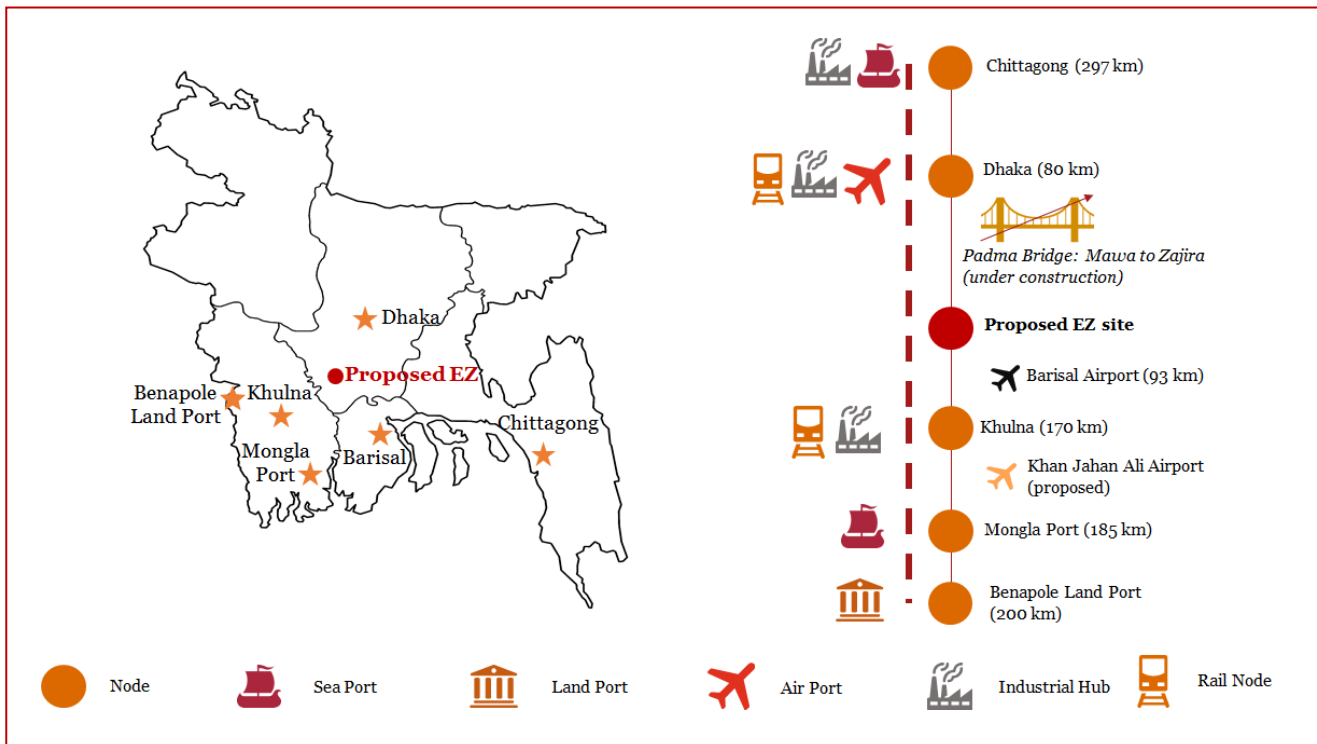


Source: MACE analysis

2.6.4. Transport Infrastructure in Proximity of Proposed EZ Site

For any location to shape up as a potential EZ, access to multimodal connectivity is an important feature to enable seamless logistics. Figure below depicts the site location in light of the major trade gateways, industrial nodes, and transport infrastructure in the country.

Figure 8: Transport infrastructure in proximity of proposed EZ site



Source: Information obtained from site visit, Google Map, and PwC Analysis

Above figure elucidates that the proposed EZ has good access to Khulna and South-Western Bangladesh and Barisal. It is also located in proximity to Capital city, Dhaka. Padma Bridge is in close proximity to the project site. Once Padma Bridge is operational, direct road connectivity would be established between the project site and Eastern Bangladesh (including Dhaka, Chittagong). Owing to good domestic connectivity linkages, domestic market oriented industries may act suitable in the site surrounding context.

Last Mile Connectivity: The proposed EZ site is bordered by zilla road, Z8065 (Majhirghat-Kazirhat Road) towards its east; zilla road, Z8012 (Shariatpur-Kathalbari Road) is located at a distance of 1-2 km along the site’s southern and western boundary. Presently both Z8065 and Z8012 are single-lane bituminous roads. Basis discussion with officers from UNO and RHD, it is understood that Z8012 would be upgraded to a 2 lane regional highway. This road would provide support for faster movement of heavy vehicles required for transporting construction material as well as manufactured goods. Basis site visit, it was observed that there are village roads crossing the area demarcated for proposed EZ. There are a few settlements (basis reconnaissance ~500-600 households) on both sides of the village roads. These would be affected in case widening of the village roads is taken up.

Rail Connectivity: Kamalapur Station (65 km) at Dhaka is the nearest railway station to proposed EZ. This is the largest railway station in Bangladesh and it has an Inland Container Depot to handle containers being imported or exported. However, presently Padma River needs to be crossed to reach Kamalapur Station from proposed EZ. Padma River Bridge, which is currently under construction will be a multi-purpose bridge having both road as well as railway facility. Naodoba Railway station is being built at a distance of 3 km from the

proposed EZ site area. This railway station once completed, will enable faster movement of both goods and people between EZ site and other major cities like Dhaka, Khulna, Benapole, and Chittagong.

Air Connectivity: Nearest airport is Hazrat Shah Jalal Airport in Dhaka. It is Bangladesh's largest and busiest airport and provides air transport services to both domestic and international passengers. This airport is around 80 km away from EZ site. Barisal airport is nearest domestic airport at a distance of 93 km.

Sea Port Connectivity: Mongla Sea Port is the nearest port to the proposed EZ site at a distance of 185 km. It is the 2nd busiest port in Bangladesh after Chittagong Port (297 km from EZ site). GoB is developing another port at Payra as a deep-sea port (205 km from site location). It is understood that the proposed EZ is located at a significant distances from sea ports of Bangladesh.

Land Port Connectivity: Benapole is the nearest land port located at around 200 km west of the proposed EZ site. It is Bangladesh's largest and busiest land port with a capacity to handle 2 million tonnes of goods per year. Bhomra Land Port is another port located at around 240 km west of the proposed EZ site, towards south of Benapole Port. It started its operations from May, 2013 and has a capacity to handle .5 million tonnes of goods per year.¹²

2.6.5. Utility Linkages at the Proposed EZ

Availability of utilities is most critical to support day to day operations of any industry. Different industries have varying requirement of utilities depending on their raw material and final products. Basic utilities that are required by any industry can be captured in four baskets i.e. power, water, gas and telecommunication facilities. It is important for industries to have access to cheap utilities in order to manufacture their products at competitive prices, since cost of utilities impact the manufacturing cost of products.

Power Availability: Presently, Jajira has 2 operational substations with capacity of 10 MVA each, having voltage of 33/11 KV which can be upgraded to 40 MVA each on requirement. As per discussions with REB officials, we were informed that the present demand in the region is of 8 MVA, the surplus power can be supplied to the EZ location, thus these substations can meet the power requirements of proposed EZ site during the construction phase. Both the substations are around 3 km away from the site location.

There are 2 additional substations under construction at the East and West boundaries of the proposed EZ site. These substations will also have a capacity of 10 MVA each, having voltage of 33/11 KV, which can be upgraded to 40 MVA each on requirement.

These substations are currently drawing power from Madaripur Grid, which has a capacity of 125/91 MVA. Construction of another Grid is also in progress in Shariatpur Sadar Upazila around 28 km from proposed site location. This Grid is expected to have a capacity of 160/240 MVA and will provide electricity to Jajira Upazila.

Basis discussions with REB officers, we were informed that 33 or 132 KV line can be provided at the proposed EZ site location, however a separate substation will have to be constructed for that purpose at the site location. Details about the same has been captured in the off-site infrastructure section of this report.

Power sources available in proximity of the proposed EZ site can meet the power requirements of the proposed EZ site during construction phase.

Water Availability: Presently there is no existing pumped water supply system present in the proposed site location. Source of irrigation and drinking water in the area of the EZ site location is ground water. Basis discussions with UNO officers, it was understood that ground water is available at a depth of 40-50 feet from the ground level. Potential for extracting water from Padma River can also be explored since the river is at a distance of around 2-3 km from site location. It was also observed that there are plenty of small channels and streams in the vicinity of proposed EZ site area, the same can be explored for extracting water for industrial use.

¹²
[http://bsbk.portal.gov.bd/sites/default/files/files/bsbk.portal.gov.bd/page/aff207ea_8eaa_470b_9280_c939c972cf7d/overview%20\(June'15\).pdf](http://bsbk.portal.gov.bd/sites/default/files/files/bsbk.portal.gov.bd/page/aff207ea_8eaa_470b_9280_c939c972cf7d/overview%20(June'15).pdf)

Proposed site has proximity to Padma River, thus the option of extracting water from Padma River may be further explored. Details regarding supply of water to the EZ site has been captured in the off-site infrastructure chapter of this report.

Gas Availability: Presently, there is no gas source or gas supply near to the proposed EZ. Gas Transmission Company Limited (GTCL) is the primary nodal agency responsible for laying down gas transmission pipelines in Bangladesh. Basis discussions with UNO officers and information available on website of GTCL, it was understood that the nearest gas pipeline is available in Munshiganj (located at road distance of around 50 km from the proposed EZ, on the other side of Padma River). GoB is undertaking a project to install 6.15 km long, 30-inch diameter gas pipeline over Padma River Bridge to west and south-west Bangladesh. It is expected that gas will be made available in Jajira region, once construction of Padma River Bridge is completed. Among the list of upcoming projects with GTCL, construction of Jajira-Gopalgonj 30”x 95 km gas pipeline and Payra-Barisal-Jajira gas pipeline is also on the cards.¹³ Though the projects are at conceptualization stage, GTCL anticipates establishing the pipelines by 2021.¹⁴ Proposed Payra-Barisal-Jajira gas pipeline will enable import of LNG from Payra port and transmission of the same to the national grid of Bangladesh.¹⁵ Establishing of gas pipeline in the proposed EZ region would boost setting up of industries like fertilizers, ceramics, cement etc. and also gas based power plants.

Gas is a comparatively cheaper fuel source to generate power, thus ensuring smooth industrial production. It is expected that BEZA officials can make provision to establish gas connection till proposed EZ site in future after the gas pipeline is established over Padma Bridge.

Telecom Availability: Telecommunication facility is available in the region of the proposed EZ site with major private telecom service providers (like Grameen Phone, Bharti Airtel, Banglalink, Teletalk) providing voice calling and internet facility. Optical fiber cables have been laid till Jajira UNO office and bandwidth of around 2 mbps is available. Optical fiber network at the proposed EZ could be set up by sourcing the telecom line from UNO office.

Wastewater Treatment Facility: Presently, there is no wastewater treatment facility in the vicinity of the proposed EZ site which can be used by the industries that would come up inside the EZ. Provision for wastewater treatment facility has been captured in the master planning section of this report.

Solid Waste Management Facility: Presently, there is no solid waste management facility in the vicinity of the proposed EZ site which can be used by the industries that would come up inside the EZ. Provision for solid waste management facility has been captured in the master planning section of this report.

2.6.6. Access to Social Infrastructure

An important predecessor for establishing of industries in a region is the type of social infrastructure that is present in the region. Quality of educational institutes determine the availability of skilled local manpower, quality of residential and medical facilities determine whether skilled manpower can be brought in from outside to work at a particular place or not. With the growth in economy, quality of lifestyle has become an important determining factor which can influence investment decisions for a particular place. Hence, it is important to understand social infrastructure available in Shariatpur district.

Academic Facilities: Shariatpur district has 2 Polytechnic Institute, 1 Technical School and College, 1 Nursing Institute, 43 Training Institutes for basic skill development and 64 Union Digital Centre for imparting knowledge about computers to the young people in the district. It also has several institutes which provide vocational training to students at Higher Secondary Education levels.

Some of the major colleges in Shariatpur district are –

- Shariatpur Polytechnic Institute
- Angaria Technical School and College

¹³ https://petrobangla.org.bd/admin/attachment/webtable/596_upload_o.pdf

¹⁴ <http://www.daily-sun.com/post/213515/Gas-pipeline-to-Gopalganj-thru-Padma-Bridge-likely>

¹⁵ <http://www.daily-sun.com/post/213515/Gas-pipeline-to-Gopalganj-thru-Padma-Bridge-likely>

- Joynagar Technical School

As per the TVET Census – 2015 report, there are 126 Vocational Institutes in Shariatpur district offering courses ranging from Computer Science, Telecommunications, Electrical and Electronics to Stitching, Garment Making, Pisciculture, Food and Beverage Technology, General House wiring etc.

International quality educational facilities are not available in this region. World class academic institutions are located in Dhaka (~80 km).

Access to both general and technical academic facilities in proximity will ensure availability of semi-skilled human resources in the proposed EZ.

Medical Facilities: There are 5 upazila health complex, 23 union sub centres, 115 community clinics, and 18 private clinics in Shariatpur district.¹⁶ In addition, there are also a few Union Health and Family Welfare Centres being operated by Directorate of General Health Services in Shariatpur district.

Presently there are no international standard medical facilities available at Shariatpur district. It is expected that upon completion of Padma River Bridge, healthcare facilities in Dhaka will be easily accessible to people in Shariatpur.

Access to basic healthcare facilities is necessary for catering to the requirements of the manpower employed in the proposed EZ.

Residential Facilities: Basic residential facilities are available in Jajira upazila. Basis preliminary site visit and discussions with local residents, we were informed that residential requirements of unskilled and semi-skilled manpower to be employed in the proposed EZ are available in the surrounding region. GoB has prepared a concept paper to develop modern townships in Jajira and Mawa region in order to support growth of tourism and industrialization in the region.¹⁷ With the construction of Padma Multipurpose Bridge, it is expected that the economy of Shariatpur district will witness a spurt in industrial activity and to support this, development of modern townships and international standard hotels in this region will become imperative.

Key Takeaway

The Proposed EZ site at Jajira is well connected by road network, which in turn connects the site to other modes of transportation (railways & ports). Preliminary assessment suggests that the site has access to multiple sources of water and power. Gas does not exist however, based on stakeholder discussion with UNO officials; we understand that the GoB has plans to supply gas in the region once the Padma Bridge is operational. In absence of existing effluent treatment facilities, provision for wastewater treatment and solid waste management to be done within the EZ site has been captured in the master planning section of this report. Basic social infrastructure is available in the region surrounding the EZ site, which can cater to the needs of semi-skilled and unskilled employees.

¹⁶ Local Health Bulletin, 2016 for Upazilas in Shariatpur district

¹⁷ <http://www.thedailystar.net/frontpage/2nd-padma-bridge-17-other-projects-govt-seeking-japanese-fund-1509418>

3. Benchmarking

3.1. Purpose and Objective

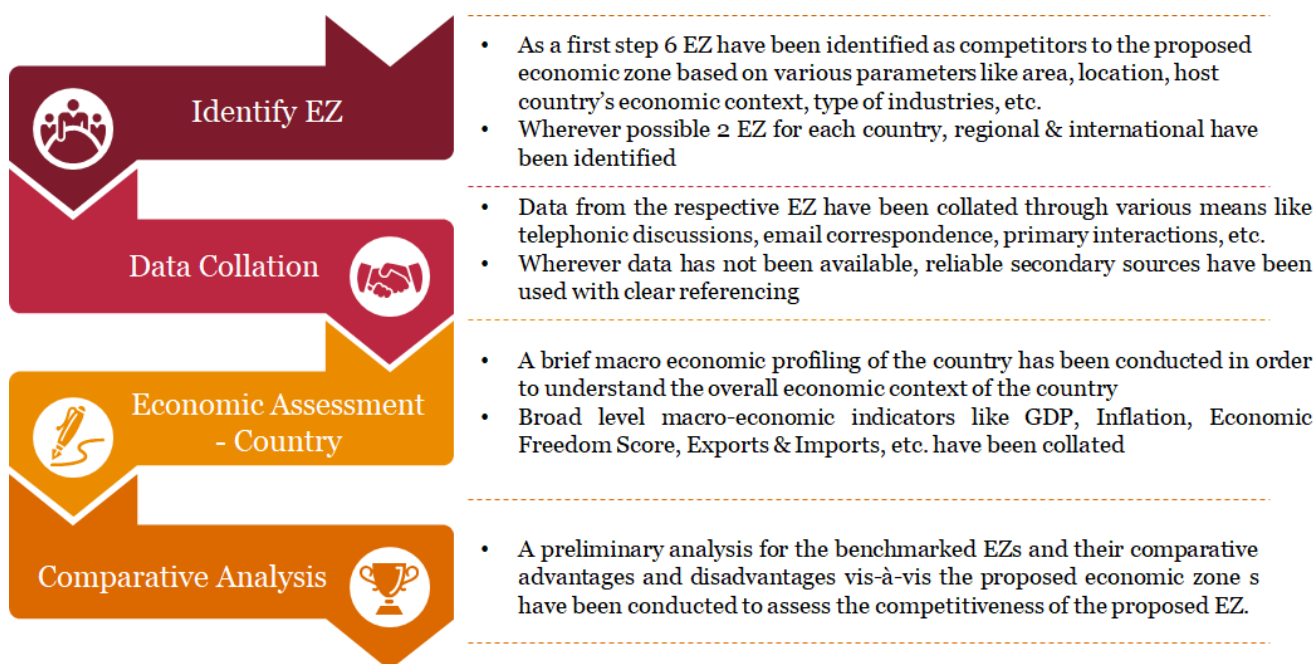
The success of an economic zone often hinges upon the competition experienced by it from similar developments either within the country or region. Additionally, at a planning stage a developer should be well abreast of various best practices and the quality of economic zones that are being developed across the world. Hence, studying of other economic zones and their development strategies are vital information for a developer to construct a state of the art industrial region which incorporates the best prevalent practices of the world.

Based on this premise, this chapter attempts to provide a profiling of various economic zones which share similar physical and economic attributes as the proposed economic zone.

3.2. Methodology of Benchmarking

The benchmarking exercise has been conducted through extensive research which entailed telephonic discussions, email correspondence, primary interactions, etc. with developers of economic zones. An illustration for the flow of the benchmarking exercise has been depicted below:

Figure 9: Benchmarking Methodology



The identification of economic zones has been carried out on the following broad parameters as described below:

Figure 10: Benchmarking Methodology

Area of Economic Zone	Wherever possible economic zones of similar sizes to the proposed EZ have been selected. However, this parameter has been kept flexible to accommodate more of comparable economic zones
Industry Type	Only those economic zones which are multi-product in nature have been considered for the benchmarking. Sector specific or service based economic zones have been ruled out
Product Offering	Economic zones offering superior quality infrastructure and professionally management have been considered. Non operational of decrepit zones have been ruled out.
Stage of Development	The benchmarking have been limited to economic zones that are in active stages of marketing. Non operational or saturated zones have not been considered

Post identification of the shortlisted EZs an information request mailer have been circulated to the respective marketing or business development teams for the EZs. The data thus obtained have been further validated through telephonic discussions with concerned persons in order to ensure data adequacy and accuracy.

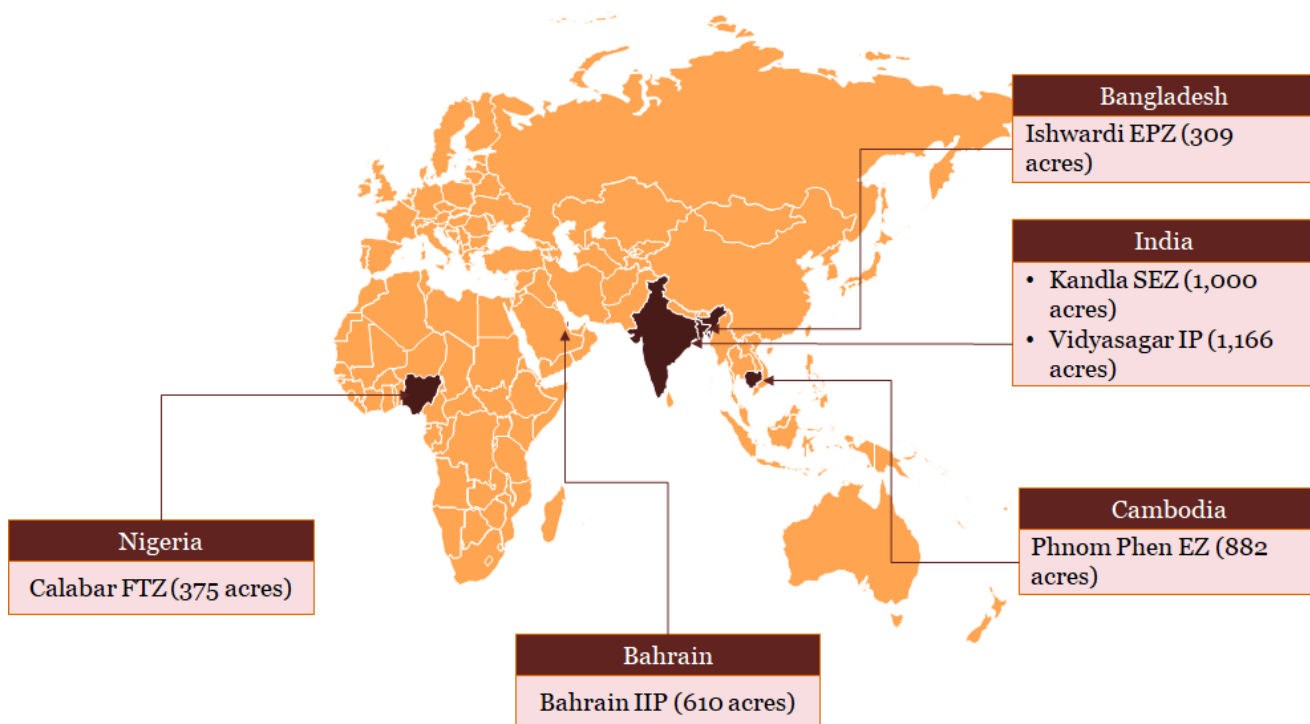
Post receipt of all data pints a brief macro-economic profiling of the respective countries have been conducted to assess their economic landscapes.

Finally a comparative assessment of all these EZs have been done with proposed EZ in Jajira to assess the comparative position of the proposed EZ in Jajira to each of these EZs.

3.3. Competitor Identification

The subject economic zone is located in Jajira and is envisaged to cover a **land area of approx. 532.14 acres** in Bangladesh. Bangladesh has not witnessed the development large scale organized economic zones as yet, however it has got a few small scale export processing zones. Hence, **an EPZ comparable** to the subject economic zone was identified within the country. Based on extensive research and the parameters as highlighted above, the following economic zones have been identified in the figure shown on next page.

Figure 11: Geographic Spread of Comparable EZ



Source: PwC Research

A brief overview and rationale for selection for each of these economic zones have been provided below:

Table 5: Brief Overview of Shortlisted SEZ

Name of economic zone	Country	Type of industries	Land Area	Rationale
Kandla SEZ	India	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)	1,000 acres	The Kandla Special Economic Zone is a Government promoted EZ in India and one of the oldest export processing zones of Asia. It is located in the western coast of India in the state of Gujarat and caters to a multitude of manufacturing industries like automotive, food & beverages, FMCG, etc. Hence, it is considered to be similar to the proposed EZ which is also oriented towards a host of industries within the manufacturing sector and promoted by the Government of Bangladesh. Thus this EZ has been considered to be a suitable competitor to the proposed EZ.
Vidyasagar Industrial park	India	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)	1,166 acres	The Vidyasagar Industrial Park is a multi-product industrial park located in the industrial town of Kharagpur in West Bengal, India. This industrial park is spread over approx. 1,166 acres and is promoted by the West Bengal Infrastructure Development Corporation. Although the proposed EZ is larger in quantum as compared to the subject EZ in Jajira; the industry mix and relative proximity on account of being located in West Bengal makes it a suitable competitor of the proposed EZ.

Name of economic zone	Country	Type of industries	Land Area	Rationale
Calabar Free Trade Zone	Nigeria	Manufacturing, Warehousing, Trading, Oil and Gas.	375 acres	The Calabar Free Trade Zone (CTFZ) is north of the port of Calabar and is adjacent to it providing easy freight transportation facilities. The Free Trade Zone started its operation in 2001 and is maintained by Federal government. The EZ is home to a diverse range of manufacturing products which is similar to the proposed EZ in Jajira. Keeping cognizance of the overall attributes of the zone it is believed to be a suitable comparable to the envisaged EZ in Jajira.
Phnom Penh	Cambodia	Textiles, Food processing, Plastic, Leather, automobile parts, electrical parts etc.	882 acres	Located in the capital city of Cambodia, the Phnom Penh SEZ is an important industrial hub of Cambodia. Located centrally in the heart of the region's east-west corridor, Phnom Penh SEZ provides easy sea access to Japan (via Ho Chi Minh City) and Singapore (via the Sihanoukville's deep-sea port). The EZ is home to varied sector of industries like textiles, food processing, leather, etc. similar to the proposed EZ. Hence, Keeping cognizance of the overall attributes of the zone it is believed to be a suitable comparable to the envisaged EZ in Jajira.
Bahrain International Investment park (BIIP)	Bahrain	Electrical and electronic goods, Textiles, fiberglass, plastics, pharmaceuticals, print and packaging, engineering components, Food processing	610 acres	Situated in the country of Bahrain, the Bahrain International Investment Park is positioned as a location for high quality foreign direct investment in Bahrain, offering a tax free location with full duty free access to Gulf Cooperation Council (GCC) markets. Projects from a wide range of sectors have been approved for the park including food products, medical technology, household products, electronics devices, packaging materials and electrical switchgear manufacturing. Hence, keeping in mind the size and overall industrial mix, this park has been chosen as a competitor for the proposed EZ in Jajira
Ishwardi EPZ	Bangladesh	Plastic goods, Garment Accessories, Metal Products, Garment Accessories, Miscellaneous, Electronics and electrical goods	309 acres	Ishwardi Export Processing Zone is one of the export processing zones in the Myemensingh division of Bangladesh. This is a multi-product EPZ and has similar types of industries which are being proposed within the envisaged EZ in Jajira. Moreover, the EZ is similar to the proposed EZ in Jajira hence considered as a suitable competitor.

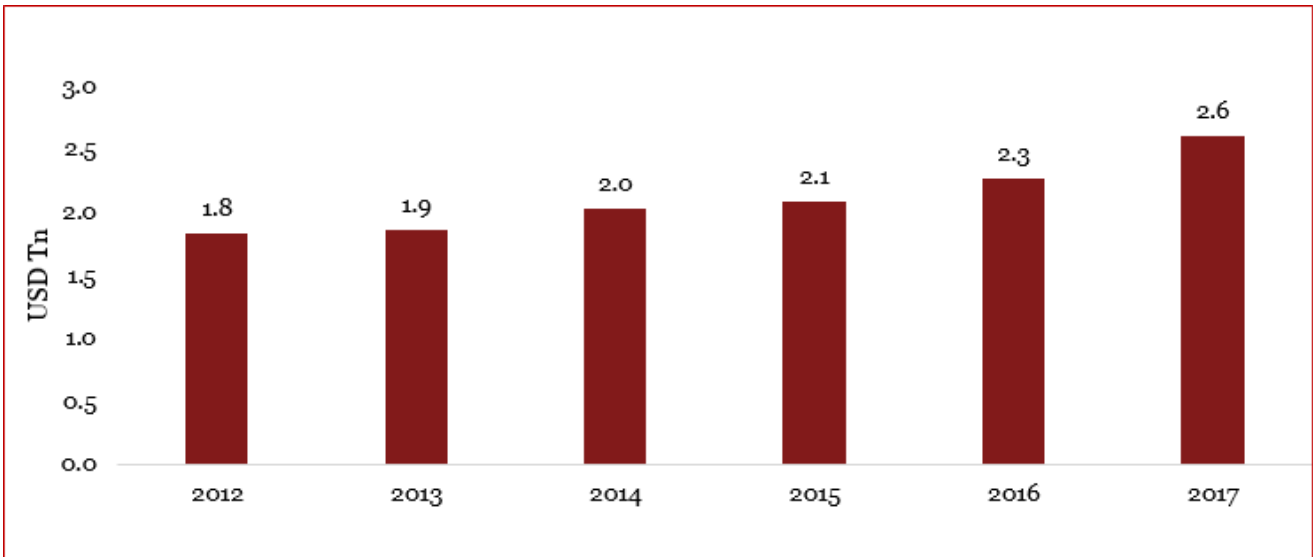
Source: PwC Research

The following sections of the report shall elucidate the macroeconomic landscape of the each of the host country and a profiling of the respective economic zones.

3.3.1. India

India is one of the largest trade partners of Bangladesh and share longstanding trade and cultural relationships. India also has one of the longest international borders with Bangladesh. India had started its special economic zone regime in 2001 and has successfully promoted a number of successful economic zones both through government initiatives as well as joint ventures with private sectors. India has emerged as one of the fastest growing economies of the world and registered healthy GDP growth rates as depicted below. **Data used for the analysis is the latest data point available in the respective database.**

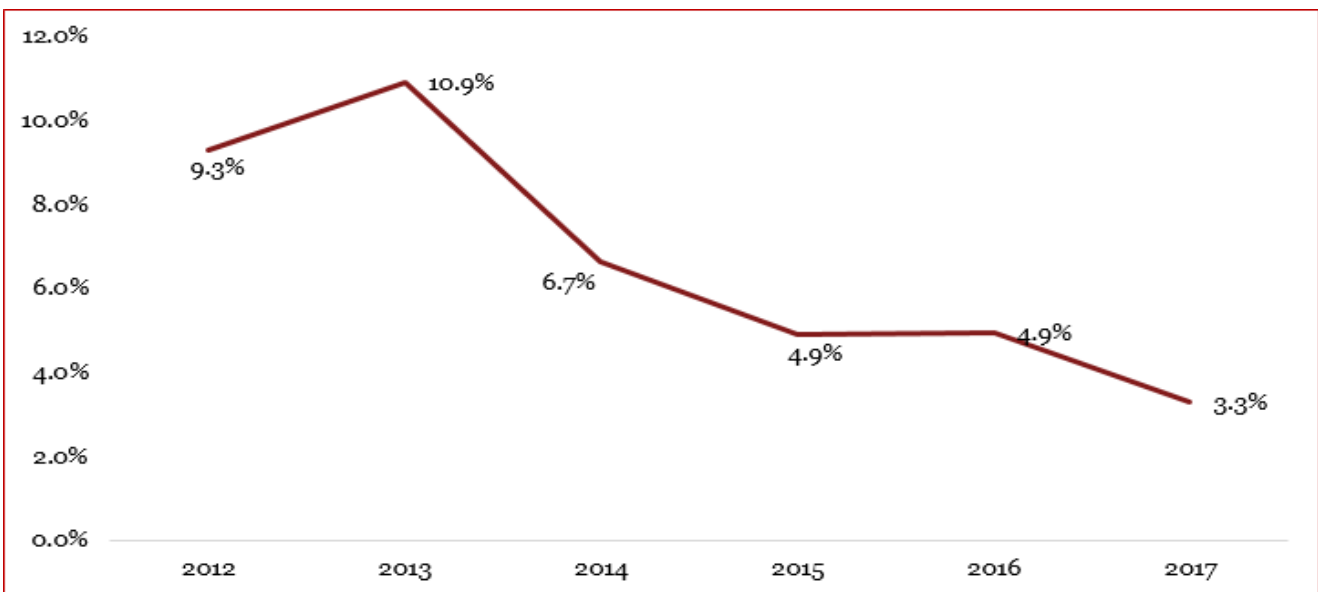
Figure 12: GDP Trend of India



Source: World Bank (<https://data.worldbank.org/country/india>)

Inflation rates in India have eased post a surge in the inflation rates owing to decreasing prices of food grains and the same is depicted below. **Data used for the analysis is the latest data point available in the respective database.**

Figure 13: Inflation Trend of India



Source: World Bank (<https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=IN>)

The other macroeconomic indicators for the country have been summarized below:

Table 6: Macro-economic Parameter of India

Macroeconomic Indicator	Description	Data Source
Unemployment	3.50%	The Heritage Foundation
FDI Inflow	\$40.0 billion	The World Bank
Exports	USD 295.8 billion	ITC Trade Map
Imports	USD 444 billion	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	130	The Heritage Foundation
Cato Institute's Human Freedom ranking	102	Human Freedom Index Cato Institute
World Economic Freedom's Global Competitive Index Rating	40	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	100	Doing Business 2018

India is an emerging economy with a predominantly restricted economy as might be deciphered from its rank of 130. The country is gradually shifting from being a largely regulated and restricted economy to a more open market economy. Economic liberalization measures, including industrial deregulation, privatization of state-owned enterprises, and reduced controls on foreign trade and investment began in the 1990s and unshackled the economy from a longstanding regime of regulations. The country also witnessed a paradigm shift in its taxation regime with introduction of Goods & Services Tax (GST). The restricted levels of economic freedom is also reflected in the human freedom ranking wherein India ranks fairly low.

Recent years have witnessed India gaining significantly on the economic competitiveness front and is leading group of South Asian economies. Some of the key factors contributing to the improved rankings are improvement in infrastructure, increased public investment and sped up approval procedures by the Government.

Post identification of the various macro-economic parameters of India, the subsequent section of the report intends to highlight the various attributes of each of the economic zones within the country.

3.3.1.1. Kandla Special Economic Zone

The Kandla Special Economic Zone is located in the western state of Gujarat in India. The economic zone was the first Export Processing Zone (EPZ) in Asia. The SEZ is spread across approx. 1,000 acres in close proximity to the Kandla Port. The Port of Kandla is India's hub for exporting grains and importing oil and one of the highest-earning ports in the country. The economic zone houses companies from a gamut of industries like pharmaceuticals, textiles, chemicals, etc. Being the first economic zone of the nation and owing to its strategic location within the industrial state of Gujarat, the location has witnessed healthy interest levels from investors especially within the pharmaceuticals and chemical sector. The zone also provides superior quality infrastructure along with reliable utility connectivity which has vastly facilitated investments within the zone.

Figure 14: Kandla Special Economic Zone



Source: Google Images

The detailed profiling of the Kandla Special Economic Zone is provided below:

Table 7: Kandla Special Economic Zone

Factors	Kandla SEZ
Site	
Land Size (acres)	1,000 acres
Number of Plots	Over 185 companies are operational within the special economic zone
No. of Development Phases	The development has been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	The land lease for industrial land is INR 211.75 / sq.m. / annum (USD 3.25 / sq.m / annum)
Pre-Built Factories (PBF) (Y/N)	There are Pre-Built Factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	<ul style="list-style-type: none"> Lease rentals for PBF are INR 1,500 / sq.m / annum (USD 23.03 / sq.m / annum) for ground floor built-up area;

Factors	Kandla SEZ
	<ul style="list-style-type: none"> Lease rentals for PBF are INR 1,325 / sq.m / annum (USD 20.34 / sq.m / annum) for first floor; Lease rentals for PBF are INR 1,150 / sq.m / annum (USD 17.65 / sq.m / annum) for second floor;
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	Fixed charges of INR 5 / Kwh ¹⁸ (USD 0.08 / Kwh)
Cost of Water (Taka/USD)	The charge of industrial water is INR 49.5 / KL ¹⁹ (USD 0.76 / KL)
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping to Chennai	<ul style="list-style-type: none"> Hamburg – Kandla → USD 1,415²⁰ Rotterdam – Kandla → USD 1,415²¹ Antwerp – Kandla → USD 1,303²² New York – Kandla → USD 1,888²³
Cost of Labor (Taka/USD)	
Management	The salary of a management professional in the state of Gujarat is approx. USD 201.7 / month ²⁴
Technicians	The salary of a technician in the state of Gujarat is approx. USD 186 / month ²⁵
Skilled	The salary of a skilled in the state of Gujarat is approx. USD 678 / month ²⁶
Unskilled	The salary of a unskilled in the state of Gujarat is approx. USD 100 / month ²⁷
Sectors	
Type of Sectors within the Zone	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)
Special Regime	
Yes/No	Yes , there's a special regime for incentives
Fiscal Incentives	
Customs Duties	Exemptions from Customs duty on imports.
Corporate Taxes / Indirect Taxes	Exemption from central and state level taxes
Income Tax on Profits	100% Income Tax exemption on export income for SEZ units under Section 10AA of the Income Tax Act for first 5 years, 50% for next 5 years thereafter and 50% of the ploughed back export profit for next 5 years.
Social Security Tax	No social security tax is available in India
No restrictions on Money Transfers	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval ²⁸ .

¹⁸ Source: <http://kasez.gov.in/wp-content/uploads/2017/07/INFRASTRUCTURE-DETAILS-IN-KASEZ.pdf>

¹⁹ Source: Kandla Special Economic Zones Authority

²⁰ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

²¹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

²² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

²³ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

²⁴ Source: <http://www.averagesalarysurvey.com/india>

²⁵ Source: <http://www.averagesalarysurvey.com/india>

²⁶ Source: <https://tradingeconomics.com/india/indicators>

²⁷ Source: <https://tradingeconomics.com/india/indicators>

²⁸ Source: <http://www.dobusinessinindia.in/repatriationoffund.php>

Factors	Kandla SEZ
Others	<ul style="list-style-type: none"> Exemption from Service Tax Exemption from payment of Royalties & Cess on construction materials
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes , there is a one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite Administration office is available within the zone
Onsite Convenience Retail	Onsite Convenience Retail is available within the zone
Onsite Housing	Onsite Housing is available (KASEZ Township) within the zone
Onsite Schools	Onsite Schools are not available within the zone
Onsite Community Facilities	Onsite Community Facilities are not available within the zone
Onsite Security	Onsite Security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	Number of apartments and housing facilities are available in Gandhidam
International Hospital/Clinic (Within 20km)	Ram Krishna super specialty hospital is available within close proximity of the economic zone
International Schools (Within 20 kms)	Quality schools like Alaina International school, Amarchand Singhvi International school etc. are available within close proximity of the zone

The SEZ in Kandla has well developed industrial infrastructure and access to major utilities like reliable power and water. Moreover, access to a deep sea port and other modes of transportation like railways and roads have acted as key enablers for this zone to create a positive end user perception.

3.3.1.2. Vidyasagar Industrial Park

The Vidyasagar Industrial Park is a multi-product industrial park located in the industrial town of Kharagpur in West Bengal, India. This industrial park is spread over approx. 1,166 acres and is promoted by the West Bengal Infrastructure Development Corporation (WBIDC). The economic zone houses industries from sectors like automotive, light engineering, etc. The industrial park has generated mild response from investor owing to issues pertaining to service and quality of infrastructure being provided.

Figure 15: Vidyasagar Industrial Park



Source: Google Images

Table 8: Vidyasagar Industrial Park

Factors	Vidyasagar Industrial Park
Site	
Land Size (acres)	1,166.64 acres
Number of Plots	Over 19 companies are operational within the special economic zone
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	There is a onetime upfront land premium payable of INR 58.32 Lakhs / acre (USD 89,637 / acre) . ²⁹
Pre-Built Factories (PBF) (Y/N)	There are no Pre-Built Factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	There is no lease rate for PBF since PBF are not provided
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The cost of power is approx. INR 7.45 / kWh (USD 0.11 / kWh) for industries ³⁰
Cost of Water (Taka/USD)	The cost of industrial water is approx. INR 18 / KL (USD 0.28 / KL) ³¹

²⁹ Source: http://www.wbidc.com/industrial_parks/available_land.htm

³⁰ Source: https://www.wbsecl.in/irj/go/km/docs/internet/new_website/pdf/Tariff_Volumn/PDFsam_mergetariff2.pdf

³¹ Source: Interactions with WBIDC officials

Factors	Vidyasagar Industrial Park
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping to Kolkata	<ul style="list-style-type: none"> Hamburg – Kolkata → USD 1312-1677³² Rotterdam – Kolkata → USD 1285-1665³³ Antwerp – Kolkata → USD 1370-1665³⁴ New York – Kolkata → USD 836-924³⁵
Cost of Labor (Taka/USD)	
Management	The salary for a management professional in West Bengal is approx. USD 1,125 / month ³⁶
Technicians	The salary for a technician in West Bengal approx. USD 478 / month ³⁷
Skilled	The salary for a skilled labour in West Bengal approx. USD 153 / month ³⁸
Unskilled	The salary for an un-skilled labour in West Bengal approx. USD 115 / month ³⁹
Sectors	
Type of Sectors within the Zone	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)
Special Regime	
Yes/No	Yes , there's a special regime for incentives
Fiscal Incentives	
Customs Duties	No exemption on custom duties are applicable
Corporate Taxes / Indirect Taxes	No exemption on corporate taxes are applicable
Income Tax on Profits	No exemption of income tax profits are applicable
Social Security Tax	No exemption on social security taxes are applicable
No restrictions on Money Transfers	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval ⁴⁰ .
Others	<ul style="list-style-type: none"> 100% of Electricity Duty subject to the maximum ceiling of INR 25 lakhs / year / INR 1.25 crores in 5 years (USD 38,450 / year to USD 192,250 in 5 years) An eligible unit in the medium and large sector will be entitled to reimbursement to the extent of 80% of contribution towards Employee Provident Fund and Employees' State Insurance Industries shall be eligible for 75% of refund of stamp duty Anchor unit subsidy of INR 100 lakh (USD 153,800) shall be offered for the first two manufacturing enterprises with minimum employment of 100 members and minimum investment of INR 50 Crore (USD 7,690,000) Industrial units will be encouraged for filing their successfully generated, registered and accepted patents based on their original work/research. The State Government will provide financial

³² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

³³ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

³⁴ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

³⁵ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

³⁶ Source: https://www.payscale.com/research/IN/Job=General_%2F_Operations_Manager/Salary/6e042b69/Kolkata

³⁷ Source: <http://www.averagesalarysurvey.com/calcutta-india>

³⁸ Source: <https://paycheck.in/main/salary/minimumwages/west-bengal>

³⁹ Source: <https://paycheck.in/main/salary/minimumwages/west-bengal>

⁴⁰ Source: <http://www.dobusinessinindia.in/repatriationoffund.php>

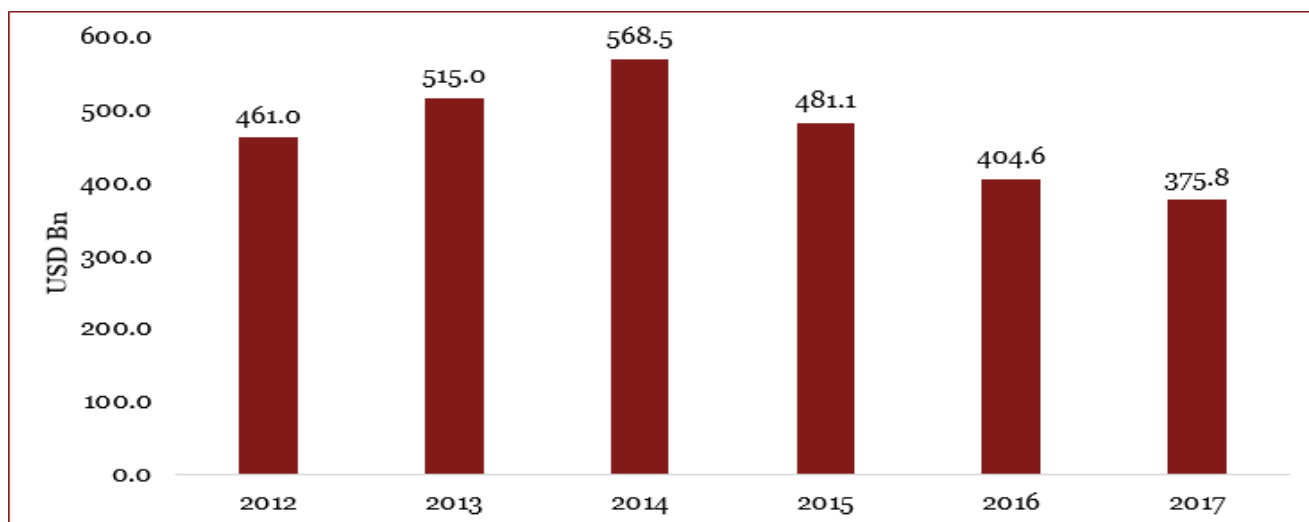
Factors	Vidyasagar Industrial Park
	<p>assistance of 50% of the expenditure incurred, up to a maximum of INR 2 lakh (USD 3,076), / patent. The expenditure incurred will include the amount spent on filing of patent, attorney fees, patent tracking etc.</p> <ul style="list-style-type: none"> • 75% waiver of fees incurred towards land conversion charges
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes , there is a one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite Administration office is available within the zone
Onsite Convenience Retail	Onsite Convenience Retail is not available within the zone
Onsite Housing	Onsite Housing is not available within the zone
Onsite Schools	Onsite Schools is not available within the zone
Onsite Community Facilities	Onsite Community Facilities is not available within the zone
Onsite Security	Onsite Security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	A number of apartments/ housing facilities are available around the SEZ in Kharagpur town.
International Hospital/Clinic (Within 20km)	SK Multi-specialty hospital, Glocal Hospital and various other hospitals are present around the SEZ
International Schools (Within 20 kms)	Quality schools like St. Agnes school is available in close proximity to the zone

Although the park is promoted by the nodal agency for industries, poor quality infrastructure, lackadaisical approach of Government has resulted in this park witnessing feeble interest from investors.

3.3.2. Nigeria

Nigeria is a Federal Republic country in the West Africa. It is the 32nd largest country by area and 7th most populous country in the world marginally ahead of Bangladesh (8th). Nigeria is a lower middle income group with a mixed economy. The economy of Nigeria is dependent primarily on oil, agriculture. The remittances from other parts of the world is another source of income with manufacturing gaining steam. The major exports of Nigeria are Oil, Cocoa, wood etc. with oil having a share of more than 90% of exports. The primary imports include machinery, electric machinery and equipment, plastics etc. Nigeria after the military rule has improved its economy and is the largest economy in Africa surpassing South Africa. Nigeria has witnessed recessionary trends in its economy owing to falling oil prices and shrinkage of production due to insurgencies. The GDP trend of Nigeria has been depicted in the next page. **Data used for the analysis is the latest data point available in the respective database.**

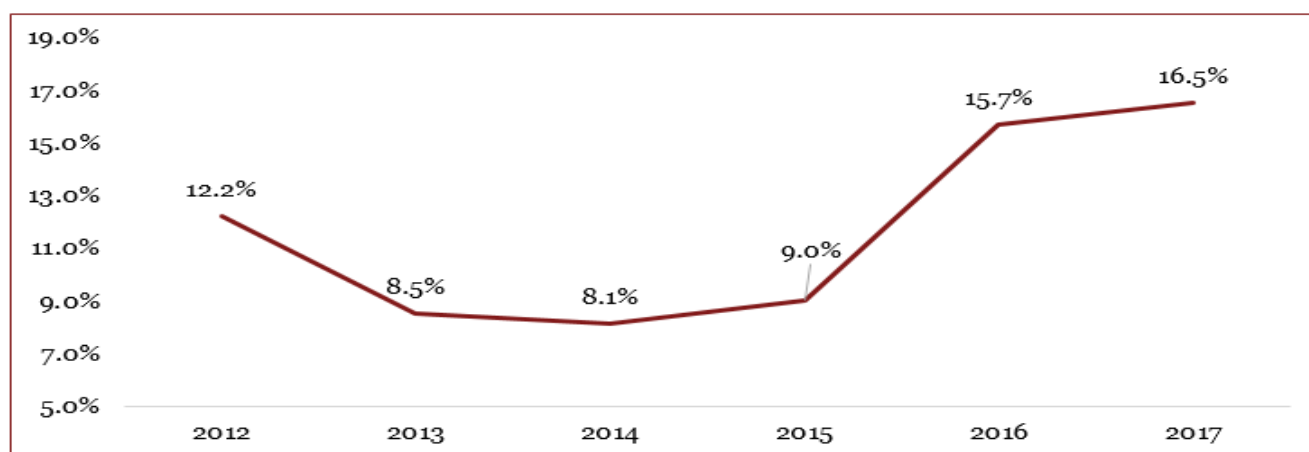
Figure 16: GDP Trend of Nigeria



Source: World Bank

Inflation in Nigeria had increased sharply owing to steep rise in prices of food items like potatoes, yams and other tubers, milk cheese and eggs, bread and cereals, coffee tea and cocoa. This rise in prices have been fueled by political unrest in various parts of the country. **Data used for the analysis is the latest data point available in the respective database.**

Figure 17: Inflation Trend of Nigeria



Source: World Bank

The other macroeconomic indicators for the country have been summarized below:

Table 9: Macro-economic Parameter of Nigeria

Macroeconomic Indicator	Description	Data Source
Unemployment	5%	The Heritage Foundation
FDI Inflow	\$4.4 billion	The Heritage Foundation
Exports	USD 40.7 billion	ITC Trade Map
Imports	USD 28.9 billion	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	104	The Heritage Foundation
Cato Institute's Human Freedom ranking	133	Human Freedom Index Cato Institute

Macroeconomic Indicator	Description	Data Source
World Economic Freedom's Global Competitive Index Rating	125	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	145	Doing Business 2018

Nigeria is the most populous country in Africa and one of the key economies of Africa. Nigeria has been striving to achieve freedom in economic activities however, actual implementation of free market reforms has been very slow. Low global oil prices have adversely impacted the petroleum-based economy of the country. Economic growth has been driven by agriculture, telecommunications, and services, but diversification has yet to help a significant majority of the population who live in poverty. Severe economic policy distortions and a lack of transparency in the economic system continue to deter progress in Nigeria. Moreover, repeated attacks by insurgent groups have also inhibited investor's confidence which also has reflected on the Human Freedom Ranking.

Post identification of the various macro-economic parameters of Nigeria, the subsequent section of the report intends to highlight the various attributes of the Calabar Free Trade Zone within the country.

3.3.2.1. Calabar Free Trade Zone (CFTZ)

The Calabar Free Trade Zone is a part of the Nigerian Export processing zone Authority (NEPZA) which is the nodal agency for promoting industrialization in Nigeria. The Calabar FTZ is located in "Cross river state", South part of Nigeria. The CTFZ is north of the port of Calabar and is adjacent to it providing easy freight transportation facilities. The Free Trade Zone started its operation in 2001 and is maintained by Federal government. In 2009 many companies faced power problems in the zone which affected the zone development. Lack of dredging in the Calabar River made Calabar port unusable forcing companies to shift to other ports. The FTZ is maintained by government and allows all the multi-product manufacturing units making it idyllic for comparable with Jajira.

Figure 18: Calabar FTZ



Source: Google Image

A detailed profiling of the economic zone is presented below:

Table 10: Calabar Free Trade Zone

Factors	Calabar Free Trade Zone (CFTZ)
Site	
Land Size (acres)	375 acres
Number of Plots	Over 78 companies are registered in CFTZ.
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Land is available for sale at a cost of USD 50 / sq.m.
Pre-Built Factories (PBF) (Y/N)	There are no Pre-Built Factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	There is no lease rate for PBF since PBF are not provided
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The Cost of Power is N 75 / Kwh (USD 0.21 / Kwh)
Cost of Water (Taka/USD)	The charge of industrial water is N 200 / liter (USD 0.56 / liter)
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available.
Transport costs	
Cost of shipping 20 foot FCL container shipping to Chennai	<ul style="list-style-type: none"> • Hamburg – Calabar port → USD 1475-2051⁴¹ • Rotterdam – Calabar port → USD 1439-2014⁴² • Antwerp – Calabar port → USD 1402-1978⁴³ • New York – Calabar port → USD 1100-1775⁴⁴
Cost of Labor (Taka/USD)	
Management	The average salary of management of NGN 3,00,978 / month (USD 827 / month) ⁴⁵
Technicians	The average monthly salary for Technicians is NGN 1,50,307 / month (USD 413/month) ⁴⁶
Skilled	The average monthly salary of skilled laborers is NGN 43,672 / month (USD 120 / month) ⁴⁷
Unskilled	The average monthly salary of unskilled laborers is NGN 18,197 / month (USD 50/month) ⁴⁸
Sectors	
Type of Sectors within the Zone	Electrical & Electronic Products, Textile Products, Leather Products, Pharmaceuticals, etc.
Special Regime	
Yes/No	Yes , there's a special regime for incentives
Fiscal Incentives	
Customs Duties	Exemption from payment of customs and import duties.
Corporate Taxes / Indirect Taxes	<ul style="list-style-type: none"> • 20% tax deduction for providing new Infrastructure. • Complete tax holiday from all the state/ central government taxes.
Income Tax on Profits	Income tax exemption is at 30%.
Social Security Tax	Employers are required to make monthly contributions of 1% of payroll to the National Social Insurance Trust Fund. ⁴⁹

⁴¹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁴² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁴³ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁴⁴ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁴⁵ Source: <https://www.mysalariescale.com/blog/7-types-engineers-nigeria-salary-structures/>

⁴⁶ Source: <https://www.mysalariescale.com/blog/7-types-engineers-nigeria-salary-structures/>

⁴⁷ Source: <https://mywage.org/nigeria/salary/salary-check#/>

⁴⁸ Source: <https://mywage.org/nigeria/labour-law/work-and-wages>

⁴⁹ Source: <https://www.pwc.com/gx/en/services/people-organisation/social-security.html>

Factors	Calabar Free Trade Zone (CFTZ)
No restrictions on Money Transfers	Transfer pricing is applicable according to the Transfer Pricing Regulation, 2012. ⁵⁰
Others	<ul style="list-style-type: none"> • Investment tax credit at the current rate of 5% • Royalty at the rate of 7% on shore and 5% off shore
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes , there is one stop shop for the EPZ.
Support Amenities	
Onsite Administration office	Onsite Administration office is available within the zone
Onsite Convenience Retail	Onsite Convenience Retail is not available within the zone
Onsite Housing	Onsite Housing is not available within the zone
Onsite Schools	Onsite Schools is not available within the zone
Onsite Community Facilities	Onsite Community Facilities is not available within the zone
Onsite Security	Onsite Security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	Independent dwelling houses are available in close proximity to the zone
International Hospital/Clinic (Within 20km)	Quality hospital like Arubah Specialist Hospital is present in close proximity to the zone
International Schools (Within 20 kms)	Quality school like Surefoot International School is present in close proximity to the zone

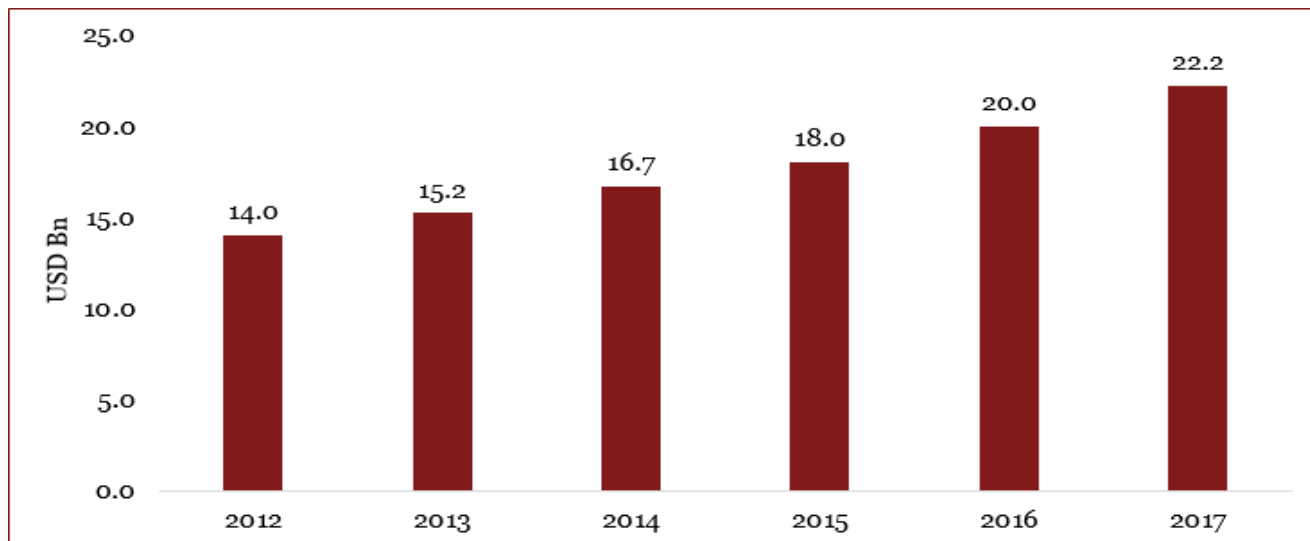
This zone has suffered from inefficient governance and maintenance and safety issues which have significantly inhibited the zone's investment attracting potential.

3.3.3. Cambodia

Cambodia is a South-east Asian country with its economy mostly dependent on textiles, tourism and agriculture. The garment industry is a source of large share of economy to the country similar to Bangladesh. Cambodia however also gets a significant amount of revenue generation from tourism. Cambodia has a long history of trade through sea ports. Sihanoukville Autonomous Port is the deep sea port in Cambodia. Nearly 80% of the country exports are apparel. Following more than two decades of strong economic growth, Cambodia has attained the lower middle-income status and the same has been depicted in the next page. **Data used for the analysis is the latest data point available in the respective database.**

⁵⁰ Source: http://pwcngigeria.typepad.com/files/tp-rules_firs-presentation.pdf

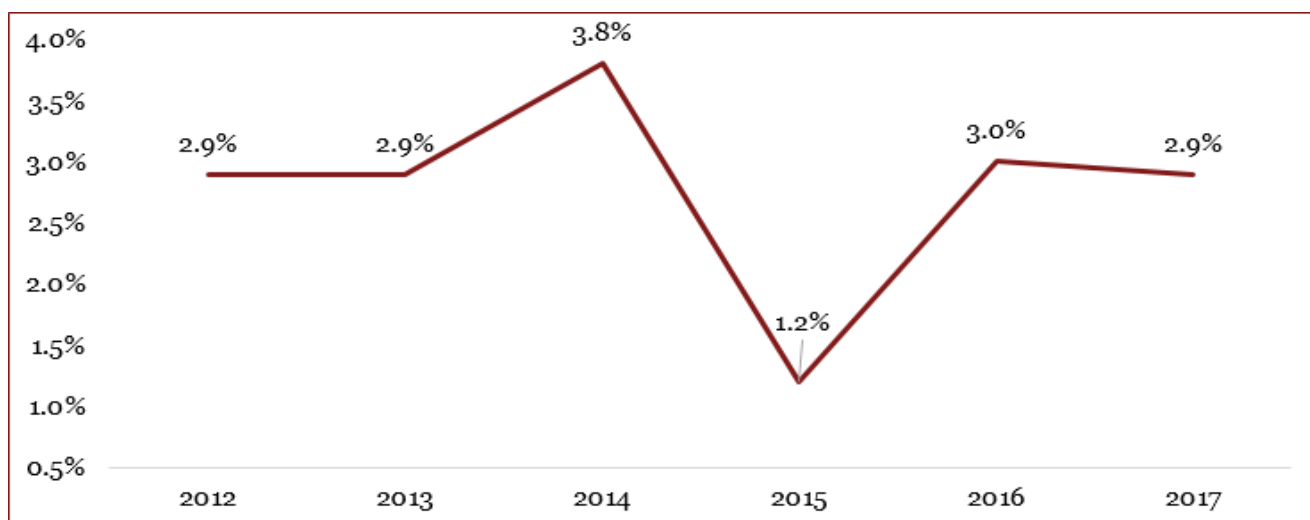
Figure 19: GDP Trend of Cambodia



Source: The World Bank

The Inflation rate has seen a substantial decrease after its peak in 2008 which coincided with the global economic meltdown. One of the reason for the dipping inflation rate has been the fall in oil prices. The inflation of Cambodia has been depicted below. **Data used for the analysis is the latest data point available in the respective database.**

Figure 20: Inflation Trend of Cambodia



Source: The World Bank

The other macro-economic parameters of Cambodia have been presented below:

Table 11: Macro-economic Parameter of Cambodia

Macroeconomic Indicator	Description	Data Source
Unemployment	0.3%	The Heritage Foundation
FDI Inflow	USD 2.8 billion	The World Bank
Exports	USD 10.07 billion	ITC Trade Map

Macroeconomic Indicator	Description	Data Source
Imports	USD 10.07 billion	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	101	The Heritage Foundation
Cato Institute's Human Freedom ranking	58	Human Freedom Index Cato Institute
World Economic Freedom's Global Competitive Index Rating	94	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	135	Doing Business 2018

The economic growth in Cambodia is boosted by the garment industry that is well integrated into the world trading system. However, the country's overall score has decreased owing to with declines in property rights, labor freedom, and fiscal health outweighing an improvement in government integrity. Cambodia's economy is heavily dependent on tourism and the apparel industry. More than half of the labor force is engaged in subsistence farming, and Cambodia remains one of Asia's poorest countries.

Post analysis of the broad macro-economy of Cambodia, an analysis of the Phnom Penh SEZ has been provided on the below.

3.3.3.1. Phnom Phen Economic Zone

Phnom Phen SEZ located 10 kms from the city of Phnom Penh has been established in 2006. Since its inception it has been a driving factor for growth and investments. Located in the capital city of Cambodia, the SEZ received special attention of foreign companies and investors. Currently over 80 International companies from 15 different nations have invested in the SEZ. The SEZ has a leading number of investors and investments from Japan. The SEZ along with its tenants has signed an MOU with anti-corruption unit of Cambodia to increase transparency. A disaster prevention support system has been set up too. All these facilities combined with initiatives and strategic location made Phnom Phen SEZ an ideal location for investors in Cambodia.

Figure 21: Phnom Phen SEZ



Source: Google Images

A detailed profiling of the Phnom Phen SEZ is provided in the next page:

Table 12: Phnom Penh SEZ

Factors	Phnom Penh SEZ
Site	
Land Size (acres)	882 acres
Number of Plots	Over 88 companies are operational within the special economic zone
No. of Development Phases	The development have been carried out over a period of time but in three phases
Land Lease (+length) or Sale (Taka/USD)	Land lease available at USD 70 / sq.m. Land sale or lease is up to 50 years.
Pre-Built Factories (PBF) (Y/N)	There are no Pre-Built Factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	There is no lease rate for PBF since PBF are not provided
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	Charge of Power is USD 0.19 / KWh of electricity consumed
Cost of Water (Taka/USD)	The charge of industrial water is USD 0.3 / KL
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping to Chennai	<ul style="list-style-type: none"> • Hamburg – Phnom Penh Autonomous Port → USD 1,287⁵¹ • Rotterdam – Phnom Penh Autonomous Port → USD 1,342⁵² • Antwerp – Phnom Penh Autonomous Port → USD 1,330⁵³ • New York – Phnom Penh Autonomous Port → USD 1,503⁵⁴
Cost of Labor (Taka/USD)	
Management	The average salary for a management professional is approx. USD 2,156 / month ⁵⁵
Technicians	The average salary for a technician in Alabauga is approx. USD 400 / month ⁵⁶
Skilled	The average salary for a skilled laborer is approx. USD 359 / month ⁵⁷
Unskilled	The average salary for a un-skilled laborer is approx. USD 153 / month ⁵⁸
Sectors	
Type of Sectors within the Zone	Textiles, Food Processing, Plastic, Leather, Automobile Parts, Electrical Parts etc.
Special Regime	
Yes/No	Yes , there's a special regime for incentives
Fiscal Incentives	
Customs Duties	<ul style="list-style-type: none"> • Import duty exemption on construction materials and production equipment • Import duty exemption on production materials for export industry and export duty exemption;
Corporate Taxes / Indirect Taxes	Exemption of 10% VAT in addition to import duty exemption.
Income Tax on Profits	There is profit tax exemption with a concept of “Trigger Period” + 3 years + Priority Period. The maximum trigger period is the first year of profit or 3 years after the tenant earns its first revenue, whichever sooner

⁵¹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁵² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁵³ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁵⁴ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁵⁵ Source: <http://www.averagesalarysurvey.com/cambodia>

⁵⁶ Source: <http://www.averagesalarysurvey.com/cambodia>

⁵⁷ Source: <https://tradingeconomics.com/cambodia/minimum-wages>

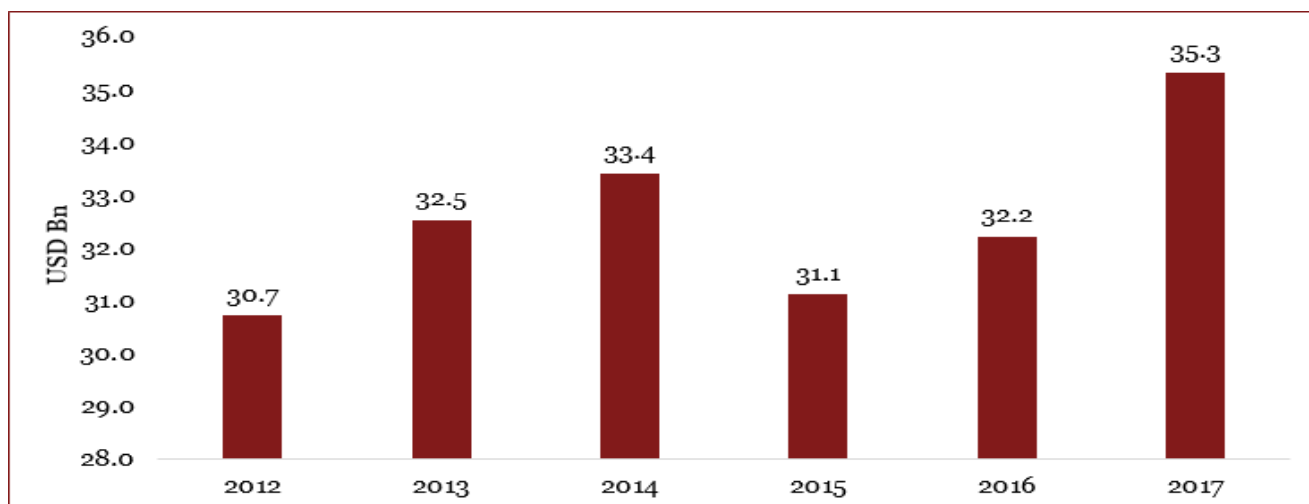
⁵⁸ Source: <https://tradingeconomics.com/cambodia/minimum-wages>

Factors	Phnom Penh SEZ
Social Security Tax	Employers are required to contribute 0.8% of the average monthly wage of workers to the National Social Security Fund (NSSF) as Social Security Tax
No restrictions on Money Transfers	There are currently no restrictions on the repatriation of profit or capital derived from investments made in Cambodia, nor on most transfers of funds abroad. The Law on Investment guarantees that investors can freely remit foreign currencies abroad for the purposes of repatriation of invested capital on dissolution of an investment project.
Others	50 year lease of land available to foreign investors (renewable and transferable)
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes , there is a one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite Administration office is available within the zone
Onsite Convenience Retail	Onsite Convenience Retail is not available within the zone
Onsite Housing	Onsite Housing is not available within the zone
Onsite Schools	Onsite Schools is not available within the zone
Onsite Community Facilities	Onsite Community Facilities is not available within the zone
Onsite Security	Onsite Security available within the zone
Quality of Life	
International Housing (Within 15 Km)	International Housing is not available within close proximity of the zone
International Hospital/Clinic (Within 20km)	Quality hospital like Royal Phnom Penh Hospital is available in close proximity to the zone
International Schools (Within 20 kms)	There are many schools of International repute like Northbridge International school, International school of Cambodia etc. in close proximity to the zone

3.3.4. Bahrain

The Kingdom of Bahrain is an island country in the Persian Gulf which falls under high income economy. The economy of Bahrain is diverse and sustainable. The currency of Bahrain is the second most valued in the world. Bahrain's investments were mostly in banking and tourism sectors since two decades. Financial centers in the country's capital Manama have seen the fastest growth in the world. The major exports of the country are oil/petroleum crude oil followed by aluminum. They constitute to most of the government revenues. The major imports of the country are machinery and chemicals. Bahrain is one of the few nations where personal income tax is not levied. The GDP trend of Bahrain is shown in the next page. **Data used for the analysis is the latest data point available in the respective database.**

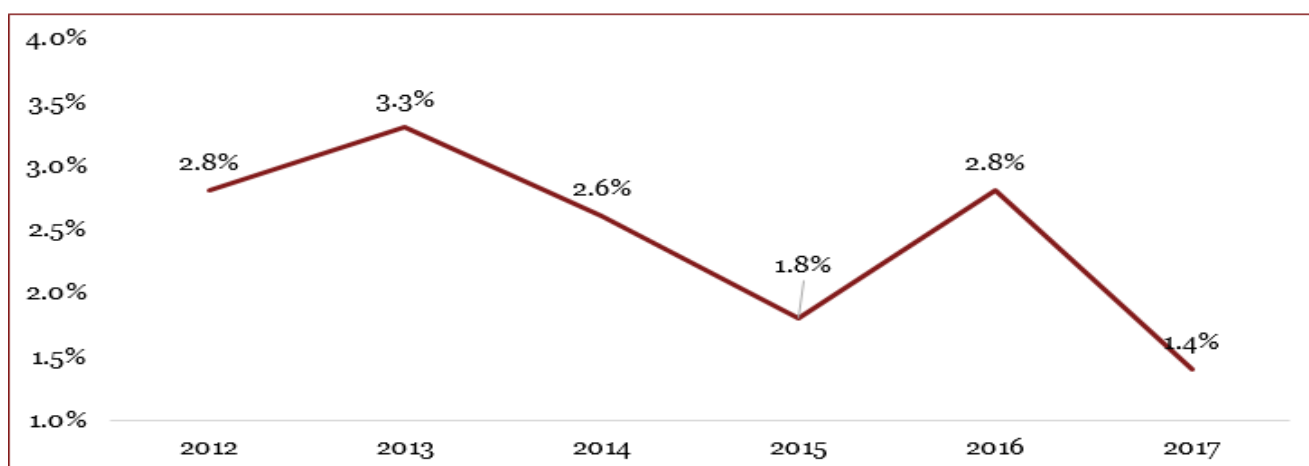
Figure 22: GDP Trend of Bahrain



Source: The World Bank

Bahrain's recent decrease in inflation trend might be attributed to a robust non-oil sector, with the wholesale and retail trade, hotels and restaurant sub-sectors performing strongly. Austerity measures by the government helped in decreased inflation rate in 2017. **Data used for the analysis is the latest data point available in the respective database.**

Figure 23: Inflation Trend of Bahrain



Source: The World Bank

Post analysis of the broad macro-economy of Bahrain, an analysis of the Bahrain International Investment Park (BIIP) has been provided below:

Table 13: Macro-economic Parameter of Bahrain

Macroeconomic Indicator	Description	Data Source
Unemployment	1.3%	The Heritage Foundation
FDI Inflow	\$281.9 million	The Heritage Foundation
Exports	USD 9.9 billion	ITC Trade Map
Imports	USD 11.9 billion	ITC Trade Map

Macroeconomic Indicator	Description	Data Source
Heritage Foundation's Index of Economic Freedom Rankings.	50	The Heritage Foundation
Cato Institute's Human Freedom ranking	88	Human Freedom Index Cato Institute
World Economic Freedom's Global Competitive Index Rating	44	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	66	Doing Business 2018

Bahrain is the 50th most free economy in the world. Of the six Gulf Cooperation Council (GCC) states, Bahrain has been the most affected by the political unrest in 2011 which has impeded economic developments within the country. Bahrain's economy has also been hard hit by the lowering of oil prices and the Government also faces the long-term challenge of boosting Bahrain's regional competitiveness. The Government also is facing pressure to maintain generous state subsidies and a large public sector. Due to declining global oil prices, the government has focused on reining in public spending by reducing subsidies for fuels, food items, water, and electricity.

3.3.4.1. Bahrain International Investment Park (BIIP)

The Bahrain International Investment Park (BIIP) is a superior quality Business Park that has been developed by the Ministry of Industry, Commerce and Tourism. The Park I situated in a strategic location with good connectivity and access to both the Bahrain International Airport and the Shaikh Khalifa Sea Port in Hidd.

BIIP which is considered a landmark development in Bahrain has been positioned as a destination for high quality foreign direct investment and export oriented domestic products. It focuses on attracting high value added products that create quality employment and wealth. It is envisaged that investment in the park will be primarily in internationally traded manufacturing or services activities.

Figure 24: Bahrain International Investment Park (BIIP)



Source: Google Images

A detailed profiling of the park is provided below –

Table 14: Bahrain International Investment Park (BIIP)

Factors	Baharin International Investment Park
Site	
Land Size (acres)	610 acres
Number of Plots	Over 56 companies are operational within the special economic zone

Factors	Baharin International Investment Park
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Land lease is available at the rate of USD 2.66/sq.m/year and the lease period is 25 years.
Pre-Built Factories (PBF) (Y/N)	Yes. There are Pre-Built factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	The lease rentals for Pre-Built Factories are approx. BD 2.5/sq.m/month
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The cost of power ranges between USD 0.04 to 0.08 / Kwh
Cost of Water (Taka/USD)	The charge of industrial water ranges between USD 1.06 to 1.99 / KL
Onsite Wastewater Treatment Plant (Y/N)	There is no onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping to Chennai	<ul style="list-style-type: none"> • Hamburg – Khalifa Bin Salman Port → USD 920-1226⁵⁹ • Rotterdam – Khalifa Bin Salman Port → USD 925-1233⁶⁰ • Antwerp – Khalifa Bin Salman Port → USD 924-1275⁶¹ • New York – Khalifa Bin Salman Port → USD 1085-1964⁶²
Cost of Labor (Taka/USD)	
Management	The average salary of production manager in Bahrain is approx. BHD1,694 / month (USD 4,491 / month) ⁶³
Technicians	The average salary of a technician in Bahrain is approx. BHD 600 /month (USD 1,591/month) ⁶⁴
Skilled	The average salary of a technician in Bahrain is approx. BHD 425 / month (USD 1,127 / month) ⁶⁵
Unskilled	The average salary of unskilled labor in Bahrain is approx. BHD 150 / month (USD 400/month) ⁶⁶
Sectors	
Type of Sectors within the Zone	Electrical and electronic goods, Textiles, fiberglass, plastics, pharmaceuticals, print and packaging, engineering components, Food processing etc...
Special Regime	
Yes/No	Yes, there's a special regime for incentives
Fiscal Incentives	
Customs Duties	Exemption from import duties on raw materials and equipment is permitted
Corporate Taxes / Indirect Taxes	0% corporate tax (with a 10 year guarantee) is provided
Income Tax on Profits	There is no income tax levied in Bahrain
Social Security Tax	The current rate of contributions to the Social Insurance Organization (SIO) is 19% for local employees (12% employer; 7% employee) and 4% for expatriate employees (3% employer; 1% employee)
No restrictions on Money Transfers	100% repatriation of capital is allowed
Others	<ul style="list-style-type: none"> • Duty free access to all GCC markets (unlike Free Zones in the region)

⁵⁹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁶⁰ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁶¹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁶² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁶³ Source: <https://www.albawaba.com/business/here-are-top-20-salaries-bahrain-2018-1121680>

⁶⁴ Source: <https://www.paylab.com/BH/salaryinfo/top-management>

⁶⁵ Source: <https://www.paylab.com/BH/salaryinfo/top-management>

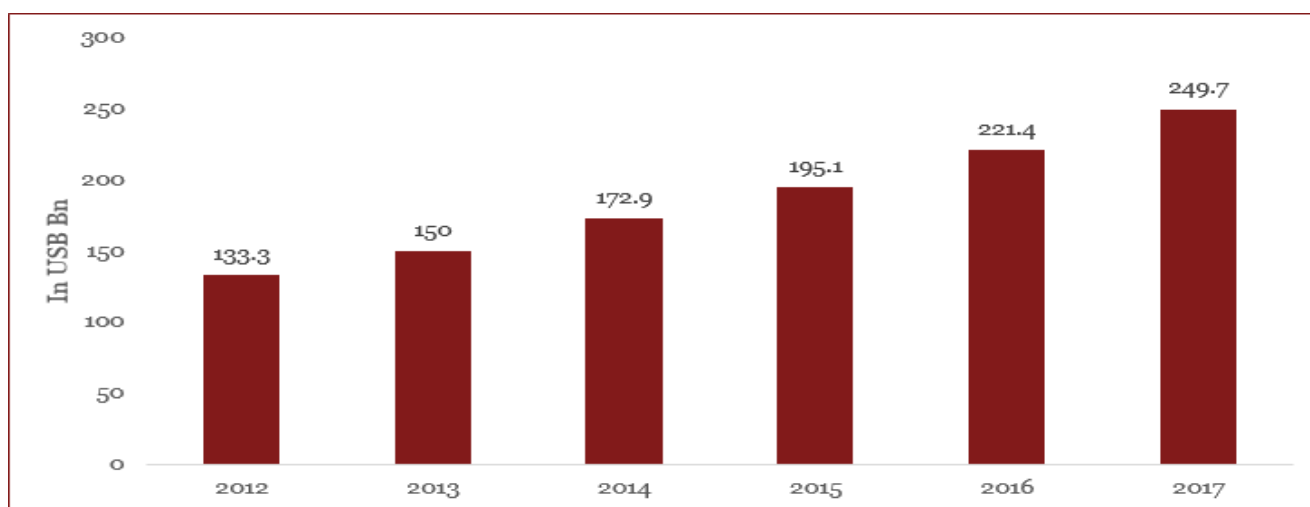
⁶⁶ Source: <https://gulfnnews.com/news/gulf/bahrain/unskilled-indian-workers-in-bahrain-to-get-minimum-wage-of-bd100-1.83592>

Factors	Baharin International Investment Park
	<ul style="list-style-type: none"> No minimum capital required for investments
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes , there is a one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite administration office is available within the zone
Onsite Convenience Retail	Onsite Convenience Retail is available within the zone
Onsite Housing	Onsite Housing is not available within the zone
Onsite Schools	Onsite Schools is not available within the zone
Onsite Community Facilities	Onsite Community Facilities is not available within the zone
Onsite Security	Onsite Security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	Quality housing like Belvedere Apartments including many others are available in close proximity to the zone
International Hospital/Clinic (Within 20km)	Quality hospitals like Bahrain specialist Hospital including many others are available in close proximity to the zone
International Schools (Within 20 kms)	Quality schools like available City International school are available in close proximity to the zone

3.3.5. Bangladesh

Bangladesh, a South Asian country is a middle power and a developing nation. Being the eighth most populous country in the world, the total GDP rank estimate as of 2018 is 31st and per capita is at 139th place. The major exports of the country include garments, sea foods and agriculture products. Garments contribute to majority of the export share followed by sea food. The major imports include machinery, cotton, iron and steel. Bangladesh has been listed among the next 11 emerging markets and is also one of the fastest growing economies according to IMF. The Financial centers in the country have performed extremely well making the financial sector second largest in sub-continent after India. The investments from foreign companies made Bangladesh grow rapidly in communication sector. The GDP is mostly driven by exports from RMG and sea foods. The GDP trend over the years is shown below. **Data used for the analysis is the latest data point available in the respective database.**

Figure 25: GDP of Bangladesh

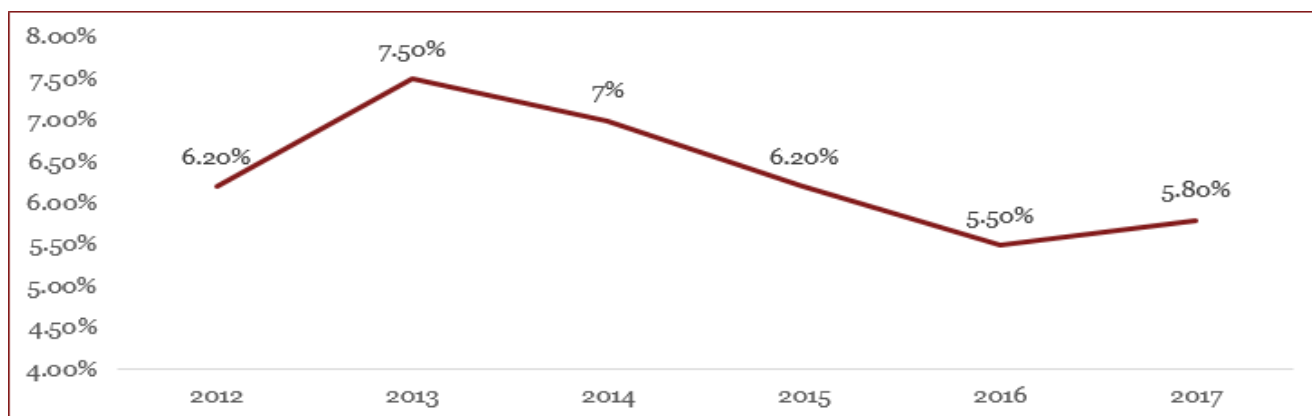


Source: The World Bank

According to leading economists of World Bank, the steady decline in non-food inflation from June 2016 to December 2016 is primarily attributable to the weakening of aggregate demand caused by a large decline in remittances. The declining remittance has reduced the purchasing power in both rural and urban areas

significantly. Further, there was no upward revision in the administered prices of gas and electricity. It has also been observed that there has been a fall in prices for food items like lentils, vegetables, onions, and garlic which has assisted in bring down food inflation. **Data used for the analysis is the latest data point available in the respective database.**

Figure 26: Inflation Trend of Bangladesh



Source: The World Bank

Post analysis of the broad macro-economy of Bangladesh, an analysis of the Ishwardi EPZ has been provided below:

Table 15: Macro-economic Parameters of Bangladesh

Macroeconomic Indicator	Description	Data Source
Unemployment	4.10%	The Heritage Foundation
FDI Inflow	\$2.1 billion	The World Bank
Exports	USD 40.3 billion	ITC Trade Map
Imports	USD 48.9 billion	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	128	The Heritage Foundation
Cato Institute's Human Freedom ranking	133	Human Freedom Index Cato Institute
World Economic Freedom's Global Competitive Index Rating	99	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	177	Doing Business 2018

Bangladesh's economy has grown by approximately 6 % annually for two decades despite prolonged political instability, poor infrastructure, insufficient power supplies, and slow implementation of economic reforms. Garment exports forms the backbone of Bangladesh's industrial sector, accounted for more than 80 % of total exports from the country. Some of the areas where Bangladesh lags which has resulted in the country's poor scoring are antiquated property rights, poor record keeping, inefficient contract enforcement, etc.

3.3.5.1. Ishwardi EPZ

The Ishwardi EPZ is located in the northern part of Bangladesh in the Rajshahi Division of Bangladesh. The EPZ is home to a number of companies from sectors like RMG, Electrical & Electronics, Chemical & Fertilize, Metal Products, etc. The EPZ provides employment to approx. 9,590 workers and has successfully attracted investments of approx. USD 125 Mn.

Figure 27: Ishwardi EPZ



Source: BEPZA

A detailed profiling of Ishwardi EPZ is provided below:

Table 16: Ishwardi EPZ

Factors	Ishwardi EPZ
Site	
Land Size (acres)	309 acres
Number of Plots	There are about 290 Industrial plots
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Tariff for land is USD 1.25 / sq.m / year. Plot size 2000 sq.m on average.
Pre-Built Factories (PBF) (Y/N)	Pre-Built factories are available with an area of 20420 sq.m
Lease Rate for PBF (Taka/USD)	Lease rate for PBF is USD 1.25 / sq.m / year
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the zone
Cost of Power (Taka/USD)	The cost of power is BDT Tk. 8.06 / Kwh (USD 0.1 / Kwh)
Cost of Water (Taka/USD)	The cost of water is BDT Tk. 24.74 / KL (USD 0.3 / KL)

Factors	Ishwardi EPZ
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the Export processing zone.
Transport costs	
Cost of shipping 20 foot FCL container shipping to Chennai	<ul style="list-style-type: none"> • Hamburg – Port of Mongla → USD 1110-1672⁶⁷ • Rotterdam – Port of Mongla → USD 1122-1672⁶⁸ • Antwerp – Port of Mongla → USD 1125-1672⁶⁹ • New York – Port of Mongla → USD 2366-2615⁷⁰
Cost of Labor (Taka/USD)	
Management	The average salary for a management professional is approx. USD 533 / month ⁷¹
Technicians	The average salary for a technician is approx. USD 403 / month ⁷²
Skilled	The average salary for a skilled laborer is approx. USD 107.25 / month ⁷³
Unskilled	The average salary for an unskilled laborer is approx. USD 56 / month ⁷⁴
Sectors	
Type of Sectors within the Zone	Plastic goods, Garment Accessories, Metal Products, Garment Accessories, Miscellaneous, Electronics and electrical goods etc...
Special Regime	
Yes/No	Yes , there is one stop shop proposed with the zone
Fiscal Incentives	
Customs Duties	Duty free import of construction materials; Duty free import of machineries, office equipment & spare parts etc.; Duty free import and export of raw materials and finished goods; Duty & quota free access to EU, Canada, Norway, Australia etc.;
Corporate Taxes / Indirect Taxes	100% exemption of tax for 3 years, 50% for the nest three, 25% for the final (7 th) year; Relief from double taxation;
Income Tax on Profits	100% exemption of Income tax for 3 years, 50% for the nest three, 25% for the final (7 th) year
Social Security Tax	No concept of social security tax in Bangladesh
No restrictions on Money Transfers	Full repatriation of capital invested from foreign sources is allowed by Bangladesh. Similarly, profits and dividend accruing to foreign investment may be transferred in full. If foreign investors reinvest their repatriable dividends and or retained earnings, those will be treated as new investment. Foreigners employed in Bangladesh are entitled to remit up to 50 percent of their salary and will enjoy facilities for full repatriation of their savings and retirement benefits.
Others	Exemption from dividend tax; Remittance of royalty, technical and consultancy fees;
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes , there's one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite Administration office is available within the zone
Onsite Convenience Retail	Onsite Convenience Retail is not available within the zone
Onsite Housing	Onsite Housing is not available within the zone
Onsite Schools	Onsite Schools is not available within the zone
Onsite Community Facilities	Onsite Community Facilities is not available within the zone

⁶⁷ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁶⁸ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁶⁹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁷⁰ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁷¹ Source: <http://www.averagesalarysurvey.com/bangladesh>

⁷² Source: <http://www.averagesalarysurvey.com/bangladesh>

⁷³ Source: <https://tradingeconomics.com/bangladesh/indicators>

⁷⁴ Source: <https://tradingeconomics.com/bangladesh/indicators>

Factors	Ishwardi EPZ
Onsite Security	Onsite Security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	International Housing is not available within close proximity of the zone
International Hospital/Clinic (Within 20km)	Quality hospitals like Aljami private hospital lies within close proximity of the zone
International Schools (Within 20 kms)	Quality schools like Oxford International school and a list of various other schools are within close proximity of the zone

Source: PwC Analysis

3.4. Comparative Analysis

This section captures an exhaustive comparative analysis of both broad level geographic indicators and site specific comparative parameters between the EZ site coming up in Jajira and its potential competitors in the region. Tables below provide an insight into macro-economic performance indicators of the countries which are home to the industrial parks shortlisted as competitors to EZ site in Jajira, Bangladesh. A comparison has been made to understand how Bangladesh stands with respect to these countries. This comparison is important as investors often take into consideration the macro-economic performance of countries to shortlist investment destinations in order to minimize risks to their investments and maximize their returns.

Table 17: Macro-Economic indicators (2017-18)

Country	GDP (USD billion)	GDP annual growth rate (%)	GDP per capita (PPP) (USD)	Inflation Rate (%)	Unemployment Rate (%)	Population (million)
India	2,597	6.62%	1,939	3.3%	3.5%	1,339.2
Nigeria	375.8	0.8%	1,968	16.5%	5.0%	190.9
Cambodia	22.2	6.81%	1,384	2.9%	0.3%	16.00
Bahrain	35.3	3.4%	23,655	1.4%	1.3%	1.5
Bangladesh	249.7	7.28%	1,516	5.8%	4.1%	164.67

Source: World Bank and the Heritage Foundation

Table 18: FDI indicators 2017

Country	FDI for 2017 (USD million)
India	39,966
Nigeria	3,497
Cambodia	2,784
Bahrain	519
Bangladesh	2,151

Source: World Bank

Table 19: Heritage Foundation Score 2018

Country	Heritage Foundation Rating (global)	Individual country score	Score change	Freedom group ranking	Competitor's ranking
India	130	54.5	+1.9	Mostly unfree	5
Nigeria	104	58.5	+1.4	Mostly unfree	3
Cambodia	101	58.7	-0.8	Mostly unfree	2
Bahrain	50	67.7	-0.8	Modertely Free	1
Bangladesh	128	55.1	+0.1	Mostly unfree	4

Source: The Heritage Foundation

Table 20: Global Competitiveness Ranking 2017-18

Country	Global Competitiveness Ranking 2018	Country Score	Global Competitiveness Ranking 2017	Rank Change from 2017 to 2018
India	40	4.59	39	-1
Nigeria	125	3.30	127	+2
Cambodia	94	3.93	89	-5
Bahrain	44	4.54	48	+4
Bangladesh	99	3.91	106	+7

Source: World Bank

Table 21: Global Financial Market Development Ranking (World Economic Forum)

Country	Financial Market Development Ranking
India	42
Nigeria	91
Cambodia	61
Bahrain	46
Bangladesh	98

Source: World Economic Forum

Table 22: World Bank Doing Business Ranking 2017-18

Country	Ease of Doing Business Ranking 2018	Ease of Doing Business Ranking 2017	Rank Change from 2017 to 2018
India	100	130	+30
Nigeria	145	169	+24
Cambodia	135	131	-4
Bahrain	66	63	-3
Bangladesh	177	176	-1

Source: World Bank

Table 23: World Bank Doing Business Components 2017-18

Country	India	Nigeria	Cambodia	Sri-Lanka	Bangladesh
Starting Business	156	130	183	75	131
Dealing with Construction Permits	181	147	179	47	130
Getting Electricity	29	172	137	79	185
Registering Property	154	179	123	25	185
Getting Credit	29	6	20	105	159

Country	India	Nigeria	Cambodia	Sri-Lanka	Bangladesh
Protecting Minority Investors	4	133	108	108	76
Trading Across Borders	146	183	108	78	173
Enforcing Contracts	164	96	179	111	189

Source: World Bank

The comparative study done indicates that while Bangladesh is becoming more competitive at the global stage, it is still lagging behind economies like India and Bahrain. Owing to Bangladesh's close proximity to India, India can be considered a major competitor to Bangladesh in terms of attracting foreign investments. Although, Bangladesh fares better than India in terms of allowing new businesses to be established and providing construction permits, it lags behind India in all other major macro-economic parameters like providing electricity and easy credit facility, registering of property, protecting minority investors and enforcing contracts.

Bangladesh Investment Development Authority (BIDA) has taken cognizant of the need to improve Bangladesh's ease of doing business rankings and has set a target of reaching double digit ranking by 2021 from its current rank of 177. Areas of improvement identified by BIDA are - Streamlining regularity service delivery in National Board of Revenue, Directorate of Environment, RAJUK, Courts, Export Promotion Bureau, Chief Controller of Imports and Exports, and other agencies in 11 thematic areas which are a part of Doing Business Components as listed in Table "World Bank Doing Business Components 2017-18".

These initiatives could make Bangladesh a more competitive economy in future.

Improvement in macro-economic scenario of Bangladesh would also need to be supported by the facilities and cost advantages being offered by proposed EZ site in Jajira in order to attract investments. A comparative study of competing economic zones have been done on the next page to understand competitiveness of the EZ site in Jajira with respect to its competitors.

Table 24: Comparative Analysis

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
Site							
Land Size (Acres)	532.14 acres	1,000 acres	1,166.64 acres	375 acres	882 acres	610 acres	309 acres
Number of Plots	319 plots have been allocated. 311 of these plots are for industrial use and rest for specialized infrastructure & utilities.	Over 185 companies are operational within the special economic zone	Over 19 companies are operational within the special economic zone	Over 78 companies are registered in CFTZ.	Over 88 companies are operational within the special economic zone	Over 56 companies are operational within the special economic zone	There are about 290 Industrial plots
No. of Development Phases	The development is proposed to be carried out over a period of 6 years in 3 phases of 2 years each.	The development has been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in three phases	The development have been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Industrial land lease rent is BDT 215.2/ sq. m. / year (USD 2.62/sq. m. / year) for 50 years lease period, subject to escalation of 10% in a block of 3 years.	The land lease for the industrial land is INR 211.75/sq. m. / annum (USD 3.25 /sq. m./annum)	There is a onetime upfront land premium payable of INR 1,441 / sq. m (USD 22.15/sq. m). ⁷⁵	Land is available for sale at a cost of USD 50/sq. m.	Land lease available at USD 70/sq. m. Land sale or lease is up to 50 years.	Land lease is available at the rate of USD 2.66/sq. m/year and the lease period is 25 years.	Land lease is USD 1.25/sq. m/ year. Plot size 2000 sq. m on average.
Pre-Build Factories (PBF) Y/N	Yes, 35 acres of land parcel has	Yes, there are pre-build	No pre-built factories are	No pre-built factories are	No pre-built factories are	Yes, there are pre-build	Yes, there are pre-build

⁷⁵ Source: http://www.wbidc.com/industrial_parks/available_land.htm

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
	been earmarked for PBF	factories provided as a part of the product offering.	available as a part of the product mix	available as a part of the product mix	available as a part of the product mix	factories provided as a part of the product offering	factories provided as a part of the product offering
Lease rate for PBF	Lease rent rate for PBF is BDT 2,959/ sq. m. / year (USD 36.08 / sq. m / year)	<ul style="list-style-type: none"> Lease rentals for PBF are INR 1,500/sq. m/ annum (USD 23.03 / sq.m / annum) for ground floor built-up area; Lease rentals for PBF are INR 1,325/sq. m / annum (USD 20.34/sq. m / annum) for first floor; Lease rental for PBF are INR 1,150 /sq. m./ annum (USD 17.65/sq. m. /annum) for second floor 	There is no lease rate for PBF since PBF are not provided	There is no lease rate for PBF since PBF are not provided	There is no lease rate for PBF since PBF are not provided	The lease rentals for Pre-Built Factories are approx. BD 2.5/sq. m/month	Lease rate for PBF is USD 1.25/ sq. m/year
Infrastructure/Utilities							
Onsite independent Power (Y/N and type)	No onsite captive power plant available for the economic zone. Power will be sourced from an onsite substation	No onsite captive power plant available for the special economic zone.	No onsite captive power plant available for the special economic zone.	No onsite captive power plant available for the special economic zone.	No onsite captive power plant available for the special economic zone.	No onsite captive power plant available for the special economic zone.	No onsite captive power plant available for the special economic zone.

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
	connected to national electricity grid	Power sourced from national electricity grid	Power sourced from national electricity grid	Power sourced from national electricity grid	Power sourced from national electricity grid	Power sourced from national electricity grid	Power sourced from national electricity grid
Cost of Power (Taka/USD)	The cost of power within the economic zone is taken as BDT 8.69/ Kwh (USD 0.106/Kwh)	The cost of power with the economic zone is INR 5/ Kwh ¹⁸ (USD 0.08 / Kwh)	The cost of power with the economic zone is INR 7.45 / Kwh (USD 0.11 / Kwh) for industries ⁷⁶	The cost of power with the economic zone is N 75/Kwh (USD 0.21/Kwh)	The cost of power with the economic zone is USD 0.19/Kwh of electricity consumed	The cost of power with the economic zone is in the range of USD 0.04 to 0.08/Kwh	The cost of power with the economic zone is BDT Tk. 8.06 / Kwh (USD 0.1 / Kwh)
Cost of Water(Taka/USD)	The cost of industrial water supply is taken as BDT 36.53/ KL (USD 0.44/ KL)	The cost of industrial water is INR 49.5 / KL ¹⁹ (USD 0.76 / KL)	The cost of industrial water is approx. INR 18 / KL (USD 0.28 / KL) ⁷⁷	The cost of industrial water is N 200 / liter (USD 0.56 / liter)	The cost of industrial water is USD 0.3 / KL	The cost of industrial water ranges between USD 1.06 to 1.99 / KL	The cost of industrial water is BDT Tk. 24.74 / KL (USD 0.3 / KL)
Onsite Wastewater Treatment Plant (Y/N)	Yes, an onsite waste water treatment plant has been proposed in the master plan	Yes, there is onsite waste water treatment plant available within the special economic zone	Yes, there is onsite waste water treatment plant available within the special economic zone	Yes, there is onsite waste water treatment plant available within the special economic zone	Yes, there is onsite waste water treatment plant available within the special economic zone	No, there is no onsite waste water treatment plant available within the special economic zone	Yes, there is onsite waste water treatment plant available within the special economic zone
Transport Costs							
Cost of shipping 20 foot FCL container	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows:

⁷⁶ Source: https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/pdf/Tariff_Volumn/PDFsam_mergetariff2.pdf

⁷⁷ Source: Interactions with WBIDC officials

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
	<ul style="list-style-type: none"> Hamburg – Port of Mongla → USD 1110-1672⁷⁸ Rotterdam – Port of Mongla → USD 1122-1672⁷⁹ Antwerp – Port of Mongla → USD 1125-1672⁸⁰ New York – Port of Mongla → USD 2366-2615 	<ul style="list-style-type: none"> Hamburg – Kandla → USD 1,415⁸¹ Rotterdam – Kandla → USD 1,415⁸² Antwerp – Kandla → USD 1,303⁸³ New York – Kandla → USD 1,888 	<ul style="list-style-type: none"> Hamburg – Kolkata → USD 1312-1677⁸⁴ Rotterdam – Kolkata → USD 1285-1665⁸⁵ Antwerp – Kolkata → USD 1370-1665⁸⁶ New York – Kolkata → USD 836-924 	<ul style="list-style-type: none"> Hamburg – Calabar port → USD 1475-2051⁸⁷ Rotterdam – Calabar port → USD 1439-2014⁸⁸ Antwerp – Calabar port → USD 1402-1978⁸⁹ New York – Calabar port → USD 1100-1775 	<ul style="list-style-type: none"> Hamburg – Phnom Penh Autonomous Port → USD 1,287⁹⁰ Rotterdam – Phnom Penh Autonomous Port → USD 1,342⁹¹ Antwerp – Phnom Penh Autonomous Port → USD 1,330⁹² New York – Phnom Penh 	<ul style="list-style-type: none"> Hamburg – Khalifa Bin Salman Port → USD 920-1226⁹³ Rotterdam – Khalifa Bin Salman Port → USD 925-1233⁹⁴ Antwerp – Khalifa Bin Salman Port → USD 924-1275⁹⁵ New York – Khalifa Bin 	<ul style="list-style-type: none"> Hamburg – Port of Mongla → USD 1110-1672⁹⁶ Rotterdam – Port of Mongla → USD 1122-1672⁹⁷ Antwerp – Port of Mongla → USD 1125-1672⁹⁸ New York – Port of Mongla → USD 2366-2615⁹⁹

⁷⁸ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁷⁹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁰ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸¹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸³ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁴ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁵ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁶ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁷ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁸ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁸⁹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁰ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹¹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹² Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹³ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁴ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁵ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁶ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁷ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁸ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

⁹⁹ Source: <https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/>

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
					Autonomous Port → USD 1,503	Salman Port → USD 1085-1964	
Cost of Labor (Taka/USD)							
Management	The average salary of a management professional is approx. USD 533/month ¹⁰⁰	The average salary of a management professional in Gujarat is approx. USD 201.7 / month ¹⁰¹	The average salary of a management professional in West Bengal is approx. USD 1,125 / month ¹⁰²	The average salary of management of NGN 3,00,978 / month (USD 827 / month) ¹⁰³	The average salary of a management professional is approx. USD 2,156 / month ¹⁰⁴	The average salary of production manager in Bahrain is approx. BHD1,694 / month (USD 4,491 / month) ¹⁰⁵	The average salary of a management professional is approx. USD 533/month ¹⁰⁶
Technicians	The salary of a technician is approx. USD 403/month ¹⁰⁷	The salary of a technician in the state of Gujarat is approx. USD 186 /month ¹⁰⁸	The salary for a technician in West Bengal approx. USD 478 /month ¹⁰⁹	The average monthly salary for Technicians is NGN 1,50,307 / month (USD 413/month) ¹¹⁰	The average salary for a technician in Alabauga is approx. USD 400 / month ¹¹¹	The average salary of a technician in Bahrain is approx. BHD 600	The average salary for a technician is approx. USD 403 /month ¹¹³

¹⁰⁰ Source: <http://www.averagesalarysurvey.com/bangladesh>

¹⁰¹ Source: <http://www.averagesalarysurvey.com/india>

¹⁰² Source: https://www.payscale.com/research/IN/Job=General_%2F_Operations_Manager/Salary/6e042b69/Kolkata

¹⁰³ Source: <https://www.mysalaryscale.com/blog/7-types-engineers-nigeria-salary-structures/>

¹⁰⁴ Source: <http://www.averagesalarysurvey.com/cambodia>

¹⁰⁵ Source: <https://www.albawaba.com/business/here-are-top-20-salaries-bahrain-2018-1121680>

¹⁰⁶ Source: <http://www.averagesalarysurvey.com/bangladesh>

¹⁰⁷ Source: <http://www.averagesalarysurvey.com/bangladesh>

¹⁰⁸ Source: <http://www.averagesalarysurvey.com/india>

¹⁰⁹ Source: <http://www.averagesalarysurvey.com/calcutta-india>

¹¹⁰ Source: <https://www.mysalaryscale.com/blog/7-types-engineers-nigeria-salary-structures/>

¹¹¹ Source: <http://www.averagesalarysurvey.com/cambodia>

¹¹³ Source: <http://www.averagesalarysurvey.com/bangladesh>

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
						/month (USD 1,591/month) ¹¹²	
Skilled	The average salary for a skilled laborer is approx. USD 107.25 / month ¹¹⁴	The salary of a skilled in the state of Gujarat is approx. USD 678 / month ¹¹⁵	The salary for a skilled labour in West Bengal approx. USD 153 / month ¹¹⁶	The average monthly salary of skilled laborers is NGN 43,672 / month (USD 120 / month) ¹¹⁷	The average salary for a skilled laborer is approx. USD 359 / month ¹¹⁸	The average salary of a technician in Bahrain is approx. BHD 425 / month (USD 1,127 / month) ¹¹⁹	The average salary for a skilled laborer is approx. USD 107.25 / month ¹²⁰
Unskilled	The average salary for an unskilled laborer is approx. USD 56/month ¹²¹	The salary of a unskilled in the state of Gujarat is approx. USD 100 /month ¹²²	The salary for an un-skilled labour in West Bengal approx. USD 115 /month ¹²³	The average monthly salary of unskilled laborers is NGN 18,197 / month (USD 50/month) ¹²⁴	The average salary for a un-skilled laborer is approx. USD 153 /month ¹²⁵	The average salary of unskilled labor in Bahrain is approx. BHD 150 / month (USD 400/month) ¹²⁶	The average salary for an unskilled laborer is approx. USD 56 /month ¹²⁷
Sectors							

¹¹² Source: <https://www.paylab.com/BH/salaryinfo/top-management>

¹¹⁴ Source: <https://tradingeconomics.com/bangladesh/indicators>

¹¹⁵ Source: <https://tradingeconomics.com/india/indicators>

¹¹⁶ Source: <https://paycheck.in/main/salary/minimumwages/west-bengal>

¹¹⁷ Source: <https://mywage.org/nigeria/salary/salary-check/#/>

¹¹⁸ Source: <https://tradingeconomics.com/cambodia/minimum-wages>

¹¹⁹ Source: <https://www.paylab.com/BH/salaryinfo/top-management>

¹²⁰ Source: <https://tradingeconomics.com/bangladesh/indicators>

¹²¹ Source: <https://tradingeconomics.com/bangladesh/indicators>

¹²² Source: <https://tradingeconomics.com/india/indicators>

¹²³ Source: <https://paycheck.in/main/salary/minimumwages/west-bengal>

¹²⁴ Source: <https://mywage.org/nigeria/labour-law/work-and-wages>

¹²⁵ Source: <https://tradingeconomics.com/cambodia/minimum-wages>

¹²⁶ Source: <https://gulfnews.com/news/gulf/bahrain/unskilled-indian-workers-in-bahrain-to-get-minimum-wage-of-bd100-1.83592>

¹²⁷ Source: <https://tradingeconomics.com/bangladesh/indicators>

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
Type of Sectors within the Zone	The sectors proposed through industry assessment include: Food and Beverages, Chemicals, Pharmaceutical, Light Machinery, Equipment and Furniture	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)	Electrical & Electronic Products, Textile Products, Leather Products, Pharmaceuticals, etc.	Textiles, Food Processing, Plastic, Leather, Automobile Parts, Electrical Parts etc.	Electrical and electronic goods, Textiles, fiberglass, plastics, pharmaceuticals, print and packaging, engineering components, Food processing etc...	Plastic goods, Garment Accessories, Metal Products, Garment Accessories, Miscellaneous, Electronics and electrical goods etc...
Special Regime							
Yes/No	Yes , there's a special regime for incentives	Yes , there's a special regime for incentives	Yes , there's a special regime for incentives	Yes , there's a special regime for incentives	Yes , there's a special regime for incentives	Yes , there's a special regime for incentives	Yes , there's a special regime for incentives
Fiscal Incentives							
Customs Duties	<ul style="list-style-type: none"> Declaration of EZ as Ware housing Station- Duty free import & Export of Raw material etc. 100% duty free Import of Vehicle (One Car, One Microbus- 2000 cc) 100% VAT free Import of Machinery, 	Exemptions from Customs duty on imports.	No exemption on custom duties are applicable	Exemption from payment of customs and import duties.	<ul style="list-style-type: none"> Import duty exemption on construction materials and production equipment Import duty exemption on production materials for export industry and export duty exemption; 	Exemption from import duties on raw materials and equipment is permitted	Duty free import of construction materials; Duty free import of machineries, office equipment & spare parts etc.; Duty free import and export of raw materials and finished goods; Duty & quota free access to EU, Canada, Norway, Australia etc.;

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
	Construction Materials						
Corporate Taxes / Indirect Taxes	<ul style="list-style-type: none"> Corporate income tax exemption for 10 years (First 3 years- 100%, gradually diminishing from 80% in 4th Year to 20% in 10th Year) Exemption of VAT on utilities (80% on gas, water, and electricity; 100% on supplies) 	Exemption from central and state level taxes	No exemption on corporate taxes are applicable	<ul style="list-style-type: none"> 20% tax deduction for providing new Infrastructure. Complete tax holiday from all the state/ central government taxes. 	Exemption of 10% VAT in addition to import duty exemption.	0% corporate tax (with a 10 year guarantee) is provided	100% exemption of tax for 3 years, 50% for the next three, 25% for the final (7 th) year; Relief from double taxation;
Income Tax on Profits	<ul style="list-style-type: none"> Corporate income tax exemption for 10 years (First 3 years- 100%, gradually diminishing from 80% in 4th Year to 	100% Income Tax exemption on export income for SEZ units under Section 10AA of the Income Tax Act for first 5 years, 50% for next 5 years thereafter and 50% of the	No exemption of income tax profits are applicable	Income tax exemption is at 30%.	There is profit tax exemption with a concept of “Trigger Period” + 3 years + Priority Period. The maximum trigger period is the first year of profit or 3 years after the tenant	There is no income tax levied in Bahrain	100% exemption of Income tax for 3 years, 50% for the next three, 25% for the final (7 th) year

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
	20% in 10th Year)	ploughed back export profit for next 5 years.			earns its first revenue, whichever sooner		
Social Security Tax	No social security tax is available in Bangladesh	No social security tax is available in India	No exemption on social security taxes are applicable	Employers are required to make monthly contributions of 1% of payroll to the National Social Insurance Trust Fund. ¹²⁸	Employers are required to contribute 0.8% of the average monthly wage of workers to the National Social Security Fund (NSSF) as Social Security Tax	The current rate of contributions to the Social Insurance Organization (SIO) is 19% for local employees (12% employer; 7% employee) and 4% for expatriate employees (3% employer; 1% employee)	No social security tax is available in Bangladesh
No restrictions on Money Transfers	Full repatriation of capital invested from foreign sources is allowed by Bangladesh. Similarly, profits and dividend accruing to foreign investment may be transferred in full. If foreign investors reinvest their repatriable	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the	Transfer pricing is applicable according to the Transfer Pricing Regulation, 2012. ¹³¹	There are currently no restrictions on the repatriation of profit or capital derived from investments made in Cambodia, nor on most transfers of funds abroad. The Law on Investment guarantees that investors can	100% repatriation of capital is allowed	Full repatriation of capital invested from foreign sources is allowed by Bangladesh. Similarly, profits and dividend accruing to foreign investment may be transferred in full. If foreign investors reinvest their repatriable dividends and or

¹²⁸ Source: <https://www.pwc.com/gx/en/services/people-organisation/social-security.html>

¹³¹ Source: http://pwc-nigeria.typepad.com/files/tp-rules_firs-presentation.pdf

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
	dividends and or retained earnings, those will be treated as new investment. Foreigners employed in Bangladesh are entitled to remit up to 50 percent of their salary and will enjoy facilities for full repatriation of their savings and retirement benefits	amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval ¹²⁹ .	amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval ¹³⁰ .		freely remit foreign currencies abroad for the purposes of repatriation of invested capital on dissolution of an investment project.		retained earnings, those will be treated as new investment. Foreigners employed in Bangladesh are entitled to remit up to 50 percent of their salary and will enjoy facilities for full repatriation of their savings and retirement benefits.
Others	Exemption from income tax on salary of expatriates , dividend tax and royalty, technical fees, local govt. tax, land development tax	<ul style="list-style-type: none"> • Exemption from Service Tax • Exemption from payment of Royalties & Cess on construction materials 	<ul style="list-style-type: none"> • 100% of Electricity Duty subject to the maximum ceiling of INR 25 lakhs / year / INR 1.25 crores in 5 years (USD 38,450 / year to USD 192,250 in 5 years) • An eligible unit in the medium 	<ul style="list-style-type: none"> • Investment tax credit at the current rate of 5% • Royalty at the rate of 7% on shore and 5% off shore 	50 year lease of land available to foreign investors (renewable and transferable)	<ul style="list-style-type: none"> • Duty free access to all GCC markets (unlike Free Zones in the region) • No minimum capital required for investments 	Exemption from dividend tax; Remittance of royalty, technical and consultancy fees;

¹²⁹ Source: <http://www.dobusinessinindia.in/repatriationoffund.php>

¹³⁰ Source: <http://www.dobusinessinindia.in/repatriationoffund.php>

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
			and large sector will be entitled to reimbursement to the extent of 80% of contribution towards Employee Provident Fund and Employees' State Insurance • Industries shall be eligible for 75% of refund of stamp duty • Anchor unit subsidy of INR 100 lakh (USD 153,800) shall be offered for the first two manufacturing enterprises with minimum employment of 100 members and minimum investment of INR 50 Crore (USD 7,690,000) • Industrial units will be encouraged for				

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
			<p>filing their successfully generated, registered and accepted patents based on their original work/research. The State Government will provide financial assistance of 50% of the expenditure incurred, up to a maximum of INR 2 lakh (USD 3,076), / patent. The expenditure incurred will include the amount spent on filing of patent, attorney fees, patent tracking etc.</p> <ul style="list-style-type: none"> • 75% waiver of fees incurred towards land conversion charges 				
Non-Fiscal Incentives							

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
One Stop Shop Within the Zone	Yes , there is one stop shop proposed with the zone	Yes , there is a one stop shop within the zone	Yes , there is a one stop shop within the zone	Yes , there is a one stop shop within the zone	Yes , there is a one stop shop within the zone	Yes , there is a one stop shop within the zone	Yes , there is a one stop shop within the zone
Support Amenities							
Onsite Administration office	Provision for onsite administration office has been captured in Master Plan	Onsite Administration office is available within the zone	Onsite Administration office is available within the zone	Onsite Administration office is available within the zone	Onsite Administration office is available within the zone	Onsite administration office is available within the zone	Onsite Administration office is available within the zone
Onsite Convenience Retail	Area earmarked for support amenities in Master Plan can accommodate Onsite Convenience Retail store	Onsite Convenience Retail is available within the zone	Onsite Convenience Retail is not available within the zone	Onsite Convenience Retail is not available within the zone	Onsite Convenience Retail is not available within the zone	Onsite Convenience Retail is available within the zone	Onsite Convenience Retail is not available within the zone
Onsite Housing	No provision for onsite housing has been captured in Master Plan	Onsite Housing is available (KASEZ Township) within the zone	Onsite Housing is not available within the zone	Onsite Housing is not available within the zone	Onsite Housing is not available within the zone	Onsite Housing is not available within the zone	Onsite Housing is not available within the zone
Onsite Schools	Area earmarked for support amenities in Master Plan can accommodate onsite schools	Onsite Schools are not available within the zone	Onsite Schools is not available within the zone	Onsite Schools is not available within the zone	Onsite Schools is not available within the zone	Onsite Schools is not available within the zone	Onsite Schools is not available within the zone

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
Onsite Community Facilities	Area earmarked for support amenities in Master Plan can accommodate onsite community facilities	Onsite Community Facilities are not available within the zone	Onsite Community Facilities is not available within the zone	Onsite Community Facilities is not available within the zone	Onsite Community Facilities is not available within the zone	Onsite Community Facilities is not available within the zone	Onsite Community Facilities is not available within the zone
Onsite Security	Provision for onsite security has been duly considered	Onsite Security is available within the zone	Onsite Security is available within the zone	Onsite Security is available within the zone	Onsite Security is available within the zone	Onsite Security is available within the zone	Onsite Security is available within the zone
Quality of Life							
International Housing (Within 15 Km)	There is no international housing facility available within 15 km radius of the EZ site	Number of apartments and housing facilities are available in Gandhidam	A number of apartments/ housing facilities are available around the SEZ in Kharagpur town.	Independent dwelling houses are available in close proximity to the zone	International Housing is not available within close proximity of the zone	Quality housing like Belvedere Apartments including many others are available in close proximity to the zone	International Housing is not available within close proximity of the zone
International Hospital/Clinic (Within 20km)	There is no international hospital facility available within 15 km radius of the EZ site	Ram Krishna super specialty hospital is available within close proximity of the economic zone	SK Multi-specialty hospital, Glocal Hospital and various other hospitals are present around the SEZ	Quality hospital like Arubah Specialist Hospital is present in close proximity to the zone	Quality hospital like Royal Phnom Phen Hospital is available in close proximity to the zone	Quality hospitals like Bahrain specialist Hospital including many others are available in close proximity to the zone	Quality hospitals like Aljami private hospital lies within close proximity of the zone

Parameters	Jajira EZ site	Kandla SEZ	Vidyasagar IP	Calabar FTZ	Phnom Penh EZ	Bahrain IIP	Ishwardi EPZ
International Schools (Within 20 kms)	<p>There are no international schools available within 20 km radius.</p> <p>However, basic education facilities, polytechnic and engineering colleges are in Shariatpur.</p>	<p>Quality schools like Alaina International school, Amarchand Singhvi International school etc. are available within close proximity of the zone</p>	<p>Quality schools like St. Agnes school is available in close proximity to the zone</p>	<p>Quality school like Surefoot International School is present in close proximity to the zone</p>	<p>There are many schools of International repute like Northbridge International school, International school of Cambodia etc. in close proximity to the zone</p>	<p>Quality schools like available City International school are available in close proximity to the zone</p>	<p>Quality schools like Oxford International school and a list of various other schools are within close proximity of the zone</p>

Table on the previous page provides a comparative study on different economic zones and industrial parks that could compete with this proposed EZ site. The industrial parks studied for comparative purposes are located in South East Asia region and support sectors similar to those proposed for this EZ, providing potential investors a plethora of options for making investment decision. Following key findings may be concluded from this exercise:

Competitiveness of the proposed EZ site as compared to its competitors

1. The subject site in Jajira has been envisaged to be built over an area of 532.14 acres which is of a comparative size to its competitors. Provision has been kept for providing both industrial land and Standard Factory buildings to the manufacturers in Jajira; however apart from Kandla SEZ, Bahrain IIP and Ishwardi EPZ, no other competing economic zone offers standard factory buildings.
2. The land lease rental being charged for the subject site is competitive with respect to other EZs being studied with exception of Ishwardi EPZ, which offers lower rates due to the fact that it is operated by GoB. GoB intends to promote industrialization in Ishwardi, hence the lease rates at Ishwardi have been kept low in order to attract manufacturers. Vidyasagar IP also has low lease rental, however it only has the provision for making onetime upfront payment. Proposed EZ would be operated by a private developer, who would bring in his domain knowledge and expertise resulting in better service quality to the investors in the EZ. This could encourage investors to plan their investment in the proposed EZ. Owing to the EZ's proximity to the consumer markets in Dhaka, investors looking to sell their products in Dhaka could be tempted to invest in this site.
3. Moderate water tariff makes the proposed site as competitive as other Economic Zones.
4. The proposed master plan includes a provision for establishing a water and sewage treatment plant within the EZ. This is in line with other competing economic zones (except Bahrain IIP) which also have captive waste treatment plant.
5. Bangladesh enjoys demographic dividend thereby providing labour at a very competitive rate as compared to other competing countries / economic zones except Calabar FTZ in Nigeria. This might act as a catalyst for promoting labor intensive manufacturing activities for investors looking to manufacture in South East Asia region.
6. Fiscal incentives offered by GoB, like exemption on corporate income tax for a period of 10 years and exemption of VAT on utilities, import of machinery and construction material are attractive as compared to the incentives offered in India. However, Bahrain provides better fiscal incentives through complete exemption on income tax, corporate tax (for 10 years) and waiver on import duties on raw material and equipment. However, Bangladesh does not levy any social security tax unlike Nigeria, Cambodia and Bahrain.
7. Unlike its competing Economic Zones, provision has been kept in the Master Plan for developing support amenities which could include international quality residential facilities, health care facilities, vocational training institutes, retail store and community facility inside the EZ. This could attract quality man power to work in Jajira

Areas where the proposed EZ site is lagging behind its competitors

1. Steep power tariff acts as a key bottleneck for investors investing in the EZ. This is a country level challenge as Bangladesh faces a power deficit due to its dependence on import of coal and natural gas from other countries for generation of power. Moreover, power generation infrastructure has not developed in the country, due to which it has to buy power from neighbouring countries like India. None of the competing EZ have an onsite captive power plant which could be mainly attributed to the size of the EZ/Industrial Park and the cost involved in establishing a captive power plant. Masterplan of the proposed EZ envisages establishing an onsite substation of capacity 132/33/11 KV, which would source electricity from the substation at Jajira located around 5 km from the site. Developer would be able to procure electricity from this grid as per the requirements inside the EZ during construction and operation phase.

2. Draft One Stop Service (OSS) Act for BEZA has been passed by GoB, however presently this has not been fully implemented by BEZA for its Economic Zones. Competing EZs have an already operational OSS mechanism in place to aid investors. Absence of an operational OSS could hinder smooth investment facilitation in the proposed EZ.

Basis the analysis done above, proposed EZ is found to be competitive with respect to other EZs on majority of the comparative parameters.

In order to address high electricity cost in Bangladesh, developer could explore harnessing of solar energy. Padma Bridge, once operational shall provide access to natural gas supply in the region surrounding the proposed EZ. Natural gas is a cost beneficial source of fuel as compared to electricity.

BEZA could also fast track implementation of OSS in order to incentivize investors to set up manufacturing units in proposed EZ.

4. Industry Assessment

4.1. Purpose and Objective

Bangladesh has been considered as a global hub for producing garments and exporting the same, across the globe. Its garment industry which formed 3.89% of its total export basket in 1983-84, occupied 81.23% of the total exports in 2016-17, providing employment to around 4 million people.¹³² This underlines the importance of garment sector in Bangladesh. However, at the same time also highlights the over dependency of Bangladesh's exports on a single sector. There is a need for Bangladesh to improve its manufacturing competencies in other sectors as well, in order to make its economy resilient to possible sector specific disruptions due to automation, policy changes and increasingly competitive global scenarios. GoB has taken cognizance of this situation and has identified other sectors apart from textile and garment sector as priority sectors.

High Priority Industrial Sectors	Priority Potential Industrial Sectors
<ul style="list-style-type: none"> • Agri-Business • Textile & Garments • ICT • Leather Products • Electrical & Electronics 	<ul style="list-style-type: none"> • Plastic Industry • Light Engineering • Ship Building • Tourism Industry • Frozen Food • Ceramic Sector • Power Sector • Medical Equipment Sector • Health Care Sector • Renewable Energy Sector

Source: Bangladesh Investment Development Authority

As a part of Industry Assessment, our objective is to identify site specific target industries which can be compatible with the local economy of the region. Through this chapter, recent growth trends and policy support for various industries will be highlighted to draw attention to nascent industries which are registering robust growth figures in Bangladesh. Local level infrastructural and manpower support, presently available and proposed plans, would be elaborated and site specific suitability of various industries would be assessed. Reference to insights obtained through primary survey have also been elucidated in this section. Results obtained from both primary and secondary studies would be synthesized to arrive at final shortlist of sectors for the proposed EZ site. An industrial profiling exercise would be undertaken for these sectors, covering typical land, water, power and employment requirements for these sectors.

4.2. Our Approach

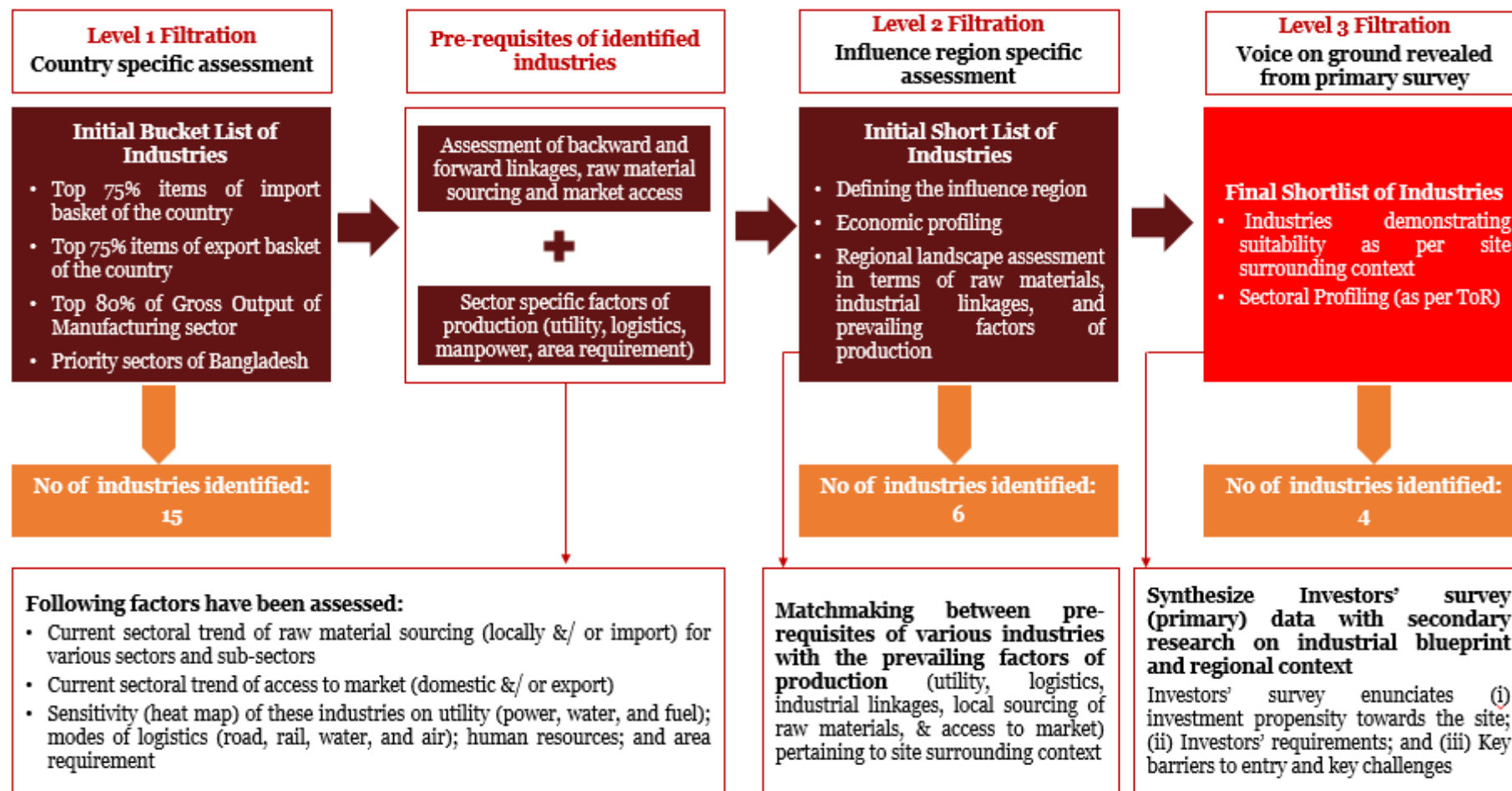
The process to shortlist the industrial sectors that can be most compatible for the proposed EZ site at Jajira involves a 4-step approach covering macro level assessment of Bangladesh as a whole and then funneling down to site level assessment, with validation from current manufacturers and members of various industrial associations.

As a part of this study, recent growth trends of different industries in manufacturing sector have been analyzed to identify an initial bucket list of industries demonstrating high growth potential. Data sources available with agencies like BIDA, BEPZA, BEZA and ITC trade map have been used for this study. This has been followed by an assessment of forward & backward linkages and factors of production requirements for each industry in the bucket list. Further, a deep dive into influence region assessment has been undertaken to assess the availability of raw materials, forward & backward linkages and factors of production requirements prevailing at the project site and influence region. In cognizance of the above, initial shortlist of sectors has been arrived at. To validate the findings of the same, a primary survey exercise has been undertaken to reach out to potential investors across

¹³² <http://www.bgmea.com.bd/home/pages/tradeinformation>

different sectors to gauge their views on sectors and suitability of the same. The findings have been synthesized to create a final shortlist of industries that should be most compatible for the proposed EZ site. Figure on the next page captures diagrammatic representation of the approach adopted.

Figure 28: Approach Methodology for Industry Assessment



Source: PwC Analysis

4.3. Country Level Assessment

In order to shortlist potential sectors that can be established at the proposed EZ site in Jajira, it is important to identify a bucket list of industries under the following heads –

- Traditionally dominant in Bangladesh
- Demonstrating better growth than country's GDP in recent past
- Thrust Sectors identified by government

Above mentioned selection criteria will ensure that during the shortlisting process all those industries are taken into consideration, which have the potential to do well in the country on basis of their historical trends. The aim is to also ensure that the shortlisted sectors are in line with those sectors which GoB has identified as thrust sectors in its National Industrial Policy, 2016.

Thrust sectors are those sectors which have been able to successfully contribute to Bangladesh's industrialization, poverty alleviation and employment generation. GoB would also consider special incentives like tax exemptions, exemption from dual taxation, tax holidays, taxation at reduced rates, accelerated depreciation etc. for these sectors on basis of their performance and contribution to national economy.

These industries would provide an initial universe of list that can be taken up for further scrutiny with respect to regional and site specific context for the proposed EZ. Sectors can then be further shortlisted, based on various sector specific prerequisites and region/site specific support available.

In order to create a shortlist of industries, data was extracted from secondary sources like ITC trade map, Ministry of Industries, Bangladesh Investment Development Authority and Bangladesh Bureau of Statistics.

Sectors were shortlisted by selecting industries on the basis of the following parameters -

- ✓ Product wise ranking of industries to identify top 80% of items, currently being produced in Bangladesh.
- ✓ A list of top 75% of items, being exported and imported, were shortlisted on the basis of average trade value over the past 5 years (in million USD).
- ✓ Sectors that have been identified by GoB as thrust sectors.

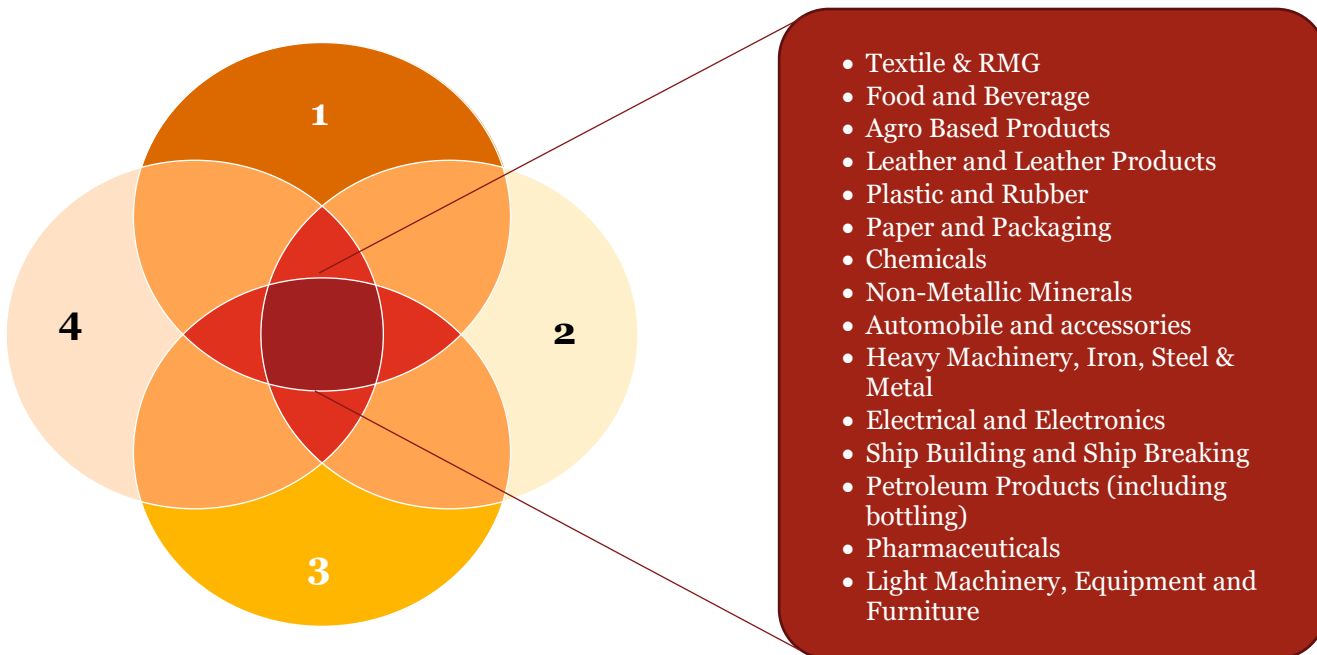
The major sectors identified post filtering through the above mentioned parameters are listed in the next page. Details of export trend, import trend and gross output of manufacturing sectors in Bangladesh are presented in the Annexure.

Figure 29: Bucket list of Sectors & Products



An initial shortlist of sectors was created by identifying those industries performing well across the parameters highlighted in the previous page. The initial shortlist of sectors are as mentioned below –

Figure 30: Initial Shortlist of Sectors



Based on secondary research, above mentioned initial list of sectors has been shortlisted. These sectors have either demonstrated healthy growth in Bangladesh or are a part of the thrust sectors identified by GoB.

4.4. Sector Specific Requirements

Post shortlisting of sectors based on a country level assessment, it is imperative to understand the salient features of each sector in order to deduce suitability of the sector with respect to the proposed EZ location. This analysis, will culminate into a basic list of pre-requisites needed for the specific sector to develop in a particular region.

The criteria for assessing the pre-requisites of sectors are two-fold –

- Study of Backward and Forward Linkages
- Sector specific Factors of Production

The above two criteria will provide an in-depth insight into the requirements of each of the shortlisted sector.

A study of **Backward and Forward Linkages** of each sector will provide information about various stages of development of these sectors, raw material required and markets where these products are consumed.

Sector specific Factors of Production will provide qualitative information about the dependency of each sector on different supporting infrastructure like modes of transportation, utility (water, power, & gas), and manpower.

Rationale behind this assessment are (i) detailed primary survey undertaken among investors to comprehend the voice on ground; and (ii) in-depth secondary research on sectoral outlook.

Holistic assessment of backward and forward linkages of various sectors including raw material sourcing and access to market have been captured in a tabular format on the next page –

Table 25: Sector Specific Backward and Forward Linkages

Sector	Description of raw materials, industrial linkages, and market access
Textile & Ready Made Garments (RMG)	<p>Textile & RMG is the major industrial sector in the country. Bangladesh is 2nd largest exporter of RMG in the world after China, having 6.4% of global market share. This industry is already well developed in Bangladesh generating growth rate of 13%.¹³³ Gross value added from this sector is BDT 2534.7 million, which is ~47% of the country's overall gross value added from manufacturing sector.¹³⁴</p> <p>GoB has set a target to achieve USD 50 billion of exports from RMG sector by 2020, in order to do so, it has also placed textile & RMG sector in its high priority industrial sector list. Among the incentives offered by GoB, garment manufacturers and exporters get 4 percent cash incentive against value addition of products manufactured in the country using locally manufactured yarn.¹³⁵</p> <p>The basic material required for this sector is cotton, which is converted into yarn, followed by conversion into fabric and finally into RMG after dyeing. Bangladesh specialises in manufacturing of RMG by dint of its attractive demographic dividend and low cost of manpower. It is cost advantageous to produce RMG in Bangladesh as compared to other parts of the world.</p> <p>Bangladesh's humid climate is not conducive for cultivation of cotton, hence cotton is primarily imported from neighbouring countries like China, India. Basis primary survey with industry sectors, local textile mills are also not able to meet demand for fabric by the RMG industry, hence fabric is also imported. Moreover due to specific quality requirements of international customers, many customers have pre-designated fabric sourcing units outside Bangladesh, from where fabrics are imported into the country. Dyeing of garment is the last stage of activity before RMG being manufactured. This is a water intensive exercise, for which mostly ground water or river water towards captive sourcing is utilized (which ascertains continuous water supply). Due to poor quality of locally available dyeing material, some firms either export their garments for dyeing or use imported dyes.¹³⁶</p> <p>Textile buyers (customers) from large economies such as USA, EU, and others place orders to RMG manufacturers in Bangladesh as producing RMG in Bangladesh is cost advantageous. This is why RMG is the major export commodity from Bangladesh to major markets such as USA, Europe, and various other large economies. Yarn and fabric produced in Bangladesh primarily caters to domestic requirements as industrial linkage towards RMG.</p>
Food and Beverages (F&B)	<p>Bangladesh's large population base has created a huge domestic potential for this sector. With growing consumption economy, demand for nutrient rich, high quality food products is increasing. Besides, catering to local demand, Bangladesh also exports processed food products to 104 countries, with major exports being to middle-east and south-east Asian countries.¹³⁷ These countries have a lot of immigrants from Bangladesh, who drive demand for Bangladesh food products in these countries. As per data available with Bangladesh Agro-Processors Association, Bangladesh clocked</p>

¹³³ <https://www.textiletoday.com.bd/overview-bangladesh-rmg-2016/>

¹³⁴ Survey of Manufacturing Industries, Bangladesh Bureau of Statistics

¹³⁵ <http://rmgbd.net/incentives-for-textile-clothing/>

¹³⁶ Primary Survey with Industry sectors

¹³⁷ <http://www.bapabd.org/home/export/1>

Sector	Description of raw materials, industrial linkages, and market access
	<p>a growth of 33% in exports of processed food in between 2011-12 to 2013-14. Major items of exports were fruit juice, biscuits, potato crackers, chips, puffed rice, jam, confectionery items, ketchup, parathas, singharas etc. As per Bangladesh Investment Development Authority, frozen food export is a priority sector for Bangladesh with special focus towards exports of shrimps.</p> <p>Food and Beverage industry can be broadly segregated into two categories – (i) agro based products and (ii) animal products</p> <p>For agro based products, the first stage is cultivation of necessary agricultural crops like cereals, fruits and vegetables. This is followed by 2-stage processing, where products like wheat are converted into flour by agro based industries and flour is then converted into 2nd stage products. These products are then packaged and sent to consumer markets.</p> <p>F&B is the second stage in the value chain, while the first being agro based products.</p> <p>Although Bangladesh being an agrarian economy is able to supply most of the raw material required for agro based industry, it also has to rely on imports for products like Wheat, Sugar and few fruit various reasons ranging from poor protein content in wheat to poor productivity of sugarcane.</p> <p>For animal products, Bangladesh is primarily focussed of exports of fish products, in particular exports of shrimp. Shrimp production is a three-stage process, starting at hatcheries, where shrimp fries are cultivated, followed by farming where adult shrimps are cultivated from the shrimp fries. This is followed by processing, where activities like deshelling, de-heading and some minimal processing takes place in order to increase the shelf life of shrimp products. Lack of technological know-how prevents shrimp processing firms from adding further value to the processed shrimps.</p> <p>Fish and shrimp cultivation takes place in coastal parts of the country like Khulna, Barisal, Cox’s Bazar and Chittagong.</p> <p>Basis primary survey, investors prefer setting up of F&B units at central locations of Bangladesh so that seamless supply to consumers located across the country can take place easily. Some large domestic and foreign F&B players also source a part of their raw materials (like additives, flavours, and chemicals) from outside the country from registered vendors in order to conform to their global quality policy.</p>
Agro Based Products	<p>Agro based products act as source of raw material and intermediaries/ backward linkage to F&B sector in Bangladesh. Agro based products can broadly be classified into three categories viz. (a) cereal, egg & fruits based; (b) tobacco; and (c) non edibles (such as jute, cotton). This sector deals with first level processing of agricultural products and it acts as the upstream industry sector for F&B sector. Being an agrarian economy, Bangladesh cultivates agricultural products in abundance.</p> <p>Although Bangladesh shows prominence in yield per unit area for wheat (3.1 MT per hectare vis-à-vis 3.07 MT per hectare globally), locally produced wheat are low on protein content. As a result of the same, Bangladesh has import dependency for wheat (Russia, Ukraine, and India are the major importers).¹³⁸ Rajshahi division is the top wheat producing division in the country. Egg and milk production in Bangladesh is not sufficient. Bangladesh’s sugar yield (per unit area) is lower compared to neighbouring countries and as a result of the same, sugar is also imported.</p>

¹³⁸ ITC Trade Database

Sector	Description of raw materials, industrial linkages, and market access
	<p>Rajshahi division produces major sugarcane and it is also largest producer of fruits including mango. Rice cultivation takes place in abundance in this country; ~75% of the total cropped area and ~80% of the total irrigated area is planted to rice. It caters to ~67% of total calorie supply and ~50% of total protein intake of an average person in this country.¹³⁹ Agro produces (both in raw form and intermediaries) caters to domestic demand as well as to F&B units for production of second stage of value chain products.</p> <p>Bangladesh specialises in export of unmanufactured tobacco. Bangladesh produces 10,000 MT of tobacco in a year, out of which ~30% is exported. Khulna and Rangpur divisions are the top most tobacco producing divisions. Tobacco cultivated caters to the domestic demand and the tobacco leaves are being exported to large economies.</p> <p>Jute is one of the predominant cash crops in Bangladesh. Bangladesh is contributing ~39% of world's jute production. Jute is cultivated in almost all districts of Bangladesh; various jute mills are located in Khulna division. As explained earlier, humid climate in this country is not conducive for cultivation of cotton, hence cotton is primarily imported from countries like China, and India owing to quality aspects as well as less lead time requirement due to import from neighbouring countries.</p> <p>Agro based products manufactured in Bangladesh primarily caters to the domestic demand and as feed to F&B industry. Export of agro based products mostly takes place to India and the surrounding countries. High dependency on primary sector (agriculture) necessitates the usage of light machinery and agricultural equipment in Bangladesh.</p>
Leather and Leather Products	<p>Leather industry is the second largest export earning sector of Bangladesh with major markets being Italy, England, Spain, France, Germany, Poland, China, Japan, USA and Canada. The overall leather industry is classified into three broad categories such as finished leather, leather products, and footwear. GoB has also declared this industry as the priority sector.</p> <p>This sector caters to only 0.5% of the world's leather trade (worth USD 75 billion). About 113 tanneries in Bangladesh produce 220 million square feet of hides and skins every year.¹⁴⁰ There are about 30 modern shoe manufacturing plants involved in production of high-quality footwear; also, ~2,500 small and medium scale footwear manufacturers are operational.¹⁴¹</p> <p>Value chain assessment of this sector depicts that in tanneries raw animal skins and hides are processed (using industrial salt and chemicals) to manufacture finished leather, which in turn is used to manufacture leather based products and footwear. Design of the leather products is a critical step which precedes the leather based products manufacturing. Designing involves skilled human resources and there appears to be a clear gap in availability of specialised manpower towards this stage.</p> <p>Tanneries in Bangladesh form a cluster, recently this cluster has been relocated to Savar area from Hazaribagh area of Dhaka. This move was undertaken in order to regulate tanneries in Bangladesh and to ensure that proper safety and environment friendly norms were being followed.</p>

¹³⁹ <http://www.knowledgebank-brri.org/riceinban.php>

¹⁴⁰ <http://www.theindependentbd.com/printversion/details/112906>

¹⁴¹ https://www.researchgate.net/publication/235609270_Bangladeshi_Leather_Industry_An_Overview_of_Recent_Sustainable_Developments

Sector	Description of raw materials, industrial linkages, and market access
	<p>Basis primary survey, these tanneries suffer from inadequate infrastructure (such as non-metalled internal road, non-functional CETP, and high electricity cost), resulting in adverse effect on production of leather and underutilization of capacity for tanneries, located in Savar. The raw material required for leather is animal hide and skin. Due to its large cattle population, Bangladesh has a good supply of leather. Cow hides account for 56% of production, goat skins for 30% and buffaloes make up the rest.¹⁴² Bangladesh is a net exporter of raw hides and skins. In 2016, Bangladesh's exports within the category were about ~USD 208 million and imports were ~USD 116 million.¹⁴³ Raw hides obtained from animals are mixed with chemicals for the purpose of tanning. The chemicals used for this process are currently imported due to lack of domestic production of the same. After tanning of leather, these leather goods are supplied to manufacturers of leather goods, where leather is converted into different products like footwear, bags, belts, clothes etc.</p> <p>Final output from this sector caters to the domestic demand as well as it serves the export market. High quality and high end leather products are being manufactured in this country which are fit for export to large economies. Bangladesh is a net exporter of leather, however export share of leather products has potential to increase in Bangladesh. For which adoption of new technologies, investment in R&D, and gradual development of designing capacity will be required. Bangladesh currently exports its leather products across the globe.</p>
Plastic and Rubber	<p>Plastic and rubber industry segment acts as intermediary and backward linkages for other sectors such as leather, packaging, machineries & equipment, footwear, and accessories. Plastic and rubber industry in Bangladesh is depicting an annual growth rate of 20%.¹⁴⁴ There are a total of 300 manufacturers in Bangladesh generating export of plastic goods is ~USD 99 million (in 2015-16, contributing to ~0.01% of global export) primarily to India.¹⁴⁵</p> <p>Oil and gas industries are the primary upstream industries required for plastic and synthetic rubber production.</p> <p>From crude oil distillation, compounding exercise is undertaken in which plastic products are polymerised. Further, mixing and moulding takes place for converting polymers to plastic products.</p> <p>Natural (procured from rubber plantation) and synthetic rubber are compounded through adding chemical additives to manufacture rubber based products for industrial, commercial, and household purposes.</p> <p>Owing to lack of oil refineries in this country, Bangladesh has limited participation in the plastic compounding stage. Since there is no polyolefin units in Bangladesh and demand of polymers is met through import (from China, Saudi Arabia, Chinese Taipei, Korea, and Thailand). Raw material requirements of plastic is met through import and from local recycled plastic waste.¹⁴⁶ It is to be noted that 20% of raw materials are from recycled</p>

¹⁴² Research Gate. 2013. *Bangladeshi Leather Industry: An Overview of Recent Sustainable Developments*.

¹⁴³ ITC Trade map

¹⁴⁴ <http://bida.gov.bd/plastic-industry>

¹⁴⁵ Bangladesh Investment Development Authority

¹⁴⁶ <http://emergingrating.com/wp-content/uploads/2017/09/Plastic-Industry-of-Bangladesh-Vol-I.pdf>

Sector	Description of raw materials, industrial linkages, and market access
	<p>materials.¹⁴⁷ Bangladesh has limited production capacity in this sector due to lack of advanced machinery and lack of skilled human resources. As a result, plastic products manufactured in this country primarily cater to domestic demand.</p> <p>Due to lack of upstream petrochemical industries, there is no production of synthetic rubber in Bangladesh. USD 25 million of synthetic rubber is imported annually. Natural rubber is produced from rubber plantations located in Chittagong, Sylhet, Madhupura, and in Bandarban hill tracts.¹⁴⁸ Major importing countries for synthetic rubber are India and non SASEC countries. Products from plastic and rubber industries are mostly used for industrial, commercial, and domestic consumption. Due to lack of advanced technology, local small and medium players have restriction in producing quality rubber products. As a result, rubber produced in Bangladesh primarily caters to the domestic demand and export contribution is very less.</p>
Paper and Packaging	<p>As per Bangladesh Paper Mills Association, there are 100 paper mills in Bangladesh with a production capacity of 1.5 million metric tonne per year. Manufacturers in Bangladesh are investing in upgradation of technology to produce export quality papers in order to export paper to 40 countries. Paper exports from Bangladesh generated revenue of USD 920,488 in fiscal year 2016-17.¹⁴⁹</p> <p>The process of manufacturing paper products can be divided into a 3-stage process. The first stage involves acquiring raw material which can be soft wood, bamboo or other fibre based plants. Raw material availability in Bangladesh is limited currently due to lack of ample land, conducive climate and soil conditions. Manufacturers are able to source local wood for manufacturing of basic paper. The wood obtained from plants is converted into pulp through use of digester, bleaching agents are typically sourced from local suppliers.¹⁵⁰ Manufacturers also use recycled paper or import pulp from other countries depending on the final product. This pulp is then converted into paper or packaging products.</p> <p>Usually integrated paper manufacturers in other countries have upstream access to forest towards sourcing of wood. In Bangladesh, locally sourced wood is procured from forest areas in Bandarban and Chittagong forest areas. However, the pulp available locally is not of high quality fit for commercial and industrial purposes.</p> <p>Per capita paper and board production in Bangladesh is ~3.5-4 kg, whereas the world average is 50 kg.¹⁵¹ This shows that Bangladesh is still lagging behind the world in per capita paper production. Although, Bangladesh is producing sufficient paper for writing, printing and newsprint purposes, consumers are still dependent on imports for packaging material used in RMG, medicine and food items. This is because Bangladesh does not produce high quality pulp locally and while local raw material can meet local demand for basic paper and tissues, it does not satisfy the needs of</p>

¹⁴⁷ The Financial Express. 2015. *Export-Oriented Plastic Industry of Bangladesh: Opportunities and Challenges*

¹⁴⁸ http://en.banglapedia.org/index.php?title=Rubber_Industry

¹⁴⁹ <http://www.theindependentbd.com/home/printnews/139544>

¹⁵⁰ Paper Sector in Bangladesh: MMA Quader (2011)

¹⁵¹ Paper Sector in Bangladesh: MMA Quader (2011)

Sector	Description of raw materials, industrial linkages, and market access
	<p>manufacturers in RMG, F&B and pharmaceutical sectors, who are very particular about their paper quality. Paper packaging items are currently imported from Japan, South Korea, China, India and Indonesia. Bangladesh imported 1 million MT of packaging material in 2016-17.¹⁵²</p>
Chemicals	<p>Chemicals sector comprises various products viz. (i) fertilizer, (ii) adhesives & paints related products, and (iii) other chemicals. This sector exhibits annual growth trend of ~9%.¹⁵³ Chemicals sector acts as the downstream sector for various sectors such as agro based, shipbuilding, and heavy machineries. Adhesives and paints based products are consumed for household, commercial, and industrial purposes. At present, chemicals sector fulfils domestic demand and it is not export oriented. This sector is largely dominated by local traders who offer competitive price across the range of products.¹⁵⁴ Primary survey among industrial players reveals that owing to lack of technical know-how, lack of skilled manpower, and lack of quality laboratory facilities (research and testing) in this country, Chemicals sector is yet to shape up in Bangladesh and get ready for export oriented manufacturing.</p> <p>Urea is the major raw material for fertilizer production. Additives are added to Urea for manufacturing fertilizers. Basis primary survey, production of urea based fertilizer is controlled by GoB; current production of urea is not sufficient to meet local demand (demand is 2.5 million MT annual and local supply is only 1 million MT annual) and owing to the same, import of fertilizer is required. Private players are involved in adding micro nutrients (NKPF) to urea in order to enhance the quality.</p> <p>Resin is the basic raw material for adhesive manufacturing, the same is imported. Downstream produces from adhesives are used in footwear, light engineering and construction sectors in the country. Large paints companies in Bangladesh are dependent on procuring raw materials through import from reputed empanelled vendors worldwide. Basis primary survey with industrial players, local (small and medium scale) chemicals manufacturers are dependent on importing resins from countries like India and South Asia.</p> <p>Outputs of Chlor Alkali and Hydrogen Peroxide are basic chemicals necessary for all industrial usage. Downstream products from these basic chemicals have demand across various sectors such as dyeing, textile, F&B, Electrical & Electronics, Steel, Leather, Pharmaceuticals, and Plastic. These inputs are primarily imported from India, China, and other Asian countries. Due to lack of integrated chemical manufacturing facilities in Bangladesh, this sector is import dependent.</p>
Non-metallic minerals	<p>Non-metallic minerals sector comprises of (a) glass, (b) ceramics, and (c) cement. This sector records an average annual growth trend of ~24%.¹⁵⁵ Manufacturing output from these sectors primarily caters to the domestic demand.</p>

¹⁵² <http://www.theindependentbd.com/home/printnews/139544>

¹⁵³ <http://www.thedailystar.net/supplements/painting-the-future-bright-1331338> <https://factsweek.com/160464/asia-textile-chemicals-market-is-projected-to-exhibit-a-caqr-of-7-6-from-2014-2020/>
<https://advancedtextilesource.com/2014/07/23/bangladesh-textile-chemicals-market-growth-continues/>

¹⁵⁴ www.banglajol.info/index.php/jce/article/download/10178/7533

¹⁵⁵ <http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489>

Sector	Description of raw materials, industrial linkages, and market access
	<p>Domestic market for glass and glassware has been estimated at USD 2 billion (2016) and sectoral outlook is demonstrating healthy growth rate of ~20% annually. Main ingredient of glass industry is sand, although quality sand is imported from China and Egypt.¹⁵⁶ In addition, Bangladesh imports the other ingredients (like limestone, dolomite, feldspar, and other minerals) required for glass industry. Local sand deposits of Bangladesh are located at Balijuri, Shahjibazar, Maddhyapara, and Barapukuria.¹⁵⁷ Secondary research depicts that local glass sector caters to ~95% of the domestic demand; local glass companies are exporting products to South Asian countries (such as India, Nepal, Bhutan, and Sri Lanka).¹⁵⁸</p> <p>Domestic market for ceramics industry has been estimated at USD 593 million (2016) and this segment is growing at ~20% annually; Bangladesh is a net importer of ceramics (USD 145 million).¹⁵⁹ Clay mining (main ingredient) is sourced locally from Mymensingh and Sylhet regions. Basis primary survey with industry sector players, for high quality products, Bangladesh is import dependent and other raw materials (minerals, adhesives, and chemicals) are being imported. This sector caters to ~85% of the domestic demand and export takes place to various countries (like India, large western economies).¹⁶⁰ Natural gas is used in the production process and owing to low Sulphur content in locally available natural gas, ceramics products look shiny and bright, which makes it adequate for export to large markets.¹⁶¹</p> <p>Limestone is the major raw material for cement production. Limestone is processed to form clinker, on which additives are mixed and crushed to manufacture cement. For cement production in this country, end-to-end manufacturing is not available as Bangladesh doesn't have enough supply of limestone. Clinker (processed limestone) is being imported from countries such as India, China, and South East Asia. Coal is also imported and fly ash is sourced locally. All the cement based industrial units are located adjacent to river to facilitate smooth logistics. Cement production in this country is primarily used for domestic consumption and minimal export takes place.</p>
Automobile and accessories	<p>With rising income levels in the country, Bangladesh's demand for automobiles is rising. The domestic market demand has been mostly satisfied by imports. Bangladesh is not present across the value chain of automobile industry due to lack of technological know-how and trained manpower. The country has been primarily dependent on assembling of automobile components; these components (completely knock down units) are being imported. Currently the passenger car import comprise of refurbished cars or re-used cars that are reconditioned in Bangladesh. Import of passenger cars has clocked USD 351 million (in 2015). Basis interaction with respondents from automobile sector we were informed that import duty on brand new vehicles ranges from 100% to 300% and as a result of the same, passenger cars are costly in the country. Due to GoB's tax structure which imposes 165 percent duty on imported new cars, 60 percent duty on cars made in Bangladesh and 25 percent Supplementary Duty on reconditioned hybrid cars, Bangladesh is witnessing a rising demand of refurbished vehicles in Bangladesh.^{162 163}</p>

¹⁵⁶ Secondary research and primary survey

¹⁵⁷ Banglapedia

¹⁵⁸ <http://www.thedailystar.net/news-detail-42940>

¹⁵⁹ Secondary Research and information obtained from industry associations

¹⁶⁰ <http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489>

¹⁶¹ <http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489>

¹⁶² <http://www.thedailystar.net/business/sales-of-reconditioned-cars-getting-popular-in-bangladesh-1530604>

¹⁶³ http://www.business-standard.com/article/companies/bangladesh-firm-keen-to-assemble-tata-small-cars-117092600034_1.html

Sector	Description of raw materials, industrial linkages, and market access
	<p>However, with development of technological know-how automobile manufacturers are starting to manufacture vehicles at competitive prices locally and have also started targeting export markets. In the recent past several foreign entities expressed their intent to invest in Bangladesh. For example, recently Ashok Leyland opened a new commercial vehicle assembly plant near Dhaka. Various assemblers of vehicles are joint-ventures with foreign entities to help bring in technology and parts. Examples include a partnership between Ashok Leyland and IFAD Autos Limited, and a partnership between Tata Motors and Nitel Niloy Group. Bangladesh has duty-free agreement with several countries due to which cars manufactured and exported from Bangladesh do not attract import duties. These cars can also attract local customers who are interested in buying new cars rather than refurbished cars.</p>
Heavy Machinery, Iron, Steel and Metal	<p>Bangladesh is one of Asia's emerging steel markets having more than 400 steel, re-rolling and auto re-rolling mills. Most of steel manufacture in Bangladesh takes place in form of long steel products and MS bars used in construction of buildings. Majority of the steel and metal based industrial units in Bangladesh are re-rolling mills and they are located in Chittagong and Narayanganj areas, where downstream produces (steel and metal scraps) from ship breaking industry are readily available. As per discussions with leading steel manufacturers, Bangladesh currently produces more than 4 million tonnes of steel and production of this sector is expected to double by 2022.</p> <p>The value of chain of this sector involves mining of iron ore and converting it into pig iron inside blast furnace. This pig iron is converted into steel ingots by adding metals like magnesium, nickel etc. as per requirements of the final products. These steel ingots are then sent to rolling mills where they are converted into billets. Billets are then converted into final products in re-rolling mills.</p> <p>Due to absence of iron ore deposits, steel industry in Bangladesh is dependent on import of scraps and billets to produce final products. Bangladesh is a net importer of iron ore; as per ITC trade data Bangladesh imported USD 2054 million worth of iron and steel products, and USD 31 million worth of iron ore and slag in 2015. This contributes to ~5% of total import of the country.¹⁶⁴ However, Bangladesh has now developed capacity to manufacture 90% of its billet requirement locally.</p> <p>Bangladesh currently manufactures steel for its domestic consumption only, however due to capacity expansion by steel manufacturers, Bangladesh has also developed potential to export steel products. Heavy machineries are dependent on supply of metals and steel. However the skill and technology requisite for the same are not available in the country. Water front facilities are required for setting up of steel, metal, and heavy machinery manufacturing related industries in the country.</p>

¹⁶⁴ ITC Trade Database

Sector	Description of raw materials, industrial linkages, and market access
Electrical and Electronics	<p>Electrical and electronics sector consists of various end products such as cables, electrical appliances, switches, white goods, electronics appliances and goods. This sector caters to both household requirements as well as industrial requirements in sectors such as shipbuilding, heavy machineries & equipment, and light machinery. Size of this sector is BDT 150 billion, out of which ~BDT 70-80 billion is met through domestic production.¹⁶⁵</p> <p>Raw materials for this sector is diversified and dependent on industrial linkages of various sectors. Products from plastic and rubber industries are used as base for production of switches and cables. Products from metal based industries are used for electrical wiring. Electronics sector has a fragmented value chain spread across various geographic locations. Spare parts of electronics sector (such as compressor, coil, and circuit) are sourced through import from India, China, Thailand, Singapore, and Malaysia. In addition to assembling of the spare parts, manufacturing of spare parts are also available in the country.¹⁶⁶</p> <p>The country's import in computer and telecommunication devices has been growing with negligible export. Growth in this sector is primarily attributed to the growing consumption pattern countrywide. Singapore, Malaysia, China, and India are the major supplier of spare parts and accessories. Major produces from this sector (such as electronic appliances like AC, fridge, TV, computer and peripherals; electrical fittings, cables, and lighting) are consumed locally. Electrical and Electronics products manufactured locally are comparatively cheaper as compared to the products being manufactured by large brands (such as Sony, Samsung, and Hitachi). Walton is the major player in electronics segment in Bangladesh with a market share of ~70%-80%. Local manufacturers hold minuscule share of market and they fail to enjoy economies of scale. Since the output from this sector are cost beneficial as compared to the product offerings of international brands, this sector mostly caters to the domestic demand. Minimal export takes place to India, Africa, Nepal, and Sri Lanka.¹⁶⁷</p>
Ship Building and Ship Breaking	<p>Shipbuilding industry in Bangladesh is growing; exports earning from this sector in FY 2016-17 was USD 65.61 million, whereas in FY 2012-13 it was USD 5.73 million.¹⁶⁸ However, Bangladesh is still a net importer of end products of shipbuilding industry, with imports of USD 155 million in 2016.¹⁶⁹ The most imported items in Bangladesh are cruise ships, excursion boats, ferry boats, cargo boats; and light vessels, fire-floats, and dredgers. There are currently 300 shipyards operating in Bangladesh where 0.3 million people are employed.¹⁷⁰ Approximately 70% of the yards are located in and around Dhaka and Narayanganj along the side of the river banks of the Buriganga, Shitalakha, and Meghna. About 20% of the shipyards are in Chittagong division located along the side of the Karnapuli River and 6% are located along the bank of Poshur River of Khulna division, and the remaining 4% are located in Barisal division. Almost all inland, coastal, and bay crossing ships are constructed and repaired locally in these local shipyards.¹⁷¹</p>

¹⁶⁵ *INSPIRED, Electronics Sector Report, EU*

¹⁶⁶ *Primary survey with industry players*

¹⁶⁷ *Primary Survey with industry players*

¹⁶⁸ <https://thefinancialexpress.com.bd/trade/export-earnings-from-shipbuilding-soar-1513396358>

¹⁶⁹ *ITC Trade Database*

¹⁷⁰ <https://thefinancialexpress.com.bd/trade/export-earnings-from-shipbuilding-soar-1513396358>

¹⁷¹ *Japan Bangla Business Center. 2014. A Report on Shipbuilding Industry of Bangladesh.*

Sector	Description of raw materials, industrial linkages, and market access
	<p>Design stage is the first component in the value chain where the layout of the ship is finalized. Ship production is primarily dependent on using steel plates to manufacture the hull of the ship and installing engines, cables and machines inside the ship. Manufacturing of ship requires designing of ship and availability of power sources. Shipbuilding industry requires input from various other downstream industries such as light engineering, chemicals (paints and adhesives), and steel.</p> <p>At present, Bangladesh has limited participation at the design stage of the value chain, which requires skilled manpower. Bangladesh shipbuilders (due to lack of specialised skillset) are supplied with designs by foreign ship owners. From the input perspective, inputs such as steel plates, switch boards, steel cables, and power transformers, are procured locally, whereas engines are imported exclusively. With regard to steel, which is the primary input necessary for the industry, Bangladesh is import-dependent. This is because maximum steel rolling mills in Bangladesh are focussed towards producing long bars which have a higher demand from the construction industry and Bangladesh has a limited steel plate producing capacity.</p> <p>The coast line of Bangladesh is also conducive for setting up ship breaking industry which primarily requires cheap labour. Shipyards in India, Pakistan and Bangladesh comprise around 80% of global breaking and recycling market.¹⁷² The biggest ship recycling yard out of these 3 countries is in Chittagong, which recycled 230 ships in 2017.¹⁷³ Basis primary interaction and sectoral research, it was understood that Bangladesh gets 60% of its steel supply from ship breaking industry, which is used in iron, steel, light engineering and equipment manufacturing industries.</p>
Petroleum products (including bottling)	<p>Petroleum sector in Bangladesh is exhibiting historical annual growth trend of 10%.¹⁷⁴ Gross value added in this sector is estimated at BDT 1309 billion.¹⁷⁵ Bangladesh is a major importer of petroleum products. Based on the petroleum and petroleum based products (such as LPG, LNG, and polymers), gas refining, storage and bottling facilities have been developed in water front locations mostly located near the sea sides of the country. Imported volume of POL (petrol, oil, lubricants) products has clocked 4.1 million MT (2016).¹⁷⁶</p> <p>Based on extraction of crude oil, distillation and polymerization takes place to manufacture various downstream products such as lube oil, plastic, and rubber. Since there is no crude oil reserve in this country, Bangladesh is not present across the value chain of this sector. Crude oil is mostly being imported from gulf countries. Setting up of oil refineries is highly capital intensive and it involves usage of advanced technologies and heavy machineries. Further, highly skilled and specialized manpower is essential towards smooth functioning of this sector. Basis primary survey with industry players, Bangladesh lacks in terms of availability of highly skilled manpower; as a result of which, Bangladesh is present in less technologically challenging aspects in the value chain of this sector. There are various local players manufacturing lube oil and blended oil which</p>

¹⁷² <http://www.atimes.com/article/shipbreaking-asia-profit-price/>

¹⁷³ <http://www.atimes.com/article/shipbreaking-asia-profit-price/>

¹⁷⁴ <http://fpd-bd.com/wp-content/uploads/2016/10/Research-Report-on-Energy-Sector-of-Bangladesh-Initiation-Mar-15-11.pdf>

¹⁷⁵ Survey of Manufacturing Industries by Bangladesh Bureau of Statistics

¹⁷⁶ Bangladesh Petroleum Corporation

Sector	Description of raw materials, industrial linkages, and market access
	are primarily consumed in sectors such as automobile, heavy engineering, and light machinery. LPG based cylinders are bottled in cylinders for industrial, commercial, and domestic supply. This sector caters to the local demand and not export oriented.
Pharmaceuticals	<p>Pharmaceuticals is one of the most popular industry sector in the country; gross value added from this sector is BDT 113 billion yearly.¹⁷⁷ Domestic market has been estimated at ~USD 2 billion (2016) with an indicative growth rate of 15% annually.¹⁷⁸</p> <p>Pharmaceuticals is a highly research and development oriented industry where regulatory aspects (like drug laws, patent issues, and affiliation with drug agencies) play key role. From basic chemicals and other products (like herbal contents), Active Pharmaceutical Ingredients (APIs) are manufactured. APIs are the key ingredients for drug manufacturing.</p> <p>Active Pharmaceutical Ingredients (APIs) of Pharmaceutical sector is sourced through import owing to quality issues and lack of API manufacturing ecosystem in the country. Basis primary survey, Bangladesh has commenced API manufacturing, but the production is not sufficient to cater to the economies of scale (~10% APIs are locally sourced). Also, owing to lack of educational ecosystem and lack of research facilities, Bangladesh is limited in R&D and sourcing of skilled technicians in this sector. Chemicals and various ingredients of drug are imported (from various markets spread across USA, Europe, and Asia) and end products (drugs) are being manufactured in this country.</p> <p>Dhaka and the surrounding region has evolved as a hub for pharmaceutical manufacturing with majority of the pharmaceutical units are located in this region. Basis primary survey with industry players, lack of adequate educational system related to pharmaceutical sector and availability of skilled human resources are major challenges that this sector is facing. End products of this industry primarily caters to domestic demand and minuscule export takes place (mostly to Africa and LDC countries).</p>
Light Machinery, Equipment and Furniture	<p>This sector involves production of mechanical equipment, agricultural machinery, bicycles, and furniture. Produces from this sector is predominantly used for catering to domestic demand.</p> <p>This is an important industry in Bangladesh as it provides backward and forward linkages to all other industries. Light machinery sector provides support for operation and maintenance of heavy machines through production of spare parts, castings, moulds, dies, fittings etc. As per information provided by Bangladesh Investment Development Authority (BIDA) there are currently 40,000 light engineering units/workshops scattered across Bangladesh. These industries develop in vicinity of industrial clusters in order to provide support to large scale capital intensive factories requiring heavy machinery. Products manufactured by this sector can be made out of rubber, ceramics, metals or plastic. Exporters from countries like China, Japan and Korea are developing light engineering facilities in Bangladesh in order to cater to export market.</p> <p>Raw materials are steel scraps, components of plastic and rubber, and wood. Basis primary interaction, we were informed that steel scrap is sourced primarily from ship breaking industries (located in Chittagong and Narayanganj). Other raw materials (such as articles made of plastic and rubber)</p>

¹⁷⁷ Survey of Manufacturing Industries 2012, Bangladesh Bureau of Statistics

¹⁷⁸ https://www.jetro.go.jp/ext_images/world/asia/bd/seminar_reports/20160413/p4.pdf

Sector	Description of raw materials, industrial linkages, and market access
	<p>are sourced locally; Bangladesh doesn't produce good quality wood required for manufacturing of furniture. Since, wood available in Bangladesh are high in moisture and fibre content and is not fit for processing.</p> <p>Bicycle sector in Bangladesh participates in the entire value chain (assembling and manufacturing). Manufacturers focused on export are completely import dependent for raw material sourcing. According to them, quality raw material fit for export is not available locally. However, majority of manufacturers are focused on catering to domestic demand.</p>

Above table describes sector wise dependency on raw material sourcing and major markets. It is evident that across the industry sectors, Bangladesh is a net importer for major raw materials and intermediaries. Industries in Bangladesh are primarily focussed on meeting domestic demand and negligible export takes place in all sectors apart from RMG, leather, pharmaceuticals and F&B. As a next step, pre-requisites in terms of logistics, utility sourcing, and dependency on manpower have been assessed. Table in the next page covers the dependency of each sector on various factors of production.

Table 26: Sector Specific dependency on Factors of Production

Industries	Import Dependency	Export Dependency	Land Transport	Air Transport	Water Transport	Access to Water Front	Electricity Requirement	Water Requirement	Gas Requirement	Labor dependency	Area Sensitivity
Textiles & RMG	High	High	Moderately High	Moderately Low	Moderately High	Low	High	Moderate	Low	High	Low
Food and Beverages	Moderate	Moderately High	Moderately High	Moderate	Moderately High	Moderately Low	Moderate	Moderate	Moderate	Moderate	Moderate
Agro Based Products	Low	Moderate	Moderately High	Moderately Low	Moderate	Moderate	Moderate	Moderate	Moderately Low	Moderately High	Moderate
Leather and Leather Products	Moderately Low	High	Moderately High	Low	Moderately High	Low	Moderately Low	Moderately High	Moderately Low	Moderately High	Moderate
Plastic and Rubber	Moderately High	Moderately Low	Moderate	Low	Moderately Low	Low	Moderate	Moderate	Moderately High	Moderately High	Moderate
Paper and Packaging	Moderate	Moderately Low	Moderate	Low	Moderately Low	Low	High	High	Moderate	Low	Moderately Low
Chemicals	High	Moderately Low	Moderate	Moderate	Moderately High	Moderately High	High	High	Moderate	Low	Moderately High
Non-Metallic Minerals	High	Moderate	Moderate	Low	High	High	High	Low	High	High	High
Automobile and Accessories	High	Low	Moderate	Moderately Low	Moderately Low	Low	Moderate	Low	Moderately Low	Moderately High	High
Heavy Machinery, Iron, Steel and Metal	High	Low	Moderate	Low	High	High	High	Moderate	High	High	High
Electrical and Electronics	High	Low	Moderately High	Moderately Low	Moderately Low	Low	Low	Low	Low	Moderate	Low
Ship Building and Ship Breaking	High	Moderately High	Moderately Low	Low	High	High	High	Low	Moderately High	High	High
Petroleum Products (including Bottling)	High	Moderately Low	Moderate	Low	High	High	High	Low	Moderate	Moderate	High
Pharmaceuticals	High	High	Moderate	Moderately High	Moderately High	Moderate	High	High	Moderately High	High	Moderately High
Light Machinery, Equipment and Furniture	Moderately Low	Moderate	Moderately High	Moderately Low	Low	Low	Moderately Low	Moderate	Moderate	Moderate	Moderate

Table in the previous page captures a heat map, which highlights the dependency of each sector on various factors of production. Further, project site and influence region (surrounding the project site) specific assessment is undertaken to assess the economic profiling, natural resources, industrial development, and backward/ forward linkages prevailing in the region. Assimilating the outcome of regional assessment with the site specific attributes related to factors of production, compatibility of initial universe of industries in site surrounding context would be assessed. Outcome of this assessment would result in the initial shortlist of industries.

Next section captures the regional assessment involving economic profiling, natural resources, and industrial linkages prevailing in the influence region surrounding the proposed EZ.

4.5. Regional Assessment

This section assesses the region surrounding Shariatpur district in terms of the following:

- Agricultural and natural resources,
- Industrial development,
- Analysis of manpower sourcing to the proposed EZ

In Chapter 3, detailed location assessment captures inherent features owing to location and proximity to strategic assets (such as Padma Bridge and other upcoming infrastructure development projects in this region). Outcome of this regional assessment shall capture if the initially shortlisted industries are suitable for establishment in the proposed EZ based on factors of production.

Border adjoining districts of Shariatpur district have been considered as the immediate influence region for the proposed EZ. These districts are the neighboring districts of the proposed EZ and could have major influence on the industries in the proposed EZ from the aspects of local supply of raw materials and industrial linkages. This influence region consists of the following districts:

- Shariatpur
- Munshiganj
- Madaripur
- Barisal
- Chandpur

4.5.1. Key Characteristics of Influence Region

The proposed EZ site is located in Jajira Upazila of Shariatpur district. This district (and the influence region) is well positioned in between the industrial hubs of Dhaka, Narayanganj, Munshiganj, Barisal, Mongla, Khulna and Jessore. Shariatpur district is drained by rivers like Padma, Meghna, Kirtinasha, Palong, Damudia and Arial Kha. These rivers ensure that there is sufficient water resources in the region to support agricultural activities. The economy of Shariatpur district is predominantly agriculture based. Out of total 225,523 holdings of the district, 65.89% are agriculture farm holdings that produce varieties of crops, namely local and High Yielding Varieties (HYV) paddy, wheat, vegetables, spices, cash crops, pulses and others. Fish of different varieties abound in the district.¹⁷⁹

¹⁷⁹ Bangladesh district statistics, 2011

Following figure captures profiling of the influence region based on demographic and economic indicators.

Figure 31: Economic and Demographic profiling of the influence region¹⁸⁰

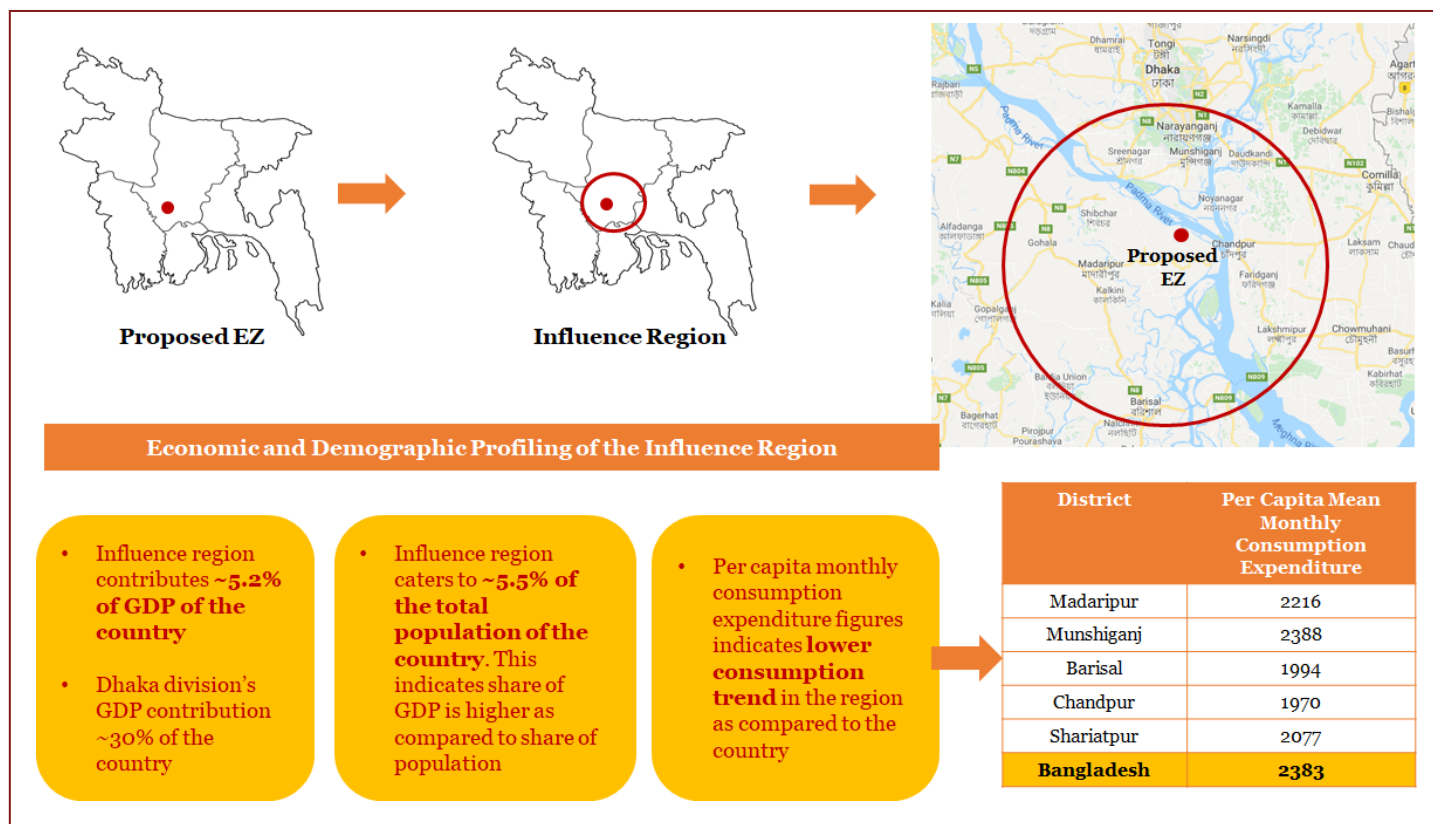


Figure on the left indicates that the influence region is not economically well off. Share of GDP and population are homogeneous in this region, which indicates no path-breaking economic and industrial activities are taking place in this region.

Relatively lower per capita monthly consumption expenditure figures indicate that the economic condition and spending pattern of the population is lower as compared to the country average. Population residing in the surrounding region of the proposed EZ has moderate lifestyle which is evident from the lower consumption expenditure pattern. Thus the influence region of the proposed EZ is not well placed as a good market place to supply finished products.

Once the proposed EZ is operational, it could act as catalyst towards transforming the overall industrial and economic outlook of this region.

¹⁸⁰ Source: Secondary Research (Lagging Region's Study, District Statistics, World Bank) and PwC Analysis

4.5.2. Raw Materials and Natural Resources available in the Influence Region

Agricultural and natural resources in Shariatpur district

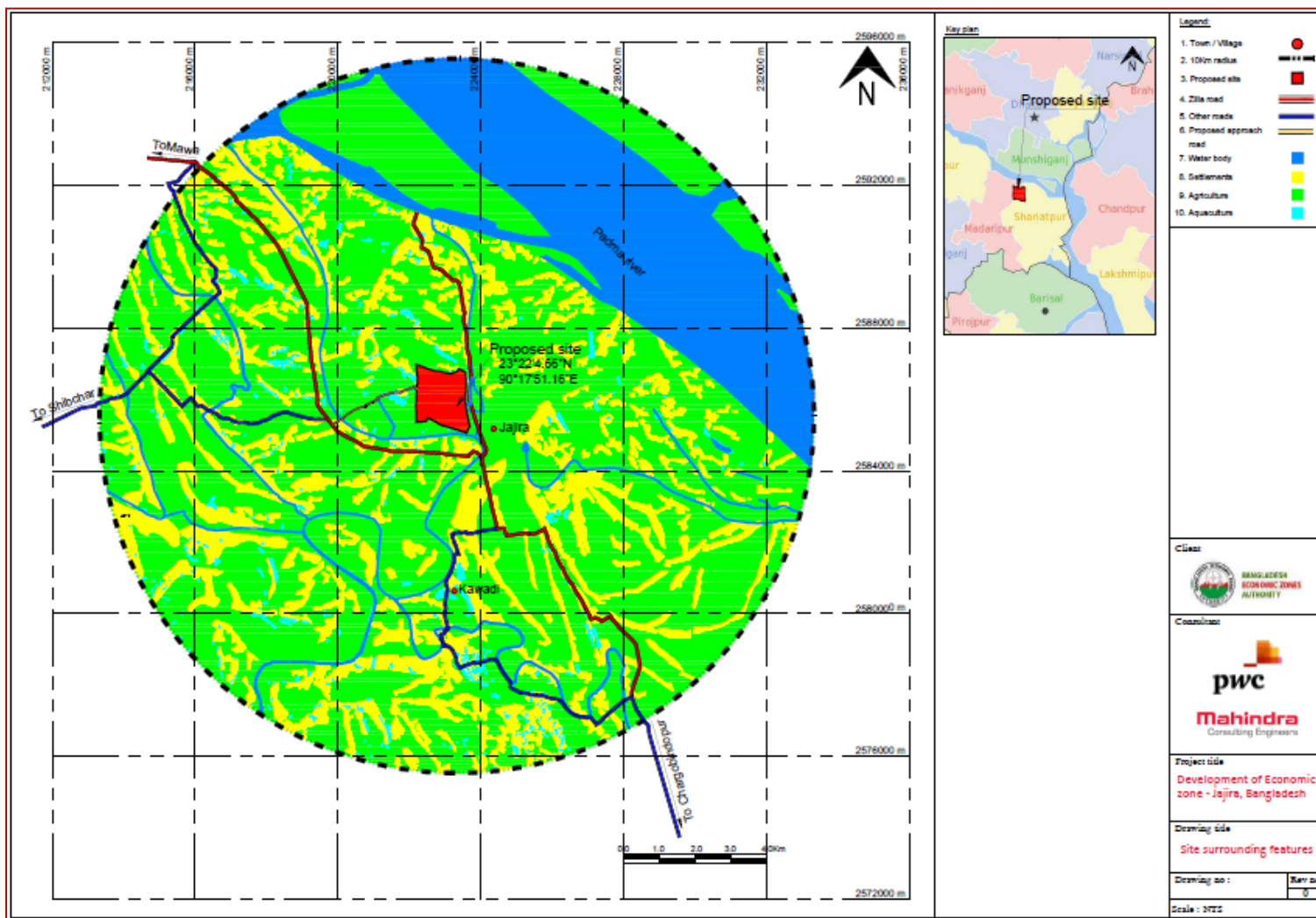
An analysis of district statistics report, 2011 of Bangladesh, reveals that Shariatpur district witnesses healthy production of rice (167,440 MT), potatoes (42,891 MT), onion (16,075 MT), tomato (8,788 MT), pepper (9,836 MT), wheat (8,279 MT), sugarcane (5,797 MT) and other agricultural products. Moreover, the riverine region in Shariatpur supports aquaculture (fish rearing) and cash crop like jute (44,990 MT).

These crops are grown both for domestic consumption as well as for export to other countries. Food Processing industries situated in neighbouring districts also source their raw material from Shariatpur district for the purpose of processing.

High dependency on agricultural activities may also push demand for fertilizers and agricultural machinery in this region.

A settlement profile of the proposed site location is shown on the next page. This profile covers an area of around 10 km radius. The map shows that there is predominantly agricultural land in the vicinity of the proposed EZ site, with scattered settlements and aquaculture being practiced. Padma River is the nearest major river to the site. Presently, this river is used to ferry goods and material owing to the lack road infrastructure in vicinity.

Table 27: Settlement Profile of the proposed EZ



Source: MACE Analysis

As per Bangladesh district statistics, 56 percent of total land area of Shariatpur district is under agriculture and 12 percent of the land area is considered as riverine area.

Agricultural and natural resources in the influence region

Following table captures snapshot of major agricultural produces in the influence region. Top five crops produced in these districts have been compared based on annual production

Table 28: Agricultural produces in the influence region (figures in MT annual production)

Crops	Shariatpur	Munshiganj	Madaripur	Barisal	Chandpur
Rice	167440	236191	216979	526156	386371
Jute	44990	6603	48161	6282	
Potatoes	42891	1126594	30806	14661	292210
Onion	16075				
Fish	10363	13533	10885		57601
Tomato		7355			
Sugarcane			21211		26362
Banana				9076	
Pulses				8335	
Radish					17860

Source: Bangladesh Bureau of Statistics- Districts' Statistics

Agro based natural resources are available across the influence region. This may act as source of raw material for potential industries like agro based products and food & beverage industry in proposed EZ.

Mineral resources in the influence region

Bangladesh is not a mineral rich nation. Following figure (in the next page) captures the mineral map of the country outlining the influence region.¹⁸¹

¹⁸¹ <https://www.omicsonline.org/open-access/present-scenario-of-renewable-and-non-renewable-resources-in-bangladesh-2151-6219.1000134.pdf>

Figure 32: Mineral Map of Bangladesh



Source: http://en.banglapedia.org/index.php?title=Mineral_Resources

Figure on the left indicates that in the influence region of the proposed EZ, only peat is available.

Deposits of peat are available in Gopalganj, Madaripur, Khulna, Sylhet, and in Sunamganj districts. Peat is primarily used for household usage as an alternative fuel. Briquettes are formed after drying peat. Briquettes are used as fuel in brick, lime and thermal power based industries.

Petrobangla launched a pilot project for extracting peat and making briquettes. The outcome was not sanguine and also the project was not economically feasible.

It is evident from this map that no significant mineral resources are available in the influence region.

4.5.3. Industries in vicinity of proposed EZ location

Industrial ecosystem in Shariatpur district

Industrial proliferation is yet to take place in this district. As of now, there are a total of 405 small scale and 3118 cottage scale industries functional in this district.¹⁸² Bangladesh Small and Cottage Industries Corporation (BSCIC) Industrial Complex is located in Shariatpur Sadar. According to district website, a total of 149 plots are occupied by 142 industrial units in the industrial complex. These industrial units are mostly related to bakery and food & beverages industries.¹⁸³

Shariatpur is predominantly agriculture based economy with some small scale agro based industries like husking mills (1106 nos.), flour mills (248 nos.), saw mills (172 nos.), rice mills (162 nos.) and having sparse handicraft, furniture and bamboo industries. These mills can provide support to manufacturing units that might get developed inside the proposed EZ in Jajira. Around 61.66% of the district's residents are engaged in agricultural activities, 2.64% are non-agricultural laborers, 0.91% work in industries, 14.34% are into trade and commerce, 6.41% people are into service industry and rest obtain their income from other sources like rent, remittance, religious activities etc.¹⁸⁴

¹⁸² <http://www.shariatpur.gov.bd/node/465029/>

¹⁸³ <http://www.observerbd.com/details.php?id=52626>

¹⁸⁴ http://en.banglapedia.org/index.php?title=Shariatpur_District

Industrial ecosystem in the influence region

Munshiganj district has maximum number of cold storages in Bangladesh, which provides supporting infrastructure for agro and food product industries. There are several rice mill, oil mill, pulses mill and flour mill located in this region, which reinforces the conducive environment for growth of agro based industries in the region. Apart from this, other major industries in this district are: textile, chemical, garments, fishing net, salt and cement. Snapshot of industrial landscape in this district is captured below:

- Cold Storage: 67 in number
- Cement: 6 in number
- Salt Factory: 2 in number
- Paper Factory: 2 in number
- Shipbuilding Industry: 3 in number

Besides the above mentioned industries, a private Economic Zone is also being developed in Munshiganj. This EZ will be spread over 216 acres and is expected to attract both local and foreign manufacturers in sectors like – high value RMG, electronics, Food & Beverage, plastic, pharmaceuticals and Light Engineering. Further, GoB has a proposed establishing a 50 acre Plastic Industrial Park, which could accommodate 348 industrial units.¹⁸⁵

Barisal district is one of the major sources of food grains and fish products in the country. It is known as “Venice of Bengal” as there is an abundance of rivers and channels that drain this region; some of the major crops cultivated in this area are – rice, paddy, seasonal vegetables etc. Barisal river port is a very important river port in Bangladesh. It is the 2nd largest river port in Bangladesh and is used to transport cargo like coal, petroleum, agricultural crops to and from Dhaka, Narayanganj, and Chandpur. Some of the industries currently operational in Barisal are –

- Pharmaceuticals (Opso Pharma)
- Textile and RMG (Khansons Textile Ltd.)
- Saline (Opso Saline)
- Cement (Anchor cement)
- Biscuit and Food Processing (Bengal Biscuit)

Barisal being a riverine district is also emerging as a hub of ship building industry. There are already 10 shipyards in this district, creating employment for around 350 people.¹⁸⁶ GoB’s proposal to develop Payra Port (100 km downstream of Barisal River Port) as a deep sea port will further boost industrialization in Barisal. Industrial development in Munshiganj, Madaripur, and Chandpur districts are captured in the table below.

Table 29: Industrial ecosystem in the influence region (breakdown of number of establishments)

Madaripur		Chandpur	
Weaving/ Handloom	29%	Husking Mill	63%
Furniture industry	23%	wooden furniture	13%
Rice Mill	15%	Bamboo	9%
Pottery	10%	Rice Mill	5%
Bamboo industry	7%	Saw mill	3%
Saw Mill	7%	Flour mill	3%
Flour Mill	5%	Handicraft	3%
Oil Mill	1%	Bakery	1%
Printing Press	1%	Pottery	1%

Source: Bangladesh Bureau of Statistics- Districts’ Statistics

¹⁸⁵ <http://www.dhakatribune.com/business/2017/02/16/demand-plastic-goods-industrial-park-keraniganj/>

¹⁸⁶ <https://bangladesheconomy.wordpress.com/2011/02/02/barisal-emerging-as-a-shipbuilding-zone/>

Proliferation of agro based industries in this region may be attributed to locally available raw materials. Owing to local market demand and availability of unskilled human resources, furniture and handloom related industrial units have developed in this region.

Hence, it can be concluded that these districts have witnessed presence of diversified industries.

Access to Export Processing Zones

Export Processing Zones (EPZs) in Bangladesh house various foreign and domestic industrial establishments which are completely export oriented. Proximity to these EPZs foster the possibility of downstream industrial linkages.

Proposed EZ is located at a distance of ~75 km from Adamjee EPZ and ~90 km from Dhaka EPZ. Industrial profiling of these two EPZs are placed in the following table.

Table 30: EPZs within 100 km radius from the proposed EZ

Dhaka EPZ	Textile, RMG and accessories, Paper products, Footwear and leather, Plastic goods, Chemical and fertilizer, metal products, miscellaneous
Adamjee EPZ	Garments and Accessories, Leather products, Footwear, Chemical and fertilizer

Source: BEPZA website

Surrounding EPZs foster industries such as Textile/ RMG, Leather and Footwear, Chemicals and Fertilizer. With the operationalization of Padma Bridge, access to these EPZs shall improve. Downstream linkages from these industries aptly backed by seamless connectivity could be potential for the proposed EZ.

4.5.4. Assessment of Manpower Sourcing

Basis interactions with heads of educational institutes during site visit it can be inferred that unskilled manpower can be sourced from Jajira upazila and nearby villages. Primary survey with investors reveals migration of unskilled labor is not a constraint in Bangladesh context. Thus, sourcing of unskilled human resources is not a challenge. Following depicts assessment on sourcing of semi-skilled manpower to the proposed EZ.

The average literacy rate in Shariatpur district is 47.26% which is slightly below the national average of 51.77%.¹⁸⁷ A study of Technical and Vocational Education and Training (TVET) Institution Census 2015 reveals that Shariatpur district has 130 TVET institutes having the following breakup –

Table 31: TVET institutes in Shariatpur

Type of Institute	Number of establishments
Polytechnic Institutes	2
HSC (Business Management)	2
Training Institute (Basic skill development)	43
Vocational Secondary Education	2
General Secondary School (Attached vocational education)	10
General Madrasa (Attached Vocational Education)	1
Nursing Institute	1
Union Digital Centre (UDC)	64
Technical School and College	1
Office(Training)	4
Total	136

Source: PwC Research

¹⁸⁷ Statistical Yearbook of Bangladesh, 2016

These institutes offer diploma courses in Computers, Mechanical, Civil, Telecommunications, Electronics and Electrical, Instrumentation and Control etc. Certain new courses like Food & Beverage Technology and Fish Culture are gaining traction among students. Computer education is the most sought after course for students.

Prominent TVET Institutes in the district

Below is a brief overview of Shariatpur's popular institutes –

Shariatpur Polytechnic Institute – It is a polytechnic institute offering courses in Computers, Telecommunications, Electronics and Instrumentation and Control. Each course has a tenure of 4 years, with around 400 students in each batch of each course. Most of the students opt to take up higher studies or migrate to places like Dhaka, Khulna and Narayanganj in search for employment.

Angaria Technical School and College – It is a Technical School offering courses in Electronics, Farm Machinery, Computers, Fish Culture and Breeding and Food and Beverage Technology. Each course has a tenure of 4 years and there are around 100 students in each batch of each course. Girls in this college generally opt for Fish culture and breeding while electronics and computers are more popular among the boys. Students from this college travel to different parts of Bangladesh in search for jobs, there are also few students who stay in Shariatpur district and take up jobs as salesmen or service engineers in branch offices selling different electronic items like TV, computer, mobile phones etc.

In Bangladesh, each Upazila has an Upazila Youth Development Officer, who is responsible for providing short term courses (ranging from 7-90 days) to young people of the Upazila wishing to learn new skills. As per our discussion with Youth Development Officer of Jajira Upazila, it was understood that most popular courses in Jajira Upazila are poultry farming, stitching, computer training, Refrigerator and AC repair, welding, poultry farming, livestock husbandry and honey farming. It is expected that young people in proximity of proposed EZ location will be skilled in above mentioned trades.

Sufficient educational institutes are available in the region to produce skilled and semi-skilled workers for the proposed EZ. However, there could be a dearth of skilled manpower in the region since majority of the educated class migrate to other regions and overseas in search of employment.

4.5.5. Summary of Influence Region Assessment

Above discussions related to an overall holistic assessment of the influence region can be summarized in the following-

1. Consumption expenditure trend in this region is lower than the country average, which indicates that the region surrounding the proposed EZ is yet to shape up as a marketplace.
2. Shariatpur district has good access to locally available agro based raw material which can be used in the proposed EZ.
3. Cash crops like jute is grown in the region which can be used as a raw material in the proposed EZ.
4. Predominant agriculture based economy could create a demand for fertilizers and agricultural machinery in the region.
5. Riverine nature of the district supports aquaculture. This can serve as an important raw material for fish fillet production.
6. No significant mineral resources in this region. Peat available in this region could be used as fuel source for power, lime, and brick based industries.
7. Absence of any existing industrial hub in Shariatpur ensures that there is no competition for the proposed EZ.

8. Presence of industrial regions (Munshiganj and Baisal) near Shariatpur district have created a conducive ecosystem for growth of economic zone in Shariatpur.
9. Supporting industries like Light Engineering, pharmaceuticals can be developed in the proposed EZ which can cater to industrial hubs close to Shariatpur.
10. On completion of Padma Bridge, road travel to Dhaka will be seamless; this will ensure access to major consumer markets in Dhaka.
11. Availability of skilled labor near the proposed EZ is a challenge due to lack of any industrial growth.
12. Locally available semi-skilled labor can be employed in the proposed EZ after providing industry specific training.

4.5.6. How Proposed EZ can act as Catalyst of Industrial Transformation in Shariatpur District

Regional assessment reveals that there is no significant industrial development in Shariatpur district. Once this proposed EZ comes up, it shall act as a catalyst towards industrial transformation in Shariatpur district and the surrounding region.

Investment (local and foreign) trend at the country level is analyzed to forecast the future potential investment figures. Further, potential investment figure at the Shariatpur district level has been estimated based on GDP share (Source: Bangladesh Investment Development Authority and Lagging Districts' Study). In three scenarios, various cases have been developed considering the proposed EZ can tap 1%, 5%, and 10% of cumulative investment inflow (from 2023 to 2027) in Shariatpur district. Following table elucidates the outcome of this quantitative analysis.

Table 32: Estimated investment inflow in the proposed EZ

Scenarios	Elaboration	Anticipated investment inflow in Shariatpur district from 2023 to 2027 (USD million)	Projected Investment inflow to the proposed EZ (USD million)		
			1%	5%	10%
Conservative	Macro-economic conditions are diminishing and as a result of the same, investment inflow prospects are not sanguine	3316	33	166	332
Base (as-is)	Business as usual scenario	4422	44	221	442
Aggressive	Macro-economic conditions are expected to improve and as a result of the same, investment inflow prospects are good	5527	55	276	553

Source: Secondary Data and PwC Analysis

Above assessment reveals that in worst possible case, USD 33 million of potential investment can flow into the proposed EZ (from 2023 to 2027) even if the proposed EZ taps 1% of the potential investment inflow to Shariatpur district. In best possible case, proposed EZ could tap USD 553 million investment. Bolstered by these potential investment figures, proposed EZ is poised to shape up as catalyst towards industrial transformation in this region and it can catapult overall socio-economic condition of Shariatpur district.

4.6. Initial Shortlist of Industries

Information from the previous sections provide insights about the pre-requisites of the bucket list of industries, profiling of the region surrounding the proposed EZ in light of economic indicators, natural resources, industrial development, and sourcing of semi-skilled and skilled manpower. This information can be distilled to create a matrix for compatibility mapping.

A compatibility mapping will create an understanding about which industries from among the bucket list of sectors are suitable for the proposed EZ. On basis of this compatibility assessment, a shortlist of industries can be drawn which are most suitable to be developed in the proposed EZ location. This shortlist will contain those specific sectors which are in conformance with the utility, connectivity and other support infrastructure available at the proposed EZ location. This shortlist will further assist in streamlining the primary assessment for which interaction with industry players in the sectors will be required to understand the on ground perception about the proposed EZ location and whether the shortlisted industries are suitable to be developed in the proposed EZ.

A matrix has been created in the next page, to map requirements of each sector with the supporting Backward & Forward linkages, Factors of Production and other prerequisites available at proposed EZ location.

Table 33: Compatibility Mapping

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Features prevailing at proposed EZ site			Easily Accessible	Multiple modes of transport required	Moderately Easy to access	Sufficient power available	Sufficient water sources available	Not Available	Semi-skilled/ Unskilled available; Skilled unavailable	Not Available
Assessment of pre-requisites of industrial sectors										
Textiles & RMG	Moderately High	Low	Moderately High	Moderately Low	Moderately High	High	Moderate	Low	High	Low
Rationale for rejection	<ul style="list-style-type: none"> This is an export oriented industry, with already a high global market share. Sector pre-requisites are met by the proposed EZ for all parameters except access to market This sector requires good access to sea ports in order to cater to global markets Proposed EZ is located at significant distances from sea ports; Poor access to Chittagong Port may hinder the growth of this sector in proposed EZ However, in future this sector can be considered suitable for proposed EZ, if Payra deep sea port is developed or Padma Bridge is operationalized 									
Food and Beverages	High	High	Moderately High	Moderate	Moderately High	Moderate	Moderate	Moderate	Moderate	Moderately Low
Rationale for selection	<ul style="list-style-type: none"> This industry primarily caters to domestic demand as well as it exports to countries having significant Bangladeshi immigrants like middle east Asia Sector pre-requisites are met by the proposed EZ for all parameters except gas, which can be substituted by electricity Proposed EZ holds a lot of growth potential for this industry as it has easy access to raw material from local industries like flour mill, rice mill, oil mill etc. Water Availability at proposed EZ can provide basic ingredient for beverage industry Aquaculture being practices in proximity to proposed EZ site can provide raw material for fish processing Proposed EZ is located close to big consumer markets like Dhaka, Munshiganj, Khulna, Barisal FMCG products like ketchup, biscuits, juice, cake etc. can find good demand in local markets Central location shall foster the possibility of supplying across the country, which is a pre-requisite for fast moving consumer goods (for F&B) 									
Agro Based Products	High	High	Moderately High	Moderately Low	Moderate	Moderate	Moderate	Moderately Low	Moderately High	Moderate

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Rationale for rejection	<ul style="list-style-type: none"> This industry mainly caters to domestic demand Sector pre-requisites are met by the proposed EZ for all parameters However, when agro based products are compared to Food and Beverage sector, the latter has the potential to generate higher value than the former Shariatpur already has small scale mills, which use locally produced crops as raw material Moreover, areas like Khulna, Rajshahi and Rangpur produce significant quantities of fruits, vegetables, tobacco and jute This sector can act as downstream industry for Food & Beverage sector, however, establishing this industry near source of raw material will generate more value for this industry 									
Leather and Leather Products	High	Moderate	Moderately High	Low	Moderately High	Moderately Low	Moderately High	Moderately Low	Moderately High	Low
Rationale for selection	<ul style="list-style-type: none"> This industry is mostly export oriented and generates 2nd highest exports after textile & RMG Apart from raw hides, Bangladesh has also started exporting finished products Proposed EZ site location satisfies all the pre-requisites for the industry To produce high quality finished goods, this sector requires skilled employees, who will need to be sourced from other districts Proximity to Dhaka, is a major advantage for the proposed EZ site as majority of the tanneries in Bangladesh are located in Savar area near Dhaka Industries producing finished leather goods can be suitable for the proposed EZ, due to proximity to Dhaka 									
Plastic and Rubber	Low	Moderately High	Moderate	Low	Moderately Low	Moderate	Moderate	Moderately High	Moderately High	Low
Rationale for rejection	<ul style="list-style-type: none"> This sector is highly dependent on import of raw material plastic beads, resin etc. for their production Access to raw material is not easily available near the proposed EZ Proximity to sea port is conducive for this industry; proposed EZ is located at a significant distance from the sea ports Gas is the primary fuel used in this industry; Proposed EZ, presently does not have any gas source in its vicinity 									
Paper and Packaging	Low	High	Moderate	Low	Moderately Low	High	High	Moderate	Low	Low
Rationale for rejection	<ul style="list-style-type: none"> This sector is dependent on import of raw material like pulp, fibre and chemicals It also has a moderate requirement of gas, which is used as fuel during preparation of paper products This sector will be more suitable if it located near Chittagong port or Dhaka Chittagong highway, from where it can have easy access to imported raw material On development of Payra, deep sea port and laying down of gas pipeline till the proposed EZ site, this industry can be developed in proposed EZ 									
Chemicals	Moderate	High	Moderate	Moderate	Moderately High	High	High	Moderate	Low	Moderately High

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Rationale for selection	<ul style="list-style-type: none"> • There are different types of chemicals having varied utility requirements like fertilizers, adhesives, washing powder, paints, varnishes etc. • Fertilizers have a high demand in proximity to proposed EZ region, due to widespread agriculture based economy • Currently manufacture of fertilizer is controlled by GoB • Private manufacturers procure urea based fertilizer from GoB and add micro-nutrients like Nitrogen, Phosphate, Potassium and Sulphate • Proposed EZ could be conducive for growth of fertilizers due to high demand generated locally 									
Non-Metallic Minerals	Low	Moderately High	Moderate	Low	High	High	Low	High	High	High
Rationale for rejection	<ul style="list-style-type: none"> • Non-metallic minerals involve manufacturing of cement, ceramics, glass etc. • For manufacturing of cement, the basic prerequisite is to have a water front access, since all clinker in Bangladesh is currently imported through sea • Manufacturing of ceramics and glass require application of high temperatures for which gas is an indispensable source of fuel • These features are not present at the proposed EZ • It is not recommended to establish non-metallic mineral industry in proposed EZ 									
Automobile and Accessories	Low	Moderately High	Moderate	Moderately Low	Moderately Low	Moderate	Low	Moderately Low	Moderately High	Low
Rationale for rejection	<ul style="list-style-type: none"> • Automobile manufacturing in Bangladesh is highly import dependent • CKD units are brought through Benapole or Chittagong port and assembled in the country • Manufacturing in this sector is automated and there is high dependency on skilled manpower like engineers • Presently the proposed EZ location does not have social infrastructure like residential units, educational units etc. • This sector is more suitable to be situated near source of import like Chittagong Port (ex- Chittagong) or Benapole Port (ex- Jessore) 									
Heavy Machinery, Iron, Steel and Metal	Low	Moderately High	Moderate	Low	High	High	Moderate	High	High	High
Rationale for rejection	<ul style="list-style-type: none"> • Bangladesh is highly import dependent for this sector, with majority of port coming through Chittagong Port • This sector requires large quantities of power and fuel • Proposed EZ has sufficient power available although it does not have an existing gas pipeline • Moreover, it does not have close proximity to Chittagong Port from where majority of the imports take place • The proposed EZ site is presently not suitable for setting of industries in this sector • On development of Payra, deep sea port and laying down of gas pipeline till the proposed EZ site, this industry can be developed in proposed EZ 									

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Electrical and Electronics	Low	Moderately High	Moderately High	Moderately Low	Moderately Low	Low	Low	Low	Moderate	Low
Rationale for selection	<ul style="list-style-type: none"> Bangladesh currently performs assembly of all electronic items These items are imported from different countries in individual units and assembled in workshops Demand for these items are growing across the country Proposed EZ offers all utilities required for manufacturing of electronics and electrical items Due to relatively small size of these items, they can be transported over long distances Hence, it is more feasible to produce these items near source of consumption Proposed EZ is located close to big consumer markets like Dhaka, Munshiganj, Khulna, Barisal Proposed EZ is ideally suitable for setting up industries pertaining to this sector 									
Ship Building and Ship Breaking	Low	Moderate	Moderately Low	Low	High	High	Low	Moderately High	High	High
Rationale for rejection	<ul style="list-style-type: none"> Access to water front is mandatory for setting up of this sector Proposed EZ site does not have access to water front Proposed EZ site presently not suitable for setting of industries in this sector 									
Petroleum Products (including Bottling)	Low	Moderately High	Moderate	Low	High	High	Low	Moderate	Moderate	High
Rationale for rejection	<ul style="list-style-type: none"> Bangladesh is currently dependent on import of petroleum products via large sea faring tankers Access to water front is mandatory for setting up of this sector Proposed EZ site does not have access to water front Proposed EZ site presently not suitable for setting of industries in this sector 									
Pharmaceuticals	Moderately Low	High	Moderate	Moderately High	Moderately High	High	High	Moderately High	High	Moderate
Rationale for selection	<ul style="list-style-type: none"> This is one of the fastest growing sectors in Bangladesh Besides catering to rising domestic demand, Bangladesh is also exporting pharmaceuticals to other countries This sector is one the largest employer of white collared jobs The requirement of gas in this industry is moderately high, as it is used in boilers. 									

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
	<ul style="list-style-type: none"> • However, gas can be substituted by electricity • Proposed EZ provides all utilities required for establishment of this industry • However, there is a need to develop social infrastructure (residential areas, educational institutes, recreational facilities etc.) in the region to accommodate skilled employees who might work in this industry • Proposed EZ is ideally located for setting up of this industry due to its proximity to big domestic consumer markets like Dhaka, Munshiganj, Khulna, Barisal • Development of API park in adjacent district of Munshiganj will provide easy access to raw material 									
Light Machinery, Equipment and Furniture	Moderately High	High	Moderately High	Moderately Low	Low	Moderately Low	Moderate	Moderate	Moderate	Low
Rationale for selection	<ul style="list-style-type: none"> • Demand for light machinery, equipment and furniture products are rising in Bangladesh • Bangladesh is gradually shifting away from importing light engineering goods to manufacturing them inside the country • Proposed EZ is located close to big consumer markets like Dhaka, Munshiganj, Khulna, Barisal making it ideal for establishing light engineering industries • Light Engineering industry also includes, farming machinery. • Local demand for farming machinery is high in the region due to Shariatpur being an agro based economy • Proposed EZ provides all utilities required for setting up of this sector • Proposed EZ is conducive for setting up light machinery, equipment and furniture industry 									

Source: PwC Analysis

Based on the above analysis, an initial shortlist of six sectors were created from the bucket list of 15 sectors. These shortlisted sectors were found to be most suitable for the proposed EZ site due to the compatibility of their forward and backward linkages, access to factors of production and growth prospects in Bangladesh. The shortlisted sectors are 1) Food & Beverages, 2) Leather and Leather Products, 3) Chemicals, 4) Pharmaceuticals, 5) Light Machinery, Equipment and Furniture, and 6) Electrical and Electronics.

**Step-wise approach brings out the initial shortlist of six industrial sectors.
Next section captures voice on ground to arrive at the final shortlist of industrial sectors suitable for the proposed EZ**

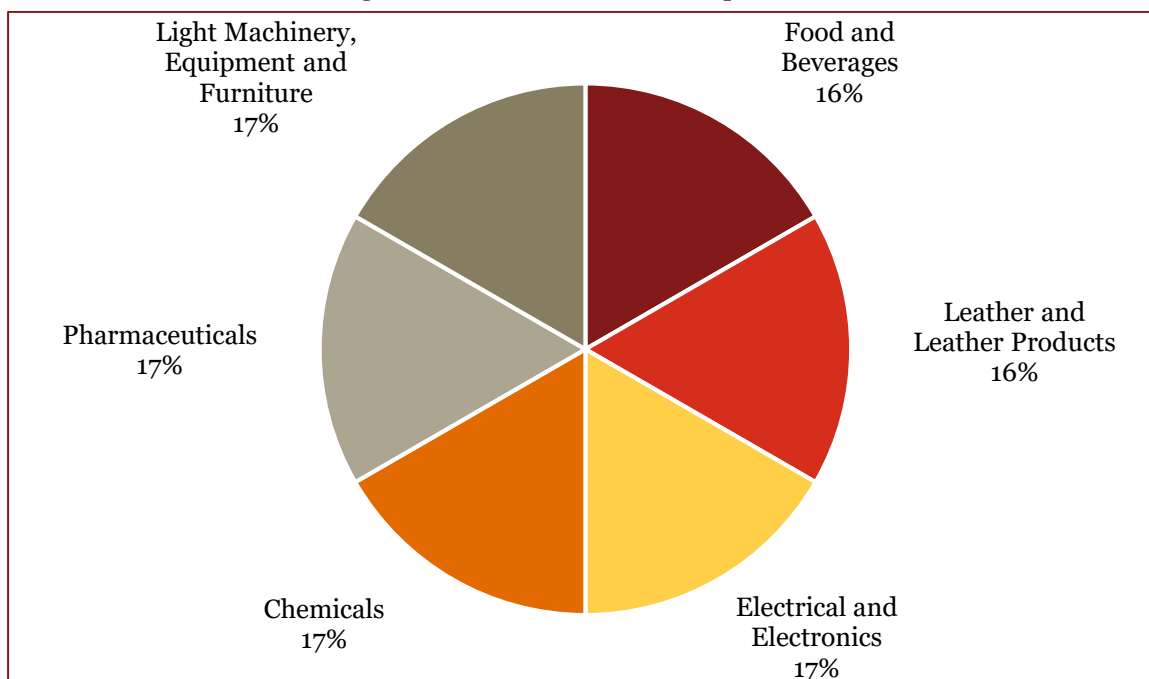
4.7. Analysis of Survey Results

The initial shortlist of industries was created using insights obtained through site visits, interaction with various government departments and information available in public domain. In order to validate the findings of the secondary research, primary survey was undertaken by interacting with various industry players in Bangladesh and overseas. A total of 78 respondents were approached – 60 respondents were Bangladesh based firms, while the rest were foreign companies, who did not have a presence in Bangladesh. For the purpose of this survey, questionnaire format provided in the ToR was used as the base to obtain insights from the industry players. Information about the perception of respondents towards Economic Zone Policy in Bangladesh, their opinion about performance of their industry in the proposed EZ region, challenges faced by respondents in doing business in Bangladesh and prerequisites of the respondents for setting up a new manufacturing unit in the proposed EZ were analyzed.

4.7.1. Profile of Respondents

The respondents of the survey were equally divided among the six shortlisted sectors for the proposed EZ site. Ten local respondents from each of the six sectors were selected for in-person interaction and three foreign respondents from each of the six sectors were selected for telephonic interviews. Attempt was made to ensure that local respondents for the survey were spread across different locations of the country (like Jessore, Mongla, Dhaka, Chittagong etc.) Companies operating out of various foreign countries were approached for interaction under the foreign respondents’ category.

Figure 33: Sectoral Profile of Respondents



Source: PwC analysis

The final shortlist of industries was prepared after taking into consideration the responses received from respondents.

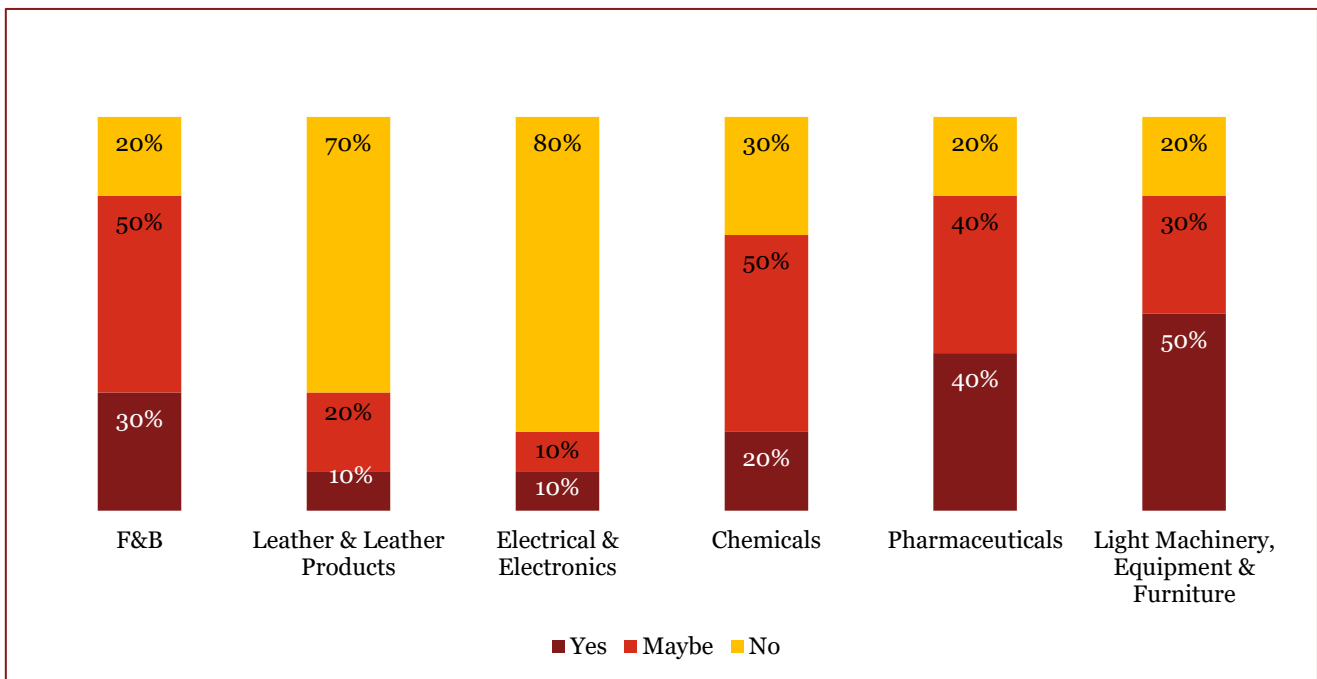
4.7.2. Perception about the Economic Zone

One of the key objective of the exercise was to assess the awareness about the GoB’s Economic Zone policy among the industrial players and also the investment appetite for the proposed EZ. Among the domestic manufacturer’s surveyed ~28% respondents were not aware about the existing policy, 43% respondents confused the Economic Zone policy with Export Processing Zone policy, 13% respondents had heard about the policy and 16% respondents were aware about the policy beforehand.

Among the foreign investors surveyed, no one was aware about Bangladesh’s Economic Zone policy and had to be briefed about the same.

Below chart captures the opinion of domestic respondents from different sectors about whether their specific sector could be successful in the proposed EZ location –

Figure 34: Investment opinion expressed by domestic investors



Source: PwC Analysis

The above chart reveals that maximum number of respondents belonging to Light Machinery, Equipment & Furniture sector showed positive intent regarding the proposed EZ and maximum number of respondents belonging to Electrical and Electronics sector showed negative intent. Significant percentage of respondents from pharmaceutical and F&B sector also showed positive intent. There were quite a few respondents who had ambivalent opinion regarding the proposed EZ site, their responses have been captured under “Maybe” option. These respondents were either unsure about whether industries from their sectors would perform well in proposed EZ site or they wanted certain pre-requisites to be fulfilled for industries to be successful.

As an outcome of this survey, 36 domestic respondents have expressed positive interest (“Yes” and “Maybe” categories together) about their industries, in the proposed EZ. Sectors from which more than 50% respondents have expressed positive interest are –

- Food and Beverages
- Pharmaceuticals
- Chemicals

- Light Machinery, Equipment and Furniture

Among the foreign respondents surveyed, 15 respondents showed negative interest towards investing in Bangladesh in near future. 3 Indian investors (2 from F&B, 1 each from Pharmaceutical and Light Machinery, Equipment and Furniture) showed positive interest, however they wanted further details like date of operationalizing of Economic Zone, price of land, details of lease holding agreement etc.

4.7.3. Analysis of responses obtained through survey

Considering the responses of both domestic and foreign industry players taken together, it is observed that 40 respondents have indicated positive or ambivalent interest towards the proposed EZ in Shariatpur. A brief synopsis of the response and discussion held with the respondents is captured in the table below –

Table 34: Synopsis of Primary Survey

Description	Yes	Maybe	No
% of respondents	21%	31%	48%
Key reasons for response	<ul style="list-style-type: none"> • Location is advantageous in terms of future connectivity and is centrally located in Bangladesh • Incentives offered by BEZA are attractive which will generate interest in expanding existing facility in Bangladesh • Proximity of EZ site to Dhaka • Proposed EZ site has provision to provide adequate power, water, gas in future 	<ul style="list-style-type: none"> • Due to rising demand manufacturers in the sector are considering business expansion in a new economic zone • Further evaluation needs to be done regarding the site • Will be able to give opinion once proposed EZ is further developed • More details regarding the proposed EZ is needed (Ex- rent, utility charges) 	<ul style="list-style-type: none"> • Political instability in Bangladesh is hindering investment decision • Unavailability of adequate power/gas supply • Difficulty in procuring license or permits from GoB • Given current underutilization of existing facilities, manufacturers are not interested in further expansion • Sector is witnessing more capacity as compared to demand. Further expansion will be considered only when demand for product increases • Manufacturers are interested in investing in close proximity of their existing manufacturing units for better management
Prominent Companies	Pran RFL, Walton Group, Pacific Pharmaceuticals, Atlas Toiletries, Sami Direct	Ferron Tubes Pvt. Ltd., Ceylon Biscuits, Standard Finnis Oil, Popular Pharmaceuticals	Country Field and Farmhouse, Apex Tannery, B&B Leather Industries, Beximco Pharmaceuticals
Insights	Basis our discussion, companies that are	Manufacturers were looking for more clarity	Some foreign manufacturers did not

Description	Yes	Maybe	No
	interested in investing in Bangladesh are already scouting for locations.	regarding time frame of the proposed EZ being developed and the rental prices that would be charged in the proposed EZ	want to invest outside their native country as a part of their business strategy.

Source: PwC Analysis

4.7.4. Barriers to Investment

The respondents were also asked about the current challenges faced by them in running business in Bangladesh and barriers to investment, specific to the EZ site area. The responses received can be broken up into 3 parts – Bangladesh specific, sector specific and site specific.

Bangladesh Specific

Most of the respondents, surveyed were optimistic about the Bangladesh's economy and expressed their satisfaction about the country's growth. However, country specific hindrances to growth and investment mentioned by the respondents had resonance across the sectors. The common problems faced by manufacturers in running a business in Bangladesh, across sectors are listed on the next page.

Power Shortage – All the investors surveyed expressed discontent with power availability across Bangladesh. Many complained about the 2-3 hour power outages suffered on a daily basis, which had affected the capacity utilization of existing machineries. Among the respondents surveyed, 40% had to make arrangements for their own source of power, which was either diesel or gas operated.

Gas Unavailability – Frequent drop in pressure of gas supply was another grouse among the respondents. Bangladesh has a network of pipes through which gas is supplied to manufacturing units. Most manufacturing units apply for piped gas to be used as fuel in their industries or a source for generating electricity (Gas is cheaper than diesel). Due to Bangladesh's depleting gas reserves, GoB has also stopped issuing new gas connections to manufacturers in the country. This is a major hindrance to investment in Bangladesh. 22% of the respondents, have put their expansion plans on hold due to unavailability of new gas connection.

Congestion at Chittagong Sea Port – Manufacturing sector in Bangladesh is dependent on imported raw material for their production to take place. Chittagong port is the most important port in Bangladesh, it caters to around 92% of the country's sea borne trade. However, this has resulted in heavy congestion in Chittagong Port, resulting in manufacturer's having to wait 10-15 days to get their raw material. Due to low draft at Mongla Port, Chittagong Port is still the most efficient way to get raw materials for the manufacturers. 85% of the respondents complained about delays in getting custom clearance and access to their imported products. Although few respondents who had outsourced the handling of their imports to 3rd party agencies were satisfied with the turn-around time taken for their goods

Sudden changes in applicable HS code – Few of the respondents expressed their dissatisfaction at the sudden changes in the applicable HS code for the imported items. Import duty on goods are levied on basis of their HS codes. Respondents claimed that custom officials suddenly charge higher import duty on items of regular import, by changing the applicable HS code under which the item is covered. This results in extra hassle for the importers as they need to visit customs law office to get the goods cleared and get clarity on applicable HS code. Sudden changes in the rate of applicable import duty creates uncertainty among the manufacturers as it causes delay in access to raw material and also makes it difficult to accurately predict costing of the manufactured goods.

Road Traffic on Dhaka-Chittagong highway – Dhaka-Chittagong is the arterial transportation node of Bangladesh. It connects the two most important industrial hub of the country, Dhaka and Chittagong. Most of the cargo getting exported or imported is transported through this road. However, due to excessive traffic on this

route, this route often witnesses serpentine queues of truck and other cargo vehicles. Traffic on this road often results in 5-6 hours delay in goods reach their destination.

Access to Credit – During the survey exercise, most of the respondents expressed disappointment in getting easy access to credit. Getting credit in Bangladesh, is a tedious task spread over 2-3 months involving lot of paperwork, documentation etc. Credit rate in Bangladesh ranges from 9-14%. Respondents mentioned that high interest rates and amount of paperwork involved in getting credit, prevented them from availing loans.

Excessive Bureaucracy – Respondents in their feedback, complained about the difficulty in interacting with government officials for any purpose. It was claimed that obtaining permission or license for any utility or activity is cumbersome, requiring many days and several levels of permissions. This is a major reason hindering manufacturers in Bangladesh from starting a new business.

Corruption – Several respondents conveyed their dissatisfaction with the unprofessional approach of government officials from clerk to officer level. In their opinion, it had become a mandatory affair to bribe Government Officials in order to get any approval or permit.

The above responses were received from manufacturers who are based out of Bangladesh and have been operating their enterprise in Bangladesh over the years. These problems were highlighted at a country specific level.

Sector Specific

The respondents were asked questions about their particular sectors to understand the challenges that they are facing in their sector, which is hindering their current business operations and affecting the growth/expansion plans of their particular sector. The problems specific to each sector are listed below –

Food and Beverages – Respondents in this sector were quite upbeat about the growth prospects of their sector. As per the respondents, F&B sector has been growing at a rapid pace in Bangladesh as rising income levels of the people in Bangladesh are allowing them to spend more on food items. Major challenge that industry players faced in this sector was from the unorganized and small scale industries, which had localized operations and had a cost advantage over the unorganized sector through evasion of taxes.

Leather and Leather products – Tannery operators expressed their displeasure at having been forced by the court of Bangladesh to shift their existing manufacturing units from Hazaribagh to Savar. This forceful eviction took place in 2017. Hazaribagh was a traditional tannery hub in Bangladesh, however due to rapid expansion of Dhaka city, this area came in close proximity to the residents of Dhaka. Tannery industry due to its polluting nature poses health hazard for nearby communities. Taking cognizance of this matter, tannery producers were shifted to a place called Savar, 25 km away. Savar was to be developed by GoB as a tannery hub, however, leather manufacturers are yet to get basic facilities like ETP, gas connection etc. in Savar. Tannery operators are upset with GoB over their forceful eviction from traditional hubs to new location.

Electrical and Electronics – Respondents in this sector were divided in their opinion about the sector's performance. The big players, like Walton group, were looking to expand aggressively and establish new manufacturing units. However, the SMEs were witnessing falling sales and shrinking margins due to their inability to compete with large scale manufacturers, who have cornered a lion's share of market sales due to economies of scale.

Pharmaceuticals – Respondents in this sector wanted GoB to reduce import duties on raw materials required to produce APIs in Bangladesh. Currently, pharmaceutical sector in Bangladesh produces branded generic final formulations using imported APIs. However, reducing the duty on import of raw materials for APIs would allow manufacturers to produce APIs in the country, thereby adding more value to their pharmaceutical products. Another challenge facing the pharmaceutical industry was GoB's prohibition in advertising of their products. This policy has resulted in certain pharmaceutical companies to adopt unethical practices of influencing doctors so as to get them to prescribe specific medicines.

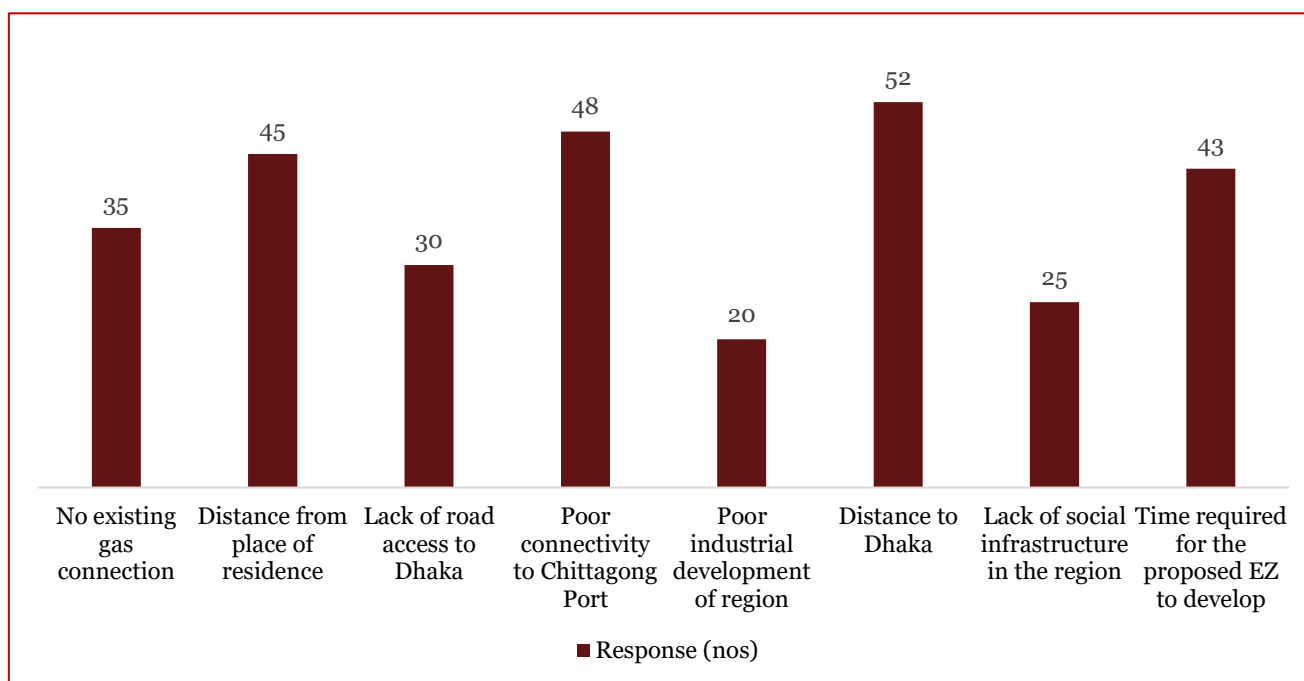
Chemicals – This sector is mostly import dependent for its raw material. Respondents faced issues due to uncertainty with HS codes of the items of import and unpredictable rate of taxes being levied. Fertilizer manufacturers have robust demand in the country, however, lack of power is hindering their production capacity.

Light Machinery, Equipment and Furniture – Respondents in this sector did not have any major sector specific issues. Their only concern was that rising competition in the sector was affecting their profitability.

EZ Site Specific

Responses received from manufacturers regarding key hindrances to site specific investments were captured in specific baskets. The figure below captures the responses of the manufacturers, some of the respondents also listed out more than one reason, hindering his investment plan in the proposed EZ region.

Figure 35: Site specific barrier to investment



Source: PwC Analysis

The above chart reveals that the major reason hindering investment in the proposed EZ region was the distance of the EZ site to Dhaka. This shows the high dependency of manufacturers on Dhaka as a major market for selling their goods. However, once construction of Padma Bridge is complete, there will be seamless road access from proposed EZ site to Dhaka. Another major reason, hindering investment in the proposed EZ site is its poor connectivity to Chittagong port which is around 297 km away from the site location. This hindrance might also get resolved on operationalization of Payra deep sea port (~200 km from EZ site). Most of the SME manufacturers choose to set up their businesses close to their area of residence. The need to shift to a new location for establishing a new manufacturing unit also hindered investment decision for the proposed EZ site. Given the very preliminary stage of planning for the proposed EZ site location, manufacturers did not want to take any investment decisions, 43 respondents surveyed, said that it was too early to make a decision. Other site specific factors that served as barrier to investment were – absence of any gas connection at the proposed EZ site, lack of social infrastructure and poor industrial development in the region.

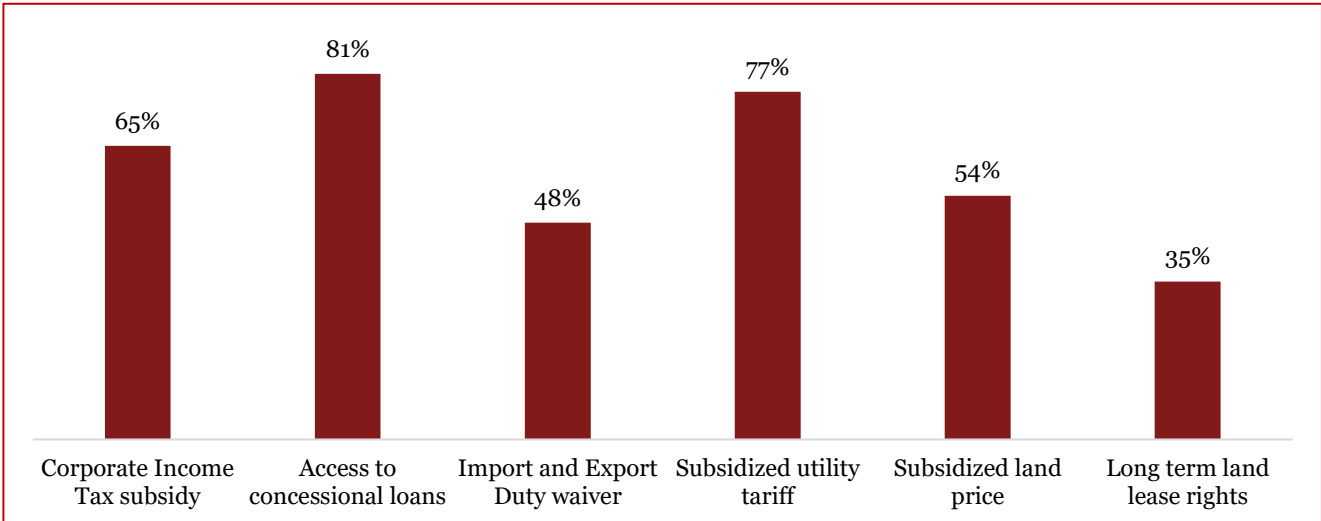
4.7.5. Pre-requisites to Investment

In order to understand the pre-requisites of investment, all the respondents were asked about their requirement with respect to (i) fiscal and non-fiscal incentives and (ii) infrastructure & logistics.

Fiscal/ Non-Fiscal Incentives

For assessing this aspect, the respondents were asked about the various fiscal and non-fiscal benefits that they require for considering an investment decisions in the proposed EZ site. Respondents raised concern about various incentives such as corporate income tax subsidy, waiver on import and export duty, subsidized utility tariff, ease in concessional loan facility and ease in obtaining clearances and approvals. Responses received from the survey is depicted in the figure next page –

Figure 36: Pre-requisites in form of incentives



Source: PwC Analysis

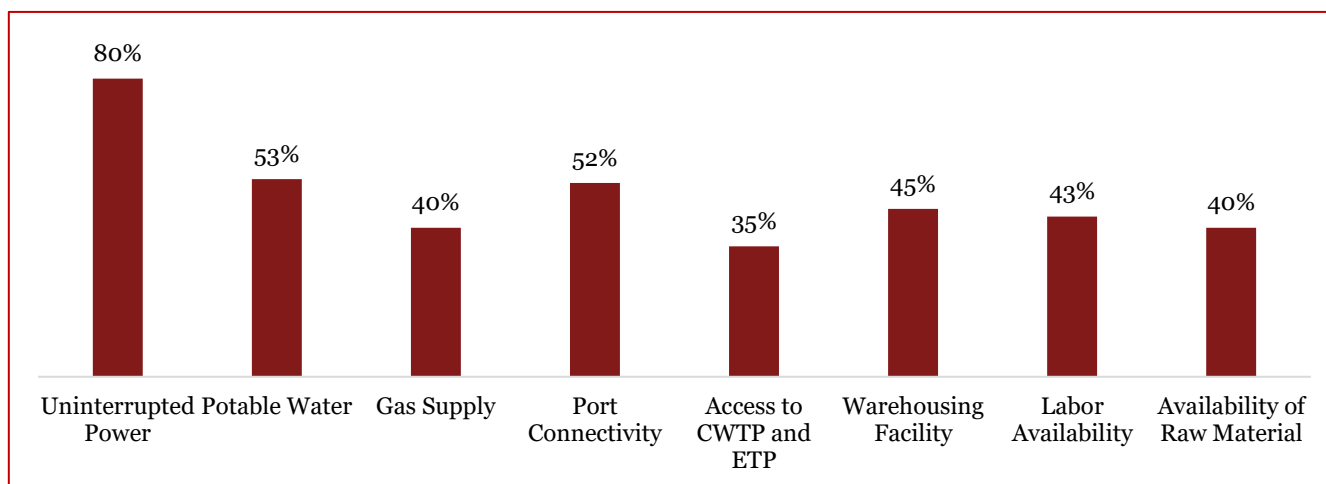
The above chart reveals that majority of the respondents have asked for access to concessional loans and subsidized utility tariff. Corporate Income tax subsidy was also among the top requirements for respondents. A healthy demand has also been obtained for getting import/export duty waiver and subsidized land price for the proposed EZ.

BEZA has already formulated a set of fiscal incentives and the same has been approved by their governing board. These fiscal incentive package would take into consideration the concerns expressed by the investors. Medium and (a few) large scale manufacturers have expressed concern about availability of concessional loan facility, the same is not captured under the incentive package offered by BEZA.

Pre-requisites for Infrastructure

A good infrastructure availability is a key enabler for success of any Economic Zone project. To understand the priority of the same, respondents were asked to specify the pre-requisites expected by them for investing in the proposed EZ. Their response is captured in the figure next page –

Figure 37: Pre-requisites in form of supporting infrastructure



Source: PwC Analysis

Manufacturers have expressed that the major factors which influence investment decisions include access to uninterrupted power supply (without voltage fluctuation), quality water availability (potable and fit for industrial consumption) and gas availability. Availability of warehousing facility and labor in the vicinity of the proposed EZ is another important factor that was highlighted during our interaction with manufacturers.

During interactions, manufacturers also highlighted the need for availability of local raw materials, particularly those who were interested in Food Processing and Light Engineering sectors. Some manufacturers also inquired about availability of social infrastructure in the vicinity like school, colleges, hospitals etc. Manufacturers involved in leather industry and chemical industry stressed on the need for having access to CWTP and ETP.

In the event of addressing the list of pre-requisites requested by the manufacturers, BEZA can expect several manufacturers to evince interest in the proposed EZ site

4.7.6. Final Shortlist of Site Specific Industry Sectors

On the basis of incorporating the feedback received during the survey, it can be safely deduced that among the respondents surveyed from the initial shortlisted sectors. Manufacturers from electrical and electronics and leather and leather products sectors have majorly expressed negative opinion about growth prospects of their sectors in the proposed EZ site. However, manufacturers from Food & Beverages, Pharmaceuticals, Chemicals and Light Machinery, Equipment and Furniture sectors have majorly evinced positive interest about the growth prospects of their sectors in the proposed EZ location.

As per the responses recorded from domestic and foreign manufacturers it can be deduced that Food & Beverages, Pharmaceuticals, Chemicals and Light Machinery, Equipment and Furniture sectors are most suitable for the proposed EZ site

A demand forecast model has been prepared in the next chapter, for the above mentioned industries to understand the land, utility and employment requirements for each of these industries over the years. This report also contains the master plan for the proposed EZ site, which incorporates the best practice layout and requirements of industry specific supporting infrastructure for the shortlisted industries.

4.7.7. Sector Profiles

This section contains the profiles of all the four shortlisted sectors obtained through industry assessment exercise. This sector profile provides a brief overview about the various sub-categories of the sectors, sector overview, sector trends, barriers to investment in the sector and various utility requirements.

Table 35: Sector Profile 1

Sector	Food & Beverage Sector
Sub-Categories Proposed	Fast Moving Consumer Goods like packaged food items – Cake, Processed Fish and shrimp, Biscuits, Bread, Ketchup, Juice, Drinks etc.
Sector Overview	Growing economy of Bangladesh has created a consumer driven demand for F&B sector. Interactions with F&B companies have revealed that past decade has seen an average of 17-18 percent year on year growth in their sales volume both on domestic front as well as in exports. Demand for biscuits have been growing at a rate of 15 percent on a year on year basis. ¹⁸⁸ Farmed fish market in Bangladesh has grown by a factor of 25 in three decades. ¹⁸⁹ Proposed EZ location is strategically located near centers of major consumption market and sources of raw material. Fish & shrimp farming is widely practiced within 200 km radius of proposed EZ location in Shariatpur, Faridpur, Gopalganj, Mongla, Khulna and Barisal. There are 248 flour, 162 rice and 73 oil mills in Shariatpur which can provide raw material to F&B industry coming up in proposed EZ site. Operationalization of Padma Bridge will provide seamless access to centers of demand in Dhaka, Khulna, Munshiganj and Barisal.
Sector Trends	Operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent. ¹⁹⁰ This will result in increased level of disposable income for people in the region of proposed EZ. It is believed that the future prospects of F&B industry in the proposed EZ region is very bright and it can replicate the growth figures of F&B industry (17-18 percent) in Bangladesh, driven by local demand as well as by catering to existing consumer demands in Dhaka, Munshiganj, Barisal, Khulna etc.
Current Barriers to Investment	Major impediment to the growth of F&B industry in the proposed EZ region is lack of road connectivity to major consumer market in Dhaka across Padma river. Existing river transport is inefficient causing a delay of 5-6 hours in transportation across the river. Presently there is no industrial belt in proximity of the EZ region where supporting infrastructure (power, gas) is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj.
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 178 to 200 acres. For purpose of demand projections, land requirement of 195 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interaction with local respondents, it can be mentioned that power requirement for this sector would range from 160 to 200 KVA per acre of factory land. For the purpose of demand projections, power requirement of 182.11 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory and type of sub-sector. Basis our interactions with manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and

¹⁸⁸ <http://lankabd.com/dse/stock-market/news/Biscuit-market-grows-fast-as-demand-rises?storyId=49129>

¹⁸⁹ <http://theconversation.com/let-them-eat-carp-fish-farms-are-helping-to-fight-hunger-90421>

¹⁹⁰ <http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker>

Sector	Food & Beverage Sector
	secondary research, it can be mentioned that water requirement for this sector normally ranges in between 6 to 8 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 7.28 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 20-25 people per acre of factory land. For the purpose of demand projections, manpower requirement of 23 people per acre has been taken for this sector.

Source: PwC and MACE Analysis

Table 36: Sector Profile 2

Sector	Pharmaceutical Sector
Sub-Categories Proposed	Manufacture of generic and patented drugs
Sector Overview	A very high domestic demand and robust exports has resulted in pharmaceutical sector in Bangladesh growing by about 1000 times since 1982, making is a USD 2 billion industry. GoB has taken cognizance of the important contribution made by pharmaceutical sector and has named this sector as the “Product of the Year” in 2018. Due to Bangladesh’s LDC status, Bangladesh can manufacture generic drugs with an exemption from obligations to implement patents and data protection for pharmaceutical products until 2033. ¹⁹¹ Bangladesh is currently dependent on imports of APIs for manufacturing of generic and patented drugs. Around 85% of its API demand is met through imports. ¹⁹² However, in order to reduce dependency on imports, GoB has developed an API park in Munshiganj district adjacent to the Shariatpur district across Padma River. This park is expected to get operationalized in 2018 providing domestic raw material to drug manufacturers in Bangladesh. ¹⁹³ Proposed EZ site is expected to benefit from this API park as it will easy access to raw material. Presently there are no pharmaceutical factories in Shariatpur, nearest pharmaceutical factories within 100 km radius to the proposed EZ site are in Barisal, Munshiganj, Gopalganj and Dhaka.
Sector Trends	Operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent. ¹⁹⁴ This will result in increased level of disposable income for people in the region of proposed EZ, who will be able to spend more on buying prescription medicines. Construction of deep sea Payra Port around 200 km from the proposed EZ site will be greatly beneficial to the pharmaceutical sector as it is greatly dependent on import of APIs presently. It is expected that the future prospects of pharmaceutical industry in the proposed EZ region can eclipse 15 percent growth rate forecasted for Bangladesh over next 5 years. ¹⁹⁵ This growth rate will be driven by local demand as well as through export through Payra deep sea port being developed 200 km south of the proposed EZ region.
Current Barriers to Investment	Major impediment to the growth of pharmaceutical industry in the proposed EZ region is lack of road connectivity to major consumer market in Dhaka across Padma river. Existing river transport is inefficient causing a delay of 5-6 hours

¹⁹¹ <http://www.dhakatribune.com/business/2018/01/01/pharmaceutical-sector-named-product-year-2018-2/>

¹⁹² <https://www.pharmpro.com/blog/2015/04/pharma-bangladesh>

¹⁹³ <http://www.bapi-bd.com/api-park/brief-outline>

¹⁹⁴ <http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker>

¹⁹⁵ <http://www.thedailystar.net/business/pharma-sector-grow-15pc-year-study-1429024>

Sector	Pharmaceutical Sector
	in transportation across the river. Absence of a deep sea port in Bangladesh, other than Chittagong Port which is more than 250 km away from the proposed EZ location hinders growth of pharmaceutical sector in the region as this sector is highly dependent of import of APIs. Presently there is no industrial belt in proximity of the EZ region where supporting infrastructure (power, gas) is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj.
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 112 to 130 acres. For purpose of demand projections, land requirement of 116 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interaction with local respondents, it can be mentioned that power requirement for this sector normally ranges in between 130 to 150 KVA per acre of factory land. For the purpose of demand projections, power requirement of 141.64 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory and type of sub-sector. Basis our interactions with various manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 10 to 14 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 12.14 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, primary surveys and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 140 to 160 people per acre of factory land. For the purpose of demand projections, manpower requirement of 149 people per acre has been taken for this sector.

Source: PwC and MACE Analysis

Table 37: Sector Profile 3

Sector	Chemicals Sector
Sub-Categories Proposed	Fertilizer
Sector Overview	It was understood through discussions with Bangladesh Fertilizer Manufacturing Association that Bangladesh has an annual demand of 2.5 million MT of fertilizer, out of which 1 million MT is produced domestically while the rest is imported. Presently, GoB does not levy any import duty on import of urea fertilizer and also controls manufacturing of urea fertilizer in the country. However, private players manufacture NPKS (Nitrogen, Phosphate, Potassium, Sulphate) enriched fertilizer by procuring urea from state controlled factories or by importing. These fertilizers are of better quality and help farmers increase the productivity of their land. On basis of their affordability farmers either procure urea fertilizer or micro-nutrient enriched fertilizers. Proposed EZ region, being agro based economy has a high demand for fertilizers

Sector	Chemicals Sector
Sector Trends	Operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent. ¹⁹⁶ This will result in increased level of disposable income for people in the region of proposed EZ, who will be able to spend more on purchasing better quality fertilizer. Construction of deep sea Payra Port around 200 km from the proposed EZ site will be greatly beneficial to this sector as manufacturers are dependent on imports to get fertilizer as state owned factories are not able to match the demand for fertilizer in the country. It is expected that NPKS fertilizer units will perform well in the proposed EZ region as Shariatpur and its adjoining districts are agro based economies. As per Bangladesh district statistics, 2011, Shariatpur district consumed 22,445 MT of urea fertilizer and 12,784 MT of NPKS enriched fertilizer.
Current Barriers to Investment	Major impediment to the growth of chemical industry in the proposed EZ region is economy backwardness of the farmers in the region preventing purchase of fertilizer. Manufacturing of urea is controlled by GoB, and having inadequate capacity is hurting growth of fertilizer industry as private players have to rely on import of urea based fertilizer, which acts as raw material during preparation of NPKS enriched fertilizer. Absence of a deep sea port in Bangladesh, other than Chittagong Port which is more than 250 km away from the proposed EZ location hinders growth of fertilizer preparation in the region as this sector is highly dependent of import of urea based fertilizer. Presently there is no industrial belt in proximity of the EZ region where supporting infrastructure (power, gas) for manufacture of fertilizer, is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 8 to 10 acres. For purpose of demand projections, land requirement of 9 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interactions with local respondents, it can be mentioned that power requirement for this sector normally ranges in between 160 to 200 KVA per acre of factory land. For the purpose of demand projections, power requirement of 182.11 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory and type of sub-sector. Basis our interactions with various manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 12 to 15 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 13.35 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, primary surveys and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh

¹⁹⁶ <http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker>

Sector	Chemicals Sector
	Bureau of Statistics, a typical factory generates direct employment for 150 to 170 people per acre of factory land. For the purpose of demand projections, manpower requirement of 164 people per acre has been taken for this sector.

Source: PwC and MACE Analysis

Table 38: Sector Profile 4

Sector	Light Machinery, Equipment and Furniture Sector
Sub-Categories Proposed	Agricultural Machinery
Sector Overview	Agriculture contributes around 17 percent of Bangladesh's economy and employs 45% of its total labor force. ¹⁹⁷ This underscores the importance of producing agricultural machinery in Bangladesh. In 2017, GoB raised subsidy on purchase of agricultural machinery from 30% to 50%, in order to expand mechanized seeding, transplanting and harvesting. ¹⁹⁸ As per Department of Agricultural Extension, current internal market size of farm machinery in Bangladesh is more than BDT 10,000 crore and local manufacturers are able to meet only 20-25% demand. ¹⁹⁹ This indicates a huge demand-supply mismatch in the sector. Presently local manufacturers import machinery parts from China, Japan and Korea, and assemble these parts to sell in domestic market. Shariatpur district (along with adjoining districts) is an agro-based economy with 56.75% of land under cultivation (temporary/permanent). ²⁰⁰ Penetration of agricultural machinery in Shariatpur district is low due relative economic backwardness of region as compared to other districts like Feni, Comilla etc. This creates a big local market for sale of agricultural products like seed plantation machines, fertilizer and insecticides applying machines, harvesters, threshers and power tillers.
Sector Trends	Operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent. ²⁰¹ This will result in increased level of disposable income for people in the region of proposed EZ, who will be able to spend more to mechanize the farming process. Construction of deep sea Payra Port around 200 km from the proposed EZ site will be greatly beneficial to this sector as manufacturers are dependent on import of machinery parts to assemble them locally. It is expected that agricultural machinery manufacturing units will perform well in the proposed EZ region as use of machines in agriculture increases production by 15%. ²⁰² As per Bangladesh district statistics, 2011, Shariatpur district had 874 power tillers, 58 tractors, and 725 threshing machines.
Current Barriers to Investment	Major impediment to the growth of agricultural machinery industry in the proposed EZ region is economy backwardness of the farmers in the region preventing purchase of agriculture machines. Absence of a deep sea port in Bangladesh, other than Chittagong Port which is more than 250 km away from the proposed EZ location hinders growth of agricultural machinery manufacturing in the region as this sector is highly dependent of import of machine parts. Lack of road connectivity to Dhaka across Padma river is a challenge as existing river transport is inefficient causing a delay of 5-6 hours in transportation across the river. Access to Dhaka is important as it is a major trading hub from where spare parts of machines can be bought. Presently there is no industrial belt in proximity of the EZ region where supporting

¹⁹⁷ Yearbook of Agricultural Statistics-2016

¹⁹⁸ <http://www.dhakatribune.com/business/2018/03/18/innovative-farm-machineries-ameliorate-agriculture-bangladesh/>

¹⁹⁹ <http://www.dhakatribune.com/business/2018/03/19/bangladeshs-homegrown-line-agro-machineries-adds-progress/>

²⁰⁰ Bangladesh district statistics, 2011

²⁰¹ <http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker>

²⁰² <http://www.thedailystar.net/backpage/90pc-mechanised-1536301>

Sector	Light Machinery, Equipment and Furniture Sector
	infrastructure (power, gas) is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj.
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 20 to 25 acres. For purpose of demand projections, land requirement of 21 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interactions with local respondents, it can be mentioned that power requirement for this sector normally ranges in between 110 to 130 KVA per acre of factory land. For the purpose of demand projections, power requirement of 121.41 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory and type of sub-sector. Basis our interactions with manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 8 to 11 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 9.71 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, primary surveys and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 165 to 200 people per acre of factory land. For the purpose of demand projections, manpower requirement of 186 people per acre has been taken for this sector.

Source: PwC and MACE Analysis

4.8. Key Takeaways

In order to arrive at the most suitable industries in site surrounding context, an industry assessment framework comprising of top-down (secondary research) and bottom-up (primary survey) was adopted.

The **top-down approach** identifies 15 best-performing industrial sectors (initial bucket list of industries) in the country context based on historical trend analysis of industrial production and foreign trade. At the next level, sectoral outlook of these industries were studied in details to understand about (i) raw material sourcing, (ii) major markets being served, and (iii) factors of production (such as utility, logistics, and manpower) necessary.

In-depth regional landscape assessment of the influence region (comprising of adjoining districts) surrounding the proposed EZ was undertaken in light of (i) economic profiling, (ii) natural resources (agricultural, marine, and mineral), (iii) industrial ecosystem in the influence region, and (iv) availability of semi-skilled and skilled manpower. It emerged out that the influence region is yet to witness significant industrial development and the economy is primarily agriculture dependent. Economically Shariatpur and the surrounding districts are yet to shape up as marketplace and industrial hub. Once Padma Bridge is operational, project site is expected to gain significantly and industrial & economic profile of this region is poised to shape up.

Regional assessment depicts the suitability of the initial bucket list of industries in site surrounding and influence region context. **Six industries were initially shortlisted** ex post facto this regional landscape assessment. These industries are: (a) Food & Beverages, (b) Leather and Leather Products, (c) Chemicals, (d) Electrical & Electronics, (e) Pharmaceuticals, and (f) Light Machinery, Equipment and Furniture.

On-ground primary survey was undertaken to validate the aptness of these initially shortlisted industries and to capture the feedback from investors. A total of 78 respondents (comprising of 60 Bangladeshi and rest foreign) were surveyed. Primary survey revealed that ~29% of the respondents have some understanding about economic zone policy and regime. Voice on ground also captured that the investors are facing challenges regarding power shortage, unavailability of fuel (natural gas), access to credit, excessive bureaucracy, and with overall logistics scenario in the country. These challenges (country specific, site specific, and sector specific) are causing hindrances to investment. Among the various site specific challenges faced by manufacturers, hindering investment towards proposed EZ, it was observed that distance from Dhaka was listed as the common reason by the manufacturers.

Respondents opined that they have certain pre-requisites of investment. **Key pre-requisites** as divulged by the primary survey are:

- Subsidized industrial space and utility tariffs
- Access to concessional loan
- Corporate income tax subsidy
- Uninterrupted access to quality utility services (power, water, and gas)
- Warehousing facility

Many fiscal and infrastructure related pre-requisites are already under implementation by BEZA as part of its EZ incentive package and operational guidelines.

(i) Food & Beverages, (ii) Pharmaceuticals, (iii) Chemicals, and (iv) Light Machinery, Equipment & Furniture have emerged as the most suited sectors for this proposed EZ

5. Demand Forecast

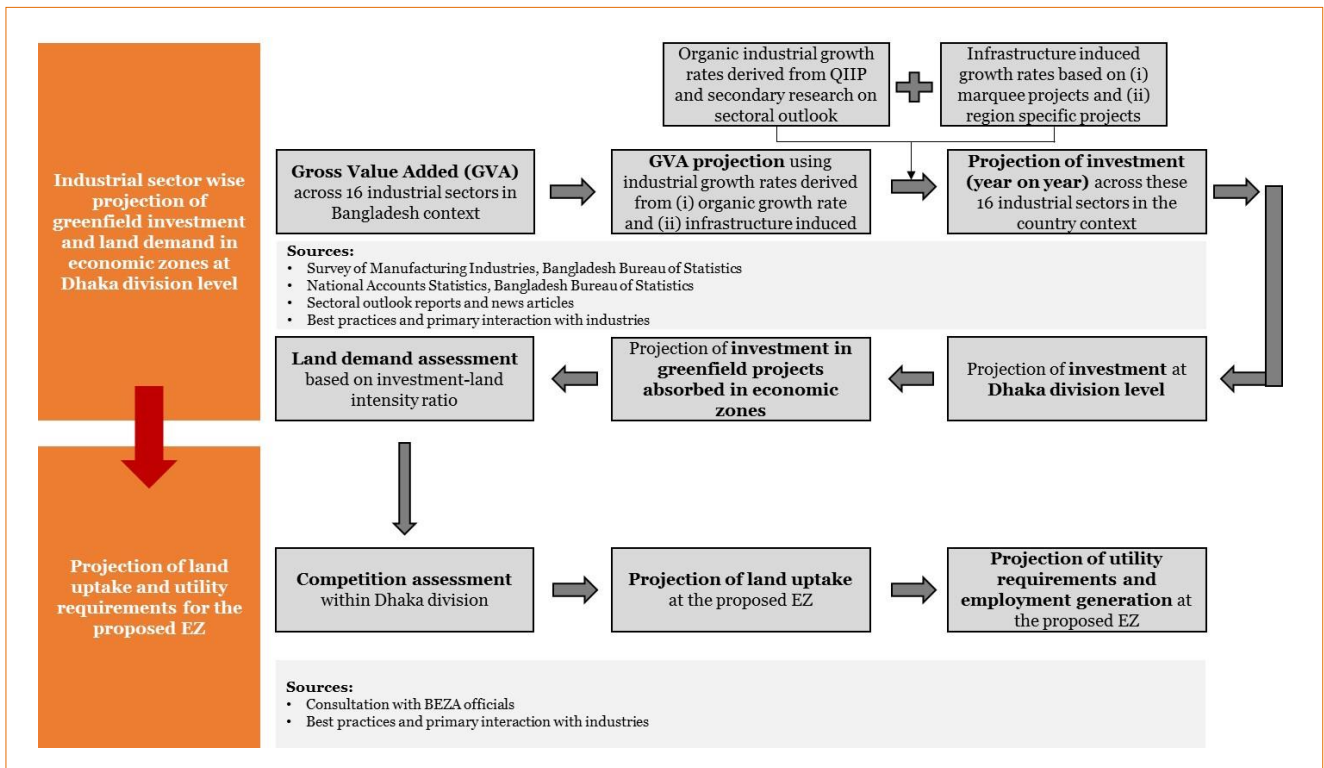
5.1. Purpose and Objective

Former chapter delves into an overall assessment of industrial sectors in regard to the country and the regional landscape (for the region surrounding the proposed EZ). This assessment culminates into identification of key industry sectors which are suitable for the proposed EZ. Based on the shortlisted industrial sectors, statistical projection techniques are applied to develop a mathematical model towards estimation of demand for the proposed EZ spread over a time span of 20 years. This chapter captures estimation of the potential demand (in terms of land uptake and utility requirements) in the context of the proposed EZ. An assessment of employment generation have also been undertaken in this chapter. Basis the key findings of this demand model, land demand uptake and potential industrial mix for the proposed EZ is arrived at; this forms the basis of the best practice master planning and infrastructure planning. It is to be noted that the estimation of utility requirements is tentative in nature and it may vary depending on the best practice master planning.

5.2. Methodology of Demand Forecast

Associative method projection technique is used for this demand forecasting study. Various parameters have been analyzed in the country and region context to understand the impact on the variables used for projection. Following figure captures overall methodology for the demand forecasting exercise.

Figure 38: Overall approach for demand forecast



Source: PwC Analysis

Step-wise approach has been elucidated in the following-

Step-1: Gross Value Added (GVA) is the measure of the value of goods and services produced by a particular industry sector. In this exercise, GVA for the best performing 16 industrial sectors (identified in last chapter) in

the country context has been considered as the base for forecasting. Survey of Manufacturing Industries 2012 (SMI) data published by Bangladesh Bureau of Statistics (BBS) has been referred for the same.

Step-2: GVA for these 16 industrial sectors have been forecasted based on industrial growth rates. It has been considered that these growth rates are generating owing to (i) organic growth rate(s) of the respective industrial sector(s) and (ii) infrastructure induced growth rates.

Quantum Index of Industrial Production (QIIP) published in National Account Statistics 2017 (NAS) by BBS has been analyzed to find out CAGR for each of these industry sectors. The results obtained from the same have been further validated by detailed secondary research on sectoral outlook and industry trends in Bangladesh. Data points in support to these parameters are furnished in the annexure.

It has been assumed that the organic growth rates of industrial sectors are augmented due to upcoming infrastructure projects planned in the country and in the region surrounding the proposed EZ. Details of the related assumptions are mentioned in the next section.

Step-3: Earlier step estimates projection of investment in the overall country context. Based on certain sets of assumptions, Greenfield investment in economic zones at Dhaka division level have been assessed. These assumptions are outlined in the next section.

Step-4: Basis secondary research on industry sector outlook and primary interaction with industries, investment-land intensity ratio (investment per unit area) has been assessed. This ratio is applied on the projected investment to estimate the land uptake forecasting in the economic zones of Dhaka division.

Step-5: In addition to the proposed EZ, various other economic zones are planned within Dhaka division. In consultation with BEZA officials, land uptake in these proposed economic zones have been prepared. After considering competition from the other economic zones within Dhaka division, land uptake projection at the proposed EZ is arrived at.

Step-6: Based on the shortlisted industry sectors suitable for the proposed EZ (identified in last chapter), land uptake projection has been calculated. Proceeds from the same would be used to formulate the best practice master planning and accordingly infrastructure requirement to be assessed.

Step-7: Referring to secondary research and prevailing best practices, utility requirements and employment generation (per unit area) have been considered. These index figures have been validated through the primary interaction held on ground. Based on the same, projection of utility requirements and employment generation for the proposed EZ has been estimated.

It is to be noted that forecasting of land uptake, utility requirements and employment generation are based on the hypothesis elaborated above. Actual scenario during on-ground development of the proposed EZ may vary than this estimation.

5.3. Demand Scenarios and Associated Assumptions

5.3.1. Demand Scenarios

Three scenarios have been considered while developing the demand forecasting model.

- Aggressive case: Economic conditions of Bangladesh and the region are improving and behaving better than expected; as a result of the same, macro-economic indicators showing good prospect and potential infrastructure projects are commencing as scheduled.
- Base case: Economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; macro-economic indicators also indicating good prospect.
- Conservative case: Economic conditions of Bangladesh and the region are showing lagging trend and behaving worse than expected; macro-economic indicators indicating hindrances to growth.

5.3.2. Key Assumptions

1. Timing and related assumptions

It has been assumed that regulatory activities and study on the proposed EZ would take place throughout the next financial year i.e. 2018-19 (termed as 2018). Further, project preparatory activities (such as off-site infrastructure development, decision on development model and appointment of private developer) would consume a timeframe of 2 years (i.e. from 2019 to 2020). Taking cues from similar developments across the globe, construction timeline of 5 years (from 2020 to 2024) has been considered.

Basis above timelines, it has been assumed that land uptake in the proposed EZ to commence from 2023 and accordingly a demand model has been prepared for 20 years (i.e. from 2023 to 2042).

2. Industries considered for this assessment

As elaborated in earlier chapter, following industries have been identified for the demand projection framework.

- Food and Beverages
- Chemicals
- Pharmaceuticals
- Light Machinery and Equipment & Furniture

3. Assumptions related to industrial growth rate (organic)

Basis primary survey of industrial units, growth trend and changing investment landscape in the country context were assessed. Based on the responses recorded during primary survey, organic industrial growth has been taken into cognizance.

As outlined in the methodology of the demand forecast, following organic industrial growth rates have been assumed. The values considered are on the conservative side. Detailed rationale behind these assumptions are placed as annexure.

Table 39: Organic industrial growth rate related assumptions

Industrial Sectors	Description of the Assumptions
Food and Beverages	<ul style="list-style-type: none"> • 8.5% annual growth from 2012 to 2021 • 9.0% annual growth from 2022 to 2026 • 10.0% annual growth from 2027 to 2031 • 8.5% annual growth from 2032 to 2042
Chemicals	<ul style="list-style-type: none"> • 7.0% annual growth from 2012 to 2016 • 8.0% annual growth from 2017 to 2021 • 9.0% annual growth from 2022 to 2026 • 8.0% annual growth from 2027 to 2042
Pharmaceuticals	<ul style="list-style-type: none"> • 16.0% annual growth from 2012 to 2016 • 18.0% annual growth from 2017 to 2021 • 20.0% annual growth from 2022 to 2026 • 17.0% annual growth from 2027 to 2042
Light Machinery and Equipment & Furniture	<ul style="list-style-type: none"> • 20.0% annual growth from 2012 to 2016 • 21.0% annual growth from 2017 to 2021 • 18.0% annual growth from 2022 to 2042

Source: National Accounts Statistics (May' 2017) by Bangladesh Bureau of Statistics; Secondary Research and PwC Analysis

4. Assumptions related to industrial growth rate (infrastructure induced)

Respondents from primary survey also opined that the infrastructure induced growth trend in the country is going to impact industrial development landscape.

Various marquee projects are planned across the country. These projects, once operational are expected to bolster the overall socio-economic growth of Bangladesh and in turn will also facilitate industrial growth. Three path-breaking infrastructure projects have been identified in the country context such as (i) Padma Bridge (approach road is ~3 km from the proposed EZ), (ii) Upgradation of Dhaka-Chittagong Highway (Dhaka is ~80 km from the proposed EZ), and (iii) Payra Port (~205 km from the proposed EZ).

In addition to these projects, following infrastructure development projects in the region surrounding the proposed EZ have been considered.

- (i) Khulna Airport (~165 km from the proposed EZ),
- (ii) Rampal Power Plant (~200 km from the proposed EZ),
- (iii) Khulna Mongla Rail Line (~170 km from the proposed EZ),
- (iv) Ruppur Nuclear Power Plant (~190 km from the proposed EZ),
- (v) Other projects: Upgradation of Dhaka-Khulna Highway, Widening of Dhaka-Barisal Highway, Proposed Bangabandhu Sheikh Mujib International airport.

It has been assumed that owing to development of these projects, industrial growth rate would be augmented to a certain extent. Following table elucidates the infrastructure induced augmentation in industrial growth rate across the three scenarios.

Table 40: Assumptions towards infrastructure induced augmentation in industrial growth rate

Details	Conservative	Base	Aggressive
Industrial growth rate augmentation per year (%) as a result of Padma Bridge (from 2021 to 2027)	1.000%	1.100%	1.200%
Industrial growth rate augmentation per year (%) as a result of upgradation of Dhaka Chittagong highway (from 2020 to 2024)	0.175%	0.200%	0.225%
Industrial growth rate augmentation per year (%) as a result of Payra Port (from 2022 to 2028)	0.225%	0.250%	0.275%
Industrial growth rate augmentation (%) as a result of (i) Khulna Airport, (ii) Rampal Power Plant, (iii) Khulna Mongla Rail Line, (iv) Ruppur Nuclear Power Plant and (v) various infrastructure development projects planned in South-West of Bangladesh (from 2021 to 2030)	0.275%	0.300%	0.325%

Source: Secondary research and PwC Analysis

Research articles and secondary sources hint that Padma Bridge is expected to boost the GDP growth of the country by 1.66%. Since the upcoming Padma Bridge is located in close proximity to the proposed EZ, it has been assumed that once the bridge is operational, industrial growth in this region shall be augmented by 1% annually. Impact of other potential infrastructure projects at country level and region level has been assumed subsequently.

Detailed rationale behind these assumptions are placed as annexure.

5. Assumptions related to investment inflow in economic zones of Dhaka division

Out of the total investment forecasted at the country level, certain portion is expected to inflow at Dhaka division level. A part of this investment inflow is Greenfield in nature (involves setting up of new facilities). Out of the total Greenfield investment estimated at Dhaka division level, it has been assumed that a certain quantum would

take place in the economic zones proposed within Dhaka division. Following table captures the assumptions related to investment inflow in economic zones of Dhaka division.

Table 41: Assumptions related to investment inflow in economic zones of Dhaka division

Details	Conservative	Base	Aggressive
Investment in Dhaka Division as % of the total investment estimated for the country	27.50%	30.00%	32.50%
% of greenfield investment	47.50%	50.00%	52.50%
Investment in economic zones (%) out of total greenfield investment	27.50%	30.00%	32.50%

Source: Secondary research and PwC Analysis

Based on information availed from secondary research and PwC analysis, Dhaka division contributes to ~30% of GDP of the country. Thus, investment in Dhaka division has been assumed as 30% (in base case) of the total investment inflow in the country. Research articles suggest that in developing countries, % of Greenfield investment is ~57.85%.²⁰³ Thus in base case, 50% of Greenfield investment has been assumed.

BEZA has embarked into an ambitious journey of setting up of 100 economic zones in the coming 15 years. Basis information obtained from BEZA officials, around 30 economic zones (including govt. driven, G2G and private) are planned in Dhaka division. Keeping in cognizance scarcity of land in Dhaka division and significant industrialization in Dhaka division, it has been assumed that in base case, 30% investment in economic zones (out of total Greenfield investment) would flow in.

Detailed rationale behind these assumptions are placed as annexure.

6. Assumptions related to investment-land intensity and number of establishments

Based on prevailing practices and primary interaction with industries and taking in cognizance similar developments in the geographical context, investment-land intensity ratio (investment per unit land area) for the shortlisted industries have been arrived at. These figures are indicative in nature and may vary depending on the exact stage of value chain and the type of finished goods.

It is very difficult to estimate number of industrial establishments in any economic zone during project conceptualization stage. Synthesizing number of industrial establishment data obtained from Survey of Manufacturing Industries 2012 with the feedback obtained from primary survey, number of industrial establishment per unit acre figures have been arrived at. It has also been taken into consideration that as per prevailing BEZA development guidelines, minimum land plot size is 1 acre.

While calculating the above, it has been assumed that the proposed EZ houses only small, medium, and large scale industries.²⁰⁴

Table 42: Assumptions related to investment-land intensity ratio

Industrial Sectors	Investment (BDT million) per acre	Area (acre) Requirement for each industrial establishment (small, medium and large)
Food and Beverages	36.76	2.00
Chemicals	217.92	1.00
Pharmaceuticals	149.15	1.00

²⁰³ http://documents.worldbank.org/curated/en/628261468781753575/110510322_20041117173021/additional/32578owps3192.pdf

²⁰⁴ Definitions of Small, Medium, and Large industries are as per Survey of Manufacturing Industries (2012) published by Bangladesh Bureau of Statistics

Industrial Sectors	Investment (BDT million) per acre	Area (acre) Requirement for each industrial establishment (small, medium and large)
Light Machinery and Equipment & Furniture	198.86	1.00

Source: Secondary research, primary interaction with industries and PwC Analysis

7. Assumptions related to competition from other proposed EZs within Dhaka division

Basis discussion with BEZA officials and data provided in BEZA website, information on the competing manufacturing EZs within Dhaka division have been gathered. Following table captures information about the same.

Table 43: Competing economic zones within Dhaka division

Sl. No.	Name of EZ	Location	District	Acres	Remarks
1	Dhaka EZ	Dohar	Dhaka	316.35	Govt. driven
2	Dhaka SEZ	Karanigonj	Dhaka	105.00	Govt. driven
3	Shreepur EZ	(Nayanpur), Shreepur	Gazipur	510.00	Govt. driven
4	Gopalganj EZ	Kotalipara	Gopalganj	201.83	Govt. driven
5	Gopalganj EZ - 2	Gopalganj Sadar	Gopalganj	200.00	Govt. driven
6	Manikgnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	Manikganj	300.00	Govt. driven
7	Munshiganj Gazaria EZ	Gazaria	Munshiganj	97.98	Govt. driven
8	Araihazar -2 EZ	Araihazar	Narayanganj	413.00	Govt. driven
9	Araihazar EZ	Araihazar	Narayanganj	1010.90	Govt. driven
10	Narayanganj EZ	Bandar & Sonarga	Narayanganj	875.65	Govt. driven
11	Narsingdi EZ	Narsingdi Sadar	Narsingdi	690.20	Govt. driven
12	Shariatpur EZ	Gosharhat	Shariatpur	750.00	Govt. driven
13	Narayanganj EZ Sonargaon	Sonargaon	Sonargaon	1000.00	Govt. driven
14	Madaripur EZ	Rajoir upazila	Madaripur	667.00	Govt. driven
15	Faridpur EZ	Faridpur Sadar upazila	Faridpur	888.28	Govt. driven
16	A K Khan PEZ	Polash	Narshindi	200.00	Private
17	Megna Industrial Economic Zone PEZ	Sonargaon	Narayanganj	80.00	Private
18	Megna Economic Zone PEZ	Sonargaon	Narayanganj	68.00	Private
19	Aman Private EZ	Sonargaon	Narayanganj	150.00	Private
20	Abdul Monem PEZ,	Gojaria	Munsigonj	197.00	Private
21	Bay Private EZ	Gazipur	Gazipur	65.00	Private

Sl. No.	Name of EZ	Location	District	Acres	Remarks
22	United City IT Park Ltd.	Badda and Vatara	Dhaka	2.43	Private
23	Arisha Private EZ	Keranigonj, Savar	Dhaka	84.95	Private
24	East-West Special EZ	Keranigonj	Dhaka	54.00	Private
25	Bosundhora Special EZ	Keranigonj	Dhaka	56.00	Private
26	city EZ	Narayangonj	Narayangonj	92.00	Private
27	City SEZ	Dhaka	Dhaka	110.00	Private
28	Sonargaon EZ	Narayangonj	Narayangonj	350.00	Private
29	private ez (bgme)	Munshiganj	Munshiganj	482.00	Private

Source: BEZA website and discussion with BEZA officials

In line with the above information, industrial space uptake in the competing EZs from 2017 to 2042 have been assumed. Details of the same are placed in the annexure. Basis suggestions obtained from various BEZA officials and realistic development scenarios of these competing EZs, this assumption has been formulated. However, on ground scenario may vary than this assumption.

8. Industrial space requirement as % of total land area

In any EZ, a certain proportion is allotted for industrial space. Remaining portion is kept reserved for allied on-site infrastructure (such as internal road connection, water and sewer system, effluent treatment facilities and utility connection) and non-processing zone (such as entrance plaza, social infrastructure, skill development facilities, green space and other amenities). It has been assumed that 65% of total land area is to be earmarked for industrial purposes. However, this is tentative and based on development guidelines of BEZA & similar developments worldwide. During best practice master planning, this ratio may vary depending on the shape of the land parcel and terrain condition.

9. Utility requirements and employment generation

Standard industry benchmarks and excerpts from the primary survey have been referred to arrive at the benchmark figures (per unit area) towards estimation of utility requirements and direct employment generation. It is to be noted that these figures are indicative in nature. These figures may vary during on-ground implementation of the proposed EZ and as per the stage in the value chain for the industry. These figures are also dependent on the production capacity and exact type of finished goods being produced.

Following table captures these benchmark figures.

Table 44: Utility requirements and employment generation- benchmark figures

Industry sectors	Power requirements (kVA per acre)	Water requirements (Cum per day per acre)	Direct Employment generation (Number per acre)
Food and Beverages	182.11	7.28	23
Chemicals	182.11	13.35	164
Pharmaceuticals	141.64	12.14	149
Light Machinery and Equipment & Furniture	121.41	9.71	186

Source: Industry best practices & standard benchmarks, primary survey

Basis primary survey, most of the industries use gas as fuel source to generate power and for boiler usage. Depending on the value chain requirements and requirements of factors of production, the same would vary. It is very difficult to estimate gas requirements without comprehending the exact requirements and exact product type from these industries. Thus, estimation of gas requirement has not been carried out in this module.

5.4. Demand Forecasting

5.4.1. Industrial Space Uptake

Based on the above stated assumptions, industrial space occupancy for the three scenarios are captured in the following table.

Table 45: Industrial space occupancy (in %) for the three scenarios (cumulative)

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Conservative	5%	6%	16%	28%	37%	41%	47%	55%	64%	82%	100%	100%	100%	100%
Base	10%	16%	34%	53%	71%	71%	86%	100%	100%	100%	100%	100%	100%	100%
Aggressive	16%	29%	54%	83%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Demand Forecasting

Detailed calculations are furnished in the annexure. Following tables elucidates the industrial sector wise industrial space uptake for the three scenarios.

Table 46: Industrial space uptake- Conservative Scenario (figures in acres) - cumulative

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Food & Beverages	10	12	33	56	74	82	91	106	123	150	178	178	178	178
Chemicals	1	1	2	3	4	4	4	5	6	7	8	8	8	8
Pharmaceuticals	5	6	18	33	43	48	54	64	77	103	130	130	130	130
Light Machinery and Equipment & Furniture	1	1	3	6	7	8	10	12	14	19	25	25	25	25
Total	17	20	56	98	128	142	159	187	220	279	341	341	341	341

Source: Demand Forecasting

Table 47: Industrial space uptake- Base Scenario (figures in acres) - cumulative

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Food & Beverages	21	34	68	106	141	141	169	195	195	195	195	195	195	195
Chemicals	1	2	4	5	7	7	8	9	9	9	9	9	9	9
Pharmaceuticals	10	17	37	60	80	80	98	116	116	116	116	116	116	116
Light Machinery and Equipment & Furniture	2	3	6	10	14	14	18	21	21	21	21	21	21	21
Total	34	56	115	181	242	242	293	341	341	341	341	341	341	341

Source: Demand Forecasting

Table 48: Industrial space uptake- Aggressive Scenario (figures in acres) - cumulative

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2035 to 2042
Food & Beverages	34	61	110	165	199	199	199	199	199	199	199	199	199	199
Chemicals	2	3	6	8	10	10	10	10	10	10	10	10	10	10
Pharmaceuticals	16	30	58	93	112	112	112	112	112	112	112	112	112	112
Light Machinery and Equipment & Furniture	3	5	10	16	20	20	20	20	20	20	20	20	20	20
Total	55	99	184	282	341	341	341	341	341	341	341	341	341	341

Source: Demand Forecasting

In accordance to the above estimated land demand, number of industrial establishments (small, medium, and large) has also been estimated. Following table (in the next page) captures the same.

Table 49: Estimation of Industrial Establishments- cumulative

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Conservative	12	14	39	70	91	101	114	134	158	204	252	252	252	252
Base	24	39	81	128	172	172	209	244	244	244	244	244	244	244
Aggressive	38	69	129	200	242	242	242	242	242	242	242	242	242	242

Source: Demand Forecasting

5.4.2. Utility Requirements

In line with the industrial space uptake projections, following tables elaborates the forecasting of utility (power and water) requirements at the proposed EZ.

Table 50: Power Requirements- Three Scenarios (figures in MVA) - cumulative

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Conservative	2.8	3.3	9.2	16.1	21.1	23.4	26.2	30.7	36.0	45.4	55.3	55.3	55.3	55.3
Base	5.7	9.3	19.1	29.9	40.0	40.0	48.3	56.1	56.1	56.1	56.1	56.1	56.1	56.1
Aggressive	9.2	16.5	30.6	46.6	56.4	56.4	56.4	56.4	56.4	56.4	56.4	56.4	56.4	56.4

Source: Demand Forecasting

Table 51: Water Requirements- Three Scenarios (figures in MLD) - cumulative

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Conservative	0.2	0.2	0.5	0.9	1.2	1.3	1.5	1.7	2.0	2.6	3.2	3.2	3.2	3.2
Base	0.3	0.5	1.1	1.7	2.2	2.2	2.7	3.2	3.2	3.2	3.2	3.2	3.2	3.2

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Aggressive	0.5	0.9	1.7	2.6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

Source: Demand Forecasting

The above stated utility consumption figures were taken at a conception and on basis on primary surveys undertaken among various industry sector players in Bangladesh. Actual demand estimation of utility has been undertaken in the Infrastructure Planning chapter, based on prevailing development guidelines in Bangladesh context.

5.4.3. Employment Generation

In line with the industrial space uptake projections, following figure elaborates the forecasting of direct employment generation from the proposed EZ.

Figure 39: Direct employment generation for the three scenarios

Scenarios	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036 to 2042
Conservative	1325	1520	4278	7793	10006	11175	12712	15012	17819	23444	29426	29426	29426	29426
Base	2509	4201	8849	14058	18915	18915	23149	27151	27151	27151	27151	27151	27151	27151
Aggressive	4052	7295	14016	21940	26625	26625	26625	26625	26625	26625	26625	26625	26625	26625

Source: Demand Forecasting

Detailed calculations are furnished in the annexure.

5.5. Key Takeaways

- Three scenarios (conservative, base, and aggressive) have been developed to forecast land demand for the proposed EZ. Base scenario assumes Business-as-Usual situation for the overall economic condition of the country and the influence region; whereas the conservative (aggressive) scenarios assume bad (good) performance of economic and infrastructure indicators in regard to the country and the influence region.
- Assumptions related to industrial growth rates and investment inflow to the subject site have been varied as per the three scenarios elaborated above. It has been assumed that in aggressive (conservative) case, higher (lower) infrastructure induced growth rate and higher (lower) investment inflow taking place to the subject site. Base case considers the current scenario backed up by evidences and present trends.

- It appears that in conservative case, complete land uptake would take place in 11 years. For base and aggressive cases, the same would be spread over 8 years and 5 years respectively.
- Total number of industrial establishments (small, medium, and large) for conservative case is 252. For base and aggressive cases, it is 244 and 242 respectively.
- For conservative case, ultimate power and water demand have been estimated as 55.3 MVA and 3.2 MLD; For base case, ultimate power and water demand have been estimated as 56.1 MVA and 3.2 MLD; For aggressive case, ultimate power and water demand have been estimated as 56.4 MVA and 3.1 MLD. These figures are indicative and may vary during formulation of best practice master planning. Details of electricity and water sourcing would be captured in the infrastructure planning stage.
- Proposed EZ is expected to generate direct employment of 29,426 in conservative case. In base and aggressive cases, employment generation figures could be 27,151 and 26,625. These figures are indicative and may vary during implementation.

6. Transport Assessment

6.1. Purpose and Objective

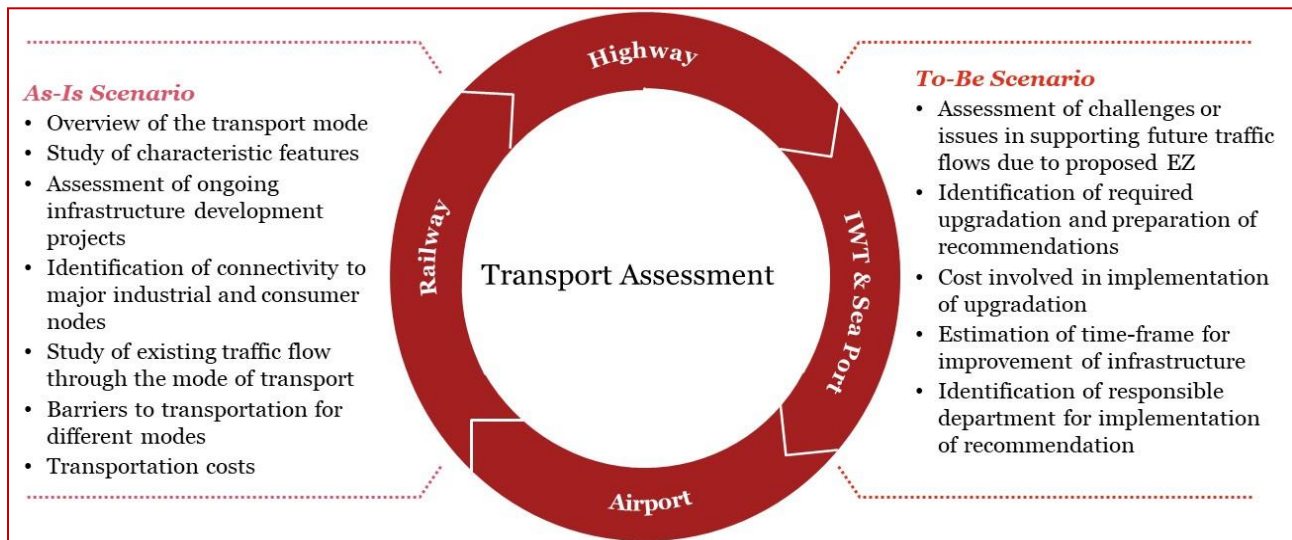
A robust transport infrastructure is the most vital enabler for movement of men and material from origin to destination. In an increasingly globalized economy, industrial development of any region needs to be supported by a seamless movement of traffic to ensure resources can be brought in or sent out to major international transit gateways.

This chapter will delineate the transport infrastructure available in the vicinity of proposed EZ site and existing connectivity with major international transit points. A comprehensive study of each mode of transport i.e. road, railway, port and airport will be performed to understand as-is scenario of these modes of transport. The impact of the development of proposed EZ site on all transport modes will be considered and proposals to upgrade the existing transport network in order to support the proposed EZ site will be elucidated.

6.2. Methodology of Transport Assessment

The approach adopted to assess transport infrastructure supporting movement of goods and passengers in the vicinity of the proposed EZ site is segregated into 2 modules. 1st module deals with evaluation of the existing status of different modes of transport with respect to its features, connectivity, traffic flow, ongoing projects and transportation costs involved. 2nd module contains recommended upgradations of different modes of transport infrastructure to support the future traffic flows due to proposed EZ, cost implication of such upgradations, timeframe over which the upgradation should take place and department responsible for concerned upgradation.

Figure 40: Assessment Methodology

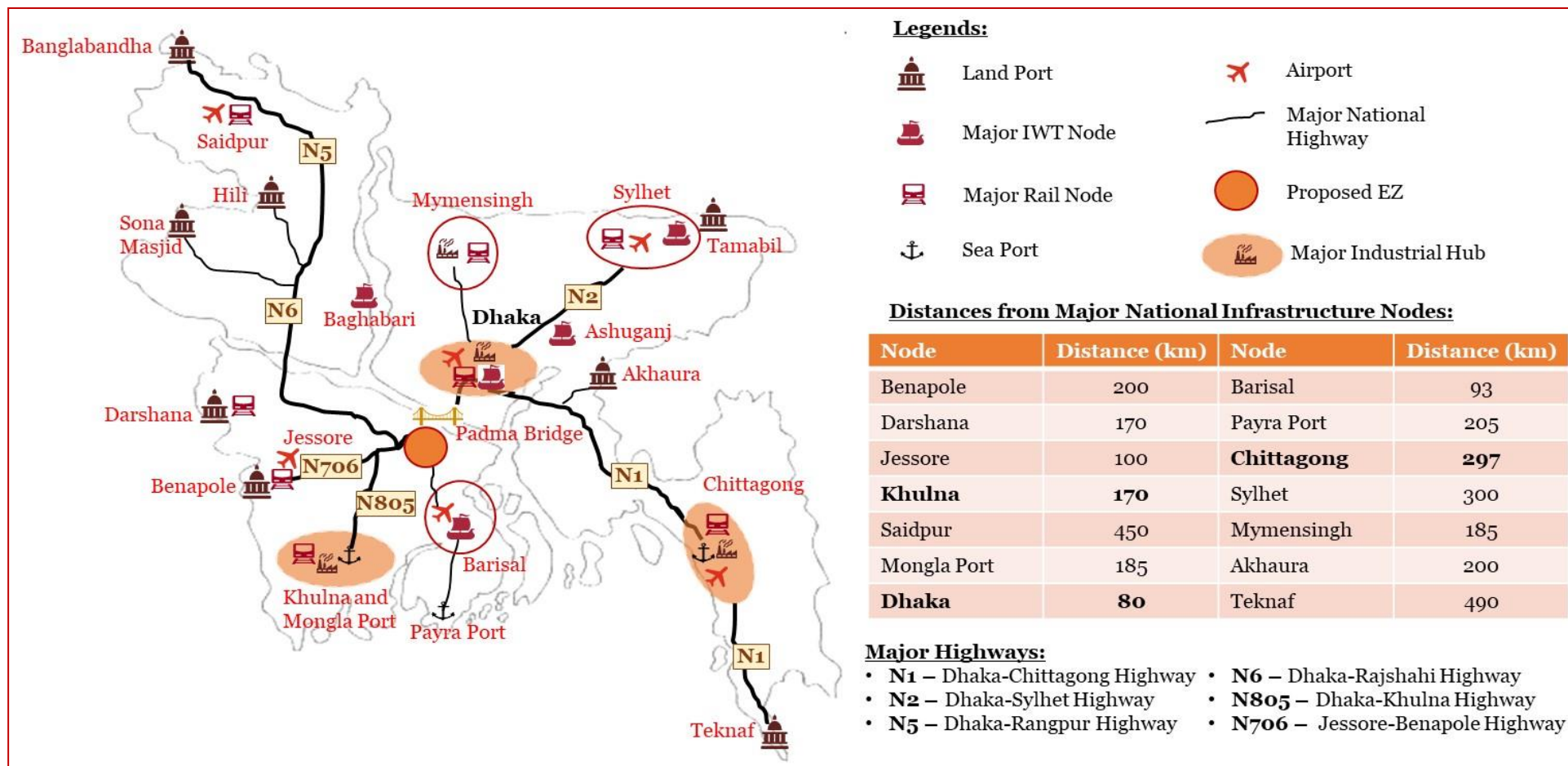


Source: PwC Analysis

6.3. Review of National Infrastructure with respect to site

A macro level view of major transport nodes across Bangladesh has been outlined in the figure below –

Figure 41: Bangladesh’s major transport nodes with respect to Proposed EZ site



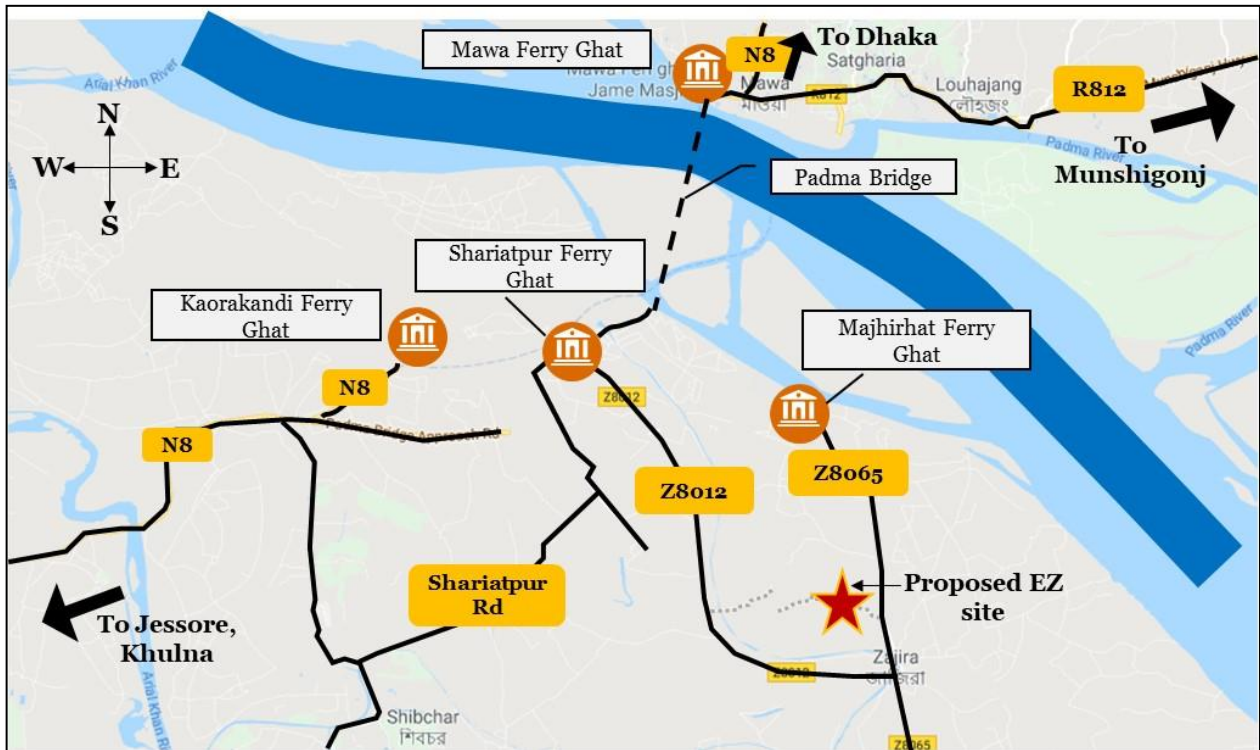
Source: PwC Analysis

6.3.1. Highways

Road connectivity is essential to foster last mile connectivity of cargo from source to destination. Good access to roadways shall enable seamless movement of cargo to/ from the proposed EZ to industrial nodes and trade gateways.

Following figure captures the road infrastructure in the vicinity of the project site.

Figure 42: Road infrastructure in the vicinity of the proposed EZ



Source: Google Map and PwC Analysis

Above figure elucidates that the proposed EZ has direct road connectivity to South-Western part of this country. It is also located in proximity to the under-construction Padma Bridge and consumer markets in Dhaka. Owing to its strategic location, once Padma Bridge is operational, project site could become a prime location in terms of industrial activities. Thus, domestic market oriented industries stand a good chance to flourish in the proposed EZ.

6.3.1.1. Highways near the proposed EZ

As illustrated in the figure above, the proposed EZ site is bordered by zilla road, Z8065 (Majhirhat-Kazirhat Road) towards its east while zilla road, Z8012 (Shariatpur-Kathalbari Road) is located at a distance of 1-2 km along the site’s southern and western boundary. Presently both Z8065 and Z8012 are single-lane bituminous roads having a width of 4.13 and 4.82 meters respectively.

Present Hindrance and Redressal by GoB

During site visit, it was observed that the road conditions in Z8065 and Z8012 are suitable for supporting movement of heavy vehicles, but single lane road will lead to traffic congestion in future, due to increased flow of commercial and passenger vehicles resulting from industrialization in the region. This might also hamper safety and road surface quality. We were also informed by the Upazila Nirbahi Officer (UNO) officials that the Roads and Highways Department (RHD) would be upgrading Z8012 to a regional highway, which would result in Z8012 being widened to 2-lane road (of width 7.3m). This road would provide support for faster movement of heavy vehicles required for transporting construction material as well as manufactured goods. However, basis

stakeholder consultations with UNO officials, we were informed that upgradation/ widening plan is yet to be proposed for Z8065. Once the proposed EZ is operational, to facilitate smooth movement of cargo emanating from the project site, widening of Z8065 could be envisaged.

Vehicular Traffic

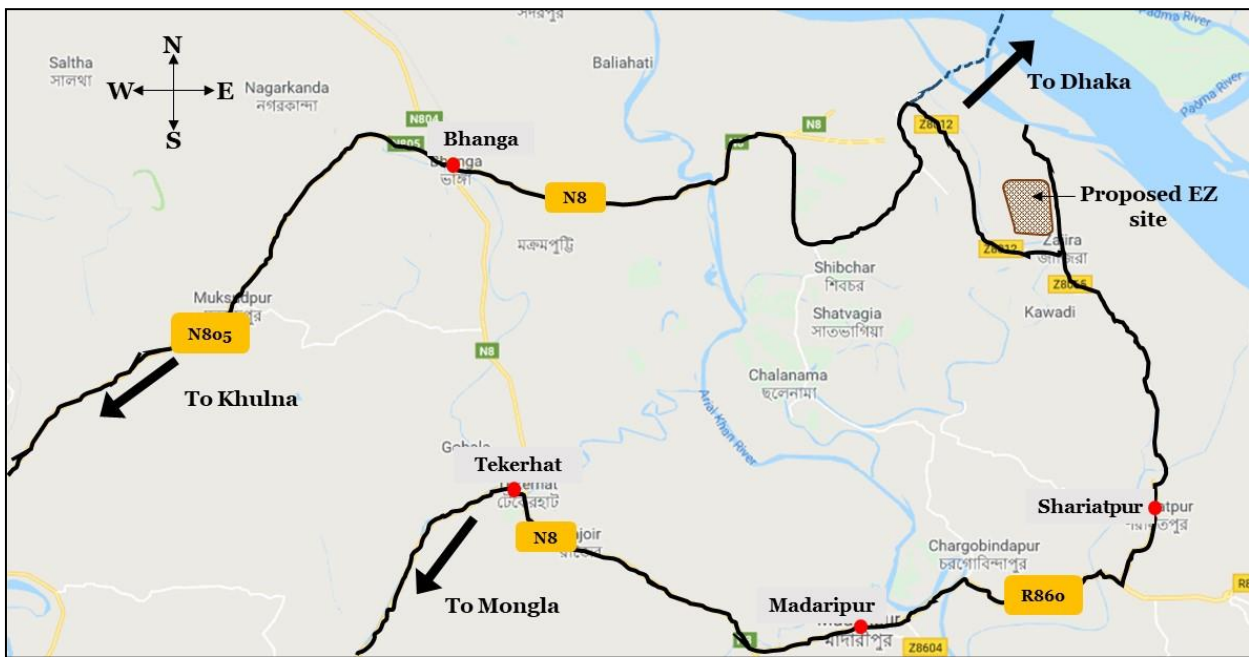
As per data available in Roads and Highways Department (RHD) database, Average Annual Daily Traffic (AADT) for Z8012 is 6,144 vehicles, out of which 5,283 is motorized, rest is non-motorized. Comparison with busiest road links of Bangladesh indicates that the AADT for z8012 is approximately 22% of the AADT of the busiest road links in the country. This reveals that currently, there is not much traffic plying on this stretch of road indicating lack of industrial activity and movement of people.

Data from RHD reveals that AADT for Z8065 is 5,308 vehicles, out of which 4,079 is motorized and rest is non-motorized. Traffic volume in Z8065 is significantly lower than the traffic volume of busiest road links in the country. This may be attributed to the fact that Shariatpur district is yet to witness industrial development.

Basis our discussion with RHD officials, we were informed that GoB has plans to widen Z8012 to 2-lane road. Widening of road would improve upon the last mile infrastructure. This would allow a faster 2-way movement of heavy vehicles, required for transporting construction material as well as manufactured goods.

6.3.1.2. Trunk Connectivity to Dhaka, Khulna and Mongla

Figure 43: National Highway near the proposed EZ



Source: PwC analysis

There are three major urban/industrial nodes in vicinity of the proposed EZ site. These are –

- Dhaka
- Mongla
- Khulna

Trunk Connectivity with Dhaka

Dhaka city is the capital and largest city of Bangladesh. It is the commercial hub of the country, attracting people from all over Bangladesh, who migrate to Dhaka in search of job and business prospects. Large corporate houses (both domestic and foreign) in Bangladesh have their head-office in Dhaka. Several major industries like textile/

RMG, pharmaceutical, leather, food processing, cement, electrical & electronics, FMCG etc. are located in and around this city.

The proposed EZ is around 80 km from Dhaka city and can be accessed by travelling along N8 (Dhaka-Mawa Highway) till Mawa Ferry Ghat. Dhaka-Mawa Highway is 2-lane bituminous road having a width of 7.21 meters, having an AADT of 14,491 vehicles. This road can support movement of heavy vehicles. However it is post operationalization of Padma Bridge this road could witness a rise in movement of vehicles. 4- laning of Dhaka-Mawa Highway is already under progress in anticipation of increase in traffic flow. This preemptive measure has been undertaken to prevent traffic congestion, which would otherwise occur. Travel on Dhaka-Mawa Highway is followed by a ferry ride till Kaorakandi Ferry Ghat or Shariatpur Ferry Ghat. This ferry ride presently requires at least 2 hours of travel time, however traffic at the ghats often result in delay of 2-3 hours in crossing the Padma River. This ferry ride leads to Z8012 from where the proposed EZ site can be accessed.

Trunk Connectivity with Mongla

Mongla is an upcoming industrial town located around 180 km away from the proposed EZ site location, requiring a travel time of around 4-5 hours from the site location. This town is home to Mongla Port, Mongla Export Processing Zone (EPZ), LPG bottling plants and 2 Economic Zones (under development).

This town can be accessed via zilla road, Z8012 till Shariatpur Sadar Upazila. Regional Highway, Shariatpur Bhedarganj Road (R860) can be accessed from Shariatpur Sadar Upazila, for travel till National Highway, N8 (Dhaka-Khulna Highway). Southward journey of around 160 km on this highway will lead to Mongla. During site visit, it was observed that presently, the roads are bituminous and conducive for movement of heavy vehicles. Basis our discussions with RHD officials, we were informed that RHD has a proposal to upgrade Regional Highway R860 into a National Highway, which will create an industry friendly passageway for transportation of goods and services to and from the proposed EZ.

Improved access to the sea port in Mongla and the industries in Mongla EPZ will create opportunities for industries related to agro products, electronic goods, leather goods, metal products, textiles, garments etc. to be established in the proposed EZ. These goods are currently manufactured in Mongla EPZ and traded through Mongla Sea Port, industries coming up in proposed EZ site can cater to the upstream or downstream requirements of these industries.

Trunk Connectivity with Khulna

Khulna is an industrial city located in west of EZ site. This city is around 170 km away from proposed EZ site at Jajira, requiring a travel time of around 4 hrs. It is the 3rd largest city of Bangladesh in terms of urbanization and industrialization; Khulna is home to various industries like jute, chemicals, seafood packaging, food processing, sugar mills etc.

Khulna can be accessed from the EZ site location through the National Highway, N8 (Dhaka-Barisal Highway) via zilla road, Z8012. N8 leads to National Highway, N805 (Dhaka-Khulna Highway) at Bhanga Upazila. A journey of around 130 km on N805 will lead to the city of Khulna. Presently, this road is 2-laned, however work is under progress to convert sections of the stretch of road in between Khulna and Jajira to 4-lane. This road is bituminous and conducive for movement of heavy vehicles. Khulna also has a major railway station, which has cargo-handling facilities and is linked to the city of Kolkata in India.

6.3.2. Land ports

Bangladesh and India share a borderline of 4,096 km, which is fifth longest border in the world.²⁰⁵ Such a long land border creates opportunity for mutually beneficial foreign trade. Land ports facilitates trade and commerce between two countries, since they provide secure gateways through which cargo can be transported. Currently, India and Bangladesh have 23 land ports to facilitate trade between the two countries.²⁰⁶

²⁰⁵ <http://www.thehindu.com/news/national/half-of-indiabangladesh-border-fenced/article17396794.ece>

²⁰⁶ Bangladesh Land Port Authority

Benapole is the nearest land port located at around 200 km west of the proposed EZ site. It is Bangladesh’s largest and busiest land port with a capacity to handle 2 million Metric Tonnes (MT) of goods per year. Access to Benapole takes place through Khulna-Jessore Highway and Jessore-Benapole Highway. Both these highways are part of the Asian Highway network and basis our discussion with RHD officials, procurement process is completed towards widening (from existing carriageway width of 7.3 m to 10.3 m) of these road alignments.

Present Hindrance and Redressal by GoB

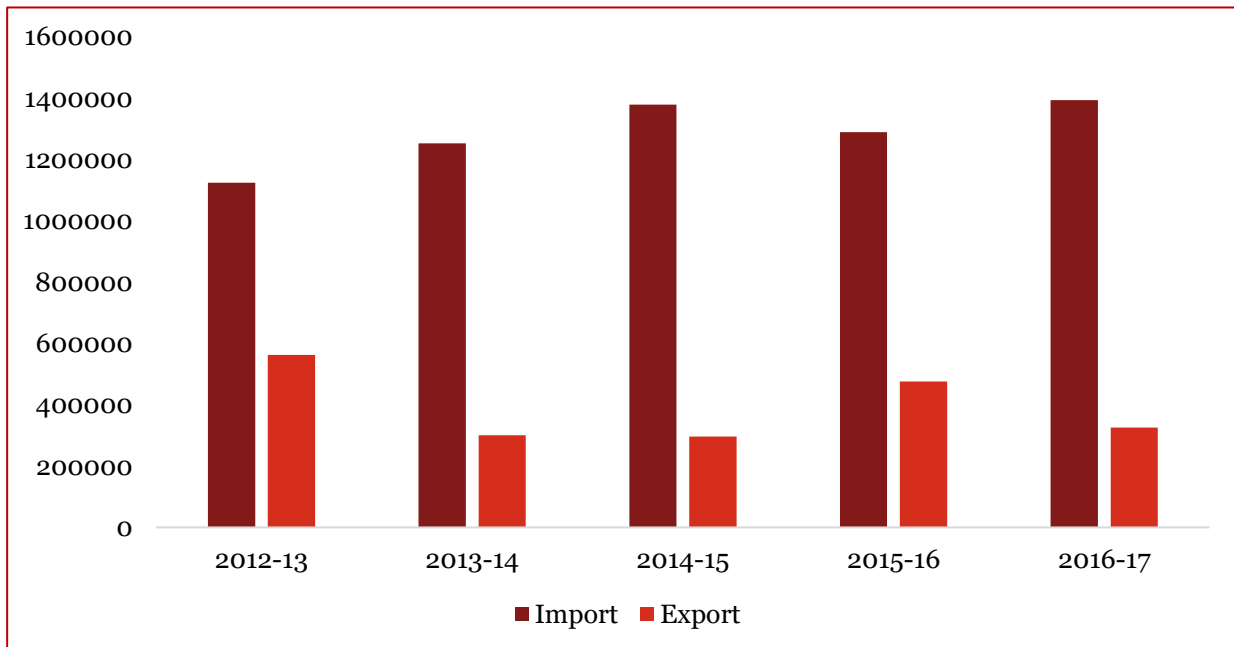
This land port is yet to be modernized. Lack of digitization and absence of modern surveillance system at Benapole Land Port results in mismanagement and theft of goods. Also, 60% of goods traded through Benapole are handled manually resulting in higher lead-time for clearance of vehicles. This results in traffic congestion at this land port. On an average cargo movement of ~250 trucks carrying export goods reach Benapole land port on a daily basis, however only 100-150 vehicles are cleared. Voice on ground reveals that owing to high gestation time at this land port, cost of export increases due to demurrage charges.²⁰⁷

Bangladesh Land Port Authority, inaugurated a new gate at Benapole on May 28, 2018 in order to ease traffic congestion at the land port and provide an alternative gate for movement of cargo carrying vehicles. A pilot project for digitalization of records has been initiated at Benapole Land Port in order to improve data entry and record maintenance. Works are also underway to install more equipment for mechanized cargo-handling at Benapole Land Port.

Benapole Land Port is spread over an area of ~62 acres, having storage capacity of 40,000 MT. Equipment available here are weighbridges, mechanized cargo handling facilities, and warehouses to support movement of goods.²⁰⁸

Figure below depicts the historical trend of foreign trade through Benapole Land Port.

Figure 44: Historical trend of foreign trade through Benapole land port (figures in MT)



Source: Bangladesh Land Port Authority

Figure above indicates that imports and exports have demonstrated stable trends over the past 5 years indicating consumption and manufacturing activities have broadly remained unchanged over the timeframe considered. Absence of marquee industrial projects in South-West region is another factor hindering growth of import or

²⁰⁷ Bangladesh Land Port Authority

²⁰⁸ Bangladesh Land Port Authority

export through Benapole Land Port. Imports through Benapole Land Port is higher as compared to exports, this signifies lack of industrialization in immediate vicinity of Benapole Land Port resulting higher dependency on India for consumer goods as elucidated in the table on the next page. Bangladesh also lacks in availability of raw material fit for industrial consumption, due to which industries (such as textile/RMG, automobile, light engineering, food and beverages) are dependent on India for import of raw material.

Major commodities traded through Benapole land port is listed in the table below.

Table 52: Types of goods being traded through Benapole land port

Major imports	Cotton, chemical, motor car, motor cycle, tyre-tube, machinery & spare parts, food grains, fish, spices, sugar, egg, aluminum, refrigerator, paper etc.
Major exports	Jute & jute goods, fish, soap, plastic goods, battery, construction materials etc.

Source: Data from Bangladesh Land Port Authority Website

Products enlisted above indicate the market potential for cross-border trade from proposed EZ.

Darshana Land Port is located ~200 km North-West of the proposed EZ site. This port does not have direct road connectivity to India but this port facilitates trade with India through railways. Wagon to wagon transshipment on railway tracks takes place at Darshana Land Port. Generally commodity items like rice, wheat, clinker, sugar, fish and milk powder are transported through this port. Currently there is a single broad gauge railway line at Darshana, however, GoB has recently approved doubling of this line to provide connectivity from India to Mongla Port in order to facilitate better access of Indian traders to Mongla Port.²⁰⁹

Bhomra Land Port is another port located at around 240 km west of the proposed EZ site, towards South of Benapole Port. It started its operations from May, 2013 and has a capacity to handle 0.5 million MT of goods per year.²¹⁰ This port was developed in 2013 and does not witness capacity traffic. However, with rising trade between India and Bangladesh, traffic through this land port could increase.

Good access to land port shall ascertain trade relationship with India, in particular West Bengal; industries in the proposed EZ can tap into Indian markets for their products and have access to raw material from the Indian side through the land ports.

6.3.3. Sea Ports and Inland Water Terminals

Waterway transport is one of the most fuel efficient, environment friendly and cheapest mode of transportation. Cost of transporting one tonne freight over one km by waterway is around 50% and 15% of the same transport done via road and rail respectively.²¹¹ Bangladesh is blessed with a riverine geography, especially towards its south, where distributaries of large rivers like Padma and Meghna drain the region. This creates a fairly widespread inland waterways network, creating an opportunity for Inland waterways transportation. Bangladesh also has a coastline of 580 km which creates good potential for sea trade with other countries. Currently, more than 90% of international trade in Bangladesh is done via shipping. This makes it vital to understand potential of waterways connectivity to support transportation in the proposed EZ region.

Proposed EZ site has access to Padma River, which flows at a distance of around 2-3 km away from the site location; it is in close proximity to Shariatpur and Kaorakandi Ferry Ghat (located around 13 km from the EZ site location). These ferry ghats are equipped to handle movement of heavy cargo carrying vehicles. These ghats are well connected to different parts of Bangladesh and India through Padma and Meghna River. However, these ghats do not have any mechanized cargo handling facilities and serve to transport passengers and vehicles across the river. Currently, these ferry ghats can handle movements of agro based products, chemicals, fertilizer, light machinery, processed food, fish products etc. Majhirhat Ferry Ghat is another ferry ghat around 2 km from EZ site location. It is a small terminal with capacity to handle transportation of people only.

²⁰⁹ https://www.joc.com/rail-intermodal/double-track-seen-slashing-bangladesh-india-transit-cost-time_20180508.html

²¹⁰ Bangladesh Land Port Authority

²¹¹ <https://www.thehindubusinessline.com/opinion/flowing-down-the-waterways/article23384237.ece>

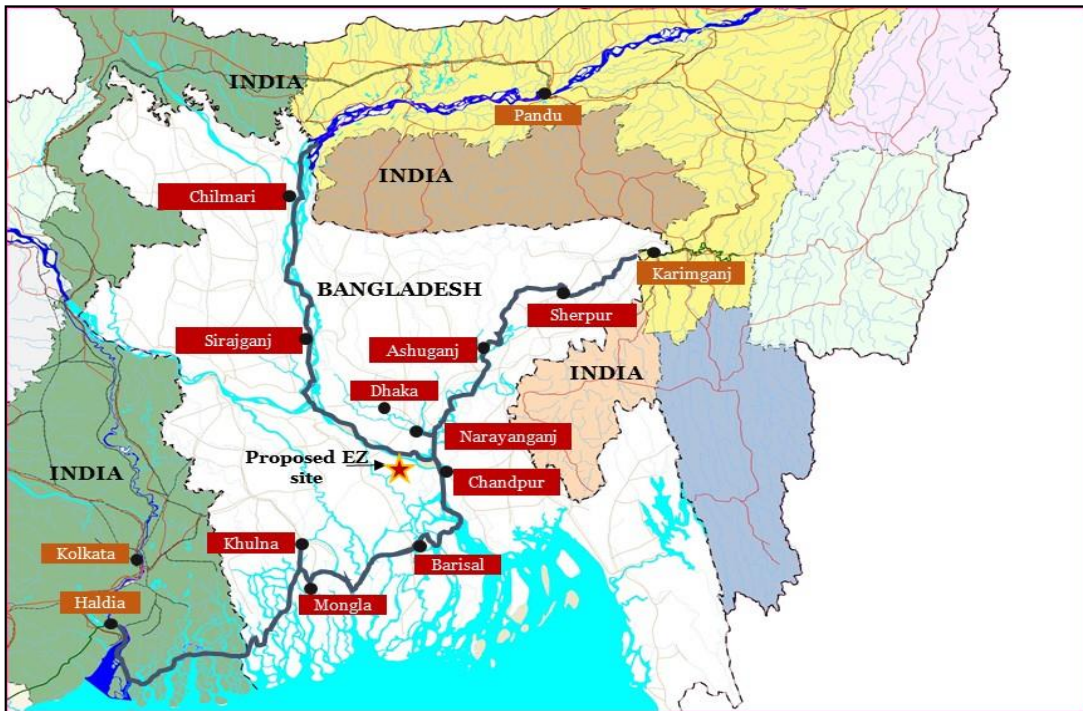
Developing these ferry ghats as river port and/ or private jetty over Padma River will enable riverine transport of bulk cargo for the proposed EZ. However, any decision on the same is subjected to bathymetric analysis, topographical survey, and feasibility assessment. Land acquisitions issues and government approvals need to be taken into cognizance.

Other ferry terminals in proximity to proposed EZ site are Barisal Ferry Terminal (at a distance of 100 km) and Khulna Ferry Terminal (at a distance of 150 km). These ferry terminals can be assessed for potential to transport goods westwards towards India. Currently, these terminals have capacity to handle movement of passengers, small vehicles and light cargo; possibilities to develop these terminals to handle heavy goods can be explored.

Protocol on Inland Water Transit and Trade

India and Bangladesh have an existing Indo-Bangladesh Protocol on Inland Waterways and Transit which allows for using inland waterways network between the two countries for the purpose of trade and commerce. As per Standard Operating Procedure of the existing protocol, both countries have six ports each, designated as the Port of Call. In Bangladesh, the Ports of Call are Mongla, Khulna, Sirajganj, Narayanganj, Pangaon (in Dhaka) and Ashuganj, whereas in India the Ports of call are Kolkata, Haldia, Pandu, Karimganj, Silghat and Farakka.

Figure 45: India Bangladesh Inland Waterways Route



Source: Bangladesh Inland Waterways Authority

This IWT route can be used by industries in the proposed EZ to transport cargo across Bangladesh and also to India. Pangaon Port, the cargo port of Dhaka, is the nearest port of call to the proposed EZ at a distance of 65 km. Post operationalization of Padma River Bridge, access to this port will become seamless and will provide support to industries in transporting goods across Bangladesh and also to markets in India. It also has an Inland Container Terminal having storage capacity of 3,500 20-foot equivalent units of containers and handles 116,000 containers annually. This port has been developed with a view to ease the pressure of cargo movement on Dhaka-Chittagong highway, thus this port is well equipped to handle heavy goods. The ICT currently has 1 mobile crane, 2 straddle carrier, 1 cargo lifting crane of 10 MT capacity among other equipment. As per information available with Bangladesh Inland Waterways Authority, Pangaon Port has a capacity of handling 10,675 MT of cargo per

month and 24,902 MT of bulk goods per month. Draft near this port is around 3.5 meters.²¹² This port can be used to transport containers, heavy cargo, clinker, fly-ash, steel, iron, chemicals etc.

Access to Sea Port

Mongla Sea Port is the nearest port to the proposed EZ site at a distance of 185 km. It has the capacity to handle 6.5 million tonnes of cargo and 50 thousand TEUs of containers every year.

However, due to Bangladesh's major industries being located in Dhaka-Chittagong region and lack of direct road or rail connectivity of the industrial region with Mongla port, this port's capacity remains under-utilized. Presently goods like jute products, frozen food, fertilizer, food grains, sugar, vehicles and containers are transported through this port.²¹³ Draft at Mongla Sea Port is currently around 4.9-6.1 meters,²¹⁴ which necessitates the use of feeder vessels to transport goods from large mother ships till the port. To address this issue, GoB is also developing another port at Payra as a deep-sea port (200 km from site location), having draft of up to 16m.²¹⁵

Figure below captures the quantum of cargo handled at Mongla Port over the past 5 years.

Figure 46: Mongla Port - Annual Import and Export Figures



Source: Mongla Port Authority

The figure above elucidates that volume of cargo being imported through Mongla Port is far higher than export figures. This indicates that there is a lack of industrialization in vicinity of Mongla Sea Port. Also, exports have declined by almost ~38% over past 5 years, when compared to imports, which have grown at a CAGR of ~25% over the same period.

Present Hindrance and Redressal by GoB

Factors, which are currently hindering growth of traffic at Mongla Port, can be attributed to the following:²¹⁶

- Heavy siltation in Pussur Channel where Mongla Port is located. This has decreased the navigable draft available to cargo carrying vessels.
- Irregular dredging in Pussur channel
- Inadequate port facilities – like obsolete equipment, dearth of storage facilities, insufficient manpower at port etc.

²¹² <http://pict.gov.bd/about/> and Bangladesh Inland Waterways

²¹³ Bangladesh Port of Mongla, Additional Information

²¹⁴ https://www.searates.com/port/mongla_bd.htm

²¹⁵ https://www.joc.com/regulation-policy/infrastructure-news/asia-infrastructure-news/bangladesh-opts-make-payra-deep-sea-port_20171121.html

²¹⁶ <http://article.sciencepublishinggroup.com/pdf/10.11648.j.ijtet.20160202.11.pdf>

- Lack of direct road connectivity to Dhaka resulting in higher lead time and cost due to multiple handling of goods

Infrastructure improvement at Mongla Port can create a viable alternative to facilitate sea bound trade for Bangladesh, as the existing seaport at Chittagong is already handling traffic much beyond its designed capacity. Recognizing the potential of Mongla Port to be developed as an important international gateway for trade and commerce, GoB has undertaken five development projects worth about BDT 42.16 billion BDT to develop facilities at Mongla Sea Port. These projects are –

- Procurement of cutter suction dredger, pilot and dispatch boat
- Navigational aids to Mongla Port
- Dredging at outer bar in Pussur Channel
- Dredging in harbor channel
- Procurement of container and cargo handling facility

Mongla Port could witness higher movement of cargo, once the above mentioned projects are executed. Operationalization of Padma Bridge could also give an impetus to the traffic at this port, since it will create direct road connectivity between Mongla Port and existing industrial hubs of Bangladesh.

Mongla Sea Port would provide a transit gateway to manufacturers from EZ site to meet their sea trade requirements.

6.3.4. Airport

Air travel is the fastest mode of travel, which enables movement of passengers as well as time sensitive and perishable cargo. Having such a mode of transport in vicinity of an industrial location enables faster movement of decision makers of an organization who may have a need of making brief visits to production centers. Perishable items like drugs, chemicals or food ingredients like dairy products, fish, fruits requiring short travel time from centers of production to that of consumption also need access to air travel. This necessitates the need to understand air travel facilities around the proposed EZ region.

Nearest international airport to the proposed EZ is Hazrat Shah Jalal International Airport (HSIA) in Dhaka. It is Bangladesh's largest and busiest airport and provides air transport services to both domestic and international passengers. This airport is around 80 km away from EZ site and requires around 5-6 hours of travel time, due to absence of direct road connectivity. Currently, this airport has the capacity to handle 8 million passengers and 2 hundred thousand metric tonnes of cargo. Over 4 million international and 1 million domestic passengers (as well as 150,000 MT of freight and mail exchange) pass through this airport annually. HSIA is anticipated to witness a passenger traffic of 12 million by 2022 and 22 million by 2035.²¹⁷ This airport also has a freight village (warehouse), terminal buildings, hangers and other modern equipment for aircraft handling.²¹⁸ Goods like RMG, vegetables, fruits, fish, dry fish and crabs are transported through HSIA.

Present Hindrance and Redressal by GoB

Air freight transportation services are used for EXIM cargo movement only with **Dhaka international airport** providing facilities for cargo handling. Most of the **major international airline operators** such as Emirates, Etihad Airways, HK airlines, Cathay Pacific, Qatar Airways are servicing the air cargo freight movement through a mix of **passenger aircrafts and dedicated freighters**. Biman Bangladesh is the Bangladesh Government owned airline facilitating cargo movement to Middle East region. The **cargo handling operations** at the Dhaka airport are also managed by **Biman Bangladesh exclusively**. The international airlines have reported significant gaps in the cargo operation as Biman Bangladesh **lacks expertise, assets and manpower** to run the operations efficiently. In fact, the operator is yet to develop expertise to track and trace the goods

²¹⁷ <https://www.airport-technology.com/projects/hazrat-shahjalal-international-airport-expansion-dhaka/>

²¹⁸ <http://www.shahjalalairport.com/>

unloaded from aircrafts. Further, there is **no separate procedure for handling of perishable and temperature sensitive cargo**. The industry players station their representatives to follow-up with Biman Bangladesh once the cargo is unloaded in Dhaka. Biman Bangladesh cites shortage of infrastructure at airport as the main reason for mismanagement of cargo. Owing to lack of necessary infrastructure for screening of cargo, **Dhaka international airport does not have the statutory clearance for shipment directly to Europe**. The Europe bound cargo is first unloaded in Dubai/other hubs for re-scanning and clearance, then forwarded to Europe. This adds to extra cost and time for industries exporting to Europe.

Given the current capacity of the airport, GoB has already appointed developers to construct a new terminal at HSIA. This project is being funded by Japan International Cooperation Agency (JICA) and post operationalization of this terminal in 2021, annual passenger handling capacity of this airport could be 20 million and cargo handling capacity could rise to 5 hundred thousand metric tonnes.²¹⁹

In order to meet the continuously rising air traffic in Bangladesh. GoB has also planned construction of two Greenfield airports. These airports are –

- i. Khan Jahan Ali Airport in Bagerhat (165 km from proposed EZ site)
- ii. Bangabandhu Sheikh Mujib International Airport near Dhaka (location to be finalized)

Good access to airport will allow industries manufacturing time sensitive goods, like RMG or designer clothes and requiring perishable products like fruits or chemicals, to develop in the proposed EZ.

As mentioned above, distance between the proposed EZ site and HSIA is 80 km, but at present owing to lack of direct road connectivity, travel time is around 5-6 hours. This could create challenges in logistics of perishable products due to higher lead-time involved. Once Padma Bridge is operational, travel time would reduce significantly. This in turn would facilitate movement of perishable and time sensitive goods from the proposed EZ to HSIA.

Presently conceptualization of Bangabandhu Sheikh Mujib International Airport is in progress, prospective location for this airport could be in immediate vicinity (within 20 km radius of proposed EZ site) this airport could be developed within the next 10-15 years. Once developed, this airport could provide a faster transit point for perishable goods manufactured in the proposed EZ.

Barisal airport is nearest domestic airport at a distance of 93 km, from where flights till Dhaka and Chittagong can be taken.

Proposed EZ has direct road access to various existing and upcoming international airports within a radius of 100 km. Proximity to airport facilitates smooth movement of perishable and time sensitive goods from the EZ.

6.3.5. Railways

Railways can haul larger volumes of cargo over longer distances as compared to trucks and trailers, and is also faster than vehicles plying on road, since it is easier to monitor and regulate traffic on railway lines. Moreover, transporting goods through railways also help in easing traffic congestions on road by reducing the requirement of trucks which would otherwise have to ply. An overview of railway connectivity in the proposed EZ region is mentioned below.

Kamalapur Station at Dhaka is the nearest railway station to proposed EZ site at the distance of 65 km towards east. This is the largest railway station in Bangladesh and it also has an Inland Container Depot to handle containers which are imported or exported. Currently containers are transported only on Dhaka and Chittagong rail route, requiring a travel time of around 10 hours. In FY 2016-17, 75 thousand TEUs of containerized goods

²¹⁹ <http://www.dhakatribune.com/bangladesh/dhaka/2017/06/12/construction-third-airport-terminal-begins-next-year/>

were transported between Dhaka and Chittagong.²²⁰ As per Bangladesh Railway Information Book, major items transported on this route are Cement, Jute, Fertilizer, Rice, Wheat, Iron & Steel, Sugar cane etc.

Present Hindrance and Redressal by GoB

The ICD at Kamplapur reached its peak annual capacity of ~90,000 TEUs six years ago, post which its traffic is declining due to **long and unpredictable service levels**.²²¹ The overcapacity of the rail network limits the capacity addition of ICD. In case of domestic movement, the use of rail service is negligible due to inadequate broad gauge network and poor terminal handling facilities. The rail freight services market is **not open for private participation**, further restricting the development of adequate infrastructure. There are **no cargo aggregators** present to aid the industries in using the rail services for domestic transportation.

Presently Padma River needs to be crossed via ferry to reach Kamalapur Station from proposed EZ site, resulting in loss of time. Padma River Bridge, which is currently under construction will be a multi-purpose bridge having both road as well as railway facility. This bridge is coming up within 2-3 km of the proposed EZ site location. Construction of this bridge will result in railway network being established in proximity of the proposed EZ site. Naodoba Railway station is being built at a distance of 3 km from the proposed EZ site area. This station could become operational by 2021.²²² This railway station once completed, will enable faster movement of both goods and people between EZ site and other major cities like Dhaka and Chittagong. Due to the location of proposed EZ site in proximity of Dhaka, it is could be envisaged that goods that are currently transported in between Dhaka and Chittagong can directly reach Naodoba in future. **Industries having trade relations with Chittagong would stand to benefit by having direct rail access.**

Cities, towards west of proposed EZ site, like Jessore (165 km) and Khulna (170 km) also have major railway junctions. Both these cities have direct rail connectivity with Benapole Land Port, which provide rail linkage with India. Jessore also has rail links with Dhaka from where trains can travel till Chittagong. GoB has already started work on improving railway connectivity in South West region of the country with plans to connect Khulna railway station to Mongla Sea Port, extending direct railway route from Khulna till Barisal and onwards to Chittagong.²²³ On completion, these projects will transform the rail connectivity in the region of proposed EZ by creating infrastructure to transport goods and passenger from Jajira to different parts of Bangladesh, as well as to neighboring countries like India. **It can be envisaged that goods being transported to/from Benapole Land Port, Mongla Sea Port as well as from Chittagong Sea Port will be able to reach Naodoba Station via direct railway line in future.**

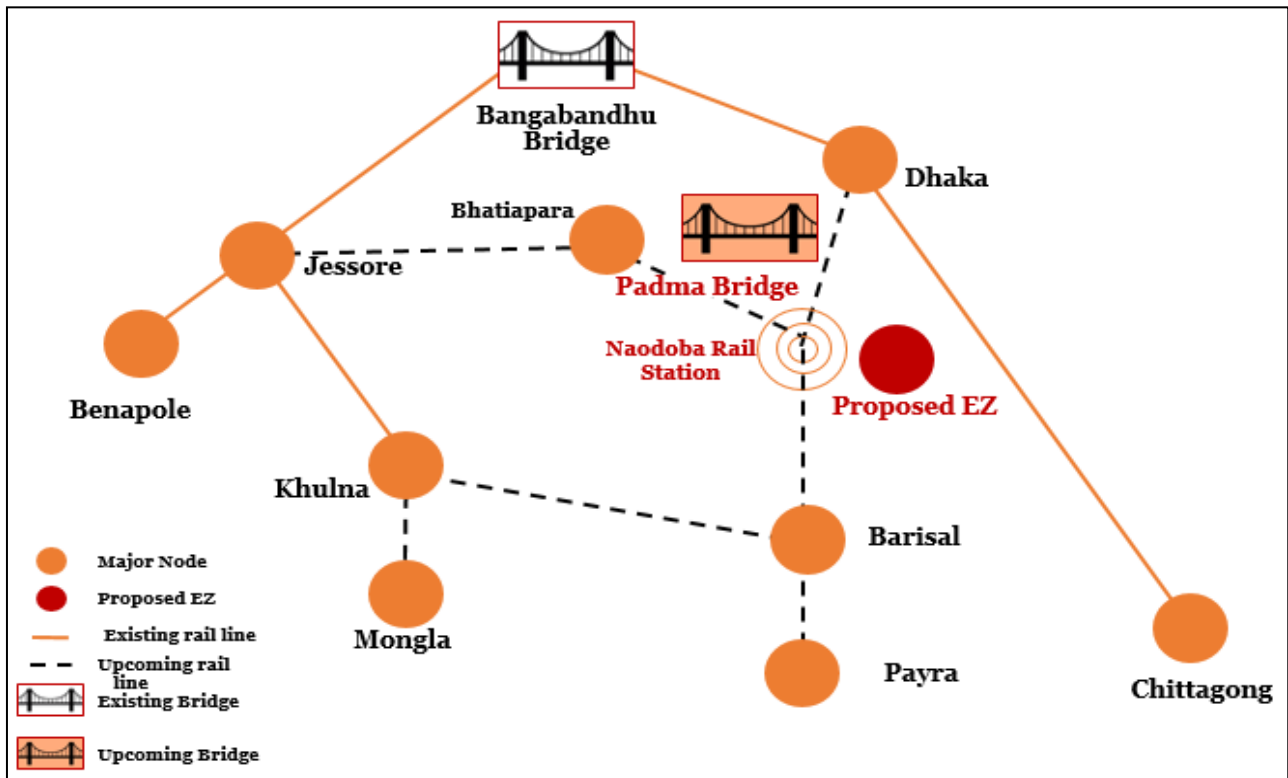
²²⁰ https://www.joc.com/rail-intermodal/rail-equipment/adb-oks-360m-loan-bangladesh-rail-cars-locomotives_20180221.html

²²¹ PwC Research

²²² <http://today.thefinancialexpress.com.bd/print/padma-rail-project-starts-resettling-people-1512060307>

²²³ http://mor.portal.gov.bd/sites/default/files/files/mor.portal.gov.bd/page/9a1ba160_209b_4d94_9077_3befdc9e2ef3/8.%20Formulation%20of%20BR%20Masterplan.pdf

Figure 47: Present and proposed railway route connecting proposed EZ to major nodes in Bangladesh



Source: PwC Analysis and Bangladesh Railway

GoB is also working with Indian Government to establish better rail links between the 2 countries. In an effort to boost transportation of goods via railways, a pilot container train containing animal feed was flagged off from India for Bangladesh on April 3, 2018. This train reached Bangabandhu west station (near Bangabandhu Bridge), 117 km from Dhaka after a 24 hours journey. Based on the results of this trial run India and Bangladesh might further increase the frequency container trains between India and Bangladesh.²²⁴

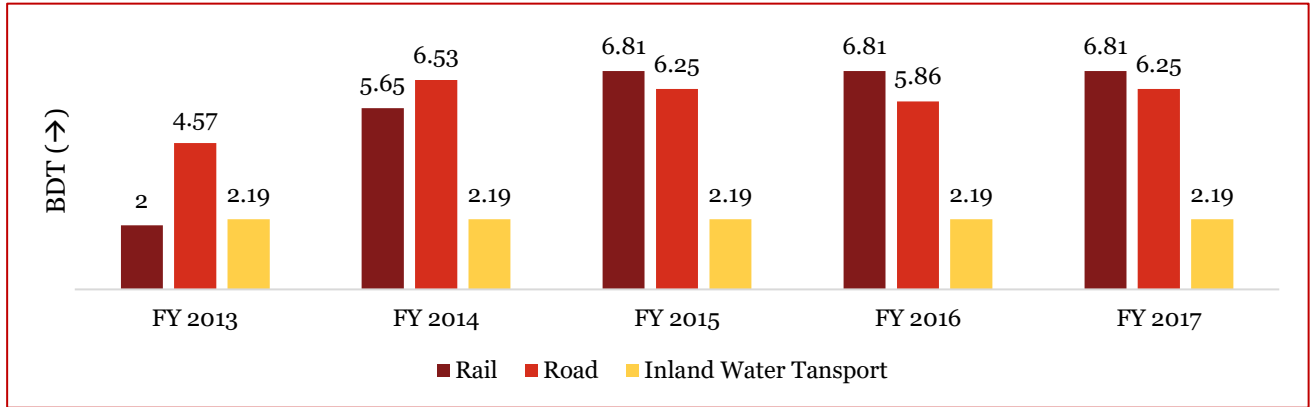
Currently, construction is in progress to establish a railway network within 5 km of the proposed EZ site. Once established, this railway network could be leveraged for movement of men and material to/from proposed EZ site.

In order to perform a holistic transport assessment, it is imperative to understand the freight charges applicable for different modes of transportation. This would help in assessing the most economical mode of cargo transport for the proposed EZ site and also assist in determining the interventions that could be taken up by GoB to further improve the transport logistics infrastructure in the vicinity of the Economic Zone sites.

²²⁴ <https://www.thehindubusinessline.com/news/pilot-container-train-chugs-off-to-bangladesh/article23427404.ece>

6.4. Rate of freight for different modes of transport

Figure 48: Freight per tonne per km for different modes of transport



Source: Bangladesh Statistics 2017

Figure above indicates that freight transport through inland waterways is the most economical mode of transporting goods, in Bangladesh. However, cost of transporting goods through rail and roads have shown an increasing trend over the past 5 years due to rising demand from manufacturers and traders.

Data presented in the figure elucidates that it is cheaper to transport goods through airways or IWT for longer distances and can then be transported via roadways to provide last mile delivery.

6.5. Potential Infrastructure Interventions to support proposed EZ

Proposed EZ site at Jajira has advantage of being located in proximity to Dhaka. Operationalization of Padma Bridge would provide seamless road and rail connectivity across Padma River to the existing industrial belt in Bangladesh, along the Dhaka-Chittagong corridor. Padma River flows at a distance of 2-3 km from the proposed EZ site. Currently, there is no existing railway network in vicinity of the site, however work is in progress to establish Naodoba railway station around 3 km from the site.

Table on the next page captures present and potential future hindrances to smooth transit of manufactured goods in the region and infrastructure interventions that could be undertaken in order to make the proposed EZ site attractive to industries looking to set up manufacturing units in the region. Interventions suggested in the table on the net page have been done after taking into considerations the infrastructure upgradation currently being planned by different departments of GoB. These interventions are indicative development activities that could be further studied apart from development activities already being implemented.

Table 53: Proposed Infrastructure Interventions

Key Asset	Existing Condition	Issues	Recommendation	Cost Implications	Timeframe for Improvement	Jurisdictional Responsibility
Upgradation of Zilla Road, Z8065	This road is a 8 km long single lane road having a width of 4.13 m. It is bituminous and can support movement of heavy vehicles.	Hindrance in smooth 2-way movement of heavy vehicles carrying cargo for EZ site could result in traffic congestion.	Widening of this road to a 2-lane road (7.43 m) for a stretch of 8 km	BDT 100 million	4 months	Roads and Highways Department
Jetty at Padma River	<ul style="list-style-type: none"> There are 3 ghats in vicinity of the site. Kaorakandi and Shariatpur Ghats can support movement of passengers and heavy vehicles, while Majirhat Ghat can support movement of passengers across Padma River. 	<p>Cargo handling facilities have not been developed at these ghats, preventing goods from being transported via IWT.</p> <p>These ghats could become irrelevant post operationalization of Padma Bridge</p>	<ul style="list-style-type: none"> Develop cargo handling facilities at existing ghats. Develop a private jetty on Padma River to cater to requirements of EZ site. 	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Inland Waterways Authority
Cargo Handling facility at Naodoba Railway Station	This station is under construction and will primarily cater to passenger movement.	Absence of cargo handling facilities at the station would necessitate longer road transport of cargo till the nearest railway station in Dhaka.	Since rail station is under construction, possibility of cargo handling facility could be explored considering the large quantum of goods to be manufactured in the region	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Railways
Upgradation of Benapole Land Port	Equipment being used at the land port is outdated with 60% of cargo being handled manually.	Lack of modern surveillance system adversely affects cargo handling in the port.	<ul style="list-style-type: none"> Setting up of modern surveillance system to track movement of cargo across the port. 	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Land Port Authority
Area demarcation at Benapole Land Port	Currently no separate zone has been earmarked for goods being transported to Economic Zones.	Congestion at Benapole Port results in delay and increased lag time in transportation of goods.	<ul style="list-style-type: none"> Allocation of a separate zone within Benapole for faster clearance of goods being transported to/from the cluster of Economic Zones in South West Bangladesh 	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Land Port Authority

7. Off-Site Infrastructure Assessment

7.1. Purpose and Objective

For sustained business operation of EZ, it is pertinent that off-site infrastructure and EZ connectivity to the proposed sectors are adequately addressed. To facilitate integration of basic infrastructure like water, power and drain with EZ, the existing infrastructure facilities surrounding the site need to be identified and gaps that could hinder development of the EZ site, need to be addressed. The major offsite infrastructure components considered for EZ are as follows –

- Site filling
- Access road to EZ
- Power supply to EZ
- Water supply to EZ
- Drain
- Compound wall
- Boundary wall

The above listed off-site infrastructure components would be developed by BEZA in order to provide support to the developer who would undertake construction of the EZ. The location of the proposed site is shown below.

Figure 49: Location map of Jajira EZ



Source: MACE analysis

7.2. Methodology of Off-site Infrastructure Assessment

A stepwise approach has been adopted to assess the off-site infrastructure at proposed EZ site in Jajira.

Step 1: Identification of possible sources

The available infrastructures in and around the proposed site for EZ can be identified by carrying out following activities –

- Study of satellite image
- Site visit
- Field investigation
- Discussion with the officials

Step 2: Feasibility study

The feasibility of utilizing the identified infrastructure component depends upon several factors for different component and are provided below.

All the infrastructure components and its developments should be in compliance with the standards prescribed in the Bangladesh Economic Zones (Construction of Building) Rules, 2017.

Site filling – The average natural ground level for the proposed EZ and the depth of site filling required.

Access road – The existing carrying capacity of the road and the probability of expansion if required.

Power supply – The available surplus capacity of existing sub-station to cater the power demand of the proposed EZ. Distance of sub-station from the proposed site and the possibility of bringing the feeder line to EZ.

Water supply – Surface water: Availability of water to meet the demand, Distance, Quality and possibility of bringing the main supply line from the source.

Ground water: Aquifer depth, Yield to meet the demand and quality of Groundwater.

Drain – Capacity of existing drain to carry the additional water from the proposed EZ area.

The terrain of the site to support the flow from the drain of EZ to reach the surrounding drain through gravity.

Boundary Wall – Presence of a structure earmarking the EZ site area and preventing unauthorized access to site

7.3. Review of last mile offsite infrastructure

Site filling

The average natural ground level for the proposed EZ is +7 m level. To avoid inundation during monsoon season, the land filling of 2 m above the existing natural ground level is considered. The finished ground level for the proposed EZ will be around +9.0 m from above Mean Sea Level. An average depth of 5 feet to 6 feet of land filling has envisaged for the proposed EZ area.

The site can be filled through dredging. As per discussion with BIWTA, River Padma can be the source of dredging sand. However detailed hydrostatic study has to be carried out for identifying the suitable point of dredging.

Figure 50: Source of Dredging Sand



Source: MACE analysis

A topographical map depicting the site contours is displayed below.

Figure 51: Site development details of the Proposed Site



Source: MACE analysis

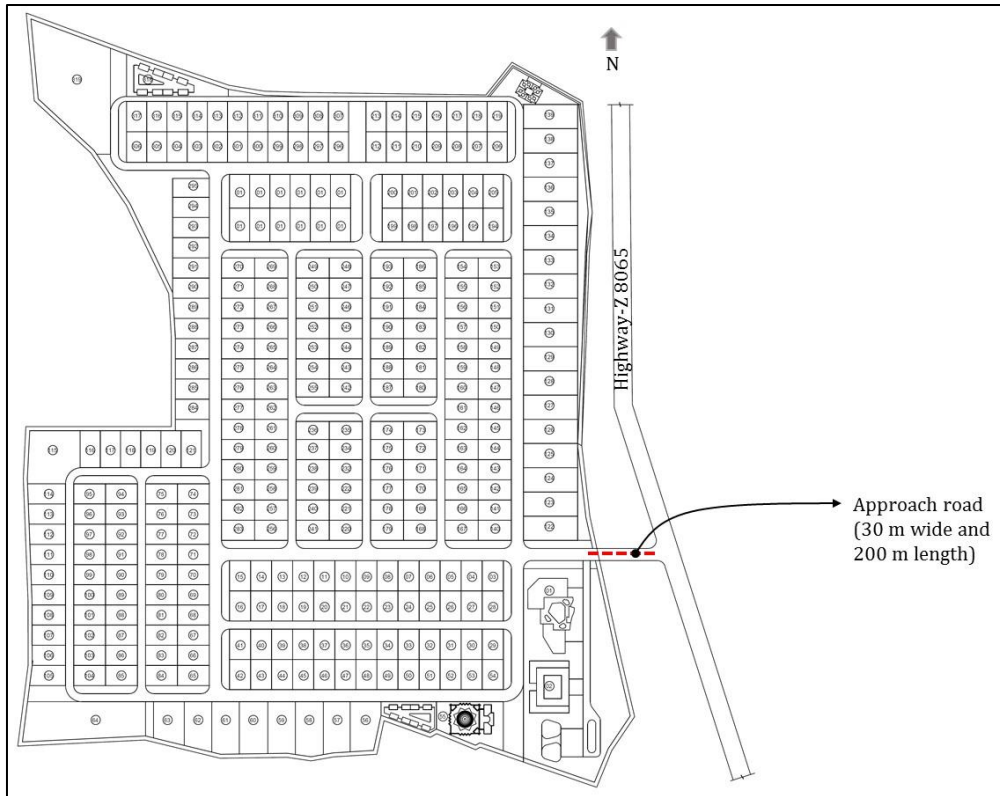
Approach Road

As shown in the figure on the next page, the Majhirghat– Kazirhat zila road abuts the proposed EZ on its eastern side establishing trunk connectivity to the proposed EZ.

An approach road from the Majhirghat– Kazirhat road of 30 m wide for a length of 200 m has been proposed connecting the industrial area of EZ.

The connectivity and linkages for the proposed EZ is shown on the next page.

Figure 52: Map of last mile connectivity to proposed EZ



Source: MACE analysis

Power Supply to Economic Zone

Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, power demand for the proposed EZ would be about 59.27 MVA. This figure is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

To cater this power demand a Main Receiving substation of 132 /33/11 kV substation has to be established in the site.

During the initial phase of development, the 33/11 kV MRSS can be established. Power to this substation can be availed from the existing 33 kV substation at Jajira substation located at a distance of 5 km to EZ site. During the site visit and the discussions with REB, authorities it is understood that the existing 33 kV incoming line to Jajira substation has a spare capacity of approximately 10 MVA demand. Based on the load growth, the MRSS can be upgraded with 132 kV substation and incoming power supply at 132 kV level shall be tapped from 132 kV from the Shariatpur Grid substation which is under construction.

The alignment of the proposed power transmission line and the location of substation are depicted in the figure on the next page.

Figure 53: Details of External Power Supply System



Source: MACE analysis

Water Supply to Economic Zone

Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, the total water demand for the proposed EZ would be about 18.5 MLD. This figure is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

Padama River is a perennial fresh water system, which is 5 km away from EZ site. It is proposed to provide infiltration gallery/well, collection well and pump house near the river basin at an approximate distance of 5 km from the site to meet the water demand of EZ on a long-term basis. Detailed hydrogeological investigations need to be carried out based on which, a water treatment plant shall be provided near the intake structure.

For the initial demand it is planned to build three to four new bore wells within the proposed site to draw the ground water. Exact location of water intake (i.e., the locations of the tube wells) within the site needs to be finalized during the construction stage.

Details regarding the external water supply system has been provided in the figure on the next page.

Figure 54: Details of External Water Supply System



Source: MACE analysis

Drainage

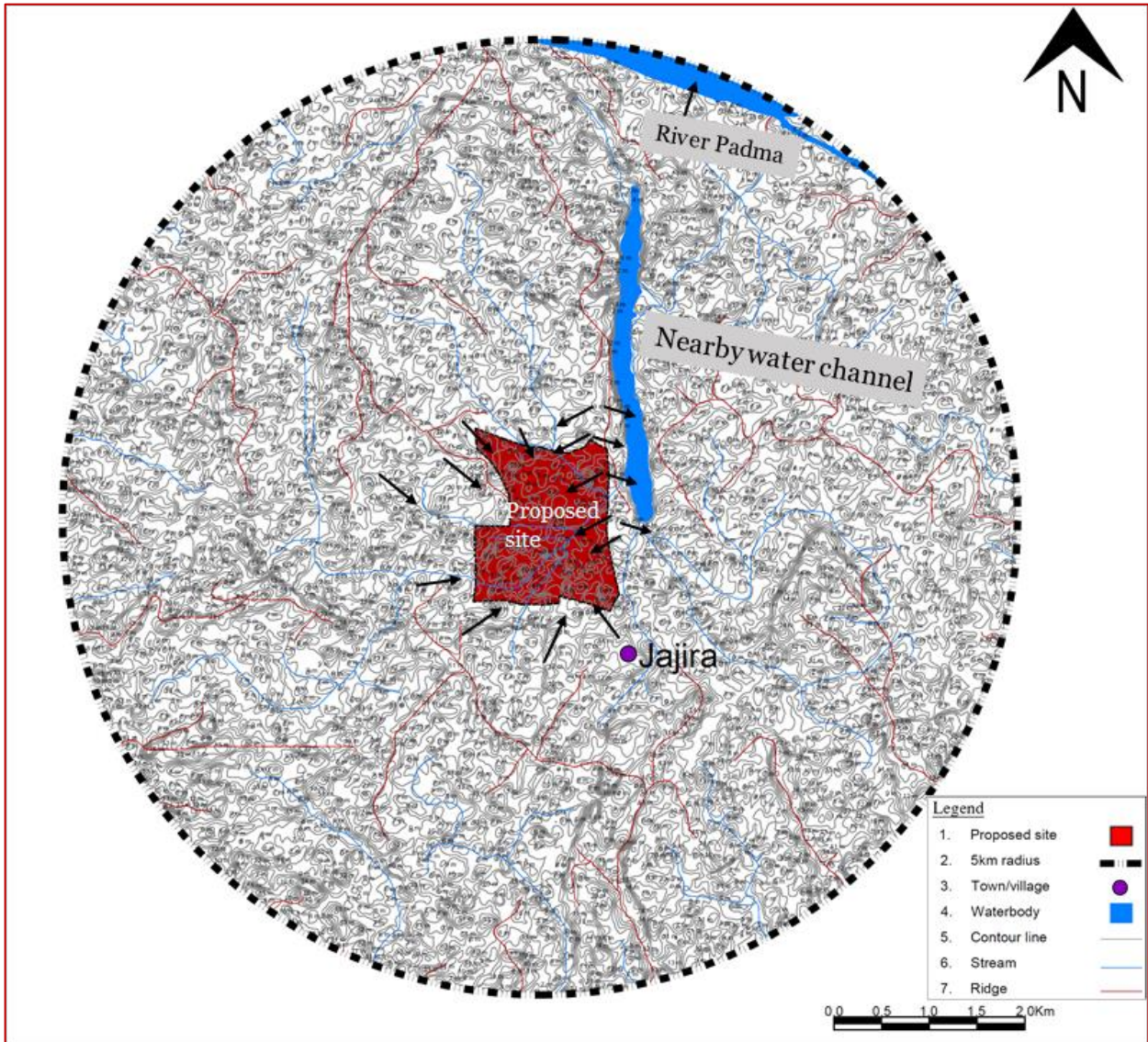
From the site visit, it is observed that, there exists covered natural water channel to the NE side of the site which connects with River Padma.

The site lies on the West side of river Padma. In general, the flow of the surrounding area will be towards the river. To determine the requirement of peripheral drain and vulnerability of site for flooding due to surface storm water runoff, detailed contour study of the surrounding area was carried out based on GIS data for the radius of about 2 km surrounding the site and the flow pattern of the surface storm water runoff based on the same is provided in the following figure. Ridge lines are the line connecting highest elevation points and the stream lines are the line connecting lowest elevation points. In general, the flow will be from the ridge line towards stream lines. From the figure on the next page, it is observed that, the site falls under stream line and there is a ridge line running along northeast side of the site.

From the flow pattern it is observed that the surface runoff flow from the surrounding area will be towards the site in all sides. Hence, it is recommended to provide the peripheral drain all along the site and is suggested to discharge at the existing water channel in the Northeast side of the site which connects with River Padma.

The site is highly undulating, and the internal drain should be planned accordingly and should be connected to the peripheral drain.

Figure 55: Study of site surrounding flow pattern



Source: MACE analysis

Boundary Wall

Construction of a boundary wall is required in order to earmark the EZ site and prevent unauthorized access to the EZ site. Presently, there is no boundary wall at the EZ site, earmarking the EZ boundary. Based on discussion had with BEZA officers during the presentation on findings of draft final report at BEZA office on 27th September 2018, it was decided that boundary wall would be developed by BEZA as a part of offsite infrastructure. Hence a boundary wall having brickwork with suitable height of barbed wire and width of 150 mm is recommended at the EZ site.

7.4. Required improvements or upgrades

Based on the above study, recommendations have been provided in the next page on developing various components of infrastructure in order to support development and operation of the EZ site.

Site filling

To avoid inundation during monsoon season, land filling depth of average 2 m from the existing ground level above the existing natural ground level needs to be carryout.

Approach road

It has been proposed to construct an approach road of 30 m wide and length of 200 m to connect the industrial area. This approach road is emerging from the existing Majhirghat– Kazirhat highway. While connecting the approach road necessary turning radius should be provided and the junction of the highway should be provided with necessary traffic management measures in safety aspect.

Power supply

No improvements or upgradation have been recommended for the existing system. However, it is recommended to propose dedicated transmission line from the Jajira sub-station at initial stage and Sharitpur sub-station during ultimate stage.

Water supply

No improvements or upgradation have been suggested in the existing off-site water supply infrastructure since it has not been considered as a source of water supply for the proposed EZ with the aim of not increasing the pressure on existing water supply infrastructure due to EZ since. Instead, a nearby available source of River has been considered as a water source for the proposed site. Hence, it is proposed to establish an intake system and water treatment plant to extract water from Padma River located at 5 km towards the northern boundary of the proposed EZ.

Drainage

At present there is no existing storm water drain nearby proposed site. However, the peripheral drain all along the boundary has been proposed with the suitable discharge point at the nearby water channel in the northeast of the site. It is also recommended to plan the internal drain and should be connected to the proposed peripheral drain.

Boundary Wall

A boundary wall is to be constructed having a height of 2.9 m along with a barbed wire fencing of 0.9 m height and width of 150 mm along the periphery of the EZ site. This wall would serve to earmark the EZ site as well as hinder unauthorized access to the site.

7.5. Last Mile Off-site infrastructure action plan

The infrastructure action plan for the proposed EZ is provided in the table at next page.

Table 54: Off-site infrastructure action plan

Key Assets	Existing Condition	Issues	Recommendations	Cost Implication	Timeframe for Improvement	Jurisdictional responsibility
Site filling	average natural ground level +7 m AMSL	inundation during monsoon season	land filling depth of average 2 m from the existing ground level.	604.38 million BDT	6 months	BEZA
Access road	Highway at 200 m distance	No connectivity to site.	Establish 1 approach road of 30 m wide and 200 m length connecting Majhirghat – Kazirhat highway.	14.00 million BDT	2 months	BEZA
Power supply	Existing 33 kV substation available at Jajira at a distance of 5 km		To build a new 33 kV dedicated power transmission line from Jajira substation during initial phase development. Ultimate Power requirement shall be met with 132 kV OHT line from Shariatpur Grid substation.	228.75 million BDT	3 months	REB
Water supply	Not available at present		Draw external water supply network lines from Padma River with Infiltration gallery.	334.82 million BDT	10 months	BWDB
Drainage	Not available at present		Peripheral drain all along the boundary need to be provided with discharge at nearby water channel at Northeast side which connects with River Padma.	175 million BDT	12 months	BEZA
Boundary wall	Does not exist.		Boundary wall having brickwork is recommended at the EZ site.	70.00 million BDT	6 months	BEZA

Source: MACE analysis

In addition to the table displayed above, a breakdown of developing off-site infrastructure components has been outlined in the table below.

Table 55: Off-Site Infrastructure cost estimates

Description of Item	Quantity	Unit	Price without tax (In million Taka)	Price without tax (In million USD)
Site Development				
Land filling	604381983	Cum	604.38	7.37
Total			604.4	7.37
Road Network				
Road (30m)	200	RM	14	0.17
Total			14	0.17
Storm Water drain Network	7	KM	175	2.13
Power Network				
33 kV line	5	KM	10	0.12
133 kV line	35	KM	218.75	2.67
Total			228.8	2.79
Water Network				
Water Supply Network	5	KM	78.82	0.96
Infiltration Gallery	16	MLD	256	3.12
Total			334.8	4.08
Boundary wall	7	KM	70	0.85
Project Sub-total			1427	17.40

Source: MACE analysis

The off-site infrastructure cost estimates have been arrived at after taking into considerations benchmark costs as prevalent in the construction sector of Bangladesh.

7.6. Key Takeaway

Off-site infrastructure captures the external basic infrastructure facilities which need to be developed. Development of off-site infrastructure is the responsibility of BEZA. The major off-site infrastructure considered for the proposed EZ are Boundary wall, water supply, power supply, access road and drainage. These external infrastructure facilities and sources have been identified and well-integrated with the proposed EZ based on site visit, data collection, stakeholder consultations with various government agencies (such as RHD, REB, and DPHE).

Key recommendations formulated from this exercise are outlined below-

- It is proposed to carry out the land filling depth of average 2 m from the existing ground level.

- Subject site has good access to trunk connectivity. Proposed EZ is located adjacent to Majhirhat – Kazirhat highway (which connects the project site to Mawa Ghat). An approach road of 200 m length and 30 m wide have been proposed to connect the industrial area.
- Groundwater sources may be tapped to meet the water demand during construction stage. In order to meet the water requirements during operation stage, surface water source needs to be explored, which is sustainable and perennial in nature.
- Padma River (located at a distance of 5 km from the proposed EZ) can act as the perennial source of surface water.
- Jajira substation (located at a distance of 5 km from the proposed EZ) can act as source of power for initial development. Based on the load growth the MRSS can be upgraded to 132 kV substation and incoming power supply shall be tapped from 132 kV Shariatpur Grid substation in order to shape up as a sustainable source of power for the proposed EZ.
- To ensure smooth collection and discharge of the surface runoff, water channel on the northeast side of the site have been identified as the suitable discharge points.

8. Master Planning

8.1. Purpose and objective

The aim of setting up an EZ in Jajira is to develop Food and Beverages, Chemicals, Pharmaceutical, Light Machinery, Equipment & Furniture industries in the region along with excellent state-of-the art infrastructure facilities and professional management to attract and support investments in industrial sectors.

While short-listing the above industries, for master planning purpose, entire processing area has been considered as a single industrial zone having varied plot sizes. However, this zoning plan is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate the same.

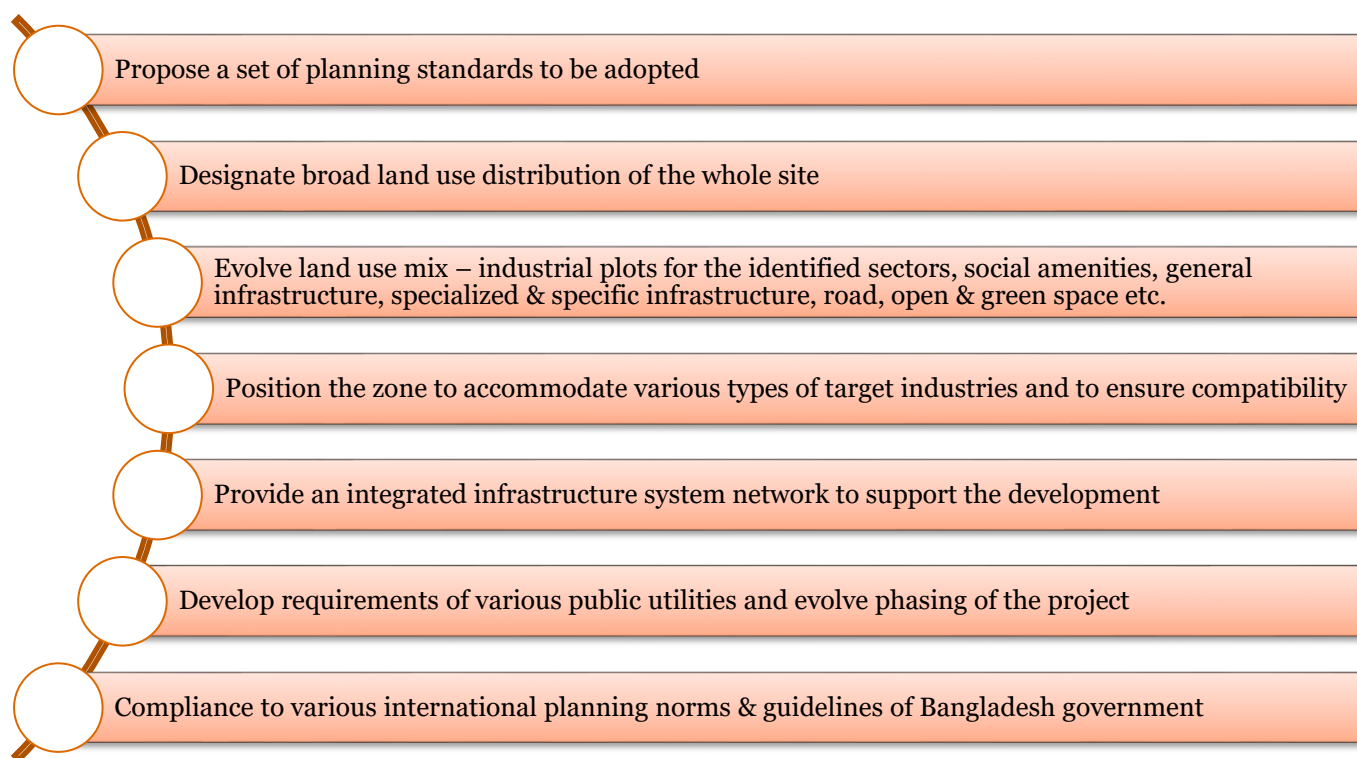
Hence, Jajira EZ, in the form of prepared land, is proposed to be developed with general and specialized infrastructure facilities. This EZ focuses on development of large, medium and small-scale industries. All facilities required for target industries have been planned and identified in this chapter. This will enable the proposed EZ to function as an integrated package having the required facilities and service activities with sufficient provision for future growth and expansion.

Given the industrial base and the concept of EZ which has evolved to leverage the cluster advantage, the proposed project will further strengthen Shariatpur district's position in the industrial sector map of Bangladesh and will contribute to the economy. A careful planning exercise has been done to position the project taking into account the geographic, demographic, raw material resources, industrial, economic and social characteristics of region and it is in this context that master planning of the project assumes significance.

The purpose of creating a master plan is to create a thriving place where investors in the targeted sectors, managers of plants, support staff and their family can work, live and lead a wholesome life. It is important to develop the master plan to accommodate both the user industries area requirements and requirements of the various identified non-industrial components of the proposed EZ.

In order to implement this uniquely conceived EZ into a fully integrated, functionally best facility and to promote a new industrial cluster image in Bangladesh, as well as to develop confidence for foreign and local investors to undertake the development of the project and subsequent operation of their businesses, certain planning objectives/principles are envisioned as depicted in the figure on the next page.

Figure 56: Principles adopted for Master Planning



8.2. Methodology of Master Planning

Based on industry assessment and demand forecast

The industries which would be envisaged for this EZ site were shortlisted after an extensive study on the macro-economic parameters of Bangladesh, combined with regional and site level assessment in order to identify and leverage the raw materials and market demand which would assist the industries in the EZ site. This was further validated through primary interactions and stakeholder consultations. Demand forecast for land space from each industry identified during industry assessment, was calculated based on the country level growth trend of the identified industry after taking into consideration the regional level investments, development of mega infrastructure and other green field EZs planned in the region.

Methodology adopted in preparing the Master Plan

The methodology adopted in preparing the master plan is provided below –

Step 1: Study of existing features and constraints

As a preliminary step of preparing the master plan, the existing features in and around the proposed site were studied in detail to understand the beneficial features and constraints. It is also necessary to understand the site on basic factors such as existing connectivity, the predominant wind direction and general slope of the terrain.

Step 2: Zoning

The preliminary step of Zoning is planning of entry/exit to the proposed site. During the stage of Zoning, the entire site area will be divided into different Zones.

Step 3: Preparation of master plan

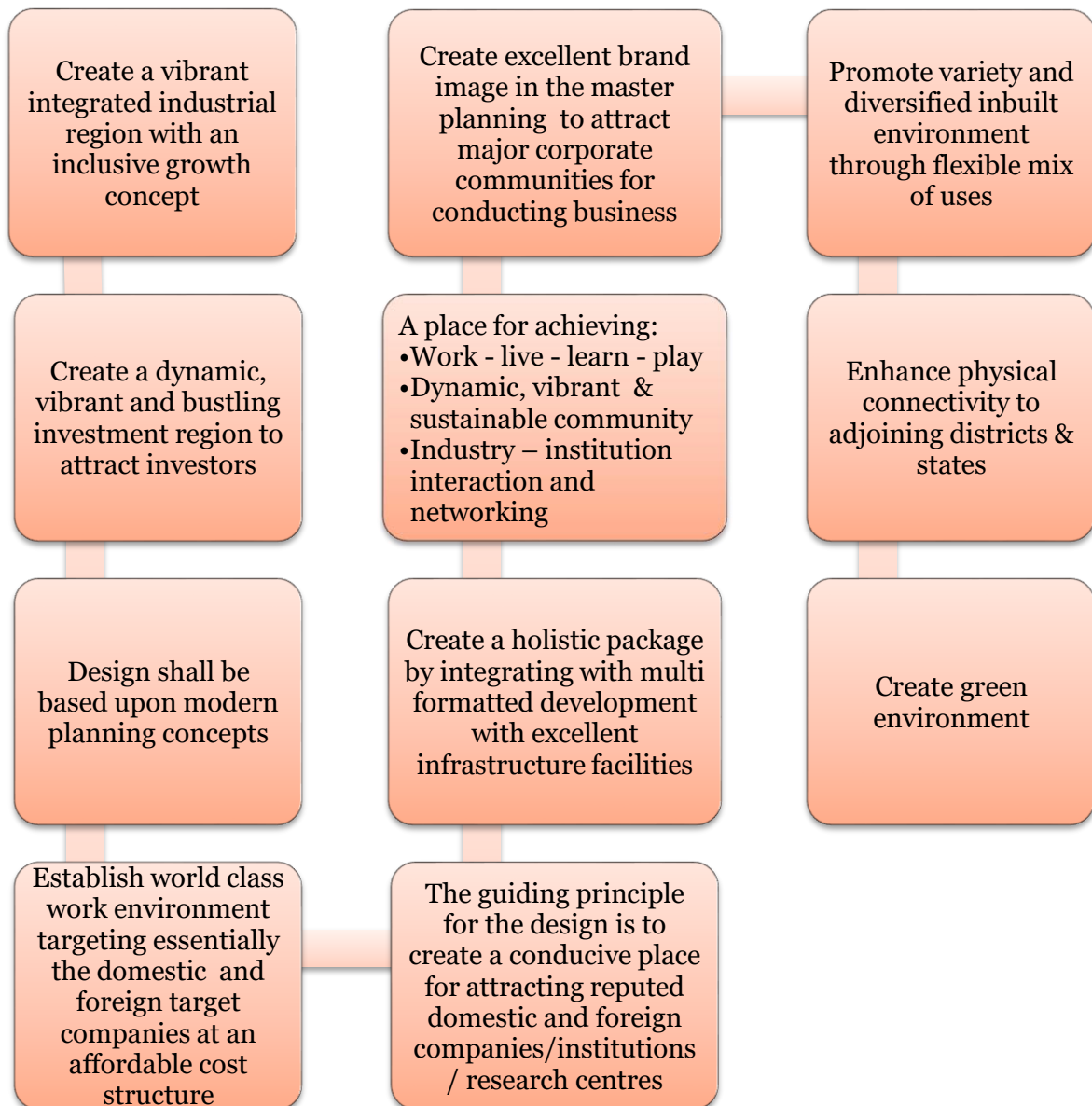
After zoning, as a preliminary step of preparing the master plan based on Zoning, the major road network has been planned based on planned entry/exit. This was followed by sub-zoning, land parcellation, planning of internal access road based on land parcellation, planning of utilities & amenities and Phasing.

The planning concepts and considerations are as follows –

Planning Concept

The planning concepts for the proposed EZ are as depicted on the next page. The EZ shall be a self-contained region with a salubrious surrounding and is envisaged to be developed as “Sustainable-holistic-smart intelligent-eco-Economic zone”.

Figure 57: EZ planning concept



8.3. Master Planning consideration

The planning for the proposed EZ is based on the broad objective of establishing a world class business environment targeted essentially at high growth manufacturing and processing industrial & related infrastructure sectors.

Each zone within the EZ shall be planned to be dedicated to the specific sub sector and would be a self-sufficient unit in terms of facilities, ability to attract investors and revenue generation.

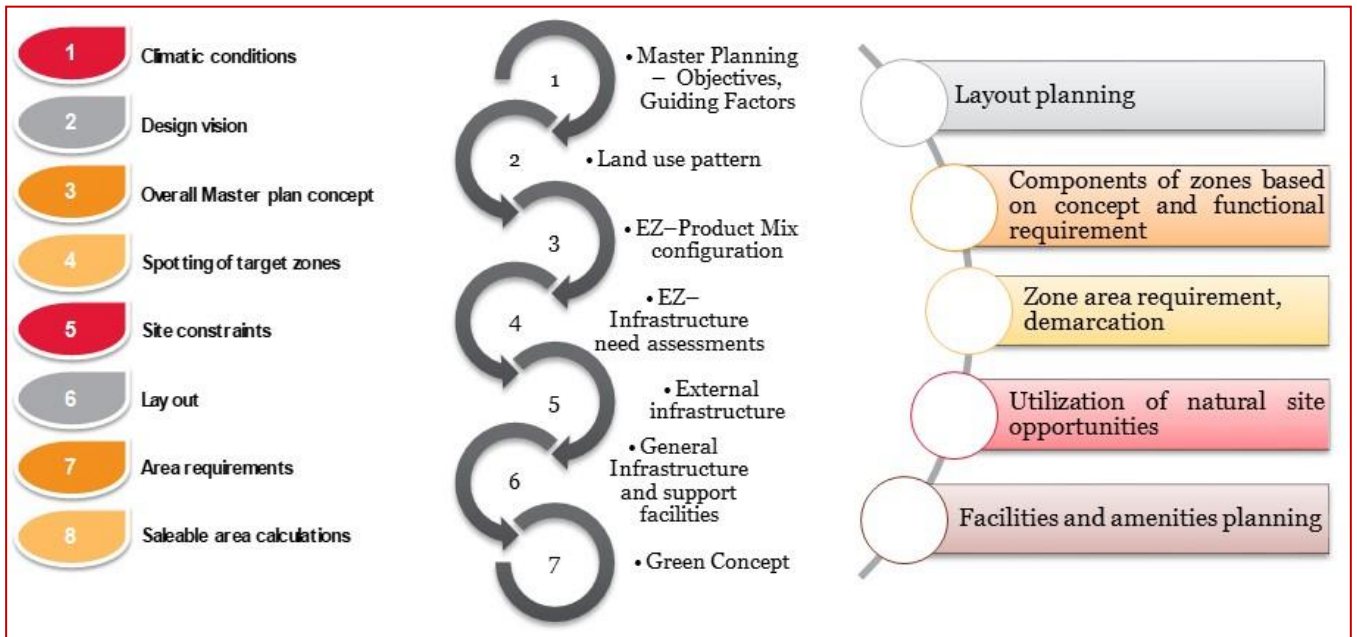
Social and commercial amenities are also planned to provide convenience to visitors as well as to the working population within the EZ. The project is planned to be housed in a lush green environment and accordingly, landscaping and greenery are planned.

While planning the EZ, the following vital issues were addressed along with strategies for successful implementation and sustained operation of EZ:

- **Land use and layout:** The whole area is suitably divided into a number of identified activity centres of different sizes. The layout is developed with complete understanding of the phasing program. Integration of the financial aspects with physical planning aspects is the most important factor for success in implementation.
- **Constraints and core offering of the site:** As enumerated in Site analysis chapter, all the site-specific constraints are fully respected and mitigation measures are fully taken into consideration while developing the master plan. Similarly, the planning fully leverages the core and supplementary offering of the site.
- **Services and amenities:** The master plan takes into account planning for services and amenities.
- **Lack of enforcement / control on land use and growth of unapproved housing / layouts:** Well-conceived EZ implementation framework shall be suggested to address these issues.
- **Non- uniform distribution / concentration of industrial growth pockets:** A structured industrial zoning in terms of raw material, effluent generations, pollution level category, end product distribution etc. is done and accordingly sub zones in EZ are suggested.
- **Conservation of ground water & surface water resources:** Sustainable infrastructure planning, incorporation of eco-friendly concepts and environment sustainability, water conservation schemes, environmental infrastructure, recycling and reuse options etc. are incorporated in the EZ development program.
- **Transportation:** The master plan looks at the transport linkages. As the EZ will have regional, national as well as international linkages for freight movement, it generates lot of traffic. A well-developed logistic hub for both raw material and finished product is planned to cater to the transport systems.
- **Poor quality of roads & unplanned road junctions leading to traffic congestions:** EZ development plan identifies the constraints and appropriate road network including the approach roads, road congestion removal by the provision of grade separators and hinterland connectivity, augmentation / widening of existing roads are being suggested.
- **Environmental management:** Various aspects such as adherence to pollution control norms & standards control over goods, storage and handling of industrial waste, common treatment, etc. are given paramount importance while planning.

The summary of considerations for master planning is depicted below.

Figure 58: Master Planning Considerations



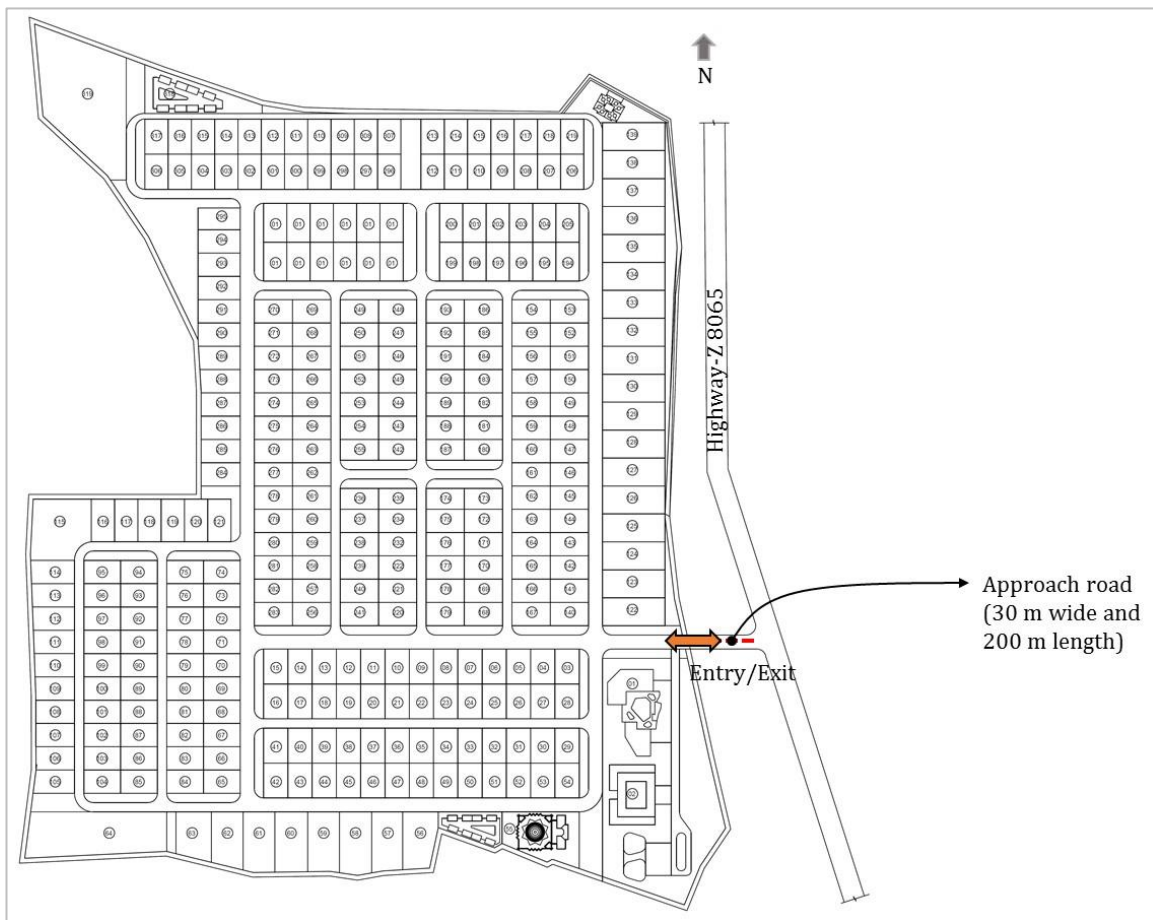
Source: MACE analysis

8.4. Zoning Plan

The preliminary step of zoning is planning of entry/exit to the proposed site. During the stage of Zoning, the whole area was divided into various zones. The major factors considered while locating the zones are Wind direction, connectivity and demand forecast.

The entry/exit planned for the proposed EZ can be from the proposed approach road connecting the Highway-Z 8065 and is depicted on the next page.

Figure 59: Entry/Exits of the proposed EZ



Source: MACE analysis

The zoning design was done in order to have a smooth pedestrian circulation by simplifying the movement patterns and allow the inter-zone movement.

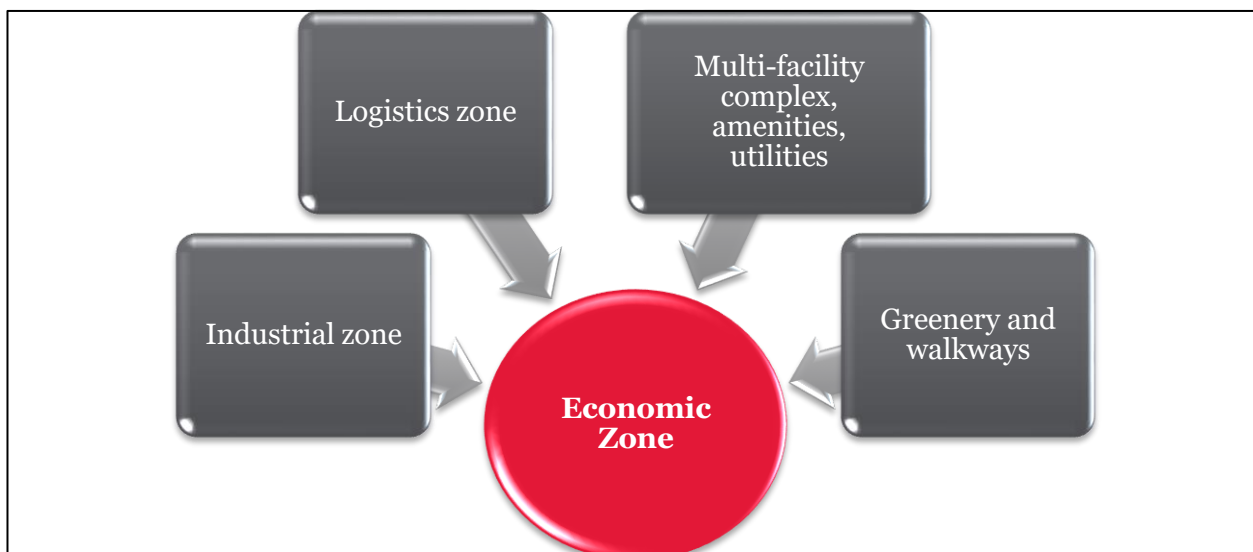
Following site parameters have been considered while positioning the zones.

- Boundary shape
- Physical site features
- Area availability
- Environmental considerations
- Micro climatic conditions
- Compatibility issues
- Surrounding areas
- Accessibility
- Transportation issues
- Visibility

Zoning, product mix and facility configuration

A well-balanced land use is perceived with a judicial mix of Logistics, Industrial, Utilities and social amenity zones as illustrated in the below figure.

Figure 60: Zoning, product mix and facility configuration



Source: MACE analysis

8.5. Zoning Principles

The development bound to occur within the EZ premises shall comply with competent local Bye-Laws. This shall ensure a uniform development of the structures and buildings planned within the EZ. BEZA has prepared a stand-alone development control regulation guideline which derives its essence from the local planning guidelines (As per BNBC). It shall be ensured that any tenant/occupant unit in the EZ while planning shall comply with all the norms as stipulated below

Floor Area Ratio (FAR)

Floor area ratio is defined as ratio between the total build-up area and total plot coverage.

In construction of building, FAR shall be 6:

Provided that internal roads, open to sky drive way and parking area, tanks, STP, ETP shall be excluded from FAR calculation.

Site coverage:

In the construction site the covered area shall be as follows

(a) maximum 50% of the total area shall be covered by factory building, power house, storage, covered parking, ETP, overhead STP etc;

(b) 30% of the site shall be covered by the drive way, open parking, 50 sqm guard room, fire command center, cycle stand, internal roads, underground water tank and septic tank and

(c) 20% of the site shall be open to sky soak area:

Provided that soaking soft pave may be used instead of green grass or naked earth in the open space.

Setback

A minimum front setback of 12 (twelve) meters shall apply to the primary street and a minimum setback of 4.5 (four point five) meters shall apply to the secondary street, or streets, unless otherwise determined by the Authority.

Side and rear setbacks shall be 3.5 (three point five) meters.

Notwithstanding anything contained in sub-rule (1) and (2), the Authority may, considering the following circumstances, make variation up to a reasonable limit in determining the setbacks, namely:

- (a) general streetscape;
- (b) properties and buildings near and surrounding the site;
- (c) fire separation distance;
- (d) solar aspect and prevailing breezes; and
- (e) bulk of the development.

Community open space for industrial plots.

For every industrial plot having an area of 1.0 hectare or more, a minimum of 10% of the total area, but not exceeding 0.25 hectare, shall be reserved as community open space and such area shall be contiguous to and shall have a means of access from every unit of the industry for recreational activities of the persons working in the industry and also linked to the external roads for safe exit during emergency.

The adjacent road network and the internal open space together shall be used for the assembly area during emergency.

8.6. Master Plan

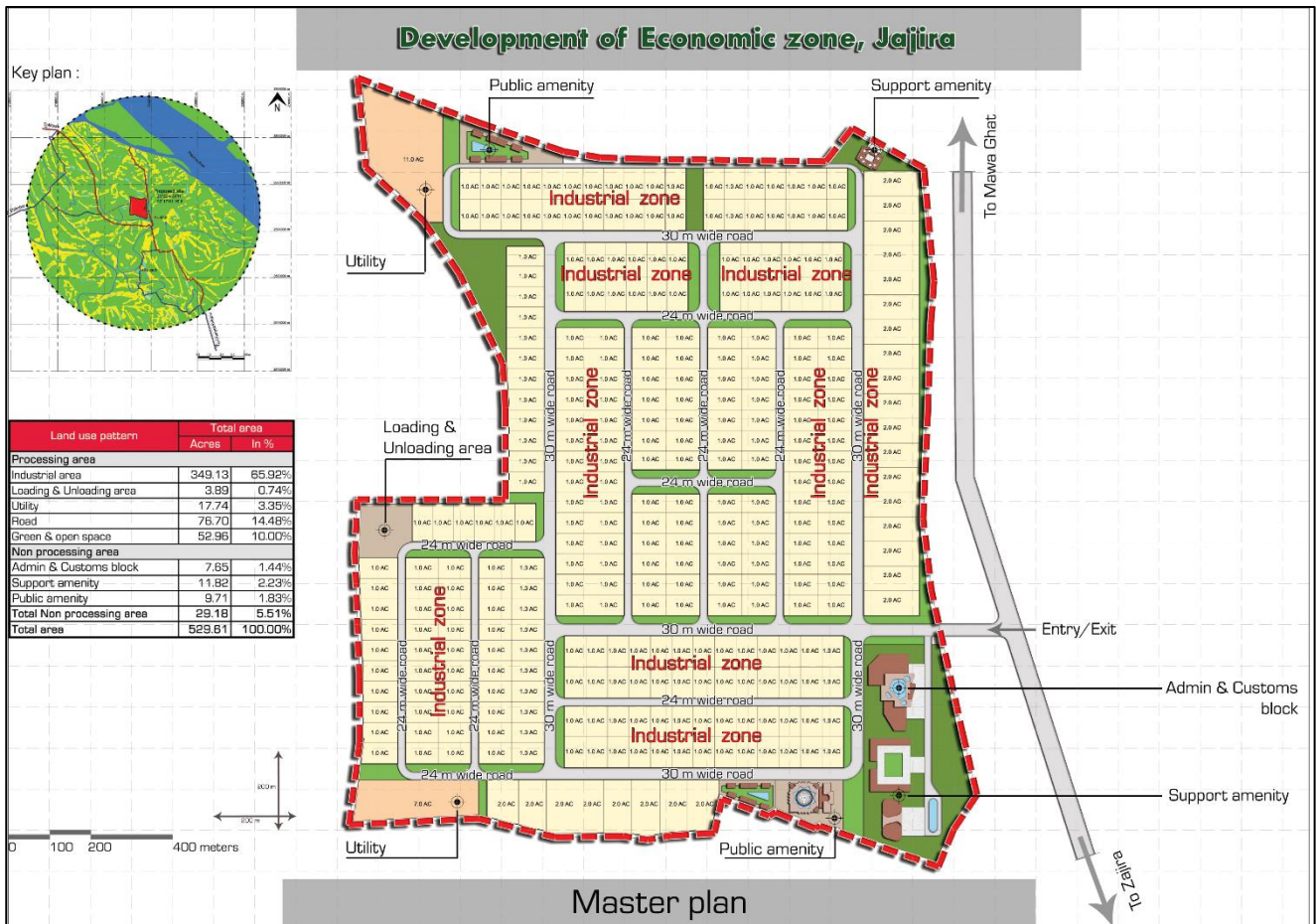
After zoning, as a preliminary step of preparing the master plan based on Zoning, the major internal road network has been planned based on the planned entry/exit. This was followed by sub-zoning, land parcellation, planning of internal access road based on land parcellation, planning of utilities & amenities and Phasing.

Detailed master planning is done cluster wise covering the following components:

- Micro level zoning
- Land use plan
 - Detailing the locations and sizes of various land uses
- Land parcel plan
 - Showing the sub-division of industrial land
- Phasing
- Utilities mapping
- Greenery and open space plan
- Road category

The master plan of EZ is given in the figure on the next page.

Figure 61: Master plan of EZ



Source: MACE analysis

Various type of industries to be accommodated within Industrial Zone arrived from market demand analysis are as follows-

- 1) Food processing
- 2) Light Machinery, equipment & furniture
- 3) Pharmaceuticals
- 4) Chemicals

Within industrial Zone, there should be a chance for establishing various type of industries according to the trend, wish and requirements of developer. In order to provide that flexibility during implementation stage, area for the Industrial Zone has been earmarked as whole and further earmarking of area for different type of industries listed above has been avoided. This will attract the developers towards EZ due to its high flexibility.

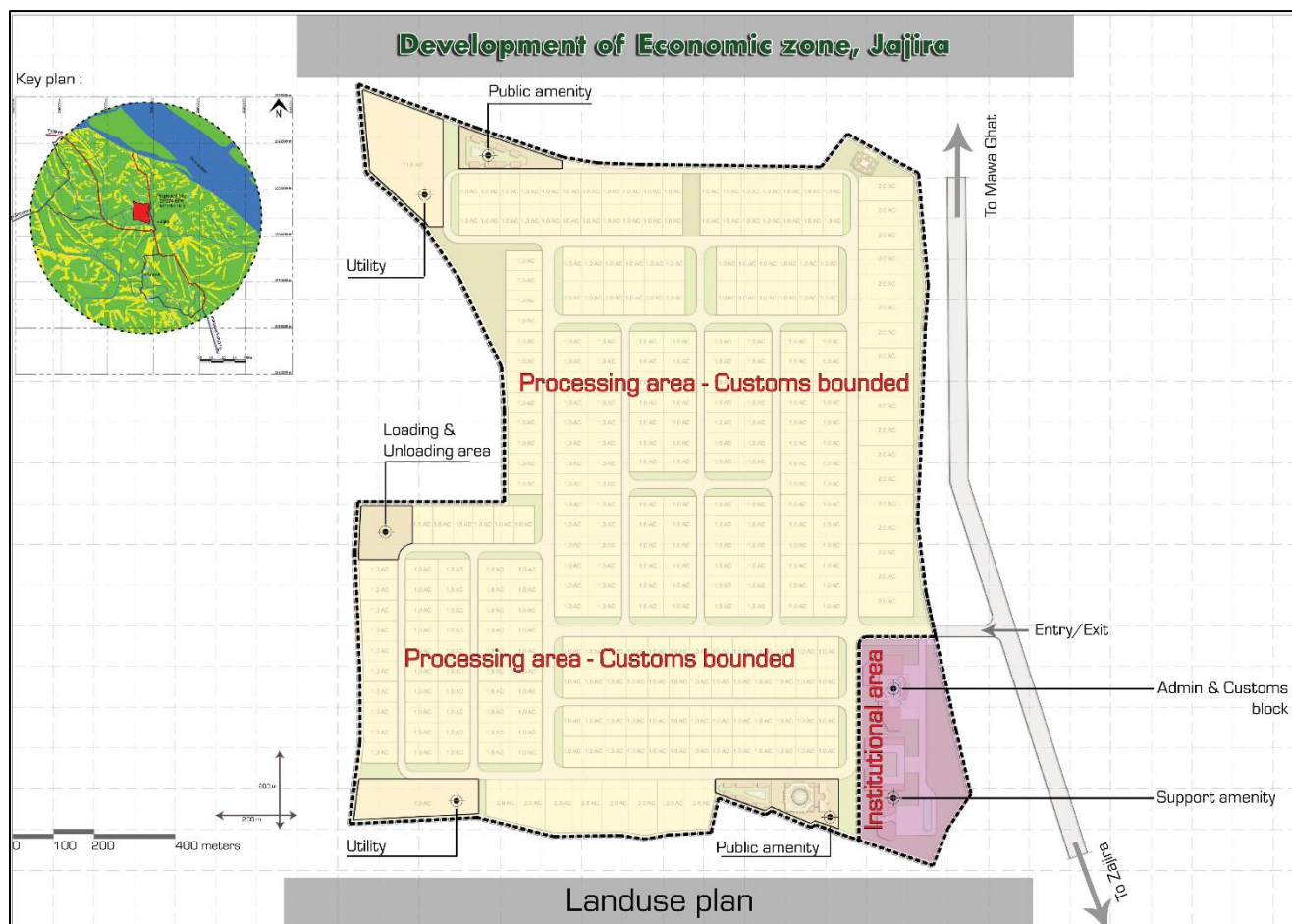
Apart, area for Utilities and supporting amenities have also been earmarked in the proposed master plan.

8.7. Land use Plan

The land use pattern of the EZ is determined considering the land requirement for various processing units, logistics requirements, utilities and public amenities etc.

The different land use proposed in the master plan is depicted on the next page.

Figure 62: Land use plan of EZ



Source: MACE analysis

Table below provides the land use pattern for the proposed EZ.

Table 56: Land use pattern for the proposed EZ

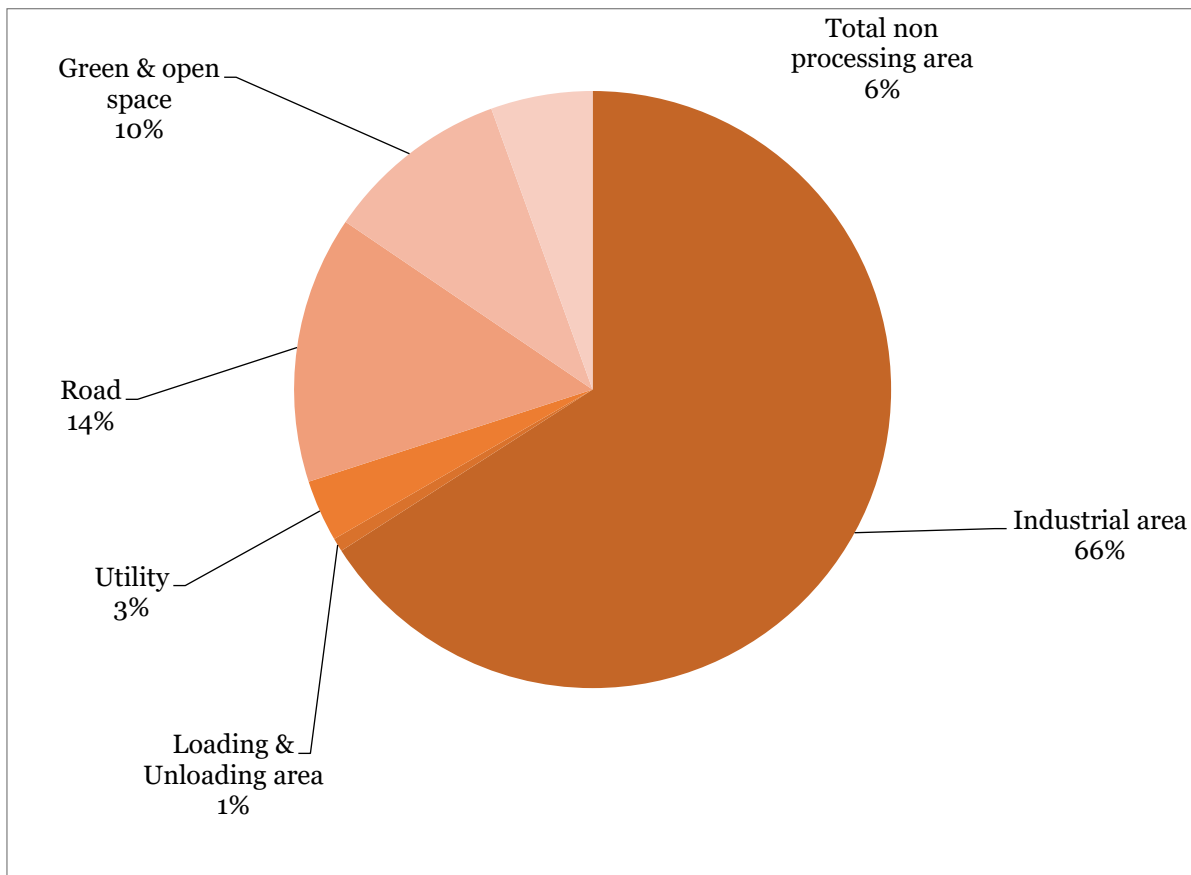
Land use pattern	Total area		Saleable area		Non- saleable area	
	Acres	In %	Acres	In %	Acres	In %
Processing area						
Industries	349.13	66%	349.13	66%	-	-
Loading & Unloading area	3.89	1%	3.89	1%	-	-
Utility	17.74	3%	-	-	17.74	3%
Road	76.70	14%	-	-	76.70	14%
Green & open space	52.96	10%	-	-	52.96	10%
Total processing area	500.42	94%	353.02	67%	147.40	28%
Non- processing area						
Admin & Customs block	7.65	1%	-	-	7.65	1%
Supporting amenities	21.54	4%	21.54	4%	-	-
Total Non-processing area	29.18	6%	21.54	4%	7.65	1%
Total area	529.61	100%	374.56	71%	155.05	29%

Source: MACE analysis

From the table on the previous page, it is also observed that through effective planning, 71% of saleable area has been achieved.

The land use pattern as elucidated in the table above covers the infrastructural components being planned to be developed inside the EZ site. Land for different industrial sectors has been allocated without keeping provision of Standard Factory Buildings (SFBs) that would be established for industries. Provision for SFBs has been kept in the Financial Model chapter. Due care has been taken to include provisions for adequate green and open space. Non-Processing area has been segregated into different blocks to include facilities like to include facilities like admin & customs blocks and supporting amenities.

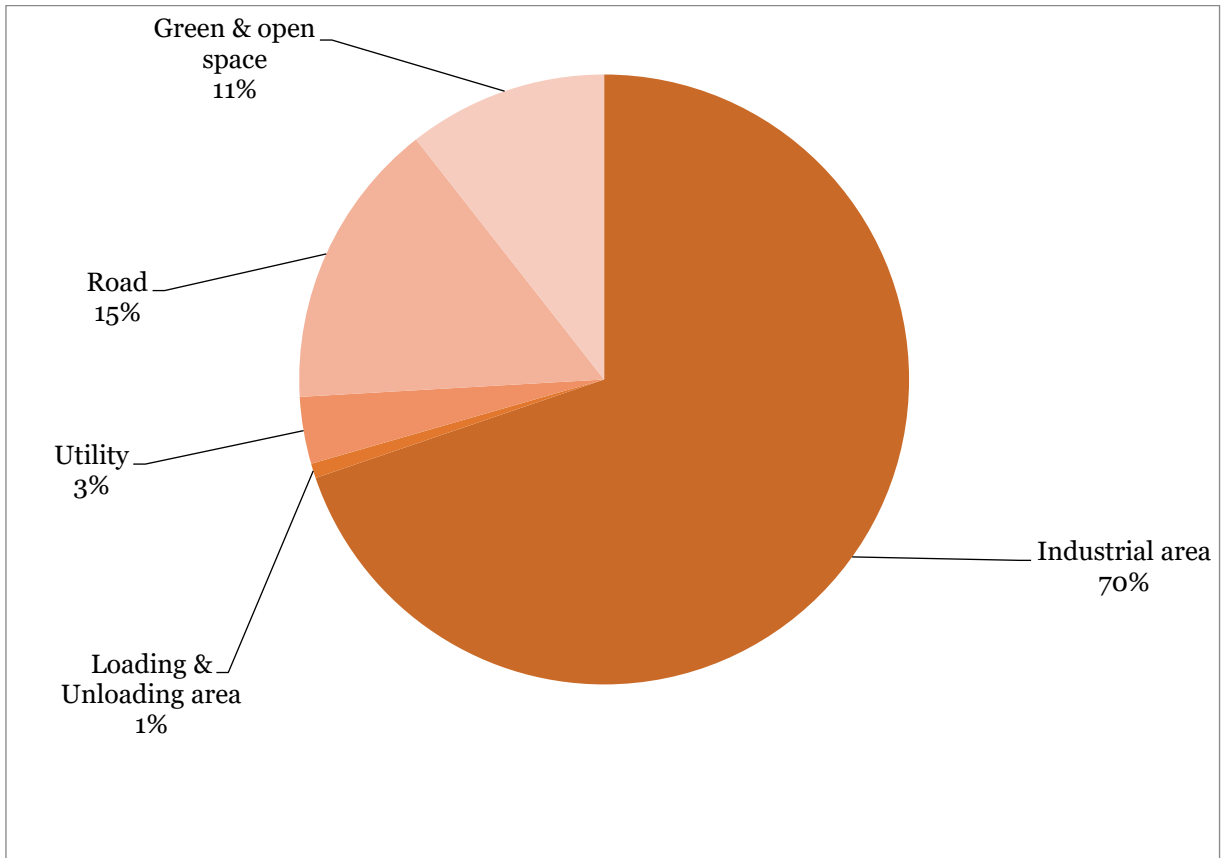
Figure 63: Land Use Pattern – EZ site



Source: MACE analysis

The above figure indicates a percentage wise breakup of land use pattern of the entire EZ site. An overview of this figure reveals that industrial sector has been allocated maximum area in the EZ site, given the fact that Jajira has potential to establish industries with good access to raw material. A further break-up of land use pattern envisaged for processing area of the EZ site has been shown in the figure on the next page.

Figure 64: Land Use Pattern – Processing Area



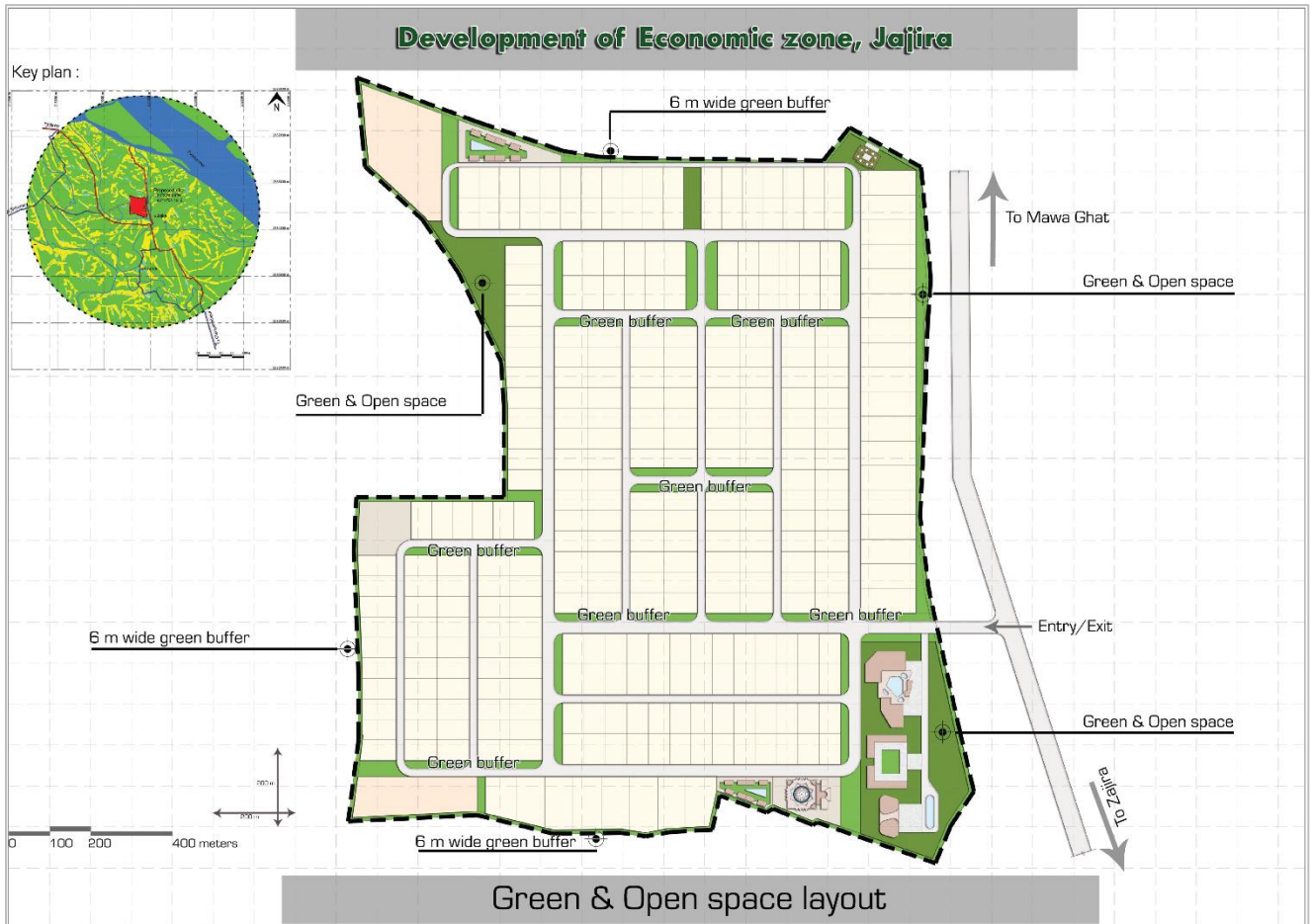
Source: MACE analysis

Based on the above land use pattern 71% of land area accounts for saleable area and remaining 29% of land area accounts for non-saleable area. Out of 71% total saleable area, 67% accounts for industrial use for targeted sector. 4% of total saleable land area is earmarked for public amenities and residential area.

Green space required as per international planning norms in practice is being earmarked at strategic locations in the master plan. Private Green within the industrial plots is not included in the computation of overall green area of EZ. The greenery will be concentrated at the boundary of zones and at pocket parks.

The layout showing earmarked area for Green/Open space within the proposed EZ is as follows:

Figure 65: Green and open space



Source: MACE analysis

8.8. Plot details

There are totally 319 plots earmarked in the proposed master plan for different usage out of which 8 plots have been earmarked for establishing required Utilities, amenities & Logistics and balance 311 plots are demarcated for industrial usage.

The number of plots and different configuration of plots provided in the master plan are shown on the next page.

Figure 66: Plot configuration of EZ



Source: MACE analysis

From the proposed land use distribution, it can be seen that industrial usage is the predominant land use.

Besides offering pleasant environment for people to work, the development will offer a variety of prepared land plots complete with infrastructure for clients to build their own factories. Industrial land will be marketed as prepared land sites complete with infrastructure.

The parcellation of plots is done depending upon the types of industries to be accommodated. Occupant units can merge or sub-divide the prepared land into appropriate sizes to meet their own requirements. Conversely, the larger plots can be subdivided by introducing some minor roads if the demand is for small plots. Prominent sites which normally command a slightly higher land premium are reserved for industrial brand names and multinational companies (MNCs) who desire these prime locations for enhancement of their corporate image and are ready to pay a premium price for the same. Apart from general infrastructure, specialized infrastructure required for a particular zone is also envisaged.

A variety of small and large plots are provided to meet the varied needs of the industrialists. A size wise breakup of the plot details envisaged for the EZ site is shown below.

Table 57: Area wise breakup of land plots

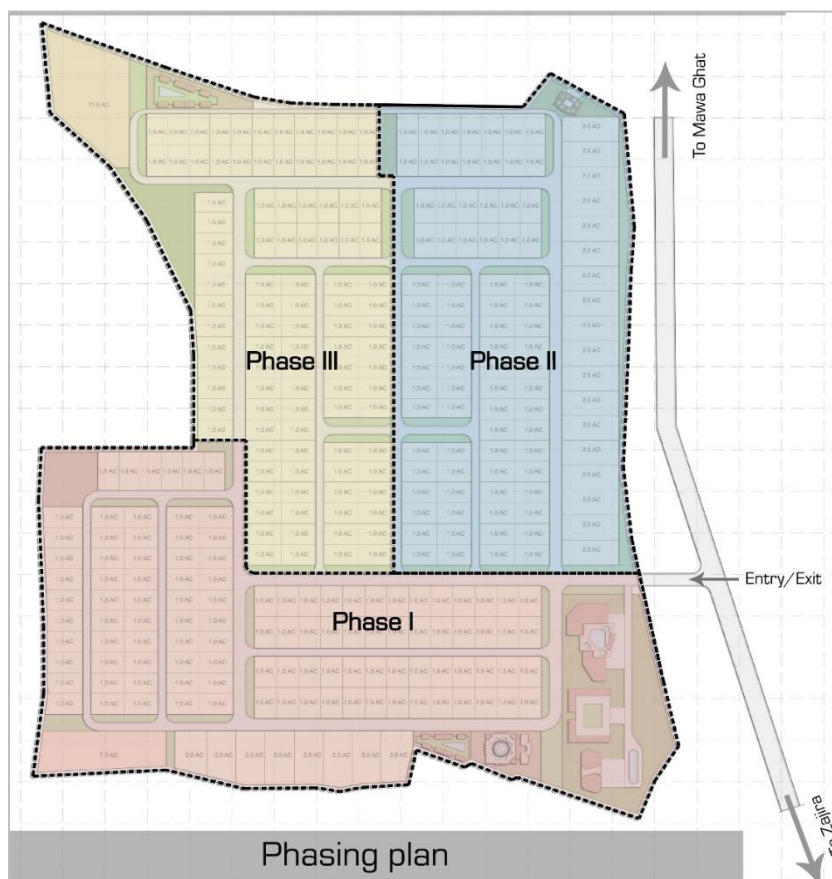
Site	Project Total	Phase I	Phase II	Phase III
Land (Acres)	529.61	219.16	158.15	152.29
No of Plots	319	123	97	99
Size of Plots				
1 acres	286	110	79	97
2 acres	26	8	18	-
>2 acres	7	5	-	2
No and size of buildings to be constructed				
Building Type	Total No in Project and Size	Phase I Total No and Size	Phase II Total No and Size	Phase III Total No and Size
EZ Entry/ Exit Gates	1 (500 Sqm)	1 (500 Sqm)	0	0
Admin & customs block	1 (1500 Sqm)	1 (1500 Sqm)	0	
Amenity blocks	4 numbers	2 numbers	1 number	1 number

Source: MACE analysis

8.9. Phasing Plan

The project is planned to be developed over 3 phases. In phase I – 219.16 acres (123 Plots) will be developed, 158.15 acres (97 Plots) in phase II will be developed and 152.29 acres (99 plots) in phase III will be developed. The details of the phasing plan are as shown in following figure.

Figure 67: Phasing plan of EZ



Source: MACE analysis

The details of the phase wise industry breakup are as shown in following table –

Table 58: Phase wise industry breakup

Land use pattern	Total area (in Acres)	Phase 1 (in Acres)	Phase 2 (in Acres)	Phase 3 (in Acres)
Industries	349.13	126	115	108.13
Loading & Unloading area	3.89	3.89	0	0
Utility	17.74	7	0	11
Road	76.7	36.26	20.61	19.83
Green and Open Spaces	52.96	23.22	19.93	9.55
Non-Processing area	29.18	22.79	2.61	3.78
Total	529.61	219.16	158.15	152.29

Source: MACE Analysis

8.10. Sustainability Initiatives

The development of the EZ is driven on strong foundation of sustainability concepts and these needs were built right in the conceptualization stage itself. The sustainable elements conceived in the concept plan include use of eco-friendly materials, recyclable material, avoidance of toxic chemicals, usage of environmental friendly products, waste minimization technologies, scientific treatment of waste and energy recovery possibilities to reduce power consumption etc. as shown in the figure below.

Figure 68: Sustainability initiatives



Source: MACE analysis

Implementation of the above mentioned sustainability ideas inside the Economic Zone would enable an eco-friendly and holistic growth of the regional economy providing adequate benefits to local stakeholders and at the same time preserving the local fauna and flora in vicinity of EZ site.

8.11. Key Takeaway

Taking inputs from industry assessment and demand forecasting, best practice master planning has been carried out to enable state-of-the art infrastructure facilities in the proposed EZ to attract and support investments in industrial sectors.

Master planning takes into cognizance layout planning, zoning based on concept & functional requirements, facilities & amenities planning. Master plan comprising Zoning plan, Road network plan, detailed land use & land parcellation plan and phasing plan has been prepared.

Key recommendations formulated from this exercise are outlined below-

- During Zoning, main entry/exits for the industrial area has been planned. The whole site area has been divided into various zones such as Industrial Zone, Logistics Zone and supporting Zone.
- After Zoning, internal road network has been planned based on planned entry/exit followed by sub-zoning, land parcellation; planning of internal access road based on land parcellation, planning of utilities & amenities and phasing.
- This project has been planned to be developed over 3 phases with each phase having a construction period of 2 years. 219 acres will be developed in phase I, 158 acres will be developed in phase II and 152 acres will be developed in phase III.
- Best practice of master planning indicates that 71% of land area accounts for saleable area and remaining 29% of land area accounts for non-saleable area. Out of 71% total saleable area, 67% is accounts for industrial use and remaining 4% of total saleable land area is earmarked for public amenities.
- 319 plots have been earmarked in the proposed master plan for different usage out of which 8 plots have been earmarked for establishing required Utilities, amenities & Logistics and balance 311 plots are demarcated for industrial usage.

9. Infrastructure Plans

9.1. Purpose and Objective

The industrial, environmental, physical & social infrastructure objectives of EZ are described in figure below.

Figure 69: EZ infrastructure objectives



Source: MACE analysis

The infrastructure is the key requirement for sustainable operation of the EZ. Infrastructure requirements are categorized as follows:

- 1) Infrastructure within EZ
- 2) Specialized infrastructure
- 3) External connectivity and offsite infrastructure for EZ.

All the necessary infrastructure facilities for the development are designed to create an ideal ambience and best environment.

As a part of Infrastructure planning and designing, the Infrastructure demand will be calculated. For the same, it is planned to consider the High demand industrial requirement as a base value for arriving the overall demand of water, power etc., for the proposed EZ. Hence, it provides the flexibility in establishing different industries based on the investors requirements which makes the EZ ready to occupy with sufficient infrastructure facilities to meet their demand.

9.2. Methodology of Infrastructure Plans

The basic considerations and the methodology adopted for planning various infrastructure components within the EZ are provided in the table below.

Table 59: Details of components covered under infrastructure plan

Components	Detailing of utilities, infrastructure within proposed EZ
➤ Roads – General considerations	○ Primary and Secondary roads are planned to give access to the industries within EZ.

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> ○ In order to maximize land values and minimize land taken by major and minor roads, a proper hierarchy of roads is proposed to ensure smooth traffic movement inside EZ.
<ul style="list-style-type: none"> ➤ Roads – categories 	<ul style="list-style-type: none"> ○ Different categories of roads are proposed for the internal road transportation network ○ The details are given in Table-Hierarchy of roads.
<ul style="list-style-type: none"> ➤ Roads – pedestrian walkways 	<ul style="list-style-type: none"> ○ Routes and paths are provided for easy movement of visitors with sufficient care so that no transport system comes in the way of pedestrians. ○ Aesthetically designed walkways are provided along with lush green environment on either side of road. ○ Pedestrian walkways are provided for all categories of roads. ○ All services for drains, sewers, water, power and telecom are contained within the road right of way. ○ Necessary signage, street name boards, zone guiding maps and visitor’s guidance map etc. are planned to be positioned at necessary locations, such as intersections and at various strategic locations in each zone. ○ No access is planned to be allowed near the road junctions and it is recommended that ingress/egress points will be with a set back at least 30 m from the road junction.
<ul style="list-style-type: none"> ➤ Roads - pavement structure 	<ul style="list-style-type: none"> ○ In the proposed EZ, flexible pavement structure is recommended for the following reasons: <ul style="list-style-type: none"> • Ease of rehabilitation in consideration for anticipated long-term settlement. • Lower reinstatement cost to accommodate future laying of utility services. ○ The typical composition of flexible pavement structure is detailed in Table- Composition of Flexible Pavement Structure considering California Bearing Ratio (CBR) value of 9% and 5 Million Standard Axles (MSA). ○ Wherever necessary, the unsuitable soil at sub-grade/below sub-grade level shall be replaced with suitable materials as per standard specifications. The sub-grade soil shall have CBR value of 9%. ○ The base course and surface wearing course should be delayed in the initial construction and could instead be laid 12 months later or in the subsequent road development program. This would minimize reinstatement costs during subsequent underground services lying, road crossings, connections and settlement in the filled areas.
<ul style="list-style-type: none"> ➤ Surface drainage – general considerations 	<ul style="list-style-type: none"> ○ Based on the topography of the EZ, the drainage pattern has been decided. ○ To prevent the storm water entering from adjacent areas to the development area, a cut-off drains all along the periphery of the site is considered and connected to existing river/discharge points.
<ul style="list-style-type: none"> ➤ Surface drainage – Peak runoff 	<ul style="list-style-type: none"> ○ The peak runoff and discharge capacities are computed based on the following design parameters.

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> The peak runoff is planned to be computed based on rational formula: - $Q = C * I * A / 360$ Where, Q = Quantity of runoff, m³/s C = Coefficient of runoff I = Intensity of rainfall, mm/hr A = Catchment area, hectare Considering the nature of soil/ surface, the coefficient of runoff adopted in the drainage computation are given below: <ul style="list-style-type: none"> 0.9 - for built-up area 0.5 - for road and other paved area 0.2 - for greenery and open area
<ul style="list-style-type: none"> ➤ Surface drainage – sizing 	<ul style="list-style-type: none"> The sizing of the drains is designed based on the discharge capacity of Q_c to cater adequately the estimated peak runoff using Manning's formula: - $Q_c = (1/n) * A * R^{2/3} * S^{1/2} \text{ (m}^3\text{/sec)}$ Where <ul style="list-style-type: none"> A = Area of cross-section of drain (m²) R = Hydraulic mean radius (m) S = Hydraulic gradient n = roughness coefficient
<ul style="list-style-type: none"> ➤ Surface drainage – design & scheme 	<ul style="list-style-type: none"> The drainage system is planned to cater for the entire EZ through gravity flow. Drains are proposed to be provided on both sides of the roads. Open trapezoidal drain is considered for the surface run off collection due to easy maintenance for the primary road. Stone pitching is considered for the side walls and PCC for the base. Covered rectangular brick masonry drain is considered for the remaining areas for optimization of area under drainage. RCC box / pipe culverts of suitable sizes are considered for road crossings. Rainwater harvesting structures are envisaged all along the drain at every 30 m interval.
<ul style="list-style-type: none"> ➤ Water demand 	<ul style="list-style-type: none"> The water demand estimation norms considered for arriving the water demand is depicted in Table-Water Demand Estimation Norms.
<ul style="list-style-type: none"> ➤ Water losses 	<ul style="list-style-type: none"> Water losses occur in the distribution and transmission network. The percentage of loss depends on the pipe material, jointing system, etc. As this is a complete loss, it is attempted to keep these losses below 10% of the total demand. Potable water has been considered to be used for processing, bathing and washing clothes, cooking, drinking and washing vessels. Non- potable water has been considered to be used for gardening, cleaning, cooling and toilet flushing. The water consumption pattern assumed is given in Table-Water Consumption Pattern.

Components	Detailing of utilities, infrastructure within proposed EZ
<p>➤ Fire protection demand - non-potable</p>	<ul style="list-style-type: none"> ○ Fire demand in litres per minute has been calculated based on the following formula: $Q_{FD} = 4000 \times (P)^{0.5} \times (1 - 0.01 \times (P)^{0.5})$ <p style="margin-left: 20px;">Where P = Population in thousands per hectare</p> $Q_{FD} = 2101.96 \text{ lpm}$ $= 126.11 \text{ cum/hr}$ ○ Considering two hours fire demand requirement, the total quantity of water required for fire protection is 252.23 cum. ○ Demand for firefighting has not been considered under daily demand as one-time storage i.e. 2 hours of fire demand will be created and maintained.
<p>➤ Average water demand</p>	<ul style="list-style-type: none"> ○ Based on the computation and analysis, the total average water demand is estimated and presented in Table-Water Demand. ○ The water demand estimation for different components in the processing and non-processing area is depicted in Table- Estimation of Average Daily Water Demand.
<p>➤ Water storage</p>	<ul style="list-style-type: none"> ○ Based on the above estimates, the following infrastructure for the EZ is proposed. ○ Underground storage tank <ul style="list-style-type: none"> • The total storage capacity of the underground storage tank based on 24 hrs. Storage requirement is proposed is shown in Table-Underground Sump Storage Capacity. • Totally there will be 2 underground storage tanks for storing potable and non-potable water including fire demand for processing and non-processing area respectively. ○ Elevated level service reservoir (ELSR) <ul style="list-style-type: none"> • The total storage capacity of the overhead storage tank based on 2 hrs. Storage requirement is shown in Table Overhead Tank Storage Capacity • Totally there will be ELSR for storing potable and non-potable water including fire demand for processing and non-processing area respectively. • As per standard norms, the tail end should have a minimum residual pressure of 7.0 m. To meet the norms, the staging height of ELSR shall be fixed accordingly by the project implementation company.
<p>➤ Water pumping station</p>	<ul style="list-style-type: none"> ○ Water pumping station for potable and non-potable water is required for pumping from the underground storage sump to respective ELSR. ○ The water supply scheme including distribution is planned based on the peak flow, minimum residual pressure and pipe material.
<p>➤ Water distribution network</p>	<ul style="list-style-type: none"> ○ It is proposed to provide separate water distribution network for potable and non-potable supply. ○ The design criteria for the design of water supply network are given below. <ul style="list-style-type: none"> • Demand computed based on the analysis. • Working hours per day - 24 • Pipe material

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> ▪ For pumping main - DI (K9) ▪ For distribution up to 200 mm dia - HDPE (PE 100) ▪ For distribution above 200 mm dia - DI (K7) ▪ Pipe roughness coefficient - 140 for DI and - 150 for HDPE ▪ Formula used for friction loss - Hazen Williams ▪ Minimum residual pressure at all tapping points - 7.0 m ▪ ELSR staging height - as per design requirement <ul style="list-style-type: none"> ○ The proposed pipe size and pumping capacity are given in Table Pipe Sizing for Processing Area and Table Pump Capacity. ○ Proposed pump capacity for pumping the water from underground sump to ELSR is given in Table-Waste Water Generation Pattern
<p>➤ Sewage quantity estimation</p>	<ul style="list-style-type: none"> ○ The sewerage system is planned to cater for the anticipated peak discharge requirements and to treat the waste to the required discharge standards. ○ The estimation of the sewage shall vary depending upon the land use distribution. ○ The domestic sewage to be generated has been assumed to be 80% of the domestic water consumption in addition to an infiltration of 10%. ○ Based on the general wastewater generation pattern, the quantity of wastewater generated in domestic premises is presented in Table-Sewage and Sullage Generation Pattern ○ Wastewater generated from toilets is considered as sewage and wastewater generated from bath / shower, laundry, hand basin and kitchen is considered as sullage (grey water). ○ The wastewater generation pattern is depicted in Table-Sewage and Sullage Generation Estimation. ○ The estimation of average daily sewage and sullage generation is detailed in Table Pipe size- sewerage network ○ Treated sewage water available @ 90% =11513.77 cum/day ○ Non-Potable water demand is 2454.57 Cum/day ○ Balance treated sewage water to be discharged as non-potable water of 9059.2 cum/day ○ Following design criteria is proposed for sewerage, treated effluent collection system <ul style="list-style-type: none"> • Demand computed based on the analysis. • Working hours per day - 24 • Pipe material - NP2 RCC for all areas except road crossing and NP3 RCC for road crossing • Pipe roughness coefficient - 0.011 • Peak flow factor - 3 • Formula used to calculate friction loss - Manning's • Infiltration - 10% • Self-cleansing velocity - 0.6 m/s • Minimum cover - 1 m • Manhole spacing – 30 m up to pipe size 900 mm

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> ○ It is presumed that each industry will treat their effluent into sewage standards prior to discharge into the sewerage network. ○ It is proposed to collect treated effluent, sewage & sullage through a single collection network which is planned based on the above design criteria. Sewerage network shall be established by the project implementation company considering the topography of the site. ○ The network is divided into trunk main and sub-mains according to the natural topography and other site constraints. Minimum pipe size of 150 mm is considered for sewerage network. ○ Proposed pipe size of sewerage network is provided in Table Sewage Quality.
<p>➤ Quality of sewage</p>	<ul style="list-style-type: none"> ○ In general, the quality of domestic sewage generation shall be as per Table STP- process and Components ○ However, this is based on the condition that occupant units treat industrial trade effluent to required level of pre-treatment before discharging to common system ○ The design and treatment scheme has been worked out based on this assumption of input quality. It is proposed to treat both sewage & sullage in a single treatment system.
<p>➤ Sewage treatment plant (STP) considerations</p>	<ul style="list-style-type: none"> ○ Sewage treatment is the process of removing contaminants from wastewater, comprising of storm run-off, domestic sewage and primary treated effluent. It includes physical, chemical and biological processes to remove various contaminants. ○ Various sewerage treatment systems considered for selection of treatment system for EZ and are given in Table Estimation of MSW Generation.
<p>➤ Sewage treatment plant technology selection</p>	<ul style="list-style-type: none"> ○ Factors considered for selection of appropriate treatment system: <ul style="list-style-type: none"> ● Reliability ● Vector nuisance ● Area availability ● Power requirement ● Capital cost ● Operation & maintenance cost ○ The above process technologies are analyzed in terms of the performance and both capital and operating cost. Based on the above analysis Sequencing Batch Reactor (SBR) system is proposed ○ This system has been widely used for municipal and industrial wastewater treatment applications to meet specific discharge requirements. ○ SBR technology advantages/benefits <ul style="list-style-type: none"> ● Consistent high-quality, low nutrient level effluent ● Tolerates wide swings in flow and organic loading ● No clarifier required ● Better control over filamentous growth and settling problems

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> • Nutrient removal without chemicals - nitrification and denitrification, phosphate removal • The system can also work with sewage in flow of 20 to 30 percentage of designed capacity due to presence of variable frequency drive (VFD) <p>○ SBR system is a fill and draw activated sludge system. SBR process uses high-efficiency oxygen transfer aeration equipment to satisfy the high-rate oxygen consumption requirement at the beginning of the "fill" and "aeration" cycles. SBR is efficient in carbonaceous pollutant removal, and is easily modified to satisfy nutrient removal of nitrogen (N) and phosphorous (P). Because the fill, aeration, settlement and draw take place in the same reaction tank, SBR tank itself would serve as the clarifier. Refer Figure-Waste Reduction by Integrated SWM for process flow diagram.</p> <p>○ 1 number of sewage treatment plant of capacity 12.79 MLD for processing area and non-processing area is proposed.</p>
<p>➤ Solid waste management (SWM)</p>	<p>○ SWM is one of the most essential services for maintaining the quality of life in EZ and for ensuring better standards of health and sanitation.</p> <p>○ If properly collected at source, SWM would reduce a number of downstream problems related to transportation and disposal of the same. Solid waste (SW) generated in EZ can be broadly categorized as under:</p> <ul style="list-style-type: none"> • Industrial non-hazardous waste • Industrial hazardous waste • Domestic wastes: kitchen and wood waste, plastic, paper, floor sweepings, etc. • Road sweeping & sanitary waste: human waste, etc. • Garden & agriculture waste, leaves, branches, plants etc. • Roads/building construction waste: earth, asphalt, concrete, brick, plaster, wood, glass, stones etc. • E-Waste: Computer systems, peripheral equipment, mobile phone sets, TVs, audio sets etc., • Hospital and biomedical waste. <p>○ The role of integrated SWM is to reduce the quantity of SW disposed of to land by recovering materials and energy from SW as depicted in Figure Waste Reduction by Integrated SWM.</p> <p>○ The generation rates of industries, logistics, commercial & residential areas vary to such an extent that exact quantification of SW generation is not feasible.</p> <p>○ However, an attempt has been made to quantify the municipal solid waste (MSW) that may be generated from various zones of EZ.</p> <ul style="list-style-type: none"> • Industries – 200 gm / person / day • Utilities – 100 gm /per person / day • Road – 10 kg / hectare / day is considered as street sweeping. • Greenery – 30 kg / hectare / day is considered.

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> • Admin and customs - 100 gm /per person / day • Supporting Amenities – 400 gm /per person / day <ul style="list-style-type: none"> ○ Based on the above, MSW quantification has been carried out and depicted in Table Estimation of MSW Generation. ○ Total estimated MSW quantity – 52.40 TPD ○ Source segregation should be made mandatory and due care has to be taken while planning the collection, transportation of waste within the site area. Users will be required to segregate their waste in the following categories and put in color coded bins. <ul style="list-style-type: none"> • Industrial non-hazardous waste • Industrial hazardous waste • Bio-degradable waste • Non-biodegradable waste • E-waste like parts of computer, monitor, cartridges etc. • Construction debris, street sweepings etc. • Hospital and biomedical waste ○ From the above only bio-degradable waste can be treated in the SW treatment facility ○ The rate of MSW generation in the initial stages will be less than the estimated quantity and hence during the initial stage, the MSW generation rate can be considered as 50% of the estimated quantity. ○ The entire MSW is planned to be collected and treated in the composting plant within EZ and the rejects shall be disposed to suitable landfill outside the EZ. ○ Suitable area has been earmarked for development of composting plant within EZ to handle the MSW generated.
<p>➤ Power supply & distribution</p>	<ul style="list-style-type: none"> ○ The system parameters are as follows: <ul style="list-style-type: none"> • Transmission line - 33 kV • Number of phases - 3 • System frequency - 50 Hz • Consumer supply voltage 33 kV /11kV/415/240 volt ○ As peak demand may vary for each facility in EZ, a diversity factor, which relates peak demand to rated load demand or calculated demand, is utilized in computation of maximum demand. ○ A simultaneous factor of 10 - 80% is normally considered. ○ Power losses generally occur in the distribution network depending upon the type of conductors and equipment installed. As this is a complete loss to the system, it is generally kept below 10% of the total load. ○ Estimated power demand is depicted in Table-Estimation of Power Demand. ○ Total estimated power demand is 59.27 MVA. ○ Distribution substation is proposed in a strategic location. Individual facilitation and all power reticulation are to be carried out at 11 kV.

Components	Detailing of utilities, infrastructure within proposed EZ
	<ul style="list-style-type: none"> ○ The advantage with reticulation at 11 kV is that it is the standard voltage and therefore electrical reticulation equipment for 11 kV systems would be readily available including spares. ○ Distribution network is the main backbone of the reticulation system. It is most essential that the network must deliver uninterrupted power, in right quantity & quality to individual facilities continuously. ○ Power can be distributed by a network of overhead lines or underground cables. ○ An overhead distribution system is adopted for much more flexible for extension and for connection of new consumers and less expensive than an underground cable system.
<p>➤ Street lighting</p>	<ul style="list-style-type: none"> ○ Street lighting has been conceived in 2 different forms. <ul style="list-style-type: none"> • Street lights for the road network • Solar street lighting ○ All the road and streets are provided with street lighting not only to assist pedestrians and traffic, but also to increase safety and security in the area. It is recommended that all lighting should be by high-pressure sodium lanterns mounted on power poles or on streetlight columns. For major roads the average illumination should be about 20 lux.
<p>➤ Landscaping</p>	<ul style="list-style-type: none"> ○ This includes works associated with the landscaping within the EZ covering tree strips along the boundary, roads, public greenery etc.

Source: MACE analysis

Industry best practices have been adopted in order to create an outline of the supporting infrastructure for the EZ site as mentioned in the table above. Presence of infrastructure components highlighted above would ensure smooth functioning of industrial activities and ease of logistics movement within the EZ site.

9.3. Infrastructure requirements and concept drawings

9.3.1. Vehicular Traffic Assessment

The objective is to assess the future traffic impact on the existing Road due to the development of EZ based on the present traffic characteristics and suggest appropriate remedial measures to address the project impacts. The following factors were taken into consideration for assessing the traffic impact.

1. Traffic generated due to the passenger movement from the proposed industries of EZ
2. Traffic generated due to the goods movement from the proposed industries of EZ.

Mode of share between all the goods movement vehicle like Truck, Medium Axle Vehicle (MAV), Light Commercial Vehicle (LCV) and Tractor is considered as 35%, 30%, 10% and 10% respectively as per the general practice for the industrial zone. Balance 15 % is considered traffic generated within the industrial area.

It is usual practice to express capacity in terms of “Passenger Car Units”. The basic consideration behind this practice is that different types of vehicles different degrees of interference to other traffic and it is necessary to bring all types to a common unit. The common unit adopted is the Passenger Car Unit (PCU).

Table 69: PCU conversion values according to Vehicles Categories

Type of Vehicle	PCU Value	No. of travelling persons
Standard Bus	3	50
Other Bus	3	35
Mini Bus	1.5	20
Van	1	14
Cars	1	4
Two Wheeler	0.5	2
Auto Rickshaw	1	3
Truck	3	1
MAV	4.5	1
LCV	1.5	1
Tractor	4.5	1

Table 600: PCU Estimation based on traffic

Description	Total Area		Type	Buses					Goods Vehicles					Total PCUs / day	
	in Acres	in %		Standard bus	Other Bus	Mini Bus	Van	cars	Two-wheeler	Auto rickshaw	Truck	MAV	LCV		Tractor
				3	3	1.5	1	1	0.5	1	3	4.5	1.5	4.5	
				50	35	20	14	4	2	3	1	1	1	1	
				45%	10%	15%	10%	10%	5%	5%	10%	30%	10%		
Industrial area	349.13	92%		205	109	285	271	950	950	633	17.46	26	9	0	3882
				40.00%		30.00%		20.00%	10.00%			100%			
Customs, Security, Admin,	29.2	8%		76	0	143	0	477	477	0	0.00	14.59	0.00	0.00	1224

Description	Total Area		Type	Buses					Goods Vehicles					Total PCUs/day	
	in Acres	in %		Standard bus	Other Bus	Mini Bus	Van	cars	Two-wheeler	Auto rickshaw	Truck	MAV	LCV		Tractor
public amenities															
GRAND TOTAL	378.31	100 %		281	109	428	271	1431	1430	633	17	41	9	0	5111

Source: MACE analysis

9.3.2. Roads

Hierarchy of roads

Primary and secondary roads are planned to give access to the industries within EZ apart. These are looped and planned with the aim of providing smooth and dispersed traffic flow to reduce traffic congestion within EZ.

The hierarchy of roads planned within EZ are provided below.

Table 61: Hierarchy of roads

Category	Road width (m)	Carriage Carriage way width (m)	Number of lanes	Length (m)		Total
				Processing area	Non-processing area	
Primary road	30	7.5 + 7.5	5,181	5,181	-	1,917
Secondary road	25	7.5 + 7.5	7,748	7,748	-	3,742
Total				12,929	-	12,929

Source: MACE analysis

The composition of pavement structure is provided in the following table.

Table 62: Composition of flexible pavement structure

Layer	Composition details
Wearing course	Dense Bituminous surfacing wearing course of 25 mm thick laid with mechanical spreaders
Binding coat	A tack coat of 0.30 kg / sq. m. of 60/70 grade bitumen
Binder course	Dense Bituminous Macadam (DBM) of 50 mm thick in 2 layers, laid with mechanical spreaders
Binding coat	A prime and tack coat of 1.2 kg / sq. m & 0.25 kg/sq.m of 60/70 grade bitumen
Base course	Aggregate base (Type I & II) of 250 mm thickness
Sub-base	150 mm thick granular sub base to a soaked CBR of min. 30%
Sub-grade	Min. soaked CBR value of 9%

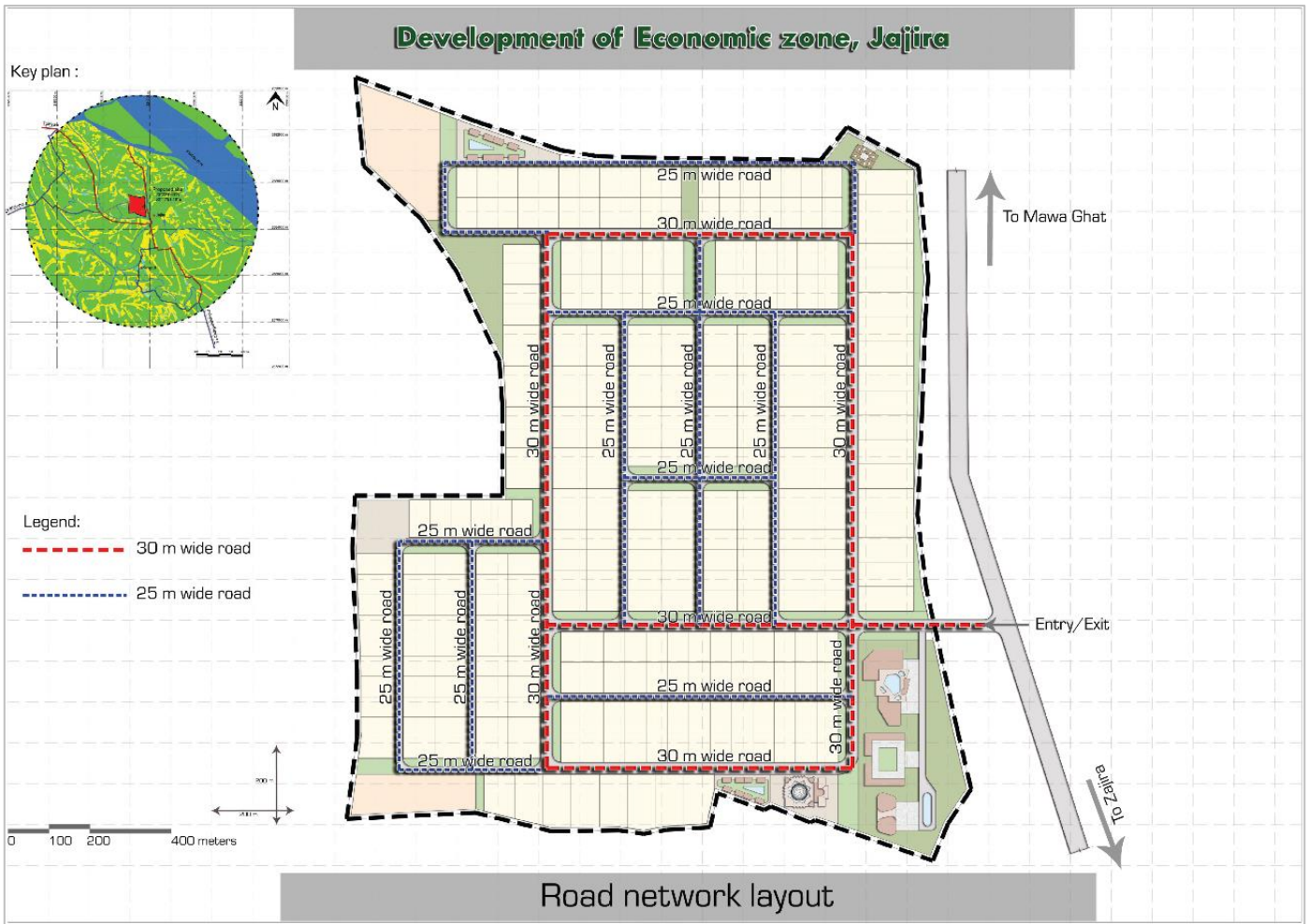
Source: MACE analysis

Adhering to the pavement structure outlined in the table above would ensure longevity of the road surface and minimize deterioration of road surface and need for frequent repair and maintenance works.

Road network drawing

The road network layout for the proposed EZ is shown on the next page.

Figure 70: Road Network Diagram



Source: MACE analysis

Figure above outlines the top view of the road network diagram. As evident from the diagram above, road plan has been created to ensure last mile connectivity to all units inside the EZ site. Figure on the next page outlines the cross-sectional view of the road structure.

Figure 71: Cross-Sectional view of road structure



Source: MACE analysis

The typical cross-sectional view of the road structure is shown in the above figures. As elaborated in the figure, provision has been kept for riding surface, drainage and street lighting facilities.

9.3.3. Power

Design basis

- **Electrical system - EHV / HV supply**

Nominal voltage	:	132/33 kV \pm 5%
Frequency	:	50 Hz \pm 2.5 %
No. of phases	:	3 phases, 3 W
Fault level	:	26 kA
- **Distribution supply**

Nominal voltage	:	11 kV / 415 V/230 V \pm 6%
Frequency	:	50 Hz \pm 3%
No. of phases	:	3 phases, 3/4 W

Power demand basis

The power demand estimation carried out on the next page is at ultimate level and based on prevailing development guidelines in Bangladesh context. This is different from the demand estimated during industrial space demand projection.

Table 63: Power demand estimation – basis

Land use pattern	Load in KVA/ha & KVA/Sqm	Simultaneous Factor
Processing area		
Industries	450.00	80%
Loading & Unloading area	250.00	10%
Utility	250.00	40%
Road	35.00	40%
Green & open space	4.00	40%
Non- processing area		
Admin & Customs block	250.00	60%
Supporting amenities	250.00	60%

Reference – published standards, guidelines and best industry standards

Power demand estimation

- The system parameters are as follows:
 - Consumer supply voltage 33/11 kV/415/240 Volt
 - Number of phases - 3
 - System frequency - 50 Hz
- As peak demand may vary for each facility in EZ, a simultaneous factor, which relates peak demand to rated load demand or calculated demand, is utilized in computation of maximum demand.
- A simultaneous factor ranging from 10-80% is generally considered based on the type of industry.
- Power losses generally occur in the distribution network depending upon the type of conductors and equipment installed. As this is a complete loss to the system, it is generally kept below 10% of the total load.

With the above consideration, estimated power demand is worked out and the summary of load estimation is presented in the table below.

Table 64: Summary of electrical load estimate

SI. No	Type of development	Load in KVA
1	Processing area	57,322
2	Non-processing area	1,950
	Total estimated load in KVA	59,272
	Total estimated load in MVA	59.27

The above table provides a summarized view of total electricity requirement of the EZ site. The individual plot wise estimated electrical demand for this facility is given in the table on the next page.

Table 65: Power demand calculation

Land use pattern	Total Area	Load in KVA/ha & KVA/Sq m of BUA	Plot Area	Simultaneous Factor	Loss Factor	Load in kVA
	Acres					
Processing area						
Industrial area	349.13	450.00	50%	80%	1.10	55973.00
Loading & Unloading area	3.89	250.00	40%	10%	1.10	43.00
Utility	17.74	250.00	20%	40%	1.10	790.00
Road	76.70	35.00	10%	40%	1.10	478.00
Green & open space	52.96	4.00	10%	40%	1.10	38.00
Total processing area	500.42					57322.00
Non-processing area						
Admin & Customs block	7.65	250.00	60%	60%	1.10	511.00
Support amenity	21.54	250.00	60%	60%	1.10	1439.00
Total Non-processing area	29.18					1950.00
Total	529.61				Load in KVA	59272.00
					Load in MVA	59.27

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

Power Supply to Economic Zone

Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, power demand for the proposed EZ would be about 59 MVA. This figure is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

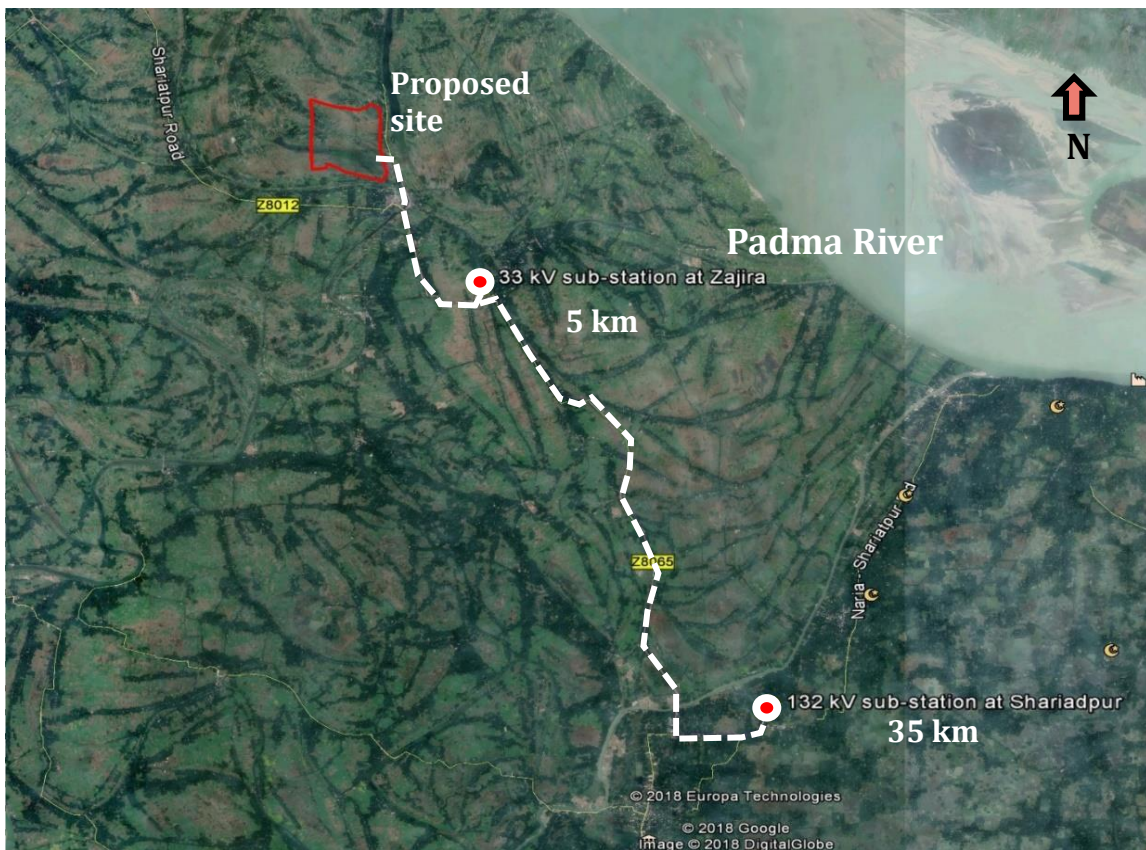
To cater this power demand a Main Receiving sub-station of 132 /33/11 kV substation has to be established in the site.

During the initial phase of development, the 33/11 kV MRSS can be established within EZ site. Power to this substation can be availed from the existing 33 kV substation at Jajira located at a distance of 5 km from the EZ site. During the site visit and discussions with Rural Electrification Board (REB) authorities, it is understood that the existing 33 kV incoming line to Jajira substation has a spare capacity of approximately 10 MVA.

Based on the load growth, the established 33/11 kV MRSS within EZ site can be upgraded to 132 kV substation and incoming power supply at 132 kV level shall be tapped from 132 kV Shariatpur Grid substation which is under construction at a distance of about 35 km from the site.

The alignment of the proposed power transmission line and the typical details of substation are depicted in the below figure.

Figure 72: Details of External Power Supply System



Source: MACE analysis

Power Supply network planned within EZ

The suggestive alignment of feeder line from Jajira sub-station is proposed along the existing Major road namely Z8065. It is planned to establish the proposed Main Receiving substations at the SW and NW corner of the site. From the sub-station the transmission line network is planned along the proposed road network of 30 m and 25 m wide roads proposed within EZ to feed the individual plots as shown on the next page.

Figure 73: Power supply network inside the EZ



Source: MACE analysis

9.3.4. Water

Demand estimation basis

The water demand estimation carried out below is at ultimate level and based on prevailing development guidelines in Bangladesh context. This is different from the demand estimated during industrial space demand projection.

Table 66: Water demand estimation norms

Description	Reference – published standards, guidelines and best industry norms
Processing area	
Industries	70 cum / ha / day - process water demand
Loading and unloading area	36 cum / ha / day - process water demand
Utilities	45 litres per capita per day
Road	1.8 cum / ha / day

Description	Reference – published standards, guidelines and best industry norms
Green	1.8 cum / ha / day
Non- processing area	
Admin & customs and Supporting amenities	45 litres per capita per day

Source: MACE analysis, published standards, guidelines and best industry norms

Table 67: Water consumption pattern

For areas with bathing facilities	
Potable water	70%
Non- potable water	30%
For areas without bathing facilities	
Potable water	45%
Non- potable water	55%

Source: MACE analysis

Water demand calculation

The summary of water demand for EZ is given below

Table 68: Water demand

S.No.	Description	Processing area	Non-processing area	Total	Unit
1	Total average demand	12329.20	6142.36	18471.56	cum/day
2	Total potable water demand	11717.34	4299.65	16016.99	cum/day
3	Total non-potable water demand	611.86	1842.71	2454.57	cum/day
4	Fire demand	238.81	13.61	252.23	cum

Source: MACE analysis

Table 69: Estimation of average daily water demand

Land use pattern	Total area	Proposed FSI	Population density /sq.ft / person	Population	Water demand					
	acres				Process water	Domestic water	Loss @ 10 percentage	Total	Potable	Non-potable
					In cum/day					
Processing area										
Industries	349.13	1.00	800	19003	9894.25	855.14	1074.94	11824.33	11401.03	423.29
Loading & Unloading area	3.89	1.00	200	848	140.22	38.16	17.84	196.21	177.33	18.89
Utility	17.74		200	3863		173.84	17.38	191.22	105.17	86.05
Road	76.70					55.89	5.59	61.48	33.82	27.67
Green & open space	52.96					38.59	17.37	55.96		55.96
Total processing area	500.42			23714.00	10034.47	1161.62	1133.12	12329.20	11717.34	611.86
Non- processing area										
Admin & Customs block	7.65	1.50	100	8229		370.31	37.03	407.34	285.13	122.20
Supporting amenities	21.54	1.00	20	115859		5213.66	521.37	5735.02	4014.51	1720.51
Total non-processing area	29.18			124088.00		5583.96	558.40	6142.36	4299.65	1842.71
Total	529.61			147802.00	10034.47	6745.58	1691.51	18471.56	16016.99	2454.57

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

Water Supply to Economic Zone

Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, potable water demand for the proposed EZ would be about 16 MLD and total water demand would be 18 MLD. This figure is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

Padma River is a perennial fresh water system, which is 5 km away from EZ site. It is proposed to provide infiltration gallery/well, collection well and pump house near the river basin at an approximate distance of 5 km from the site to meet the water demand of EZ on a long-term basis. Detailed hydrogeological investigations need to be carried out based on which, a water treatment plant shall be provided near the intake structure.

For the initial demand it is planned to build three to four new bore wells within the proposed site to draw the ground water. Exact location of water intake (i.e., the locations of the tube wells) within the site needs to be finalized during the construction stage. Basis interaction with DPHE officials, the ground water is available at a depth of 220 m. approximately from natural ground level. The lithologic profile for the proposed area is provided in the annexure.

Figure 74: Details of External Water Supply System

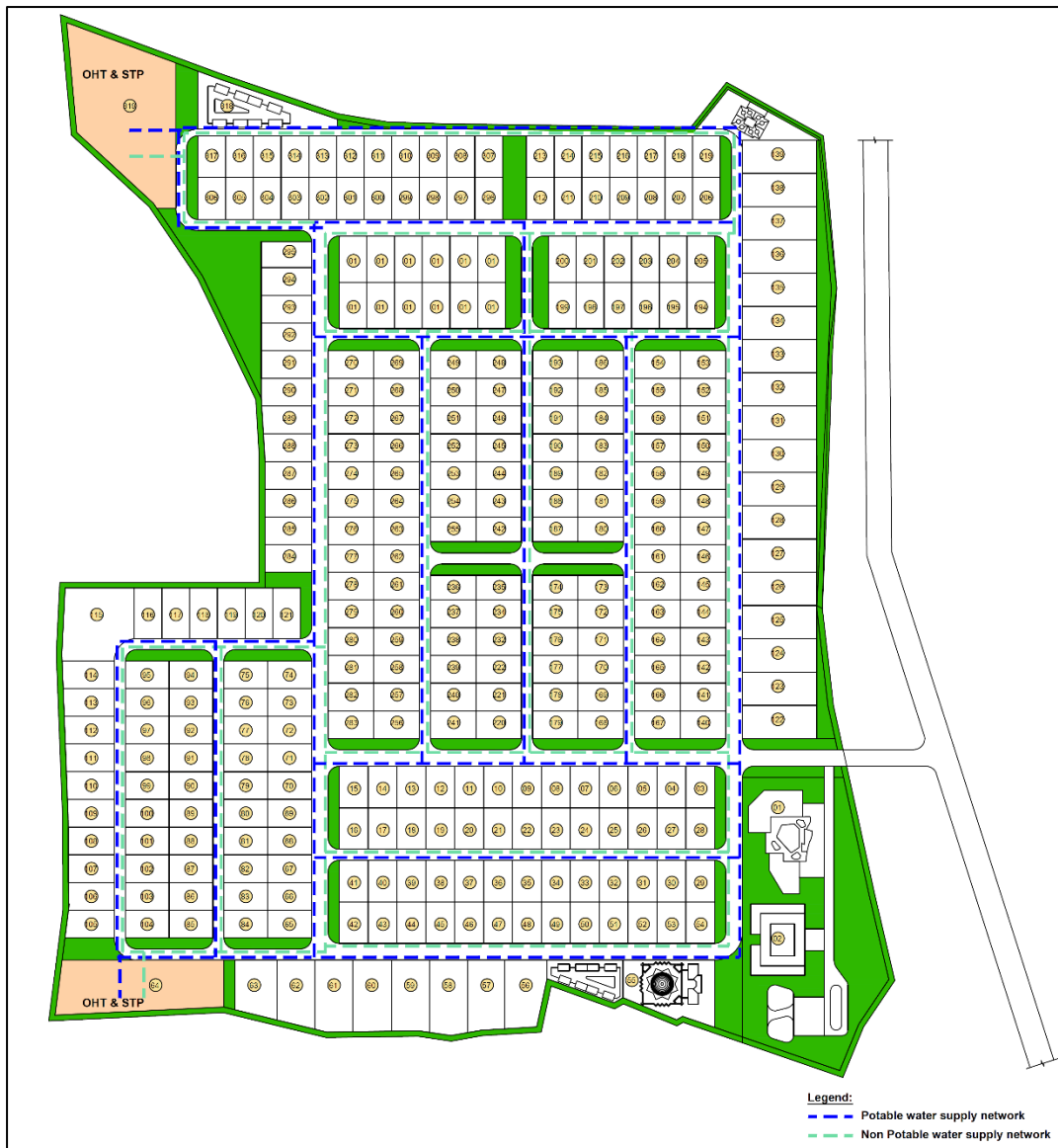


Source: MACE analysis

Potable water supply network

It is proposed to provide infiltration gallery/well, collection well and pump house near the river basin and the feeder line from the source to EZ. The layout depicting proposed potable and non-potable water supply network is provided on the next page.

Figure 75: Potable and non-potable water supply network



Source: MACE analysis

Estimated water storage capacity

The estimated storage capacity calculated based on the arrived water demand is provided in the following table.

Table 70: Underground sump storage capacity

S. No.	Description	Processing area	Non-processing area	Unit
1	Potable water	11717	4300	cum
2	Non-potable water including fire demand	851	1856	cum
	Total	12568	6156	cum

Source: MACE analysis

Table 71: Overhead tank storage capacity

S. No.	Description	Processing area	Non-processing area	Unit
1	Potable water	976	358	cum
2	Non- potable water	51	154	cum
	Total	1027	512	cum

Source: MACE analysis

Preceding tables list out the water storage capacity required to be established at the EZ site on basis of calculation of the water requirements. As per the tables, total underground sump storage capacity that would be required is 18,724 cum. and total overhead storage capacity requirement would be 1,539 cum

Required Pipe size and pump capacity

The required pipe size and pump capacity is provided in the following tables –

Table 72: Pipe sizing and Length details

Pipe size diameter (in mm)	Length of pipe (in m)				Total	Type of pipe material	
	Processing area-Potable Water	Processing area-Non-Potable Water	Non-Processing Area-Potable Water	Non-Processing Area-Non-Potable Water		HDPE pipe length (in m)	DI pipe length (in m)
110	3232	12929	-	-	16161	16161	-
140	1293		-	-	1293	1293	-
160	1293		-	-	1293	-	1293
200	1293		-	-	1293	-	1293
250	1293		-	-	1293	-	1293
300	1293		-	-	1293	-	1293
350	646		-	-	646	-	646
400	646		-	-	646	-	646
450	646		-	-	646	-	646
500	646		-	-	646	-	646
600	646		-	-	646	-	646
Total	12,927	12,929			25,856	17,454	8,402

Source: MACE analysis

Table 73: Pump capacity

Description		Processing area	Non-processing area	Unit
Potable water	Capacity	0.27	0.10	cum/sec
	Number of pumps	2 W+1S	2 W+1S	
	Power requirement of each pump	67.00	24.00	Kw
Non- potable water	Capacity	0.01	0.043	cum/sec

Description	Processing area	Non-processing area	Unit
Number of pumps	2 W+1S	2 W+1S	
Power requirement of each pump	3.00	10.00	Kw

Source: MACE analysis

The requirement of pipe size and pump capacity has been calculated in the above tables on basis of the water demand, water storage capacity and the size of the EZ site.

9.3.5. Waste water

The basis for calculating the waste water quantity is provided in the following tables.

Table 74: Waste water generation pattern

Description	Percentage
Bath / shower & laundry	55.97%
Hand basin, kitchen	12.29%
Toilet	31.74%

Source: MACE analysis, published standards, guidelines and best industry norms

Table 75: Sewage and sullage generation pattern

Sewage	72.09%
Grey water	27.91%
Gardening	19.53%
Cleaning	8.37%
Sewage	31.74%
Grey water	68.26%
Gardening	47.78%
Cleaning	20.48%

Source: MACE analysis, published standards, guidelines and best industry norms

As mentioned in the tables above, best industry practices and published standards have been adopted in order to calculate the percentage of waste water that would be generated from use of water for above mentioned non-industrial uses.

The calculated wastewater quantity is provided in the following table.

Table 76: Sewage and sullage generation estimation

Land use pattern	Total area	Water demand				Effluent generation	Sewage generation	Sullage generation	Total effluent, sewage and sullage generation	Infiltration @10%	Total sewage quantity
	Acres	Process water	Domestic water	Potable	Non-potable						
In cum/day											
Processing area											
Industries	349.13	9894.25	855.14	11401.03	423.29	4,947.13	305.15	1273.58	6,525.86	1182.43	7,708.29
Loading & Unloading area	3.89	140.22	38.16	177.33	18.89	70.11	13.62	33.10	116.82	19.62	136.45
Utility	17.74		173.84	105.17	86.05	-	62.03	100.47	162.50	19.12	181.62
Road	76.70		55.89	33.82	27.67					6.15	6.15
Green & open space	52.96		38.59		55.96					5.60	5.60
Total processing area	500.42	10034.47	1161.62	11717.34	611.86	5017.23	380.80	1407.15	6805.18	1232.92	8038.10
Non- processing area											
Admin & Customs block	7.65		370.31	285.13	122.20	-	38.79	249.63	288.41	40.73	329.15
Supporting amenities	21.54		5213.66	4014.51	1720.51	-	546.09	3306.24	3,852.33	573.50	4,425.83
Total non-processing area	29.18		5583.96	4299.65	1842.71		584.88	3555.87	4140.74	614.24	4754.98
Total	529.61	10034.47	6745.58	16016.99	2454.57	5017.23	965.68	4963.01	10945.92	1847.16	12793.08

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

Sewer network

STP is located at NW and SW corner of the site. The entire sewer network is planned along the proposed 30 m and 25 m wide roads of EZ. The layout depicting sewer network and location of STP is provided below.

Figure 76: Sewerage Network



Source: MACE analysis

Required Pipe size

Table 77: Pipe size- sewerage network

Pipe size in mm	Processing area length in m
150	4267
200	3232
300	2586
400	1293
500	646
600	388

Pipe size in mm	Processing area length in m
700	259
800	259
Total	12,930

Source: MACE analysis

The above table mentions the length of pipe that would be required for removal of sewage from the EZ site. This has been calculated after taking into consideration the perimeter of the EZ site.

Sewage quality

Table below captures the quality of sewage that would be generated due to various industrial and non-industrial activities expected to take place inside the EZ site.

Table 78: Sewage quality

S. no.	Parameters	Unit	Concentration
1	PH	-	5.5 – 9.0
2	Suspended solids	Mg/l	300– 600
3	Biochemical oxygen demand	Mg/l	250 – 350
4	Chemical oxygen demand	mg /l	400 – 600
5	Oil & grease	mg /l	<20

Source: MACE analysis

STP components and process flow diagram

Table 79: STP- process and components

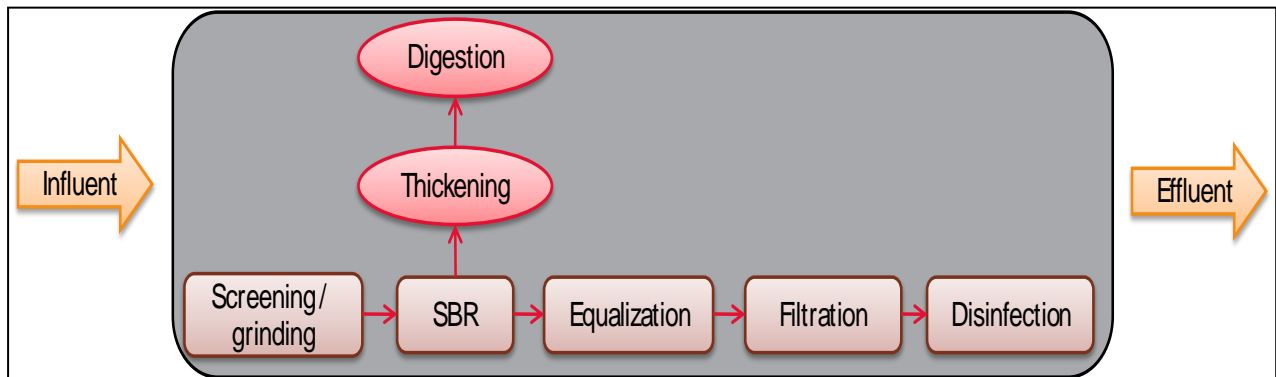
S. no.	Process	Units required	Accessories
1	Activated sludge – extended aeration	Aeration tank & secondary clarifier	Surface aerators or membrane diffuser system for oxygen supply
2	Aerated lagoon	Earthen bund basins	Fixed or floating aerators for oxygen supply
3	Up-flow Anaerobic Sludge Blanket (UASB)	Reactor with liquid, solid & gas separation facilities	Gas collector, burner and influent distribution system
4	Trickling filters	Circular tanks with media, under drain & secondary clarifier	Rotary distributor for influent and re-circulation pumps
5	Rotating Biological Contactors (RBC)	Trough with PVC/plastic discs, secondary clarifier	Drive mechanism for rotating the discs
6	Fluidized aerobic bio reactor	Reactor tank with poly propylene media and diffusers followed by secondary clarifier	Blowers for supply of oxygen through membrane diffusers

S. no.	Process	Units required	Accessories
7	Sequencing Batch Reactor (SBR)	It uses deep RCC basins, and very efficient oxygen transfer equipment's (diffused aeration mechanism)	Diffusers, blowers and aeration grid, which provides highest aeration and oxygen transfer efficiency. Decanter assembly in Stainless steel equipped with variable frequency drive to automatically control rate of decanting based on input feed condition
8	Membrane Bio Reactor (MBR)	Aeration tanks followed by balancing tank and membrane bio reactor	Diffusers, blowers to supply oxygen, air compressors for backwashing, chemical dosing for pre-treatment.

Source: MACE analysis

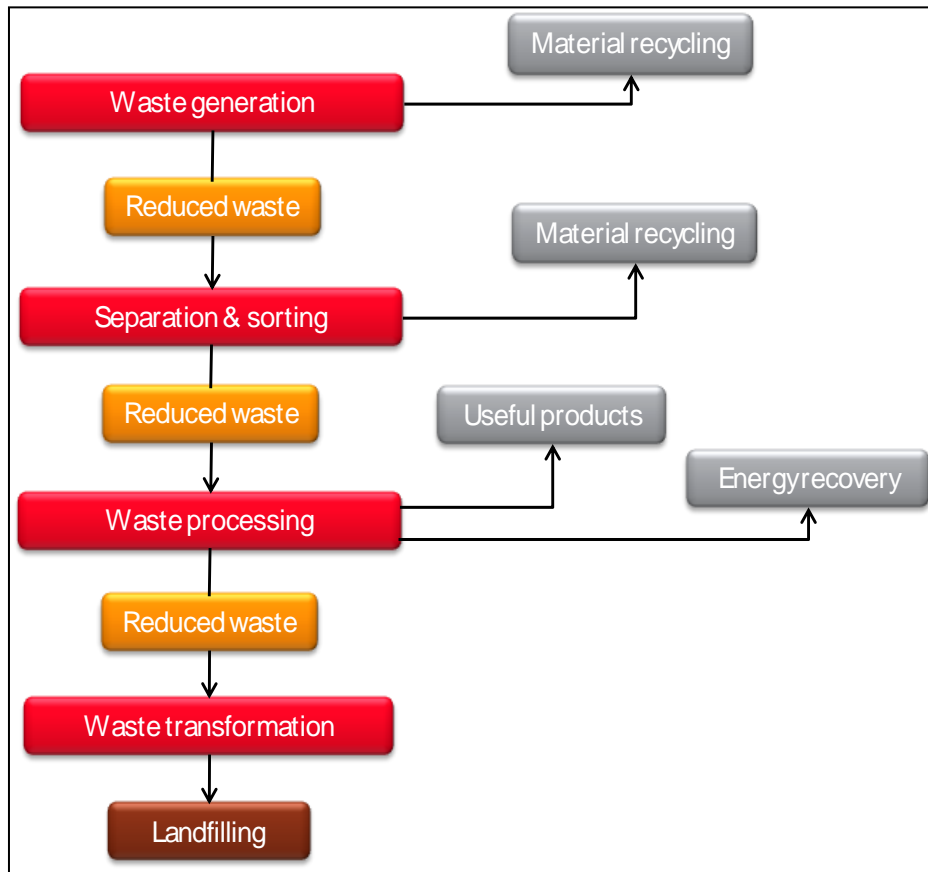
The table above captures the various components of the sewage treatment plant that would be required to set up in order to treat the sewage that would be generated from the EZ site. A process flow diagram elucidating the process of sewage treatment has been highlighted below.

Figure 77: STP process flow diagram (SBR technology)



Source: MACE analysis

Figure 78: Waste reduction by integrated SWM



Source: MACE analysis

9.3.6. Drainage

Based on the site gradient, the drainage pattern has been decided. It has been planned to discharge the flow of the internal drain into nearby River Padma.

- The drainage system is planned to cater for the entire EZ through gravity flow.
- Drains are proposed to be provided on both sides of the roads.
- Open trapezoidal drain is considered for the surface run off collection due to easy maintenance for the primary road. Stone pitching is considered for the side walls and PCC for the base.
- Covered rectangular brick masonry drain is considered for the remaining areas for optimization of area under drainage.
- RCC box / pipe culverts of suitable sizes are considered for road crossings.

Rainwater harvesting structures are envisaged all along the drain at every 30 m interval.

Figure 79: Internal storm water drain network



Source: MACE analysis

9.3.7. Solid waste

The estimated solid waste quantity is provided in the following table.

Table 80: Estimation of Solid waste generation

Land use pattern	Total area	Population	MSW generation		
	Acres		MSW generation rate	Unit	Kg/day
Processing area					
Industries	349.13	19003	200	gm/capita/day	3800.60
Loading & Unloading area	3.89	848	100	gm/capita/day	84.80
Utility	17.74	3863	100	gm/capita/day	386.30
Road	76.70		10.12	kg/ha/day	314.25
Green & open space	52.96		30.36	kg/ha/day	650.96
Total processing area	500.42	23714			5236.91
Non- processing area					

Land use pattern	Total area	Population	MSW generation		
	Acres		MSW generation rate	Unit	Kg/day
Admin & Customs block	7.65	8229	100	gm/capita/day	822.90
Supporting amenities	21.54	115859	400	gm/capita/day	46343.60
Total non-processing area	29.18	124088			47166.50
Total	529.61	147802			52403.41

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

9.3.8. Telecom/ Internet connectivity to the proposed EZ

Optical fibre cables are available near the site and the bandwidth available is around 2 mbps. At present, the internet and telecom services are provided by private telecom subscribers such as Grameen Phone, Bharti Airtel, Banglalink, Teletalk and Rabi in this region. Service by private operators has significantly improved the telecom connectivity in the region.

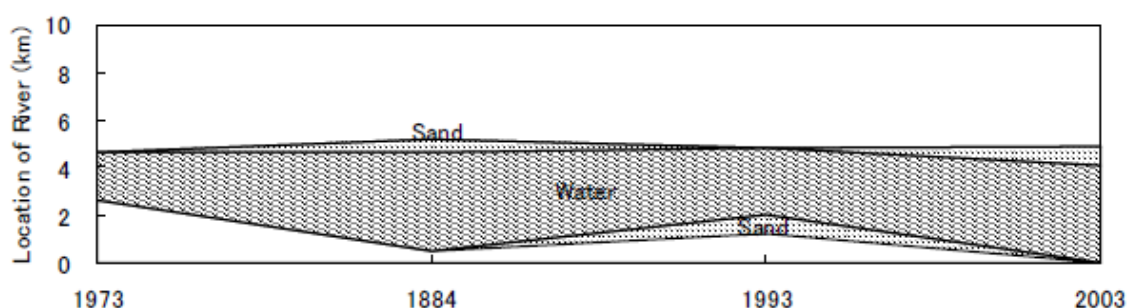
9.3.9. River morphology

The proposed Jajira EZ is located 4.5 km towards western side from the river Padma. The Padma River drains the combined flows of the Ganges and the Jamuna rivers. The river length is about 102 km from the Ganges-Jamuna confluence to the Padma-Meghna confluence. There is no major inflow from the tributaries until it meets with the Meghna River at Chandpur. River course of the Padma River is straight as a whole extending toward southeast with few char lands within the river section. Historical riverbank changes were studied and shown in the below table. The river morphology data from 1969 to 2017 is provided on annexure.

Table 81: Historical river bank changes details

Change in river width (W_{min} to W_{max}):	2.00 to 4.92 km
Average river width (W_{ave}):	3.81 km
Coefficient of variation = $(W_{max}-W_{min})/W_{ave}$	0.60
Maximum river extent during 50 years	5.24 km

Figure 80: Changes in river bank lines

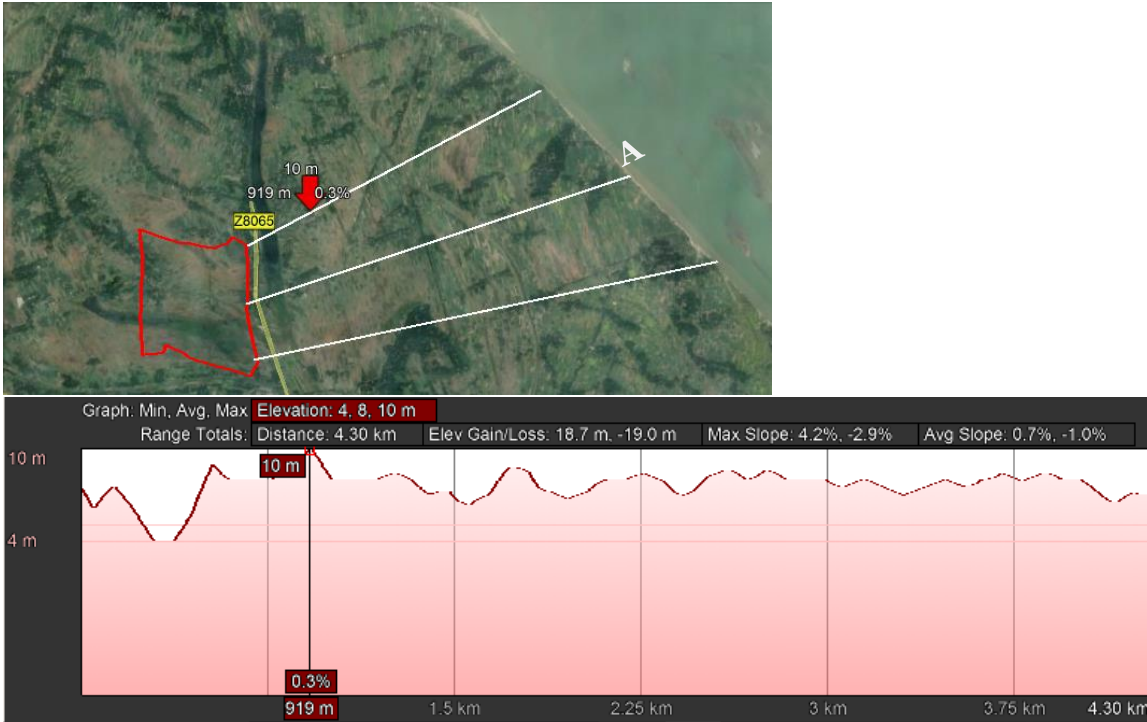


The sectional patterns of the Padma River near Jajira Site is listed below. It is noted that the river width is within the range from 3.5 km to 4.5 km, though its location shifted within the extent of about 6.5 km width.

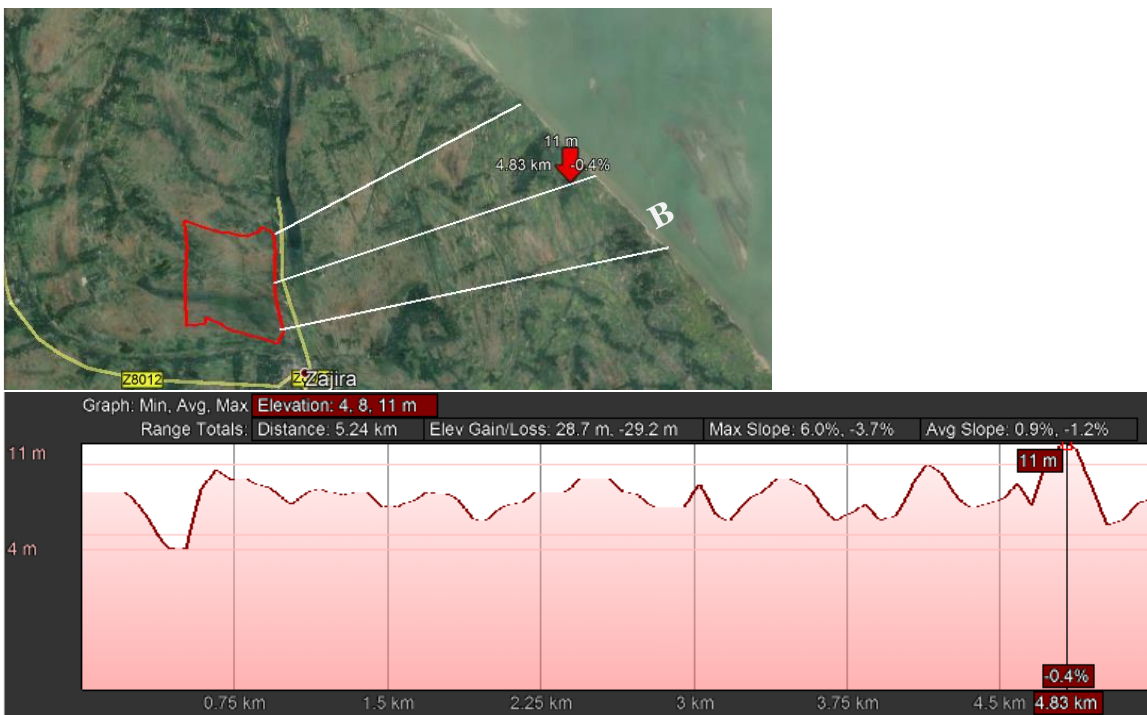
- River width: about 3.5 km from 1968 to 1976
- River width: about 4.5 km from 1977 to 1989

- River width: about 3.5 km from 1993 to 1995
- River width: about 4.0 km from 1997 to 1999

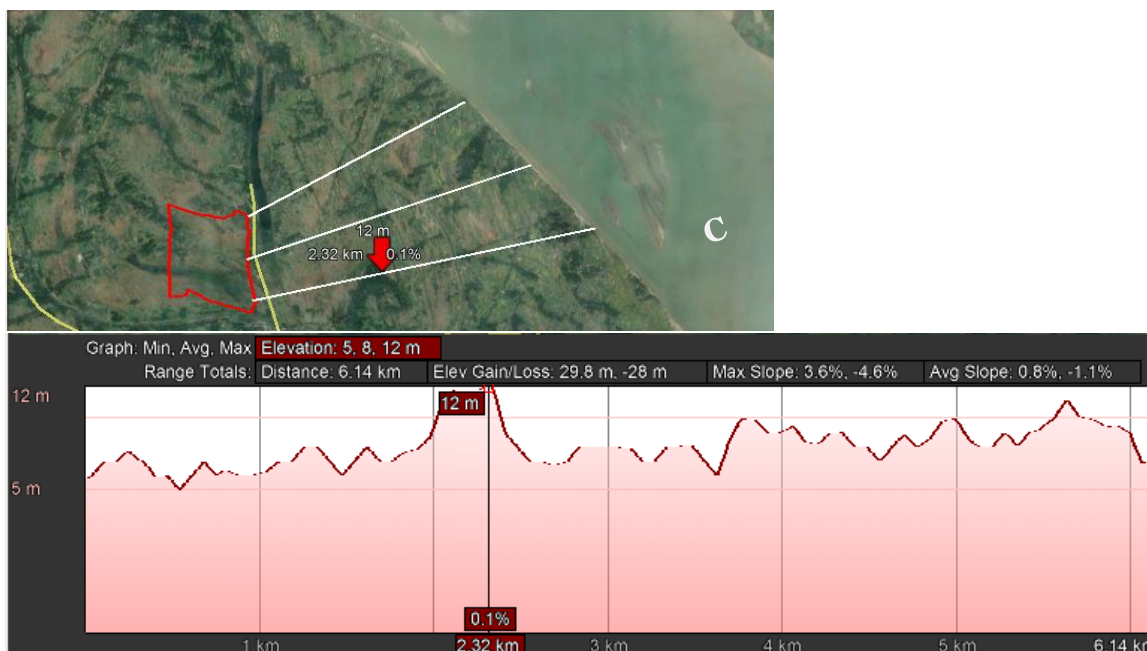
Since, the river is 4.5 km away from the proposed site and there is a Highway (Z8065) running adjacent to site along the boundary on the riverside, the embankment provision is not required. Some of the following Elevation profile also shows that the site does not require embankment and will be free from flooding due to river since there are elevated land parcels in between the site and the river.



Elevation profile along A



Elevation profile along B



Elevation profile along C

9.4. Infrastructure cost estimates

A component wise breakdown of the cost of developing on-site infrastructure as mentioned in this report has been elaborated in the following table.

Table 82: On-Site Infrastructure cost estimates

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Phase III Cost Breakdown	Price without tax (In Taka)	Price without tax (In USD)
Road Network							
Road (30 m)	5181	RM	96.36	96.36	99.28	292	3.56
Road (25 m)	7748	RM	115.5	115.5	119	350	4.27
Sub-total	12929	RM	211.86	211.86	218.28	642	7.83
Footpath and plot entry culvert							
			81.18	81.18	83.64	246	3.00
Total			293.04	293.04	301.92	888	10.83
Storm Water Network							
	12929	RM	29.04	29.04	29.92	88	1.07
Total	12929	RM	29.04	29.04	29.92	88	1.07
Power Network							
Internal Power Distribution (OHT)	12929	RM	10.25	10.25	10.56	31.06	0.38
Distribution Transformer			28.08	28.08	28.93	85.09	1.04
Street Light	12929	RM	9.42	9.42	9.71	28.55	0.35
Internal Substation	58	MVA	198	198	204	600	7.32
Fire Hydrant							
			0.41	0.41	0.41	1.23	0.02

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Phase III Cost Breakdown	Price without tax (In Taka)	Price without tax (In USD)
Total			246.16	246.16	253.61	745.93	9.10
Water Network							
Water Supply Network	12929	RM	36.63	36.63	37.74	111	1.35
Sump, Overhead Tank, Pumps			104.66	104.66	107.82	317.14	3.87
Water Treatment Plant	16	MLD	51.25	51.25	52.82	155.32	1.89
Total			192.54	192.54	198.38	583.46	7.12
Sewer Network							
Sewer Network	12929	RM	10.43	10.43	10.73	31.59	0.39
Waste Water Treatment Plant	13	MLD	153.52	153.52	158.16	465.2	5.67
Effluent Treatment Plant	11	MLD	270.91	270.91	279.12	820.94	10.01
Solid waste Management	52	TPD	269.61	269.61	277.77	816.99	9.96
Total			704.47	704.47	725.78	2134.72	26.03
Telecom	12929	RM	25.86	25.86	26.64	78.36	0.96
Total	12929	RM	25.86	25.86	26.64	78.36	0.96
Sustainable Infrastructure elements							
Open Space/ Landscaping	158881	Sqm	2.41	2.41	2.5	7.32	0.09
Greenery along road	12929	RM	0.13	0.13	0.13	0.39	0.00
Percolation Pits	862	Nos	0.41	0.41	0.43	1.25	0.02
Total			2.95	2.95	3.06	8.96	0.11
Support Amenities							
Admin Building	2000	Sqm	70	0	0	70	0.85
Maintenance Buildings	100	Sqm	1.3	1.3	0	2.6	0.03
Total			71.3	1.3	0	72.6	0.89
Project Sub-total			2,169.74	1,495.36	1,539.30	4,600.03	56.10

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

Apart from the costs considered above, calculation of total project cost also takes into consideration the construction costs of standard factory buildings and implementing environmental management plan. The costs for these components are listed below –

- Per sq. feet cost of constructing SFB has been taken to be 1,600 BDT/sq. ft. over an area of 35 acres having 60% coverage. **The cost of constructing SFBs is BDT 1,463.6 million (i.e. USD 17.85 million).**

- **The cost of implementing environmental management plan during construction and operation phase is taken to be BDT 36.8 million (i.e. USD 0.45 million).** This cost covers expenses of environmental and social experts that developer would have to hire and social and environmental audit and studies that would have to be taken in order to prevent damages to local fauna, flora and residents during the construction period.

In view of considering these additional expenses, total cost of developing the EZ site would be **BDT 6,100.5 million (i.e. USD 74.4 million)**.

9.5. Key Takeaway

On-site infrastructure captures the internal infrastructure facilities which need to be developed within the project site. Development of on-site infrastructure is responsibility of the private developer. The major on-site infrastructure considered for the proposed EZ are internal road network, power substation, effluent treatment plant and other internal infrastructure facilities.

Key recommendations formulated from this exercise are outlined below-

- In accordance to the prevailing development guidelines of BEZA, a well-defined hierarchy of roads planned within the proposed EZ (such as primary road of 30 m width and secondary road of 25 m width).
- It is suggested to align the feeder line from Jajira sub-station along the existing road and is planned to locate the main Receiving substations at NW and SW corner of the site. From the sub-station the transmission line network is aligned along the proposed road network within EZ to feed the individual plots.
- Water conveyance system including infiltration gallery / well, collection well and pump house near the river basin, and the feeder line from the identified water source (River Padma) to be provided.
- Infrastructure planning takes into consideration an underground sump for storage purpose and for distribution, it is recommended to provide overhead tank (OHT) with distribution lines connecting each plot.
- Aligning the distribution pipeline individually for potable and non-potable along the road side with plot connection have been considered.
- Sewerage Treatment Plant (STP) is located at NW and SW corner of the site. The entire sewer network is planned along the proposed 30 m and 25 m wide roads of EZ. It is proposed to use the treated water for non-potable purpose such as washing, watering to green areas etc.
- Infrastructure planning suggests adoption of Sequencing Batch Reactor (SBR) technology.

Block cost estimated based on the above outlined infrastructure components have been considered in the financial model.

10. Social Review

10.1. Purpose and Objective

BEZA has institutionalized the environmental and social management framework (ESMF) as a mechanism to identify and incorporate the social safeguards in the project design for the envisaged projects. The ESMF encompasses (a) Social review, which acts as diagnostic tool in identifying the key social concerns emanating from the proposed project (b) Impact assessment and resettlement action plan to quantify the social impacts and design the necessary mitigation measures.

The social review is being undertaken at the pre-feasibility stage of the project through site reconnaissance to ascertain the perceptions of the communities on the social concerns ensuing from the project and delineate the requirement of the resettlement process that needs to be adopted at the project design stage for mitigating the impacts. Detailed consultation meetings and primary site visits were undertaken to gather information on the existing social fabric of the project site including the socio-economic status and identifying the social infrastructure.

10.2. Socio-Economic Environment

The key parameters that are required to establish a baseline socio-economic profile of population within the project's area of influence include gender, ethnicity, social structure, employment patterns, sources of income, local tenure and property rights arrangements, use of community and natural resources. Primary information gathered by undertaking the screening survey, individual consultations and other stakeholder interaction and secondary information sourced from published references has been analyzed to establish the socio-economic baseline. The proposed economic zone will be located in three Unions (Senerchar, Purno Naodoba and Bara Kandi) at Jajira Upazila in Shariatpur District.

10.2.1. Geography

Jajira upazila is located in central Bangladesh and is spread over a total area of 246.21 square kilometres (95.06 sq mi). About two-thirds of this upazila is land and one-third is water. Padma River is the main river which flows through the northern part of the upazila. It borders Munshiganj district to the north, Naria upazila to the east and south, Shariatpur Sadar upazila to the south, and Madaripur district to the west. The proposed site is located at Uttar Duboldia Mouza of Bara kandi Union, Charkhagutia mouza and Diara Gopalpur mouza of Purno Naodoba union and Senerchar Mouza of Sener char Union.

10.2.2. Demography and existing livelihood

The total population of Shariatpur district is 1,155,824 out of which male population is 559,075 and female population is 596,749. The average size of the household in the district is 4.66 members per house with the population density being 984 per square kilometer. Literacy rate is 47.26%. It is estimated that in the year of 2018 the total population of the district is approximately 1,210,243 (Male- 585,398; Female- 624,845).

As per the 2011 census, Jajira upazila has a total population of 194,019 and the total male and female population at the upazila is 96,041 and 97,978 respectively. The population density per square kilometer is 788 per square kilometer. Literacy rate of the Upazila is 44.4%. It is estimated that in the year of 2018 the total population of the Upazila is approximately 198,729 (Male- 98,373; Female- 100,357).

The stakeholders' discussion with the local farmers and Upazilla Agricultural Officer indicated that crop rotation is being practiced in the region. The data obtained from UNO office indicates that three crop cultivation (1,050 hectares), two crop cultivation (13,344 hectares) and single crop cultivation (1,712 hectares) is being undertaken in the Upazilla. In the proposed project area three and two crop cultivation are predominantly being practices.

Based on Upazila statistic office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the proposed EZ landowners.

The low literacy rate coupled with agriculture being the major source of livelihood necessitates the requirement of devising alternate livelihood options and having skill development programs for the PAP's. The alternate livelihood options may include: providing employment opportunities during the construction of the economic zones (b) low skilled jobs such as security personnel during the operation of the economic zone (c) employment at the allied facilities that might come up because of the development of the proposed EZ.

10.2.3. Social Infra Structure

Jajira upazila has 120 primary, 14 high schools, 2 Junior High schools, 8 Dakhil Madrasas, 1 Alim Madrasas, 2 girls high school, 1 University Government College, 1 Technical school & college, 2 Government degree college, 1 Vocational College, 1 Health Complex, 9 Urban family planning centres and 21 community clinics.

10.2.4. Economy

According to District data of Shariatpur, 2016, economy of Shariatpur district is mainly agriculture based. Total land is 251,849 acre (1,019 km²), out of which cultivable land is 151,902 acre (615 km²), fallow land is 6,857 acre (28 km²) and irrigated land is 40,894 acre (165 km²). Economy of Shariatpur district is mainly agriculture based. Shariatpur has a lot of potential to become an economic powerhouse due to its location near the centre of Bangladesh, industries in Shariatpur can conduct trade and commerce with major divisions like Barisal, Khulna and even Chittagong division easily owing to its geographical location. Currently the main occupation of the people in this district is agriculture and trade. Soil in Shariatpur is fertile since this district is drained by several rivers.

10.3. Assessing Potential Impact

For the development of EZ, the authority of BEZA proposes to acquire 532.14 acres land, which comprises private land, khas land and alluvion land.

The proposed land for acquisition is mostly agricultural land. The stakeholders' discussion with the local farmers and Upazilla Agricultural Officer indicated that, crop rotation is being practiced in the region with three crop cultivation and two crop cultivation being predominantly undertaken. Based on AC land office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the landowners.

Based on stakeholders' consultation and Rapid field assessment, table below presents a summary of the project impacts.

Table 83: Project impact overview

SI No	Project Impacts	Remarks
1	Size of land to be acquired (Acre)	532.14
2	Total number of households requiring relocation (projected)	2
5	Trees	Needs detailed survey

Impact on Land Acquisition

The proposed area for establishing the EZ site is 532.14 acres. 398.075 acres of this land will involve acquiring private land while the rest of the land is khas (government owned), alluvium (government owned) and waterbody (which was not included DC proposal sent to BEZA). Based on information obtained from AC land office, DC proposed 525.235 acres and excluded waterbody (6.905 acres). However, as per discussions with BEZA team, the EZ site would encompass the 6.905 acres of waterbody, as well. Based on BEZA suggestion, the proposed land estimates also includes 50.00 acres of land which belongs to nul land category and has private ownership.

Table 84: Ownership pattern and land categories of Jajira EZ

SL No	Name of JL & Mouza	Total land (Acre)	Ownership Pattern (Acre)				Type of land Categories (Acre)				
			Private	Khas	Alluvium	Nul	Homes tead	Bazar	Khal	Halot	Pond
1	41 Uttar Dugoldia	221.95	150.75	6.17	65.03	221.95	0	0	0	0	0
2	42 Char Khagutia	30.65	29.5	1.15	0	30.65	0	0	0	0	0
3	97 Diara Gopalpur	27.09	26.44	.65	0	27.09	0	0	0	0	0
4	1 Sener Char	195.545	141.385	54.16	0	182.54	0	11.44	.31	.79	.46
5	Dubishyabor	50.00	50.00	0	0	50.00	0	0	0	0	0
	Total	525.235	398.075	62.13	65.03	512.23	0	11.44	0.31	0.79	0.46

Source: Data obtained from DC land office

Note:

- Alluvium: Government does not collect revenue from the occupier for alluvium land. According to the land office documents, ownership pattern does not include alluvium land so far.
- Hat/Market: In the Sener char mouza have 11.44 acres land had been allocated for a market but no market has been established on this land parcel. During site visit period, local people reported that farmers are cultivating different types of crops since 50 years above on the land.
- Balance 6.905 acres is occupied by water body which also be obtained for developing the EZ.

Cost of land

According to Jajira zila sub-Registry office land price list, per decimal price of land in five mouza for Nul (Agricultural Land), Homestead/household, vita, pond, Doba, Garden categories is shown in table below –

Table 85: Mouza wise per acre cost of different categories of land

Mouza name	Land Categories & Per acre Land Price(million BDT)					
	Nul	Homestead	Vita	Pond	Doba	Garden
Saner Chor	2.16	6.44	2.50	0.12	0.03	1.5
Uttar Duboldia	2.76	0.17		0.11	0.00	0.00
Chor Khagutia	1.87	3.33		0.09	0.00	0.00
Diara Gopalpur	1.86	0.88		1.50	0.80	0.00
Dubishyabor*	0.07					

Source: AC land office (*included in the new proposal)

Generally, two steps are followed to determine replacement value for the land acquired. The first one is the 'Conventional' rule set by the law often called DC payments or Cash compensation under law (CUL). Second, the project has provision for 'top up' payments to match replacement value for land acquired in the case of difference between DC valuation and current market price (CMP).

The CMP survey conducted for the proposed EZ was interview based. The interview was conducted with landowners, most recent buyers and sellers and Deed writers of the proposed mouza where land is proposed to be acquired. Based on three group's interview, we found that the current market price is on an average 10% higher than Govt rates (excluding registration cost and stamp duty).

For the development of this EZ, BEZA proposes to acquire 532.14 acres land, out of which the private land acquisition is for 398.075 acres. In accordance to the current legislations governing land acquisition of Bangladesh is the Acquisition and Requisition of Immovable Property Act 2017 (hereinafter, “the Act”) which replaces the old 1982 Ordinance on Acquisition and Requisition of Immovable Property and BEZA’s RSMF, cost of land for private land was taken as 3 times the cost obtained from AC land office for private land and 1 time the cost for government land or *Khas land*. Table below captures cost of land as per both the methods.

Table 86: Cost of land

SL No	Name of Mouza	Quantity (acre)	Average Mouza Rate including 200% premium/CUL(BDT)	Average CMP of different land (BDT)	Remarks/ ratio
1	41 Uttar Dugoldia	221.95	1442.47	1557.87	100:108
2	42 Char Khagutia	30.65	167.65	176.03	100:105
3	97 Diara Gopalpur	27.09	148.42	152.87	100:103
4	1 Sener Char	195.54	1208.68	1232.85	100:102
5	Dubishyabor	50.00	1035.05	1035.05	No Need
6	Waterbody	6.905	5.55	5.55	No Need/ Khas land
Total		532.14	4,007.80	4,160.21	4,160.21

Source: site visit

Based on Govt. mouza rate total land cost was found to be **BDT 4.01 billion** (including 200% premium). On the other hand, CMP survey result indicates difference between CMP and CUL, and the CMP survey findings recommended land cost to be **BDT 4.16 billion** (excluding registration cost and stamp duty)

Based on three groups findings, including 200% premium is almost same with current market prices and road side land cost is higher than average mouza rate including 200% premium/CUL/Tk.

Affected Agricultural Land

According to the proposed land area, it is estimated that 532.14 acres of land would be obtained for the EZ, of which 512.23 acres is nul/agricultural land.

Challenges of Land Acquisition

1. Land use of proposed Acquisition is predominantly Agricultural and the land is quite fertile in nature
2. Land price is high and major part of proposed land is private in nature
3. Peodominantly PAPs are dependent on agricultural activities

To overcome challenges pertaining to acquisition of land, satisfactory compensation need to be awarded to the PAPs

Figure 81: Pictures of agricultural land at project site

During Winter (Rabi Season)



During monsoons



Impact on household structures and utilities

Based on stakeholder’s consultation meeting and rapid census, the project will impact more than 2 household structures in Uttar Duboldia village. These households are are constructed on private lands. The household structures are of ‘tin shed kaccha type.

Table 87: Details of household

SL	Name of Household Head	Type of Structure	Number of structure	Remarks
1	Md Akhter Hossain	Tin sheed Kacca	3	Land categories Nul
2	Foyjul Shekh	Tin sheed kacca	2	Land categories Nul

Source: site visit

10.4. Requirements for SIA and RAP

10.4.1. Social impact Assessment Requirements

The ideal situation for any project would be that it does not have any adverse impact on the population around. In practical, that is not always possible. The proposed EZ at Jajira Upazila under Shariatpur district will require acquisition of about 532.14 acres mostly of agricultural from five mouza’s. A detailed social impact assessment (SIA) should be carried out to assess the standard of living of this population, and hence arrive at an estimate of the losses that they will have to face in terms of assets- fixed and otherwise, loss of livelihood opportunities. The

SIA report may be used further for putting together a resettlement action plan to diminish the adverse impacts to the affected population, as well as provide compensation as required. The SIA report can also be used to understand the existing social fabric amongst the affected population, and this can deepen the understanding of what an R&R plan will require.

Land Acquisition & Impact Mitigation Objectives

The principles and guidelines proposed in the ESMF are to avoid or minimize adverse impacts on private landowners and khas/public land users; mitigate the adverse impacts that are unavoidable; and assist the PAPs to improve, or at least to restore, their living standards and income earning and production capacity to the pre-acquisition levels.

10.4.2. Requirement of RAP

The development of the EZ is envisaged on land 532.14 acres. For the development of EZ, the authority of BEZA proposes to acquire 532.14 acres land. The proposed land parcel is spread across five Mouza's at three unions in Jajira Upazila. The proposed land for acquisition is mostly agricultural land. The stakeholders' discussion with the local farmers and Upazila Agricultural Officer indicated that, crop rotation is being practiced in the region with three crop cultivation and two crop cultivation being predominantly undertaken. Based on AC land office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the landowners. Based on stakeholders consultation meeting, the total number of project affected persons (PAPs) are higher than 2000 directly and indirectly. A Resettlement Action Plan needs to be prepared for the PAPs.

Based on the principles proposed for impact mitigation, it is proposed that the below matrix be adopted for the specific entitlements for different types of losses, entitled person, and the institutional responsibility to implement them.

Table 88: Entitlement Matrix for Loss of homestead land

Ownership type	Entitled Person	Entitlement	Responsibility
Homesteads on Private lands	Legal Owners, as determined by DCs*, or by Courts in cases of legal disputes	In addition to Compensation-under-law (CUL) & applicable top-up (as for loss of lands above): <ul style="list-style-type: none"> • Assistance to construct and rebuild the houses in the same homesteads, in cases of partial acquisitions • Relocation assistance, including land development, where PAPs choose to relocate on their own, or developed plots if they choose to relocate in public lands to be arranged by BEZA, where acquisitions require relocation elsewhere. • Provision of pre-acquisition level basic utilities (water supply, sanitation, electricity, etc.) CUL or replacement costs, whichever is greater. If applicable (subject to difference between CUL & Current Market price)	Paid by project

Ownership type	Entitled Person	Entitlement	Responsibility
		<ul style="list-style-type: none"> • Top-up equal to the difference between CUL and replacement costs. • Transition allowance (TA) for income loss 	
Homesteads on khas lands or Other public lands	Vulnerable Non-title Persons	<ul style="list-style-type: none"> • Relocation assistance, including developed plots in their own or other public lands, to be arranged by BEZA • Provision of water supply and sanitations facilities. 	Paid by project

*DC will determine the market price of crops with assistance from district Department of Agricultural Extension and district Agricultural Marketing

Table 89: Loss of houses/Structures used for living, business and other activities

Ownership type	Entitled Person	Entitlement	Responsibility
All Houses/ Structures on Acquired Private Lands	Legal owners, as determined by DCs, or by courts in cases of legal disputes.	Compensation-under-law (CUL) or replacement cost, whichever is greater.	CUL paid by DC
		<ul style="list-style-type: none"> • Transfer Grant (TG) to cover the carrying costs of household goods, at one-eighth of the replacement costs of the affected structures. • Allowed to keep the salvageable materials 	TG paid by Project

Table 90: Loss of agricultural, commercial, employment and rental homes

Ownership type	Entitled Person	Entitlement	Responsibility
Agricultural Income: On private Lands	Legal owners as determined by DCs, or by courts in cases of legal disputes	Current market value of trees, based on species, size and maturity. <ul style="list-style-type: none"> • Current harvest prices of fruits on trees, if they are felled before harvest. • Owners are allowed to sell the trees. 	By BEZA (included in the CUL) and/or By Project (included in the top-up)
Business Income: <ul style="list-style-type: none"> • Temporary closure of businesses in existing premises • Partially affected businesses • Businesses requiring removal from the existing 	Business Owners (premise / land owners & tenants)	Compensation, based on 30 days' average daily net income, for the actual number of days the businesses remain closed or complete the civil works	By Project
	Business Owners (premise/land owners & tenants)	Compensation, calculated as above, for smaller of the number of days needed to repair and reopen the individual business premises, or complete the civil works.	By Project
	Business Owners (premise/land owners & tenants)	Relocation in khas/public lands, plus compensation, calculated as above, for a period of 30 days; or Compensation,	By Project

Ownership type	Entitled Person	Entitlement	Responsibility
premises and spots		calculated as above, for the number of days the business owners need to find alternative locations themselves, but for a maximum period of 90 days.	
• Loss of employment income	Business Employees	Compensation at current daily wage rates for the period needed to reopen the businesses, or for a maximum of 30 days.	By Project
• Loss of income from rented-out premises on private Lands & VNR Lands	Legal Owners and Current Owners/Users of VNR lands	<ul style="list-style-type: none"> • Six months' rent at the current rates to the owners of the premises on private lands. • Three months' rent at the current rates to the owners/users of premises on VNR lands 	By Project

Table 91: Loss of trees on acquired, private and public lands

Impact Type	Entitlement Person	Entitlement	Responsibility
If acquisition amounts to 20% or more of the total productive area	Legal Owners, as determined by DCs, or by Courts in cases of legal disputes	Transition allowance equal to three times the harvest prices of one year's crops produced in the acquired parts of the lands	By Project

Table 92: Unforeseen losses

Impact Type	Entitlement Person	Entitlement	Responsibility
As may be identified during subproject preparation & implementation	As Identified	As determined in consultation with World Bank and the stakeholders.	By Project

10.5. Overview of Social Legal and Policy requirements

The current legislations governing land acquisition for Bangladesh is the Acquisition and Requisition of Immovable Property Act 2017 (hereinafter, "the Act") which replaces the old 1982 Ordinance on Acquisition and Requisition of Immovable Property. The Act provides safeguards for landowners and has provisions for payment of 'fair value' for the property acquired. The act also made provisions for payment of crop compensation to tenant cultivators. However, it does not cover project-affected persons without titles or ownership record and does not ensure replacement value of the property acquired. It does not permit the affected persons to take the salvageable materials for which compensation has been paid by the DC. It has no provision of resettlement assistance and transitional allowances for restoration of livelihoods of the non-titled affected persons.

In all cases, the Deputy Commissioner (DC) determines (i) market value of acquired assets on the date of notice of acquisition (based on the registered value of similar property bought and/or sold in the area over the preceding 12 months); and (ii) 200% premium on the assessed value (other than crops) due to compulsory acquisition. The DC payments "awarded" to owners is called cash compensation under law (CCL). The market value determined by DC is invariably less than the real market price as owners customarily report undervalued land transaction prices in order to pay lower stamp duty and registration fees. The premium paid by DC has been increased from 50% to 200% of market value for government land acquisition and to 300% in case of private land acquisition in

the new act. However, even so in most cases the compensation remains less than the real market price or replacement value (RV).

World Bank's policy on involuntary settlement OP 4.12 covers direct economic and social impact caused by

(a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) lost of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or

(b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons

Table below shows the comparison of GOB's Ordinance and WB policy gaps between WB OP 4.12 and GOB 2017 Act.

Table 93: Gap Analysis: WB OP 4.12 and GOB 2017 Act

Gaps between WB OP 4.12 and GOB 2017 Act.	Recommendation to bridge the gaps
Gaps with regard to avoidance and minimized project impacts	The project designs including that of the associated facilities should aim to minimize impacts.
Existing GOB laws recognize title owners only; informal settlers are not covered.	All affected persons irrespective of titles will need to be identified for compensation and assistance
Existing laws and methods of assessments do not ensure full replacement costs. However, the 2017 Act has increased the provisions for compensation.	Provisions should be adopted for additional top-up payments to ensure replacement costs at current market price
Consultation with affected community is not legally required under the Act.	Extensive consultations will need to be carried out during the preparatory phase; similar consultation will continue during project implementation
The affected land owners can object to the acquisition in the beginning but once the hearing is done and settled, there is no scope of further complaint during the acquisition process.	There will be a provision of two-tier grievance redress mechanism in the project. One local level GRC (LGRC) and another project level GRC (PGRC).
No support or programme for income and livelihood restoration	The project benefits will include income and livelihood restoration
No provision for reconstruction or replacement of non-religious common property resources	The project will reconstruct all physical and cultural resources (PCRs) and common property resources if affected by the project.

For a seamless land acquisition it is proposed to adhere with World Bank Operational policies that are also adopted in BEZA's ESMF while determining the entitlement for the project affected people.

10.6. Stakeholder Consultations

10.6.1. Introduction and Objectives

This section provides the stakeholder identification and analysis as well as a brief understanding of the engagement process for the project. "Stakeholder" refers to those who have plausible stake in the environmental/social impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. It is highly desirable for all key stakeholders to arrive at a consensus on sensitive features, impacts and remedial actions. Stakeholder identification was done by examining the potential impacts of the project in terms of:

- ✓ Who may be affected directly (project affected people);

- ✓ Which agencies might have responsibility for the impact management;
- ✓ Which other organizations might have an interest in monitoring proponent activities or have local knowledge to contribute; and
- ✓ Which private/non-government sector entities might face financial and social hardships if the predicted impacts occur

The stakeholders identified in the project comprise of project impacted people, project beneficiaries, various government officials.

The main objective of the consultation process is to minimize negative impacts of the project and to maximize the benefits from the project to the local populace. The objectives of consultations undertaken as part of this project are:

- ✓ Promote public awareness and improve understanding of the potential impacts of proposed projects
- ✓ Solicit the views of affected communities / individuals on environmental and social problems
- ✓ Improve environmental and social soundness
- ✓ Clarify values and trade-offs associated with the different alternatives
- ✓ Identify contentious local issues which might jeopardize the implementation of the project
- ✓ Establish transparent procedures for carrying out proposed works
- ✓ Inform the affected populace about the entitlement framework and to settle problems with mutual consent
- ✓ Create accountability and sense of local ownership during project implementation; and
- ✓ To obtain information on baseline environment

10.6.2. Methodology of Stakeholders Consultation

Different techniques of consultation with stakeholders were used during project preparation, viz., in-depth interviews, public meetings, group discussions etc. to understand the socio-economic profile of the community and the affected families, baseline environment, environmental/social concerns etc. A two-fold Stakeholder Consultation Meeting (SCM) was carried out simultaneously during the social review. In this regard, the SCMs were conducted firstly with both the primary and secondary stakeholders and later, affected persons within the occupation and gender based groups were consulted through Focused Group Discussions (FGD). Two FGDs were carried out at the Project area (Molla kandi at Sener Char village and Boati Kandi at sener Char village). FGDs were conducted at different locations of the Project areas with three different occupational/gender groups, e.g., Farmers, Land Owner, Youth Group and women.

10.6.3. Level of Consultations

Public consultations in the form of institutional and focused group discussions were carried out during the period from 10th January 2017 till 7th and 8th August, 2018. Types of consultations done with various participants using various tools including, interviews with government officials, focused group discussion etc. are presented in below table:

Table 94: Types of Consultations

Level	Type	Key Participants
Institutional	Stakeholder Meeting	Various Govt. Officials
Community	Focused Group Discussion	PAP, Women, marginalized people

10.6.4. Institutional Stakeholders Consultation

Consultation conducted at institutional level with various Government Officials are furnished in this section.

Date of Meeting: 10 January, 2017

Location of Meeting: Upazila Nirbahi Officer's Office, Dy. Commissioner's office and RHD office in Jajira and Shariatpur

Officials Met: Listed as follows –

Name of Person	Designation/Department	Contact Details	Date of Consultation
Md. Mahmudul Hossain Khan	Deputy Commissioner, Shariatpur	01961133501	10-Jan-17
Rahela Rahmat Ullah	UNO & Executive Magistrate, Jajira	01961133523	10-Jan-17
Zakir Hussain	Executive Engineer (RHD)	01730782810	10-Jan-17
Mahmud Hassan	Sub-Divisional Engineer (RHD)	01730782811	10-Jan-17
Md. Sohrab Ali Biswas	General Manager (Rural Electricity Board)	01769-400071	10-Jan-17
Md. Shah Alam	Dy. General Manager (Technical) (REB)	01769402090	10-Jan-17
Md. Shafiqul Islam Sheikh	Executive Engineer (Water Development Board)	01734601836	10-Jan-17
Pankaj Chandra Debnath	Assistant Commissioner (AC Land)	-	10-Jan-17
Md. Shahjalal	Surveyor (AC Land's Office)	01712277043	10-Jan-17
Asyadullah	Upazila Social Service Officer (Department of Social Services)	-	10-Jan-17
Md. Habibur Rahman	Upazila Agriculture Officer (Department of Agricultural Extension)	-	10-Jan-17
Bimalendu Sarkar	Upazila Engineer (Local Government Engineering Department)	-	10-Jan-17
Swapan Matubber	PIO (Department of Disaster Management)	-	10-Jan-17
Kamrul Hasan	Assistant Upazila Education Officer (Upazila Education Office, Jajira)	-	10-Jan-17
Nuruddin	AJE (REB)	-	10-Jan-17
Nazimuddin	Upazila Rural Development Officer (Bangladesh Rural Development Board, Jajira)	-	10-Jan-17

Salient Points of Discussion

At the onset, the officials from Upazila Nirbahi Office welcomed the idea of developing economic zone in the region and country by BEZA and expressed their consent on the same. They were of the belief that an Economic Zone in Jajira would bring in employment and prosperity in the region. The UNO also emphasized on the good connectivity the site offered, once the construction of Padma Bridge is completed. Discussions were held on various developmental aspects of the proposed EZ like land acquisition status, utility availability, road connectivity etc. The discussion was concluded by a visit to the project site to gain an on-ground understanding of the various issues. Some of the key features discussed were as follows:

It was understood that the site is a contiguous land parcel with access to zila road, Z8012 around 2-3 km from its western and southern boundary. There is a water channel along the northern boundary of the EZ site and a zila road, Z8065 along the eastern boundary of the site. A few village roads cross the site currently and there are some hutments near the western boundary of the proposed EZ site location.

Currently, the proposed EZ site location is under cultivation with 2-3 crop rotation being practised on the land. It is a low lying land which gets inundated during monsoons with water rising to around 6-10 feet over the land.

Water availability is not an issue near the site as there are river channels which flow in the vicinity of the site location and also ground water is available at a depth of 40-50 feet. Padma River flows around 4-5 km north of proposed EZ site boundary, which can serve as an important source of water.

Currently Jajira has 2 operational 33/11 KV substation with a capacity of 10 MVA each, these substations can be upgraded to 40 MVA each on basis of requirement. These substations are around 3 km from the proposed EZ site location. Currently the demand of power from these substations is of around 8 MVA, rest of the electricity can be provided to the EZ site. There are 2 more 33/11 KV substations under various stages of construction on the Eastern and Western boundaries of the site location. These substations will also be of 10 MVA capacity, upgradable to 40 MVA. These substations are currently drawing power from grid located at Madaripur town having a capacity of 125/191 MVA. However another grid having capacity of 160/240 MVA is under construction at Shariatpur town around 20 km away. Once ready, this grid will supply power to the substations in Jajira.

10.6.5. Focused Group Discussions (FGD)

In-spite of hindrance faced due to agitation of the local populace on the site area, some people of the village attended the FGD session and shared their valuable opinion. At the beginning of the session, the villagers wanted to know the extent of land to be acquired with delineation of proper boundary of the acquired land.

The Focused Group Discussions (FGD) were carried out with different group at the proposed EZ area on 6th, 7th and 8th August 2018. PwC personnel discussed about the future developments and benefits to the community due to the development of the EZ. Due to the agitation of the local populace, the FGD session were not formal. The details of the Focused Group Discussions are furnished below and the record of attendees have been attached in Annexure.

Table 95: Details of Focused Group Discussion

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
Land Owners, Farmers, Youth Group and Social Elites (Number of attendees could not be counted due to informal setting of the FGD)	Affected and adjacent residential settlements	<ul style="list-style-type: none"> Loss of Agriculture land Loss of Livelihood 	<ul style="list-style-type: none"> Acquisition of cultivable agricultural land should be avoided for the development of economic Zone. The economic zone needs to be developed over barren land. The agricultural land is significant livelihood income source and employment generation mode for the inhabitants. Acquisition of the agricultural land will render the inhabitants unemployed. Also, most of the inhabitants are illiterate which will further attenuate the difficulty in finding employment opportunities. Therefore, without making 	Employment opportunities for the youths to be provided on a priority

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
		<ul style="list-style-type: none"> • Employment opportunity • Development of social infrastructure • Skills training to enhance the competency • Priority for local population 	<p>arrangement for employment of these people, agricultural land should not be acquired for EZ.</p> <ul style="list-style-type: none"> • If the project is developed, various job opportunities may be created, however there should be sufficient skill development training that needs to be imparted. The skill training should focus on soft skills development, community-oriented courses, craftsman training (for semi-skilled opportunities) • The training system should lead to train young people in employable skills who are open to immediate employment opportunities • The project affected youths should be prioritized for employment opportunities 	
Women Group (Number of attendees could not be counted due to informal setting of the FGD)	Affected and adjacent residential settlements	<ul style="list-style-type: none"> • Loss employment • Loss of homestead gardening • Loss of social benefit • Equal opportunity of employment • Keeping in mind the opportunities to the affected persons • Ensure Family security 	<ul style="list-style-type: none"> • Apart from men, women also participate in farming, which is economically profitable. If these agricultural lands are acquired, these women stand to lose working opportunities. • There should be sufficient scope for women's employment for the development of the EZ. There should be equal opportunity for women as well as men. • Ensure the safety and security of the people especially the women considering the large influx of migrants during the construction activities of EZ. 	<p>Women to be provided with equal opportunities.</p> <p>No gender bias decision should be made</p>

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks

Figure 82: Focused Group Discussion



FGD with land owners and farmers



FGD with women group at the project site

Summary of Social Impacts

- Proposed acquisition of 532.14 acres of land, of which 512.23 acres nul/agricultural in nature
- Proposed acquisition of 398.075 acres of Private land
- Impact on 2 household structures

10.6.5.1. Training for skill development in Project Area'

Based on consultation with community including potential PAPs of the project area, requirement of following pertinent training is suggested.

Table 96: Training for skill development in Project Area

SL No	Type of Trade	Course Duration	Institution
1	Electrician	6 months	Department of Youth Development
2	Welding	3 months	Vocational Training Centre

3	Carpentry	6 months	Vocational Training Centre/NGO
4	Automobile	6 months	Vocational Training Centre
5	Plumbing	6 months	Vocational Training Centre

10.7. Key Takeaway

For the development of EZ, the authority of BEZA proposes to obtain 532.14 acres land. 398.075 acres of this land will involve acquiring private land while the rest of the land is khas (government owned), alluvium (government owned) and waterbody (which was not included DC proposal sent to BEZA).

As per CUL study, based on Govt. mouza rate, total land cost was found to be BDT 4.01 billion. However, CMP survey result indicates difference between CMP and CUL, and the CMP survey findings recommended land cost to be BDT 4.16 billion (excluding registration cost and stamp duty).

It is suggested that a detailed social impact assessment (SIA) along with Resettlement Action Plan (RAP) should be undertaken to assess the social impacts the affected people, and devise social management plan to mitigate the impacts of the land acquisition. It is proposed that the SIA and RAP should adhere with the requirements of ESMF as institutionalized by BEZA. The SIA report may be further used for putting together a resettlement action plan to diminish the adverse impacts to the affected population, as well as provide compensation as required. The SIA report can also be used to understand the existing social fabric amongst the affected population, and this can deepen the understanding of what an R&R plan will require.

11. Environmental Review

11.1. Purpose and Objective

The Environmental Review has been undertaken with the following objectives:

- To facilitate an understanding of the elements of the existing baseline conditions of project's area of influence;
- To identify the aspects of the project likely to result in significant impacts to environmental and social resources/receptors;
- To analyse and map relevant stakeholders involved in the project;
- To predict the significance of the impacts of the Project;
- To develop an understanding for the management and monitoring of impacts; and
- Preparation of Environmental Management Plan (EMP)

11.2. Methodology of Environmental Review

The methodology for the initial environmental review of the proposed site are:

- Identification and review of applicable local, state, national and international environmental and social regulatory and institutional frameworks;
- Establishment of baseline conditions of the site and surrounding area through the following:
 - Detailed surveys to observe environmental and social characteristics of the project area;
 - Discussions with the stakeholders and identification key issues during planning, construction and operation phase of the project;
 - Baseline data collection of the site and project area with respect to water, ambient air and noise quality etc. and
 - Ecological assessment on flora and fauna of the site and project area through secondary data collection.
 - Assessment of the socio-economic environment through collation of secondary information of the site, supplemented by consultations with the local communities to understand community perception with regard to the project and its activities;
- Impact Assessment and Mitigation Measures for environmental components for pre-construction/construction and operation phases. To minimize the adverse impacts mitigations measures will also be suggested; and
- Development of Environmental Management Action Plan which includes the following:
 - Mitigations for adverse environmental impacts and associated risks;
 - Institutional arrangement - management tools and techniques for the implementation of environmental impacts and risk mitigations;
 - Monitoring and reporting of requirements and mechanisms for the effective implementation of the suggested mitigations;
 - Monitoring arrangements for effective implementation of suggested mitigations for the proposed project;

11.3. Overview of Environmental Legal, Regulatory and Policy requirements for the project (GoB, WB etc.)

This section highlights the regulatory requirements set out by Government of Bangladesh (GoB) and World Bank (WB) in relation to protection of environment and its resources as well as protection of the social environment from adverse impacts associated with the project development. These requirements are summarized below.

Table 97: Applicability of Key Environmental Legislation at a Glance

Name	Key Requirement	Applicability	Remarks
Acts/Rules			
The Environment Conservation Act, 1995 and subsequent amendments in 2000 and 2002 and 2010	Mandatory requirement of prior environment clearance for certain category of project for conservation and improvement of environment and control and mitigation of pollution of the environment.	Applicable. The project is classified under red category EIA study required to be undertaken	Site approval certificate is to be obtained from DoE
Environment Conservation Rules, 1997 (Subsequent Amendments in 2002 and 2003)	To ascertain responsibility for compensation in case of damage to ecosystem Restriction on polluting automobiles, sale and production of environmental harmful items. Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes. Declaration of ecologically critical areas Promulgation of standard limit for discharging and emitting waste. Formulation and declaration of environmental guidelines. Categorization of industries, development projects and other activities on the basis of pollution activities of the existing or proposed industries/ development projects/ activities.		
Environment Court Act, 2000 and subsequent amendments in 2002	To give high priority to environment pollution prevention	Applicable as the project shall have environmental impacts	All the developments to be carried out as per ECA, 1995 & ECR, 1997 and amendments.

Name	Key Requirement	Applicability	Remarks
The Private Forests Ordinance Act, 1959	Conservation of private forests and for the afforestation on wastelands.	Applicable as the tree cutting is involved in development of off-site facilities	Tree cutting to be carried out after taking permission from Regional Forest Officer, Forest Department
The Protection and Conservation of Fish Act, 1950 and subsequent amendments in 1982	Prohibit or regulate the construction, temporary or permanent of weirs, dams, bunds, embankment and other structures	Applicable. The project involves construction of embankment and other structures.	Necessary permission would need to be taken for construction of embankment.
Water Pollution Control Ordinance 1970	Prevention of water pollution	Applicable from the prospective of prevention of pollution	Applicable during both construction stage (e.g. sewage and equipment washing and maintenance liquid waste discharges at construction camps) and operation phase
The ground Water Management Ordinance 1985	Management of Ground Water Resources. Tube well shall not be dug in any place without permission from Upzilla parishad.	Applicable. 3-4 nos. tube wells will be dug to develop water supply system during initial phase	Permission should be taken before digging tube wells
The Embankment and Drainage Act 1952	An Act to consolidate the laws relating to embankment and drainage and to make better provision for the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion and other damage by water.	Applicable. The project involves construction of embankment.	Regulatory authority Ministry of Water Resources and FCD
Wetland Protection Act 2000	Adhere to a formal environmental impact assessment (EIA) process, as set out in EIA guidelines and manuals for water sector projects or related to alteration of natural drainage. No construction of roads if likely to effect the flow of navigable water ways without clearance from concerned authorities Upland flow in water channels to preserve eco-system Protection against degradation and resuscitation of natural water-bodies such as lakes,	Applicable. The proposed site location has low lying area.	Permission to be taken from the Ministry of Water Resources and DOE

Name	Key Requirement	Applicability	Remarks
	<p>ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes.</p> <p>Completely stop the filling of publicly-owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment.</p> <p>Stop unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.</p>		
The Building Construction Act 1952 (with latest amendment 2006)	An Act to provide for the prevention of haphazard construction of building and excavation of tanks which are likely to interfere with the planning of certain areas in Bangladesh	Applicable as the project involves development of infrastructure	Regulatory authority is Ministry of Works
Bangladesh Economic Zones (Construction of Building) Rules, 2017	The rule states overall economic zone design requirements including zoning, open space requirement, green area, building orientation, accessibility and infrastructural requirements, access to fire appliances etc. The rule also elaborates the design requirements for individual building in the EZ, requirement of necessary permits, duties and responsibilities of developer, required qualification and responsibilities of the technical personnel involved, requirement of timely inspection etc.	Applicable as the project involves construction of buildings in the economic zones	In exercise of the powers conferred under section 38 of the Bangladesh Economic Zones Act, 2010, GoB made this rule
The Vehicle Act, 1927 The Motor Vehicles Ordinance, 1983 The Bengal Motor Vehicle Rules, 1940	To regulate vehicular exhaust emissions	Applicable as heavy vehicle movement is involved both during construction and operation phase	Regular maintenance and upkeep of the vehicles should be carried out. Regulatory authority is Bangladesh Road Transport Authority
The Factories Act, 1965 Bangladesh Labour Law 2006, amendment 2013	This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions.	Applicable as the workers will be employed during construction and operation phase	Regulatory authority is Ministry of labour

Name	Key Requirement	Applicability	Remarks
Bangladesh Labour Rules 2015			
Policies			
National Environment Policy, 1992	For sustainable development	Applicable for all development projects	Usage of energy efficient building material, fuel etc. should be encouraged
National Environment Management Action Plan 1995	Conservation of natural habitats, bio-diversity, energy, sustainable development and improvement of life of people	Applicable for all development projects	Usage of energy efficient material, green building techniques, reduction of carbon foot prints etc.
National Conservation Strategy	Sustainable development of Industrial Sector	Applicable for all development projects	Usage of energy efficient material, green building techniques, reduction of carbon foot prints etc.
The National Energy Policy, 1995	Protecting the environment by requiring an EIA for any new energy development project, introduction of economically viable and environment friendly technology.	Applicable. EIA study is to be carried out	Energy efficient materials and techniques should be explored
The National Water Policy, 2000	To ensure efficient and equitable management of water resources, proper harnessing and development of surface and ground water, availability of water to all concerned and institutional capacity building for water resource management	Applicable. Ground water is required to be withdrawn for fulfilling water requirement at initial phase	Conjunctive use of water should be explored
The National Water Management Plan, 2001	Addresses options for water quality, considerations behind measures to clean up industrial pollution, where effluent discharge monitoring and zoning regulations for new industries are emphasized	Applicable as the proposed development will involve generation of sewage	Installation of sewage treatment facility within the premises
World Bank's Safeguards			
OP 4.01 Environmental Assessment	Ensures sustainability and environmental feasibility of the project. Projects are classified into A, B & C category depending on the nature and extent of the impact.	Triggered	Project classified as Category A considering impacts of project
OP 4.12 Involuntary Resettlement	Ensures safeguards to address and mitigate risks due to involuntary resettlement such as economic, social and environmental risks.	Triggered	The proposed project requires acquisition of 532.14 acres of land (mostly agricultural and private in nature)
Private Sector Development Support Project			

Name	Key Requirement	Applicability	Remarks
Environment & Social Management Framework (ESMF)	Describes all the mandatory environmental and social clearances and purpose of the same required to be taken before development of the project	Triggered	The framework sets out mitigation, monitoring and institutional measures to be taken during design, implementation and operation of the project activities to eliminate adverse environmental impacts, offset them, or reduce them to acceptable levels.

11.4. Project Description

Proposed EZ is spread over an area of 532.14 acres. It has access to major trade and industrial nodes located in south-western parts of the country. Proximity to upcoming Padma Bridge shall ensure direct road access to the entire country towards seamless cargo movement to/ from the proposed EZ. Naodoba rail station would be established in the vicinity of the project site. This rail node in turn shall connect the proposed EZ to other parts of the country such as Khulna, Mongla, Benapole land port, Dhaka, and Chittagong.

In line with the identified features of the proposed EZ and its competitiveness, a framework of industry assessment has been formulated which takes into cognizance availability of factors of production (logistics, utility, manpower), agricultural & natural resources, and possible industrial linkages in site surrounding context. Based on the regional landscape and site intrinsic features, suitability of various industrial sectors have been assessed. The following industrial sectors emerged out as the potential industrial mix for the proposed EZ:

1. Food & Beverage Sector: Fast Moving Consumer Goods like packaged food items – Cake, Processed Fish and shrimp, Biscuits, Bread, Ketchup, Juice, and Beverages
2. Pharmaceutical Sector: Manufacture of generic and patented drugs
3. Chemical Sector: Such as Fertilizer
4. Light Machinery, Equipment and Furniture Sector: Such as Agricultural Machinery

Best practice master plan of the proposed EZ has been formulated based on the above stated industrial mix. This master plan is captured in chapter titled “Master Planning”.

11.5. Baseline Scenario

11.5.1. Location and Study Area

The proposed EZ is located in Jajira Upazila, Shariatpur district of Dhaka division. Dhaka division, located at the central part of the country is economically most affluent division of Bangladesh and it houses capital city of the country, Dhaka. Dhaka division has 13 districts, Shariatpur is one of these. Shariatpur district is located on the south-western side of Dhaka division and it has close proximity to Padma River. It is surrounded by the Munshiganj district in the North, Chandpur in the East, Barisal and Madaripur in the South and west respectively. The proposed site is spread across five Mouza’s (Senarchar, Uttor Dugoldia, Char khagutia, Dubishyabor and Diara Gopalpur) and three unions (Senarchar, Purno Naodoba and Bara Kandi) at Zajira Upazila in Shariatpur District. The location is presented in below figures.

Figure 83: Location of the proposed EZ site



Source: Google Map and PwC Analysis

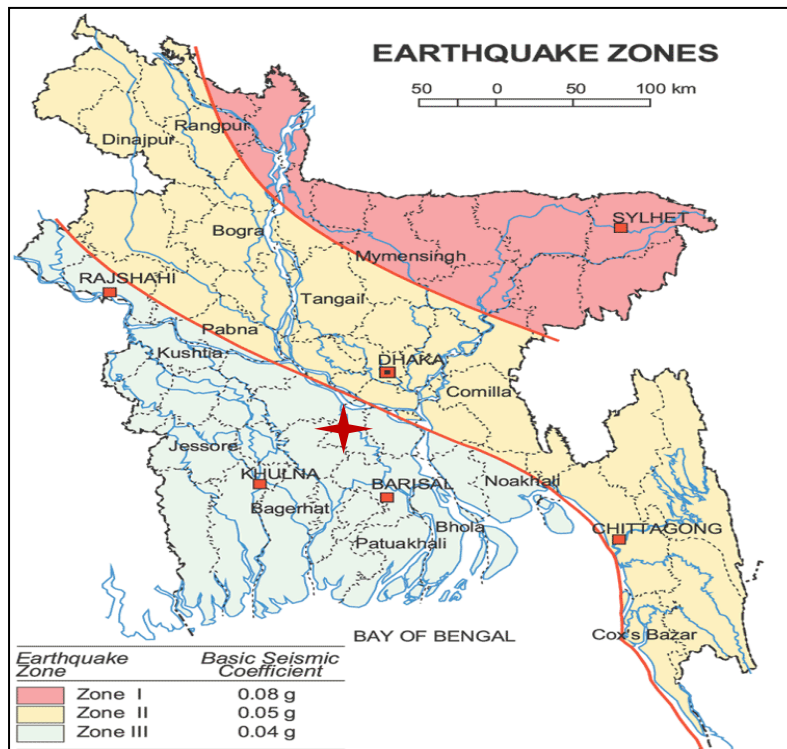
The proposed site is located in proximity to Padma River. This river flows to the north and east side of the site at a varying distance of 3 Km to 7 Km. Padma River has been identified as key feature of the site surrounding and currently has a significant role on the topography of proposed site. Since the site is located on the flood plain of the river, 5 km radius from proposed site boundary has been considered as zone of influence due to the proposed development. Hence 5 Km radius is considered as study area for carrying out Environmental and Social review. Zila/Upazila level secondary information was also collected for various environmental and social components irrespective of any demarcated boundary.

11.5.2. Topography and Seismology

EZ site has no undulation and is low lying. The land use pattern of the project site is 'agriculture'. The site gets inundated (depth of waterlogging is about 6 to 10 feet) during the monsoon. River Padma flows to the north and east side of the site at a varying distance of 3 Km to 7 Km.

Bangladesh has been divided into three generalized seismic zones. The northeastern regions of Bangladesh are the most active zones and belong to the zone-I. The zone II consists of the regions of recent uplifted Pleistocene blocks and considered as moderately active. The southwest Bangladesh is seismically quiet zone and represented by zone III. Proposed site is located in Zone III, which indicates that the project site is less prone to earthquake.

Figure 84: Seismic Zoning map of Bangladesh



Source: Prime Minister's Office Library, Dhaka

11.5.3. Climatological Condition

Shariatpur district experiences a moderate climate throughout the year with average annual rainfall of 2,105 mm and temperature ranging from 37.8°C during summer to 12.6°C during winter. Such a warm and moist climate creates a conducive environment for agricultural growth in the region resulting in the economy of Shariatpur district being predominantly agricultural.

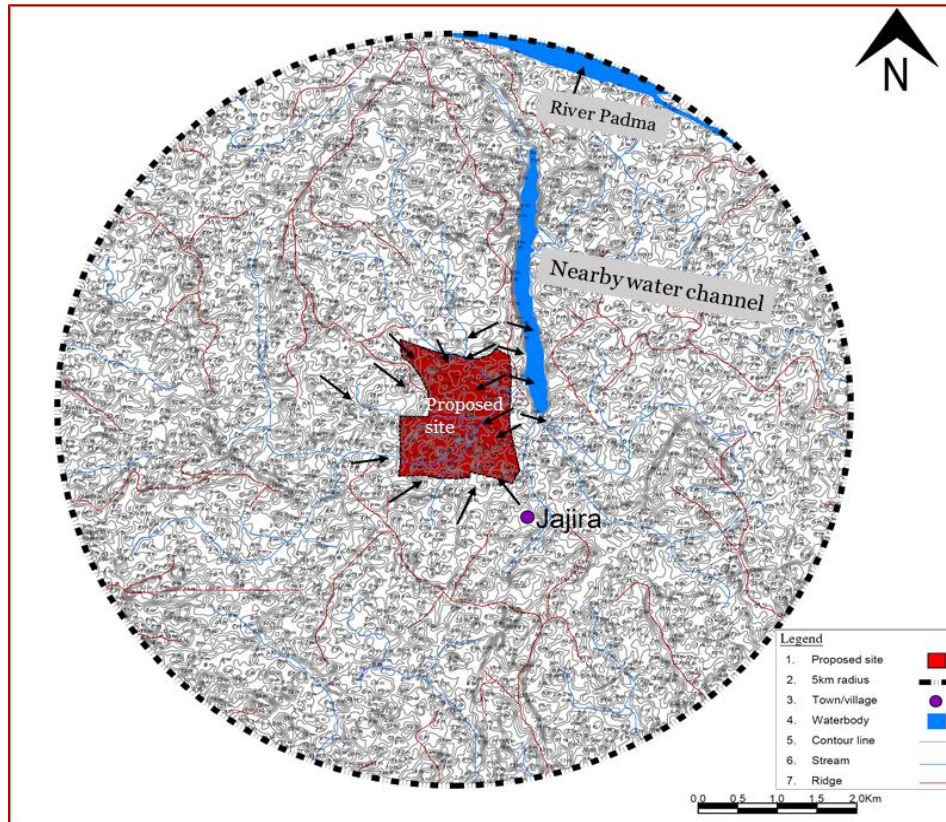
11.5.4. Land use Pattern

Proposed land parcel for acquisition is mostly agricultural land. The stakeholders' discussion with the local farmers and Upazila Agricultural Officer indicated that crop rotation is being practiced in the region. Three crop cultivations and two crop cultivations are being predominantly undertaken. Based on AC land office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the landowners.

11.5.5. Drainage Pattern

From the site visit, it is observed that, there exists covered natural water channel to the NE side of the site which connects with River Padma. The site lies on the West side of river Padma. In general, the flow of the surrounding area will be towards the river. To determine the requirement of peripheral drain and vulnerability of site for flooding due to surface storm water runoff, detailed contour study of the surrounding area was carried out based on GIS data for the radius of about 2 km surrounding the site and the flow pattern of the surface storm water runoff based on the same is provided in the following figure.

Figure 85: Drainage pattern of proposed project area



Source: Study of Drainage Pattern

Ridge lines are the lines connecting highest elevation points and the stream lines are the line connecting lowest elevation points. In general, the flow will be from the ridge line towards stream lines. From the figure it is observed that, the site falls under stream line and there is a ridge line running along northeast side of the site.

From the flow pattern it is observed that the surface runoff flow from the surrounding area will be towards the site in all sides. Hence, it is recommended to provide the peripheral drain all along the site and is suggested to discharge at the existing water channel in the Northeast side of the site which connects with River Padma. The site is highly undulating, and the internal drain should be planned accordingly and should be connected to the peripheral drain.

11.5.6. Soil Environment

In project surround area sandy loams with some black cotton soils in the low lands are found. Crop rotation is being practiced in the region. Predominantly three crop cultivation and two crop cultivation practice are being undertaken. Based on AC land and Union level land office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority landowners.

11.5.7. Air Environment

Based on the secondary information and the site reconnaissance survey it was observed that baseline air quality was satisfactory and air pollution poses little or no threat. This may be due to the fact that the project area is located in a rural area with no significant industries in the surrounding area and the traffic was relatively less.

To establish the baseline of air environment monitoring was conducted by DoE, Bangladesh on 15th May'2018 from the northern side of project area. During the time of monitoring the direction of wind was from south to north and weather condition was sunny. Concentration of Suspended Particulate Matter (SPM), SO₂ and NO_x was monitored. The results are furnished in the following table.

Table 98: Ambient Air Quality of Project Area

Location	Date	Concentration of Pollutants (microgram/m ³)			Remarks
		SPM	NO _x	SO ₂	
Northern side of Project Area	15.05.2018	84	23	Not Detected	<ul style="list-style-type: none"> • Wind Direction- from South to North • Weather was sunny
Standard	-	200	100	365	-

Source: Primary monitoring conducted by DoE, Bangladesh

It was observed from the report that all the pollutant concentrations are well below than the stipulated standard of Bangladesh Environment Conservation Act, 1995 (amended in 2005)

11.5.8. Noise Environment

To establish the baseline condition of noise environment monitoring of noise level was carried out by DoE, Bangladesh at 2 locations. The level of noise found well within the standard of Noise Pollution (Control) Rules 2006 standard at both the locations. The results of ambient noise quality of the project area is presented in below table.

Table 99: Ambient Noise Quality of Project Area

Location	Date	Time	Sound Level in dBa
West side (outside of Project Area)	15.05.2018	2:35 pm	52.2
East Side (outside of Project Area)	15.05.2018	2:40 pm	51.6
Bangladesh Standard at day time (6:00 am to 09:00 pm) for mix area as per Noise Pollution (Control) Rules 2006			60

Source: Primary monitoring conducted by DoE, Bangladesh

11.5.9. Water Environment

11.5.9.1. Ground Water

According to UNO Officials and local inhabitants at the ground water level is at 40-50 feet from the ground level. For the preliminary interpretation of the tentative ground water depth in the proposed site, the data for 2 of the nearest boreholes have been observed. It was observed on basis of the lithology profile that the recommended depth of tapping the water is from 130 m BGL to 205 m BGL for 1 bore well and from 120 m BGL to 208 m BGL for the other. Appropriate hydrological observations and tests need to be carried out within the proposed EZ site to determine the exact depth of groundwater. Bore well data collected from Department of Public Health and Engineering (DPHE) department in support of groundwater level is furnished in the annexure.

To understand the ground water quality of the study area ground water sampling was conducted by DoE on 13.05.2018 for further analysis. It was observed that the value for Biochemical Oxygen Demand (BOD), Turbidity, Total Dissolved Solid (TDS), Chloride are higher than the standards recommended by Department of Public Health Engineering, Bangladesh. Whereas TDS, Turbidity, chloride are within recommended limit.

Table 100: Ground Water Quality of Project Area

Date	Coliform	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	Turbidity (NTU)	Chloride (mg/l)
13.05.2018	0.0.	2	Not Detected	1034	98.1	440

Source: Primary monitoring conducted by DoE, Bangladesh

11.5.9.2. Surface Water

Padma, Meghna, Palong and Kirtinasha are the notable rivers of Shariatpur district. River Padma flows to the north and east side of the site at a varying distance of 3.000 Km to 7.000 Km. There are plenty waterbodies present within the proposed site. Kata khal, the canal flows through the proposed area, joins Arialkha River branch near Kazirhat bazar. This Branch also connects with Padma River. The project proposes acquisition of 6.905 acres of waterbody.

Surface water sample from site area was drawn by DoE on 13.05.2018 for testing to get an idea about the surface water quality of the project area. Parameters such as pH, BOD, COD, TDS, EC and chloride parameters were tested. It was observed that BOD value exceeds the standard as stipulated in the Environmental Conservation Rules, 1997.

Table 101: Surface Water Quality of Project Area

Location	Date	pH	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	EC (μ s/cm)	Chloride (mg/l)
Site area	13.05.2018	7.62	15	46	333	636	35
Standard		-	≤ 6	-	-	-	-

Source: Primary monitoring conducted by DoE, Bangladesh

The baseline monitoring reports conducted by DoE has been attached as annexure to this report.

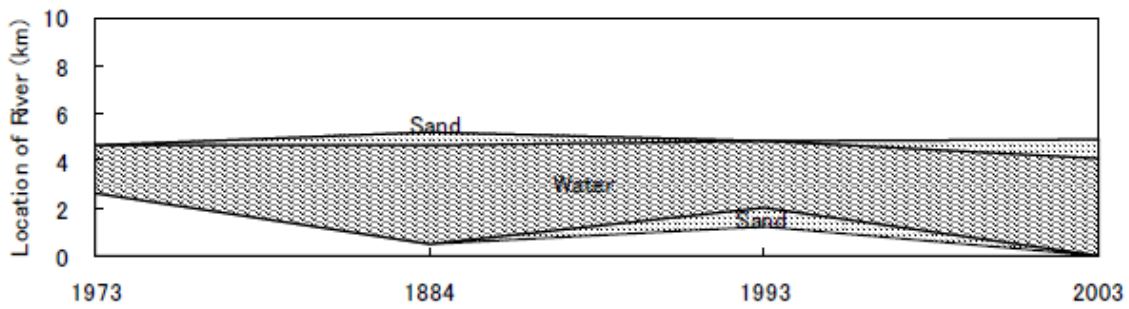
11.5.9.3. River morphology

The proposed Jajira EZ is located 4.5 km towards western side from the river Padma. The Padma River drains the combined flows of the Ganges and the Jamuna rivers. The river length is about 102 km from the Ganges-Jamuna confluence to the Padma-Meghna confluence. There is no major inflow from the tributaries until it meets with the Meghna River at Chandpur. River course of the Padma River is straight as a whole extending toward southeast with few char lands within the river section. Historical riverbank changes were studied and shown in the below table. The river morphology data from 1969 to 2017 is provided on annexure.

Table 102: Historical river bank changes details

Change in river width (W_{min} to W_{max}):	2.00 to 4.92 km
Average river width (W_{ave}):	3.81 km
Coefficient of variation = $(W_{max}-W_{min})/W_{ave}$	0.60
Maximum river extent during 50 years	5.24 km

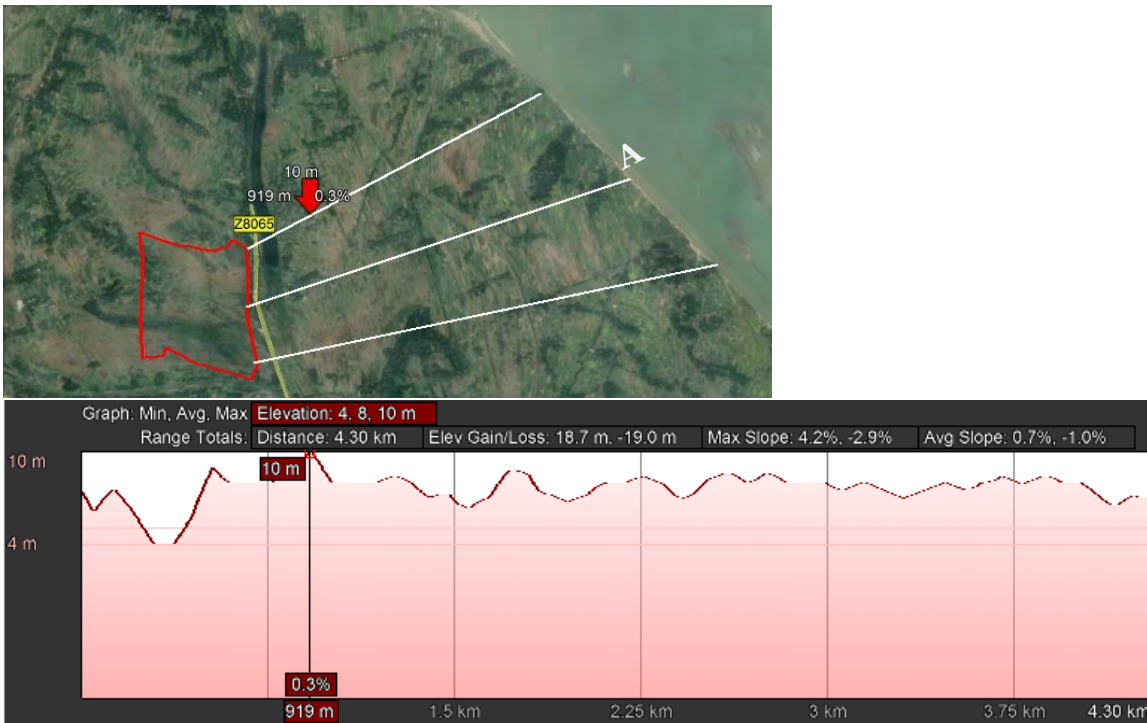
Figure 86: Changes in river bank lines



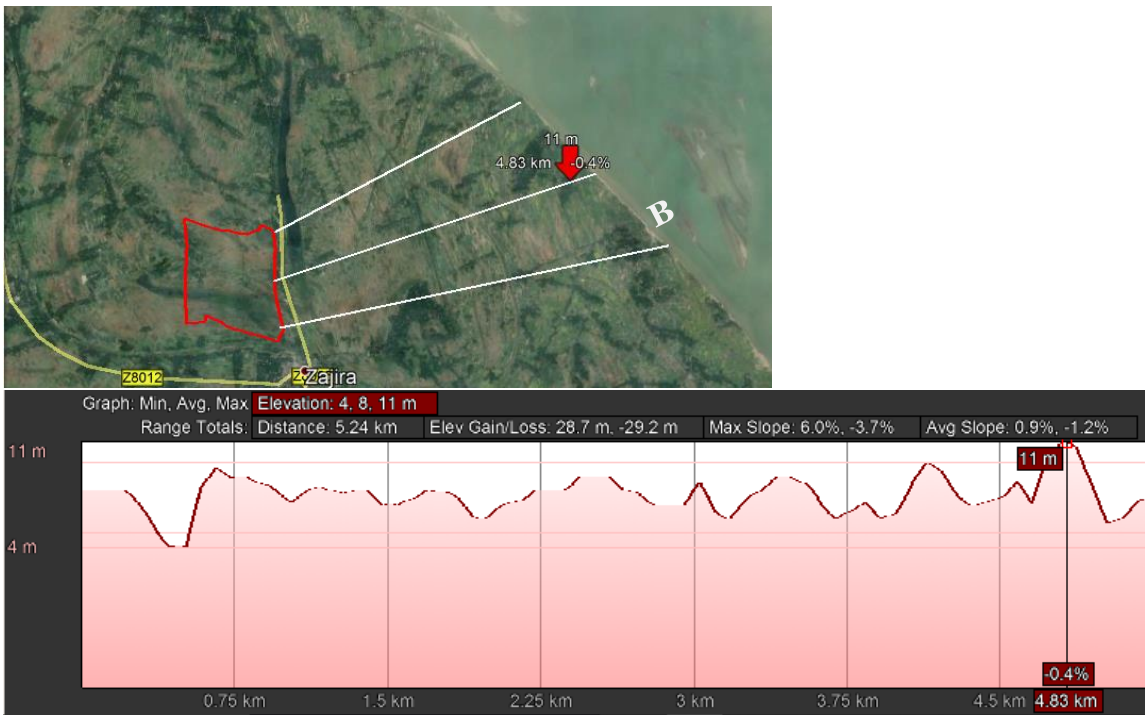
The sectional patterns of the Padma River near Jajira Site is listed below. It is noted that the river width is within the range from 3.5 km to 4.5 km, though its location shifted within the extent of about 6.5 km width

- River width: about 3.5 km from 1968 to 1976
- River width: about 4.5 km from 1977 to 1989
- River width: about 3.5 km from 1993 to 1995
- River width: about 4.0 km from 1997 to 1999

Since, the river is 4.5 km away from the proposed site and there is a Highway (Z8065) running adjacent to site along the boundary on the riverside, the embankment provision is not required. Some of the following Elevation profile also shows that the site does not require embankment and will be free from flooding due to river since there are elevated land parcels in between the site and the river.



Elevation profile along A



Elevation profile along B



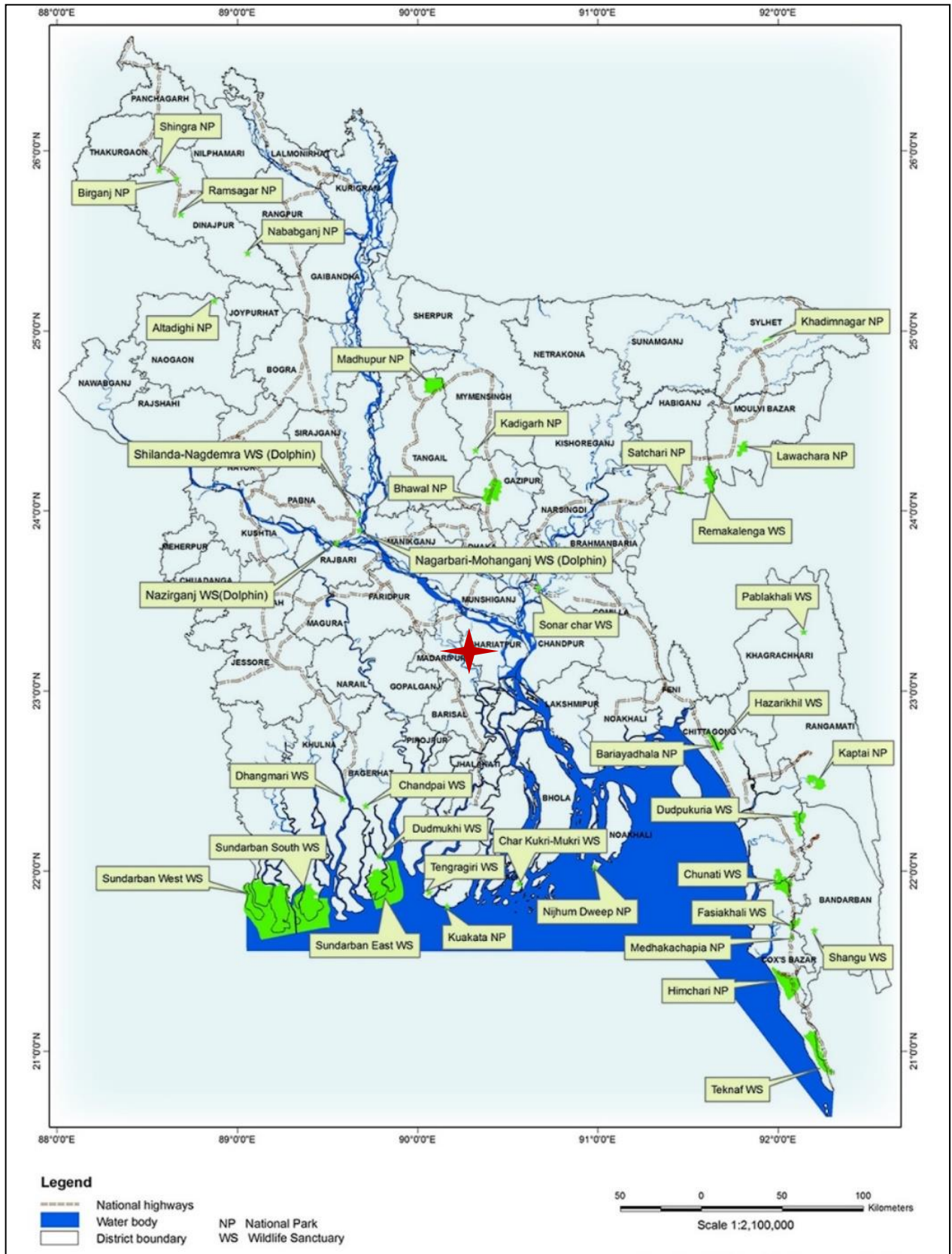
Elevation profile along C

11.5.10. Biological Environment

11.5.10.1. Protected Area

There is no protected area located within the study area. The map of Bangladesh showing location of protected areas across the country is presented in the figure on the next page.

Figure 87: Protected Areas of Bangladesh



Source: Forest Department of Bangladesh

11.5.10.2. Forest Area/Vegetation Cover

There is no presence of forest land in and around the proposed site. There are few trees of species like Randi koroi, Jackfruit, Banana, Boro observed in proposed EZ area. The forest map of Bangladesh is furnished in the figure below.

Figure 88: Forest Areas of Bangladesh



Source: Prime Minister's Office Library, Dhaka

11.5.10.3. Flora & Fauna

There is no forest area within the proposed site and study area. There is also no presence of any protected area/Ramsar site in the study area. 2 chars namely Majheer Char and Puler Hater Char located at NE side of proposed site supports good number of avifaunal species in winter. Information pertaining to ecological resources were collected from Upazila Forest and Fisheries Officers and Local community. The EIA report on Padma Bridge²²⁵ also considered to get an idea about the ecology of project area. The flora and fauna recorded from study area is presented in the next section.

Terrestrial Flora

Agricultural crops are the major type of vegetation in the Project area. All flood plains in the Project area are being extensively used for agriculture. Paddy is the major crop. Lower parts of the cropfields are used for Aman cultivation and comparatively higher portion are used for Boro and Aus crops. Local inhabitant plant Rostrate sesbania (*Sesbania rostrata*) is cultivated at the end of Boro harvesting and this species is commonly found in all area. Among the weeds, Sessile joyweed (*Alternanthera sessilis*), thorny Amaranth (*Amaranthus spinosus*), Bermuda grass (*Cynodon dactylon*), Smartweed (*Polygonum sp*), Creeping oxalis (*Oxalis corniculata*) etc are common species. Among the recorded species Amaranthaceae, Gramineae, Cotton grass (Cyperaceae), Spurge (Euphorbiaceae) families' possess the highest number of species. Herbs dominate shrubs in cropfield vegetation.

Vegetation around the households in study area consists of mostly commonly cultivated tree species and wild shrubs and herbs. Common planted tree species are Raintree (*Albizia saman*), Mango (*Mangifera indica*), Coconut (*Cocos nucifera*), Mehogani (*Swietenia mahagoni*), Banana (*Musa sp*), Gogon Siris (*Albizia richardiana*), Raintree (*Samanea saman*), and Betel Palm (*Areca catechu*). Homestead flora consist both native and exotic species and some of them are naturalized. *Albizia richardiana*, Guava (*Psidium guajava*), *Swietenia mahagoni*, *Dalbergia sissoo* are some of the common plant. The species diversity of the Charland is comparatively lower than other ecosystems. Most of the plant species in the Charland are grass type. Rattlepod (*Crotalaria retusa*), Tall reed (*Phragmites karka*) is the first introducer whereas Mutha (*Cyperus sp*), Kolmi (*Ipomoea sp*), Vetiver Grass (*Vetiveria zizanioides*) Durba (*Cynodon sp*) etc are second level successor. Next in succession, some bushy plant species like Blue Morning Glory (*Ipomoea fistulosa*) grows.

Aquatic Flora

Rivers, canals, perennial water bodies and fishponds are the permanent wetland. Seasonal wetlands are mainly floodplains which inundates in the monsoon. Most of the Project area supports seasonal wetlands. Wetlands govern necessary nutrients and other elements for whole ecosystems as it is an important type. Wetlands are abounded by various types of aquatic flora such as free floating, rooted floating, submerged, sedges and meadows and marginal plants. Gramineae, Hydrocharitaceae, Cotton grass (Cyperaceae) are dominant family. Commonly noticed free floating plants are Floating Water Hyacinth (*Eichhornia crassipes*), Water Lettuce (*Pistia strateotes*), *Salvina cucullata*, Aquatic fern (*Azolla*) and Duckweed (*Lemna*). Most dominant rooted floating plants are Star lotus (*Nymphaea nouchali*), Water snowflake (*Nymphoides indicum*), *Ludwigia abscondens*, *Myriophyllum sp*, Asian watergrass (*Hygroryza aristata*) etc. Among the submerged species, Water weed (*Hydrilla verticillata*), *Helencha (Enhydra Fluctuans)*, *Aponogeton natans*, *Hydrocharis dubia*, Common hornwort (*Ceratophyllum desmersum*), Tape grass (*Vallisneria spiralis*) etc. are found.

Fauna

Commonly found bird's species in the project area are Cattle Egret (*Bubulcus ibis*), Black Drongo (*Dicrurus macrocerus*), Rock pigeon (*Columba livia*), House crow (*Corvus splendens*), House Sparrow (*Passer domesticus*), Common Myna (*Acridotheres tristis*), Large-billed crow (*Corvus macrorhynchos*), Little Egret (*Egretta garzetta*), Indian Pond Heron (*Ardeola grayii*), Spotted Dove (*Spilopelia chinensis*), Long tailed shrike (*Lanius schach*), Asian Pied Starling (*Gracupica contra*), Whitethroated Fantail (*Rhipidura albicollis*), White-throated Kingfisher (*Halcyon smyrnensis*), Yellow-billed Egret (*Ardea brachyrhynchos*), Zitting Cisticola

²²⁵ <https://www.adb.org/sites/default/files/project-document/63200/35049-01-ban-eia.pdf>

(*Cisticola juncidis*), etc. Common bird of prey species found in the project area are Brahminy Kite (*Haliastur Indus*), Black-winged Kite (*Elanus caeruleus*), Crested Serpent Eagle (*Spilornis cheela*), and Common kestrel (*Falco tinnunculus*). Species recorded from study area surrounding like Brown Fish Owl (*Ketupa zeylonensis*), Comb Duck and River Lapwing (*Vanellus duvaucelii*) are listed as vulnerable, critically endangered, endangered species as per IUCN red list respectively.

Various winter migratory bird like Western Yellow Wagtail (*Motacilla flava*), White Wagtail (*Motacilla alba*), Wood Sandpiper (*Tringa glareola*), Black Headed Ibis (*Threskiornis melanocephalus*), Brown Shrike (*Lanius cristatus*), Brown Headed Gull (*Larus brunnicapillus*), Common Black headed Gull (*Larus ridibundus*), Common Kestrel (*Falco tinnunculus*), Common Sandpiper (*Actitis hypoleucos*), Common Tern (*Sterna hirundo*), Fulvous Whistling Duck (*Dendrocygna bicolor*) etc. have been recorded from Padma river and its nearby Charland.

Common mammals are Mole Rat (*Bandicota bengalensis*), Bandicoot Rat (*Bandicota indica*), House Shrew (*Suncus murinus*), Field Mouse (*Mus booduga*), House Mouse (*Mus musculus*), House Rat (*Rattus rattus*), Small Indian Mongoose (*Herpestes autopunctatus*), Golden Jackal (*Canis aureus*) etc. Short-nosed Fruit Bat (*Cynopterus sphinx*) and Asian Indian Pipistrelle (*Pipistrellus coromandra*) are other flying mammals. Gangetic Dolphin (*Platanista gangetica*) and Common Otter (*Lutra lutra*) are the important aquatic mammals recorded in the vicinity of study area in Padma River. Gangetic Dolphin and Common Otter are listed as endangered and near threatened respectively by IUCN.

Among the reptilian species, Indian roofed turtle (*Pangshura tectum*), Median Roofed Turtle (*Pangshura tentoria*), Brook's House Gecko (*Hemidactylus brookii*), Keeled grass skinks (*Eutropis carinata*), Yellow-bellied House Gecko (*Hemidactylus flaviviridis*), Dora shap (*Amphiesma tolatum*), Daras shap (*Ptyas mucosa*), Cobra (*Naja naja*), Baiya Bang, Kunobang (*Bufo melanostictus*), Sonalibang (*Hoplobatrachus tigerinus*) etc. are commonly found. Gui shap (*Varanus bengalensis*) a nearly threatened species and Gharial (*Gavialis gangeticus*) also found in the project area.

Fishes recorded from Padma River and nearby water bodies are Rui (*Labeo rohita*), Catla (*Labeo catla*), Shol (*Channa striata*), Taki (*Channa punctate*), Gazar (*Channa marulius*), Silver crap (*Hypophthalmichthys molitrix*), Grass carp (*Ctenopharyngodon idella*), Punti (*Puntius ticto*), Chela (*Chela sp*), Magur (*Clarias batrachus*), Boal (*Wallago attu*), Kakila (*Xenentodon cancila*), Mrigal (*Cirrhinus cirrhosis*), Gutum (*Lepidocephalichthys guntea*), Tengra (*Mystus tengara*), Pabda (*Callichrus pabda*), Foli (*Notopterus notopterus*), Chapila (*Gudusia chapra*), Koi (*Anabas testudineus*), Tilapia (*Oreochromis mossambicus*), Baila (*Awaous guamensis*), Taposhi (*Polynemus paradiseus*), Chitol (*Chitala chitala*), Khalisha (*Colisa fasciata*). Other species like Golda Chingri (*Macrobrachium rosenbergii*), Badga Chingri (*Penaeus monodon*), Harina Chingri (*Metapenaeus Monoceros*), various crabs, snails, clams etc. are also recorded. As communicated by stakeholders, Kata khal, the canal flows through the proposed area, joins Arialkha River branch near Kazirhat bazar. This branch also connects with Padma River. Sometimes Hilsa (*Tenulosa ilisha*), national flagship species is found in this region.

Figure 89: Floral pattern of study area



Star lotus and Azola



Tall reed and Water Hyacinth



Kolmi



Helencha

Figure 90: Fishing activity and catch



Fishing activities inside of proposed area (fishing Boat and Gear)



Common species inside of Propose area (Baila, koi, Baim, Chela, Tengra)

11.6. Social Environment

For the development of EZ, the authority of BEZA proposes to obtain 532.14 acres land. The proposed land parcel is spread across five Mouza's (Senarchar, Uttor Dugoldia, Char khagutia, Dubishyabor and Diara Gopalpur) and three unions (Senarchar, Purno Naodoba and Bara Kandi) at Zajira Upazila in Shariatpur District. The proposed land for acquisition is mostly agricultural land. The stakeholders' discussion with the local farmers and Upazila Agricultural Officer indicated that, crop rotation is being practiced in the region. Three crop cultivations and two crop cultivation are being predominantly undertaken. Based on Assistant Commissioner land office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the landowners. According to land office, out of 532.14 acres of proposed land, 398.075 acres is categorized as private land and the rest of the land falls under category of khas, alluvium and waterbody. DC proposal was 525.235 acres excluding waterbody (6.905 acres). Based on stakeholder's consultation meeting and rapid census, the project will impact above 2 household's structures in Uttar Duboldia village which are constructed on private lands. The household structures are of 'tin shed kaccha type.

Table 103: Ownership pattern and land categories of Jajira EZ as per DC land records

SL No	Name of JL & Mouza	Total land (Acre)	Ownership Pattern (Acre)				Type of land Categories (Acre)				
			Private	Khas	Alluvium	Nul	Homestead	Bazar	Khal	Halot	Pond
1	41 Uttar Dugoldia	221.95	150.75	6.17	65.03	221.95	0	0	0	0	0
2	42 Char Khagutia	30.65	29.5	1.15	0	30.65	0	0	0	0	0
3	97 Diara Gopalpur	27.09	26.44	.65	0	27.09	0	0	0	0	0
4	1 Sener Char	195.54	141.38	54.16	0	182.54	0	11.44	.31	.79	.46
5	Dubishyabor	50.00	50.00	0	0	50.00	0	0	0	0	0
	Total	525.235	398.075	62.13	65.03	512.23	0	11.44	.31	.79	.46

Source: Data collected from DC Office, Shariatpur

The proposed site superimposed on Mouza Map is furnished in annexure.

11.6.1. Demography

As per the 2011 census, Shariatpur District has a total population of 11,55,824 and the total male and female population in the district is 559075 and 596749 respectively. The population density per sq. km is 984. The literacy rate of the district is 47.26%. The detailed demography of project district has been presented in the following table.

Table 104: Demographic Profile of Shariatpur District

District	Household			Population			Density/ sq km	Literacy in %			Sex ratio
	Urban	Rural	Total	Total	Male	Female		Total	Male	Female	
Shariatpur	247880	28600	219280	1155824	559075	596749	984	47.26	47.96	46.62	94

Source: Population & Housing Census 2011, Shariatpur

11.6.2. Social Stratification

The majority population of Bangladesh is Muslim. According to Population & Housing Census 2011, Shariatpur. Muslim population has been increasing since 1981 with a rate of 13.57% and 6.79% during intercensal periods 1991-2001 and 2001-2011 respectively. It is observed that the Hindu population is decreasing slowly since 1991.

Table 105: Population by Religion

District	Total	Religion				
		Muslim	Hindu	Christian	Buddhist	Others
Shariatpur	1155824	1114301	41330	114	23	56

Source: Population & Housing Census 2011, Shariatpur

11.6.3. Economy

According to District Statistics of Shariatpur, 2011 the economy of Shariatpur district is predominantly agricultural. Out of total 225,523 holdings of the district, 65.89% are agriculture farm holdings that produce varieties of crops, namely local and High Yielding Variety paddy, wheat, vegetables, spices, cash crops, pulses and others. Various fruits like mango, banana, jackfruit guava, coconut and betel nut etc. are grown. Fish of different varieties abound in the district. Varieties of fishes are caught from river, tributary, channels and creeks and even from paddy field during rainy season.

11.7. Impact assessment and proposed mitigation

The environmental impact assessment was carried out considering present environmental setting of the project area, and nature and extent of the proposed activities. The proposed project involves development of EZ and off-site facilities for upcoming EZ at Jajira. Potential environmental impacts associated with EZ and each of the proposed off-site facility are classified as:

- Impacts during design/preconstruction phase
- Impacts during construction phase and
- Impacts during operation phase.

At pre-feasibility stage, based on the nature of upcoming industries, the likely impact on surrounding environment have been covered in the report. However, the detailed analysis of specific impacts on basis of scale and magnitude of the individual industry should be carried out at later phase of design along with more specific mitigation measures. During the study, sensitive environmental components were identified during the site visits and qualitative and quantitative techniques have been applied for direct and indirect assessment of impacts on these components. The classification of environmental components is provided in table on the next page.

Table 106: Classification of Social and Environmental Components

Components	Sub-component	Parameters
PHYSICAL		
Water	Surface water	Hydrology, water quality
	Ground water	
Air	Air, noise	Air quality, noise level
Land	Soil	Erosion, soil quality
ECOLOGICAL		
Aquatic	Fisheries/ Aquatic species	Species, diversity, economic value
	Aquatic Biology	Density, species
Terrestrial	Vegetation	Species, population
	Wildlife	Species, population
INFRASTRUCTURE		
Water Supply	Surface/ground water	Frequency, quality
Electricity	—	Generation, Transmission, requirement,
Transport	Highways/Roads	Access, availability, type, utility of each mode
Land use	Rail	
Drainage	Air	—
	Water	Flooding, drainage

11.8. Impact Identification

During the site visit, various environmental sensitive features were identified which may potentially be impacted by the project at various stages. Identified impacts of the project activities on the environment components are given below along with the associated activities.

Table 107: Impact Matrix for Proposed Off-site Infrastructure

S. No.	Activities	Impacts	Negative Impact		Positive Impact		Not Applicable
			Short Term	Long Term	Short Term	Long Term	
A	Pre-Construction Phase						
i	Land Acquisition for site, access road and utility supply system	Change in land use pattern of existing agricultural land		√			
		Impact on livelihood		√			
		Shifting of Utilities	√				
ii	Site Preparation	Removal of Vegetation.	√				

S. No.	Activities	Impacts	Negative Impact		Positive Impact		Not Applicable
			Short Term	Long Term	Short Term	Long Term	
		Impact on aesthetic aspects		√			
B	Construction Phase						
i	Development of EZ and Construction of Boundary wall, embankment, Access Road, electrical & water supply system and administration building	Loss of Top soil		√			
		Soil contamination due to spillage of material	√				
		Surface water contamination	√				
		Air pollution	√				
		Noise pollution	√				
		Increase in traffic	√				
		Un pleasant view	√				
		Impact on Health & safety	√				
		Social impact	√			√	
		Felling of Trees	√				
C	Operational Phase						
i	Development of Off-site Infrastructure, i.e. Boundary wall, embankment, access road, water supply system, electrical supply line and administration building and operation of industries	Impact on the ambient Air Quality		√			
		Noise Pollution	√				
		Potential for surface water pollution due to industrial waste discharge		√			
		Impact on river hydrology due to construction of long embankment along the river					
		Economic Development		√			
		Accessibility				√	
		Groundwater depletion				√	
		Potential for land contamination due to industrial activities		√			
		Improved drainage		√			
		Electrification of the area				√	
		Improved health and sanitation facilities				√	
		Increased Run-off				√	
		Generation of Employment		√			
	Natural drainage pattern				√		
ii	Green Buffer development around each industrial plot	Improved Ecology	√				
		Air Quality Improvement				√	
		Aesthetics				√	

11.8.1. Impact on Climate and Meteorology

11.8.1.1. Pre-Construction, Construction and Operation Phase

Proposed project site is located in tropical region where summers are much rainier than winter. Though no change in the macro-climatic setting (precipitation, temperature and wind) is envisaged due to the project, the microclimate is likely to be temporarily modified by vegetation removal and the addition of increased pavement surface which in turn might lead to formation of heat islands especially during the daytime.

Mitigation Measures

- 10% Greenery/Open Space inside the EZ has been recommended
- Suitable plantation shall be carried out to minimize impact on micrometeorology

11.9. Impact on Land and Natural Drainage

11.9.1. Pre-Construction and Construction Phase

Site gets flooded during monsoon. The preconstruction and construction phase will involve backfilling of the land to a level higher than the High Flood Line (HFL) of the nearby Padma River with respect to the site to keep the eventual site ground level more than the high flood level ever recorded. At present, the land is predominantly agricultural in nature.

The impacts on land due to the project are as follows:

- Dredging and landfilling activity
- Soil erosion due to vegetation clearance and excavation activities;
- Topsoil degradation
- Generation of waste (hazardous and non-hazardous) from site clearance, excavations, civil works and activities of construction workers (general waste and sewage); and
- Possible contamination of soil due to potential spills of lubricating oil, fuel oil, concrete etc.
- There could be alteration with the natural water flow pattern of the subject site due alteration of the natural contours. It may create problem pertaining to water logging, soil erosion, contamination of soil

11.9.1.1. Soil Erosion

During the pre-construction and construction phase, the site clearance activities including clearing of vegetation, construction of the structures, labour camps, storage area, toilets will involve removal of top soil which will result in slope destabilization and the land will be more susceptible to soil erosion.

The soil erosion will result in the run-off of the silt to surface water impacting aquatic ecosystem of receiving water bodies with increased suspended sediment load and associated nutrients.

Most importantly after landfilling, if the land is be kept for long without further development, it leads to soil erosion due to loose top soil.

11.9.1.2. Soil Compaction

During construction activities, there will be compaction of soil in the project area due to construction of the internal access roads, movement of vehicles/ construction machinery and work force movement. The soil compaction would impact the soil physical properties such as reduction in pore spaces, water infiltration rate and soil strength etc. The extent of soil compaction is primarily limited to the Project foot print area and surroundings within 100 m distance. The impact is restricted to the construction phase of the project.

11.9.1.3. Landfilling with dredged material

The project site is located in low lying area and landfilling up to 6-10 feet will be done during site development activity. About 604,381,982 cum filling material is required for landfilling. It is proposed that sand for the backfilling operations will be obtained by dredging from the Padma River. Dredging activity may be carried out near the site location or away from site. Dredging activity will have two fold impacts - firstly as a result of the dredging process itself and secondly as a result of the landfilling of the dredged material. Impacts during dredging are given in the later section.

In case the soil quality at dumping sites is different from the sediment from the dredging sites, the ultimate soil quality of the disposal site can be affected. The soil used for landfilling should be free of any type of contamination and have similar characteristics as that of native soil to avoid impacts on the soil quality.

11.9.1.4. Waste Generation

The construction waste generated onsite comprises of materials such as excavated soil, rocks, concrete, wooden pallets, steel cuttings/filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminum cans and waste paper will also be generated by the construction workforce and labor camp site.

The waste generated during the construction phase will also include hazardous waste such as used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags. If improperly managed, solid waste could create impacts not only to land but also to local air quality, water quality, and human health. Since the site will be elevated about more than 2 m, it is likely that the surface run off from site surrounding area will be drawn to the nearby surface water system and Padma River. From the drainage pattern study it is observed that In general, the flow of the surrounding area will be towards the river. If the wastes are poorly managed, it will also be carried away by surface run off which will eventually contaminate the water bodies.

11.9.1.5. Soil Contamination

Soil contamination during the construction phase may result from filling activity, leaks and spills of oil, lubricants, or fuel from heavy equipment and wastewater. Such spills could have a long-term impact on soil quality, but are expected to be localized. Storm water run-off from the contaminated area can pollute the downstream soil and water quality of adjacent river or other waterbodies.

Spill control measures such as the storage and handling of chemicals and fuel in concrete areas with secondary containment will be implemented to minimize impacts in the event of a spill.

The soil characteristics of the native soil may also be changed due to import of soil for filling and levelling purpose. It is envisaged that the filling activity may impact the native soil due to spillages during transportation of soil and run-off during filling and compaction.

Apart from the embedded controls to be included in project design, the following mitigation measures will reduce the negative impacts on soil environment –

Mitigation Measures

- Stripping of topsoil should be scheduled as the last mile activity (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of soil;
- Top soil should be preserved and should be reused in borrow area or green area development
- Care should be taken to minimize percolation of soil used for filling to adjacent rivers during filling operations. Proper embankment may be provided in the downstream areas to minimize soil percolation to rivers.
- Vegetation should be planned and maintained for slope stabilization and to prevent soil erosion after construction period;

- The disturbed areas and soil stock piles should be maintained moist to avoid wind erosion of soil;
- The routes for movement of heavy machinery should be designated to avoid the soil compaction in other areas;
- Transport vehicles and equipment should undergo regular maintenance to avoid any oil leakages; designate routes for bringing construction material and outside soil;
- Construction contractor should designate the sites to be used for storage of hazardous wastes including waste oils, solvents, paint and batteries;
- The Contractor should ensure that no unauthorized dumping of hazardous waste are undertaken and contractor should dispose of hazardous waste through licensed traders ;
- Fuel and other hazardous substances should be stored in areas provided with roof, impervious flooring and bund/containment wall;
- The soil used for landfilling should have similar characteristics to the native soil and free of any type of contamination.
- Prior to dredging activity, analyze the soil sample to prevent impacts on the receiving environment as a result of mismatch in soil characteristics;
- During dredging activity, physical barriers such as silt screen/ curtains should be employed to prevent the spread of suspended sediments;
- The storm water drainage system shall be designed in synchronization with the existing natural drainage pattern. The direction of the flow shall be engineered to be same as that of the natural flow direction of storm and rain water;
- The construction debris and high silt content of the virgin soil, post excavation, should be kept in a designated location so as to prevent leaching during monsoons. Storm water drains shall be designed and shall be connected with rainwater harvesting pits. All the construction wastes and excavated soil shall be temporarily stacked on tarpaulin sheet (in order to prevent leaching to groundwater) and a temporary tin sheet shall be placed on the top to prevent rainwater to maximum extent to carry the soil and construction wastes to the adjacent river
- To demonstrate the commitment towards better environment, 10.00% of total area has been designated for green and open spaces. These green area shall be declared as the green zone of the EZ
- Based on the site gradient, the drainage pattern has been decided. It is recommended to provide the peripheral drain all along the site and is suggested to discharge at the existing water channel in the Northeast side of the site which connects with River Padma. The site is highly undulating, and the internal drain should be planned accordingly and should be connected to the peripheral drain which will eventually discharge the flow into nearby River Padma.

For internal storm water drainage system, following provisions are planned for –

- The drainage system is planned to cater for the entire EZ through gravity flow.
- Drains are proposed to be provided on both sides of the roads
- Open trapezoidal drain is considered for the surface run off collection due to easy maintenance for the primary road. Stone pitching is considered for the side walls and PCC for the base.
- Covered rectangular brick masonry drain is considered for the remaining areas for optimization of area under drainage.
- RCC box / pipe culverts of suitable sizes are considered for road crossings

Figure 91: Internal storm water drain network



Source: MACE analysis

11.9.2. Operation Phase

11.9.2.1. Impact on Soil Quality

After development of economic zone, disposal of industrial domestic and process waste may contaminate land and soil quality of the area. The impact can be significant and long term in case of uncontrolled discharges. Improper disposal of waste (hazardous and non-hazardous waste) may degrade soil, water, air quality and ecology of the area. As per the preliminary planning, Food & Beverage, Pharmaceutical, Chemical Fertilizer and Light Machinery industries are being envisaged for this EZ. These industries are anticipated to be polluting to some extent and hence discharge of the generated sludge, effluent and solid waste shall be done in a structured manner.

11.9.2.2. Waste Generation

Generation of waste & packaging material from food processing industries from food and beverage industries; spent carbon, Coal ash from Boiler, Solvent Distillation Residue (organic/inorganic residue), Evaporated salts,

Waste Oils & Grease from pharmaceutical industries; Spent Catalyst (Ni; Cu; Zn; Mo; Fe Based), have been envisaged as the major source of waste. Beside this, other common type of waste like Process dry sludge, ETP sludge, e-wastes, scrap batteries, domestic dry sludge, used oil, etc. are also likely to be generated from the industries proposed. All these wastes shall be segregated depending upon the source of its generation. Sludge generated from STP shall be dried using a filter-press and the dried sludge could be used as manure. There are authorized vendor for recycling e-waste in Bangladesh. E-waste to be picked up by authorized vendors. General practice followed in Bangladesh regarding the process waste is storage in a dedicated room. As the country doesn't have a concrete rules and regulations guiding the process waste disposal, practice to design and execute a localized landfill unit could be helpful. Like construction phase, the waste generated during operation will also include hazardous waste such as Spent Catalyst, organic/inorganic residue, used oil, scrap batteries, waste fuel, grease, waste oil containing rags etc. If improperly managed, waste could pollute not only to land but also to local air quality, water quality, and human health. The characteristics of wastewater from food processing industries are characterized by high concentration of organic and inorganic substance, High BOD, Suspended Solids and oil concentrations as well as emitting smells from acidification. The chemical compounds that may be present in effluent from pharmaceutical industries includes solvents (such as methanol, ethanol, acetone, isopropanol, and methyl-ethyl ketone etc.), organic acids (such as acetic acid, formic acid, organic halides, ammonia, cyanide, toluene), and active pharmaceutical ingredients (API). Effluent from light machinery, electronic/electrical industry may contain heavy metals, paint residue etc.

The estimation of solid and sewage waste likely to be generated have been presented in subsequent sections.

Table 108: Estimation of solid waste generation

Land use pattern	Total area	Population	MSW generation		
	Acres		MSW generation rate	Unit	Kg/day
Processing area					
Industries	349.13	19003	200	gm/capita/day	3800.60
Loading & Unloading area	3.89	848	100	gm/capita/day	84.80
Utility	17.74	3863	100	gm/capita/day	386.30
Road	76.70		10.12	kg/ha/day	314.25
Green & open space	52.96		30.36	kg/ha/day	650.96
Total processing area	500.42	23714			5236.91
Non- processing area					
Admin & Customs block	7.65	8229	100	gm/capita/day	822.90
Supporting amenities	21.54	115859	400	gm/capita/day	46343.60
Total non-processing area	29.18	124088			47166.50
Total	529.61	147802			52403.41

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

Table 109: Sewage and sullage generation estimation

Land use pattern	Total area	Water demand				Effluent generation	Sewage generation	Sullage generation	Total effluent, sewage and sullage generation	Infiltration @10%	Total sewage quantity					
	Acres	Process water	Domestic water	Potable	Non-potable							In cum/day				
Processing area																
Industries	349.13	9894.25	855.14	11401.03	423.29	4,947.13	305.15	1273.58	6,525.86	1182.43	7,708.29					
Loading & Unloading area	3.89	140.22	38.16	177.33	18.89	70.11	13.62	33.10	116.82	19.62	136.45					
Utility	17.74		173.84	105.17	86.05	-	62.03	100.47	162.50	19.12	181.62					
Road	76.70		55.89	33.82	27.67					6.15	6.15					
Green & open space	52.96		38.59		55.96					5.60	5.60					
Total processing area	500.42	10034.47	1161.62	11717.34	611.86	5017.23	380.80	1407.15	6805.18	1232.92	8038.10					
Non- processing area																
Admin & Customs block	7.65		370.31	285.13	122.20	-	38.79	249.63	288.41	40.73	329.15					
Supporting amenities	21.54		5213.66	4014.51	1720.51	-	546.09	3306.24	3,852.33	573.50	4,425.83					
Total non-processing area	29.18		5583.96	4299.65	1842.71		584.88	3555.87	4140.74	614.24	4754.98					
Total	529.61	10034.47	6745.58	16016.99	2454.57	5017.23	965.68	4963.01	10945.92	1847.16	12793.08					

Source: MACE analysis (sum total figures might have minor aberrations due to rounding off of the decimals)

Mitigation Measures

- Provision shall be made for proper storage and disposal of industrial waste by respective industries.
- Provisions shall be made to segregate e-waste with rest of the wastes generated.
- Alliance shall be done with e-waste recycling vendor and the segregated e-waste shall be send to the vendor for recycling purposes
- ETP shall be mandatory for all the industries. Every unit shall have its own ETP unit.
- Based estimated quantity of sewage and effluent a Sewage Treatment Plant (STP) of 12.8 MLD has been proposed
- A Common waste storage areas shall be designated for industrial domestic waste.
- Waste should be segregated at source into hazardous and non-hazardous waste. Further the waste should be segregated into recyclable and rejected waste. Recyclable waste should be sent to licensed traders for recycling and rejected waste should be disposed as per the best industrial practice for particular waste
- Industrial waste generated should be stored on sealed surfaces and should be disposed as per the best industrial practice
- Local environmental bodies shall be consulted for the initiation for the designing and constructing localized landfill for the disposal of process waste.
- No chemical/hazardous raw material should be allowed to spill over the land and should be operated in covered systems
- Excessive packaging should be reduced and recyclable products such as aluminum, glass, and high-density polyethylene (HDPE) should be used where applicable.
- Organic waste should be resold to value addition industries or can be fed to live stock.
- Sludge generated in effluent treatment plant should be sold to authorized recyclers or could be dried into cakes and used as manure for green belt

11.10. Impacts due to Dredging

11.10.1. Pre-Construction and Construction Phase

The preconstruction and construction phase will involve backfilling of the land to a level higher than the High Flood Line (HFL) of the adjacent Padma River with respect to the site to keep the eventual site ground level more than the high flood level ever recorded. It is proposed that sand for the backfilling operations will be obtained by dredging from the Padma River. According to Bangladesh Water Development Board (BWDB) the bank of Padma River towards Jajira side is prone to soil erosion. The possible physical impacts due to dredging are as follows:

- Resuspension of bottom sediments, thereby increasing turbidity
- Riverbank erosion
- Dispersion from and accumulation into bottom sediment of toxic substances
- Reduced primary productivity due to decrease in the depth of the euphotic zone
- Impact on habitat and breeding/spawning ground of fishes and other aquatic fauna due to bottom disturbances
- Temperature alteration
- Increase in nutrient levels

- If the dredged material is polluted, it may affect the ecosystem, and fisheries activities at both dredging and dumping locations

The extent of impacts due to dredging activity is highly varied and site specific, depending upon a number of factors outlined in the next page:

- Method of dredging and disposal
- Channel size and depth
- The size, density and quality of the material
- Background levels of water and sediment quality, suspended sediment and turbidity
- Current direction and speed
- Rate of mixing
- Presence and sensitivity of animal and plant communities (including birds, sensitive benthic communities, fish and shellfish)

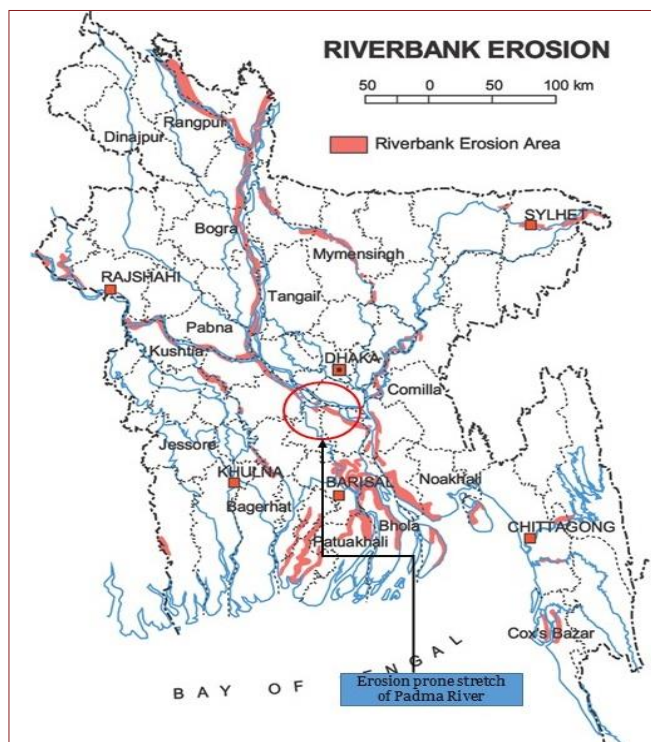
Mitigation Measures

- Prior to dredging activity, analyze the soil sample to prevent impacts on the receiving environment as a result of mismatch in soil characteristics;
- During dredging activity, physical barriers such as silt screen/ curtains should be employed to prevent the spread of suspended sediments;
- Maintain the extent of the turbidity plumes close to the dredging and disposal areas to minimize impacts on aquatic fauna habitat;
- Visually inspect for aquatic life and terrestrial organisms and stop dredging activity in case of any organism in the vicinity;

It is recommended that material for the backfilling should be sourced from borrow sites rather than through dredging. In the instance if dredging is necessary, it is recommended to adopt river bank protection work in the dredging stretches and along the bank of Padma River to protect the site and surrounding area from flooding.

As an alternate of dredging along Padma River, Borrow areas are required to be identified in order to supply earth materials for backfilling activity. At the time of selection of borrow areas priority should be given to barren or non-agricultural land. The site should be devoid of major trees /vegetation cover. The borrow sites should also be away from ecologically sensitive areas and surface waterbody to avoid impact on water quality due to borrow site operation. On completion of borrowing activity the site should be restored to its original condition or should be redeveloped (like pond) as per the need of local community/site owner.

Figure 92: River bank erosion map of Bangladesh



Source: Prime Minister's Office Library

11.11. Impact on Air Environment

11.11.1. Pre-construction phase

The pre-construction phase will involve site clearance activity for development of EZ, access road and water supply system which will lead to dust generations and other fugitive emissions. But these emissions will be localized and have impact for short duration only during clearance activity. The proposed site has very less number of trees. Precisely the trees are present in the habitation area. Majorly the proposed site is agricultural land and covered by crops since at present agricultural activity is going on.

Mitigation Measures

To minimize the dust generation, water should be sprinkled regularly at the site and low Sulphur diesel should be used in land levelling equipment to control the SO₂ emissions.

11.11.2. Construction Phase

Air quality will be impacted from the following sources during the construction phase:

- Fugitive dust emissions from site clearing, excavation work, cutting and levelling work at sites and access/internal roads, stacking of soils, handling of construction material, transportation of material, emission due to movements of vehicles, plying of heavy construction machinery etc.;
- Vehicular emissions due to traffic movement on site and on the connecting roads;
- Exhaust emissions (containing PM₁₀, PM_{2.5}, SPM, CO, HC, NO_x, SO₂ etc.) from construction machineries, other heavy equipment as bull dozers, excavators, compactors; and
- Emissions from diesel generator required for emergency power during construction period.

Mitigation Measures

To mitigate the construction impacts, project proponent should have contract agreements with contractors as well as sub-contractors to ensure implementation of mitigation measures.

- Sprinkling of water at construction site and haul roads
- Transportation of Raw materials in covered trucks
- Construction of barricades between the settlements and the site to minimize travel of fugitive emissions towards settlements
- Shrub Plantation (native species) on either side of the approach road to mitigate the fugitive dust emissions
- Construction vehicles and machinery should be regularly serviced and check for pollution control
- Prohibit usage of adulterated fuel in vehicles for running construction equipment and vehicles
- Covering the scaffolding (in case of administration building) to reduce the dust emission in outside environment
- Speed of vehicles on site is recommended to be 10-15 km/hr which will help in minimizing fugitive dust emissions due to vehicular movement

11.11.3. Operation Phase

Post development of the EZ & setting up of industries, the impacts on the air quality of the area will be from (a) air emissions from the proposed industries and (b) emissions from increased vehicular movements. These altogether may have overall negative impact on the air quality of the site and the nearby areas. For this EZ Food & Beverage, Pharmaceutical, Chemical Fertilizer, Light Machinery industries are proposed. It is envisaged that particulate matter, Sulphur dioxide, ozone, oxides of nitrogen and carbon monoxide will be generated due to increased vehicular movement, DG Operation and various industrial operations. Air emissions due to various industrial operations are furnished in below table-

Table 110: Emissions from various industries

Industry Type	Nature of Emissions
Food & Beverage Sector	<p>Air emissions from food processing industry contains some volatile organic compounds but do not contain any hazardous compounds. These industries emit low process-air emissions. Most of the processes uses electrical power and rarely emit harmful compounds to environment. But air emissions from effluent treatment plant of these industries are a major concern.</p> <p>Beside this, Chlorofluorocarbons (CFCs) used as cooling agents in many refrigeration and cooling systems in food and beverage industries are having potential to damage ozone layer of atmosphere. Emission from boiler (if applicable)</p>
Pharmaceutical Sector	<p>Prevailing public concern in respect of air pollution in these industries are odor and toxic emissions. Generation of VOC in the industry caused due to use of varieties of solvents.</p> <p>The major are VOC emissions from reactor vents, man ways, material loading and unloading, acid gases (halogen acids, sulfur dioxide, nitrous oxides). Other probable emitted pollutants from process are N₂, CO₂, H₂ and NH₃. The emission from the process is mainly liberated gases from various reactions.</p> <p>Emission from boiler (if applicable) & DG Stack</p>
Chemicals Fertilizer Sector	<p>Emission from such industries may contain CO, CO₂, NO₂, SO₂, VOCs, Trace Metals (Zn, Fe, Pb, Ni, Cd, Cr), Ammonia, Urea dust, Ammonium nitrate dust, Fluoride etc.</p>
Light Machinery, Equipment and Furniture Sector	<p>No significant air emissions is generated from light machinery industries.</p>

Mitigation Measures

- Provision should be made for peripheral green belt with 2-3 rows of local tree species all along the EZ boundary. Tree species should be selected such that first inside row is of smaller height, middle row of tree is of medium height and last row of tree is of higher height so that green belt formed appears like a cascading canopy.
- Development of thick green belt and organized greens within each industrial plots. Broad-leaved species, which can absorb pollutants, should be planted as they help settle particulates with their higher surface areas along with thick foliage
- Power Generators should be provided with stacks of adequate height (higher than nearest building) to allow enough dispersion of emission.
- Process emission if any should be controlled with the installation of adequate air pollution control systems like Venturi scrubbers, wet scrubbers, Electrostatic precipitator, bag filter etc. as applicable to the individual industry
- All industries should obtain clearance from DoE, Bangladesh as applicable. Air pollution control measures shall be adopted by respective industries in line with DOE permission
- Air pollution monitoring should be carried out quarterly by all industries to check the air pollution level.
- Preference of usage of clean fuel like LPG, low sulphur diesel should be explored

- Odour should be managed at the site using odour suppressant and planting fragrant flowering trees.
- Periodic checkups should be conducted for the workers to reduce exposure levels, rotate the shifts of the workers.

11.12. Impact on Noise Environment

11.12.1. Preconstruction and Construction Phase

Pre-construction phase will involve site clearance activity for development of access road and utilities. The site clearance will involve removal of vegetation and land levelling activities. Operation of different machineries and equipment for construction activities, running of heavy load traffic for construction materials transportation, and regular traffic movement may generate noise during construction period. The heavy equipment, machineries, transportation and earthworks used for the construction activities are the major sources of noise. It is envisaged that there will be an increase in traffic and thereby in traffic noise impacts on the receptors near the approach road from the transportation of equipment, construction materials. A number of settlements located in the vicinity of proposed site are likely to be exposed to higher level of noise due to construction activity if proper mitigation measures are not taken.

Mitigation Measures

The following mitigation measures should be implemented to minimize potential noise impacts during preconstruction and construction phases:

- Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components should be conducted;
- Machinery and construction equipment that may be in intermittent use should be shut down or throttled down during idle time;
- Acoustic enclosure should be provided for the DG set;
- Equipment known to generate noise strongly in one direction should be orientated so that the noise is directed away from nearby sensitive receptors as far as practicable;
- Honking should be avoided;
- Construction work should be carried out only during day time (from 8.00 am to 6 pm);
- Machinery to be used should comply with the noise standards prescribed by DoE.
- To deal with noise exposure by construction workers in construction site, pocket guide by OSHA is helpful.

At individual worker level, the construction contractor should be insisted to provide earmuffs to the workers exposed to high noise levels.

11.12.2. Operation Phase

After development of offsite infrastructure and economic zone, the noise levels may rise due to vehicular movement, DG set, pump sets, Boilers, mechanical and industrial operations, Auxiliary activities like operation of water pumps, booster pumps etc. Operations of ventilation units and fans can also add up to the noise generation. The major noise generating source of food processing industries could be Boiler, Motors and pumps Distillation units etc. Where as in pharmaceutical industries the main sources of noise pollution in the plant are Boiler, Reactors, Air compressors etc. In chemical fertilizer industries noise may generate from turbines compressors, blowers, pumps and reformer furnaces etc. In light machinery industries noise generated mostly due to vehicular and machinery operation. The following mitigation measures are proposed to mitigate the noise pollution during operation phase.

Mitigation Measures

- Pumps should be fitted in close room, preferably acoustic enclosure to reduce the noise generation

- Green buffer should be developed all along the project boundary. Green buffer should compose of the 2-3 rows of plants of variable height and thick canopy so as to form continuous barrier. This will help in reducing the noise level significantly.
- Noise regulators must put a strong mandate and fine on vehicle operators which are not properly maintained, produce noise (silencers not proper).
- All industries should obtain clearance from DoE before establishing industrial unit and should comply with all the conditions mentioned in the letter of environment clearance
- All industries should install the new machinery of modern make which complies with the noise standards prescribed by DoE.
- Job rotations should be practiced for workers in working at noise intensive locations to prevent prolonged exposure to high noise level as it may lead to deafness, fatigue, head ache, nausea and drowsiness. Propose PPEs must be made compulsory for workers working at locations where the intensity of noise is high.
- Acoustic design with sound proof glass paneling will be provided for critical operator cabins / control rooms of individual modules as well as central control facilities.
- Proper greasing, periodic checkups for frictionless movements.
- Honking should be regulated within the economic zone

11.13. Impact on Water Environment

11.13.1. Pre-Construction and Construction Phase

Impact on Surface Water and Groundwater Resource

The total potable water demand for the proposed EZ is 16.02 MLD. Padama River is a perennial fresh water system, which is 3-7 km away from EZ site. It is proposed to provide infiltration gallery/well, collection well and pump house near the river basin at an approximate distance of 5 km from the site to meet the water demand of EZ on a long-term basis. Detailed hydrogeological investigations need to be carried out based on which, a water treatment plant shall be provided near the intake structure.

For the initial demand it is planned to build three to four new bore wells within the proposed site to draw the ground water. Exact location of water intake (i.e., the locations of the tube wells) within the site needs to be finalized during the construction stage.

Impact on Surface Water and Groundwater Quality

The major source of wastewater generation during construction phase is from the labour camp, which will be established for project construction activity. There is a potential for contamination of surface and groundwater resources resulting from improper management of sewage. The storage of used engine oil and lubricants as waste materials has a potential to create impacts if spillage occurs.

The quality of neighboring water bodies including Padma River could also be affected due to surface runoff from contaminated soil (soil contamination due to oil/ fuel spillage and leakages), particularly during monsoon season. The surface runoff carrying the loose top soil will lead to increased sedimentation in the receiving water bodies. Contamination to water bodies may also result due to oil spilling during construction activities and/or surface runoff from the construction site to the adjacent water body. Thus measures are required to be taken to minimize the surface water pollution.

Mitigation Measures

- To avoid excavation activities during rains
- To prevent piling up of excavated soil, raw material and construction debris at site by proper management and disposal

- Construction of storm water drains along with sedimentation tanks with sand bags as partition as barrier for direct flow of run off to river.
- Check dams should be provided to prevent construction runoff from the site to the surrounding water bodies.
- Minimize run-off by using sprays for curing
- Construction of adequate nos. of toilets and proper sanitation system for workers to prevent open defecation along the river banks/water supply lines
- Construction of soak pits/septic tanks to dispose-off the domestic wastewater generated from labour camps to prevent disposal of sewage in surface water bodies. Alternatively collect labour camp sewage and connect to nearby municipal sewers.
- Proper collection, management and disposal of construction and municipal waste from site to prevent mixing of the waste in run-off and entering the water bodies
- Use of licensed contractors for management and disposal of waste and sludge;
- Labourers should be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage will be strictly restricted;
- To prevent surface and ground water contamination by oil/grease, leak proof containers shall be used for storage (preferably in paved area) and transportation of oil/grease
- Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages.

11.13.2. Operation Phase

To cater the industrial water requirement surface water from Padma River will be used. The development of economic zone shall lead to the generation of process and domestic effluent. Liquid waste from the proposed industries will be having potentiality to affect the water quality. The direct discharge of the untreated process and domestic effluent waste will lead to impacts in the surface water quality. Also, it is anticipated that surface run-off may significantly increase post development of economic zone which may impact surface water quality.

Following measures should be adopted during operation phase to minimize impacts of development of Economic zone on water quality:

Mitigation Measures

- Each industry should obtain consent of DoE Bangladesh before construction and operation and should comply to the conditions laid by them
- The Industry should also obtain the consent of the water abstraction limit from DoE, Bangladesh.
- No leachate, waste water and waste material should be stored in pervious unlined area/pond.
- Efficient Rain water Management Plan will be adopted to reduce the impact due to **surface runoff**
- ETP shall be mandatory for all the industries. Every unit shall have its own ETP unit.
- Each industry should treat the effluent and sewage generated by them so as to achieve zero discharge and no untreated effluent should be discharged into any water body
- Sludge should be dried into cakes and used as manure for green belt
- A water balance between the abstracted water and the water diverted for process purposes and domestic purpose shall be developed and based on the volume of the process and domestic waste, ETP and STP shall be designed.
- Monitoring of surface and ground water quality should be done. Analysis of the process waste water should also be done on regular basis to check efficiency of ETP and STP.
- The effluent treated process waste water shall be analysed and the analysed parameter shall be well below the Bangladesh Standard (ECR, 1997).

- Each industry should practice rain water harvesting to minimize the water consumption and reduce run-off from the site

11.14. Impact on Biodiversity

The proposed site location is mostly agricultural in nature and having very few number of trees. Hence tree felling or associated impact like habitat loss of avifaunal/smaller mammals/ reptile community will be minimal. However, due to loss of agricultural field habitat loss of associated invertebrates, reptile, smaller fish etc. is envisaged. Dredging along Padma River is also a threat to habitat and breeding/spawning ground of fishes and other aquatic fauna. Discharge of solid and liquid waste in rivers/waterbodies, shall also impact the aquatic life. Beside winter migratory birds few IUCN red listed species has also been recoded from the study area. Therefore, proper mitigation measures should be taken to minimize the impacts on biodiversity.

Mitigation Measures

- Site clearance and construction activity during monsoon and winter season may be avoided
- Provision should be made for peripheral green belt with 2-3 rows of local fruit bearing tree species all along the EZ boundary. These will attract and support avifaunal and other faunal community
- Suitable green area should be proposed inside the EZ
- Dredging from river may be avoided and possibility of drawing backfill material from borrow area may be explored
- No waste shall be discharged in water bodies
- No infrastructure development activities shall be encouraged close to the river shore line

11.15. Impacts on Occupation Health and Safety

The lack of adequate mitigation measures on the health and safety of the workers will result in accidents and injuries leading to loss of life or property. Following mitigation measures are proposed to ensure safe work place for the construction labor.

Mitigation Measures:

- The project proponent should ensure that the contractor (make part of contractors contract) to have and occupational health and safety plan. The contractor should provide accidental insurance and medical insurance to all the workers.
- The contractor should conduct daily tool box meeting for all workers to discuss potential work related hazards and other safety aspects.
- The contractor should conduct training for all workers on safety and environmental hygiene at no cost to the employees.
- The contractor should maintain first aid facilities for the workers and will instruct and induct all workers in health and safety matters (induction course) including construction camp rules and site agents/foremen will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene.
- Fencing on all areas of excavation greater than 1m deep and sides of temporary works should be observed.
- Workers should be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers.
- Reversing signals (visual and audible) should be installed on all construction vehicles and plant.
- Contractor should be responsible for evacuation injured person to the nearest medical center

- Pertinent H&S trainings should be provided to all the workers with respect to hazards linked to the activities. Additionally, the workers will be informed of precautions to be taken to avoid impacts to the local community;
- Monitoring of the PPE usage can be strengthened, in that, a mechanism can be adopted whereby defaulters receive a warning on non-usage and stringent actions can be taken on subsequent offences;
- Maintain H&S records of occupational H&S incidents, accidents, diseases and dangerous occurrences
- The contractors should ensure H&S standards of labour camps. The labour camps will be established in the proposed site area. Additionally, the representative of project proponent should conduct random spot checks to determine any issues related to improper waste disposal or the living conditions in these camps (i.e. presence of secure shelter and flooring, number of persons per room, number of toilets for the manpower, water availability etc.);
- Strong protocols should be built as part of contractual obligations around zero tolerance of child labour or harassment of women workers and even health and safety aspects. These should also be monitored by supervision and monitoring team.

Individual industries should also adopt best practice as per the industry standards for proper implementation of occupational health and safety.

11.16. Flood Risk

The project site is located within 4.5 Km of Padma River. Based on the stakeholder interactions, the flood level during monsoon season varies from 6 feet to 10 feet depth inside the proposed EZ area. To avoid inundation during monsoon season, minimum land filling of 2 m above the existing natural is considered. It is recommended to adopt river bank protection work in the dredging stretches along the bank of Padma River to protect the site and surrounding area from flooding and erosion.

11.17. Sanitation and Disease Vectors

Potential sanitation and impacts from disease need to be controlled by maintaining hygienic conditions in the EZ area throughout the operational phase as well during construction by implementing appropriate social and health programs for the Project. BEZA should ensure that improvements are made to site sanitation and should implement the mitigation measure below for all operational activities and also that the contractor (during construction phase)/ industries (during operation phase) ensures that:

- Measures to prevent malaria should be implemented by installation of proper drainage to avoid water stagnation, etc.
- Standing water should not be allowed to accumulate in the drainage facilities or along the warehouse sides to prevent proliferation of mosquitoes.
- Temporary and permanent drainage facilities should be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.
- Malaria controls should be implemented in line with social plans for the Project.
- HIV/AIDS awareness and HIV-AIDS education and prevention program should be implemented in line with social plans under the social development work stream.

11.18. Public Consultations

This section provides the stakeholder identification and analysis as well as a brief understanding of the engagement process for the project. “Stakeholder” refers to those who have plausible stake in the environmental/social impacts of the project or activity are ascertained with a view to taking into account all the

material concerns in the project or activity design as appropriate. It is highly desirable for all key stakeholders to arrive at a consensus on sensitive features, impacts and remedial actions. Stakeholder identification was done by examining the potential impacts of the project in terms of:

- ✓ Who may be affected directly (project affected people);
- ✓ Which agencies might have responsibility for the impact management;
- ✓ Which other organizations might have an interest in monitoring proponent activities or have local knowledge to contribute; and
- ✓ Which private/non-government sector entities might face financial and social hardships if the predicted impacts occur

The stakeholders identified in the project comprise of project impacted people, project beneficiaries, various government officials.

The main objective of the consultation process is to minimize negative impacts of the project and to maximize the benefits from the project to the local populace. The objectives of public consultation as part of this project are:

- ✓ Promote public awareness and improve understanding of the potential impacts of proposed projects
- ✓ Solicit the views of affected communities / individuals on environmental and social problems
- ✓ Improve environmental and social soundness
- ✓ Clarify values and trade-offs associated with the different alternatives
- ✓ Identify contentious local issues which might jeopardize the implementation of the project
- ✓ Establish transparent procedures for carrying out proposed works
- ✓ Inform the affected populace about the entitlement framework and to settle problems with mutual consent
- ✓ Create accountability and sense of local ownership during project implementation; and
- ✓ To obtain information on baseline environment

11.18.1. Methodology of Stakeholder Consultations

Different techniques of consultation with stakeholders were used during project preparation, viz., in-depth interviews, public meetings, group discussions etc. to understand the socio-economic profile of the community and the affected families, baseline environment, environmental/social concerns etc. A two-fold Stakeholder Consultation Meeting (SCM) was carried out simultaneously during the social review. In this regard, the SCMs were conducted firstly with both the primary and secondary stakeholders and later, affected persons within the occupation and gender based groups were consulted through Focused Group Discussions (FGD). Two FGDs were carried out at the Project area (Molla kandi at Sener Char village and Boati Kandi at sener Char village). FGDs were conducted at different locations of the Project areas with three different occupational/gender groups, e.g., Farmers, Land Owner, Youth Group and women.

11.18.2. Level of Consultations

Public consultations in the form of institutional and focused group discussions were carried out during the period from 10th January 2017 till 7th and 8th August, 2018. Types of consultations done with various participants using various tools including, interviews with government officials, focused group discussion etc. are presented in below table:

Table 111: Types of Consultations

Level	Type	Key Participants
Institutional	Stakeholder Meeting	Various Govt. Officials
Community	Focused Group Discussion	PAP, Women, marginalized people

11.18.3. Institutional Stakeholders Consultation

Consultation conducted at institutional level with various Government Officials are furnished in below section.

Date of Meeting: 10 January, 2017

Location of Meeting: Upazila Nirbahi Officer's Office, Dy. Commissioner's office and RHD office in Jajira and Shariatpur

Officials Met:

Name of Person	Designation/Department	Contact Details	Date of Consultation
Md. Mahmudul Hossain Khan	Deputy Commissioner, Shariatpur	01961133501	10-Jan-17
Rahela Rahmat Ullah	UNO & Executive Magistrate, Jajira	01961133523	10-Jan-17
Zakir Hussain	Executive Engineer (RHD)	01730782810	10-Jan-17
Mahmud Hassan	Sub-Divisional Engineer (RHD)	01730782811	10-Jan-17
Md. Sohrab Ali Biswas	General Manager (Rural Electricity Board)	01769-400071	10-Jan-17
Md. Shah Alam	Dy. General Manager (Technical) (REB)	01769402090	10-Jan-17
Md. Shafiqul Islam Sheikh	Executive Engineer (Water Development Board)	01734601836	10-Jan-17
Pankaj Chandra Debnath	Assistant Commissioner (AC Land)	-	10-Jan-17
Md. Shahjalal	Surveyor (AC Land's Office)	01712277043	10-Jan-17
Asyadullah	Upazila Social Service Officer (Department of Social Services)	-	10-Jan-17
Md. Habibur Rahman	Upazila Agriculture Officer (Department of Agricultural Extension)	-	10-Jan-17
Bimalendu Sarkar	Upazila Engineer (Local Government Engineering Department)	-	10-Jan-17
Swapan Matubber	PIO (Department of Disaster Management)	-	10-Jan-17
Kamrul Hasan	Assistant Upazila Education Officer (Upazila Education Office, Jajira)	-	10-Jan-17
Nuruddin	AJE (REB)	-	10-Jan-17
Nazimuddin	Upazila Rural Development Officer (Bangladesh Rural Development Board, Jajira)	-	10-Jan-17

Salient Points of Discussion

At the onset, the officials from Upazila Nirbahi Office welcomed the idea of developing economic zone in the region and country by BEZA and expressed their consent on the same. They were of the belief that an Economic Zone in Jajira would bring in employment and prosperity in the region. The UNO also emphasized on the good connectivity the site offered, once the construction of Padma Bridge is completed. Discussions were held on various developmental aspects of the proposed EZ like land acquisition status, utility availability, road connectivity etc. The discussion was concluded by a visit to the project site to gain an on-ground understanding of the various issues. Some of the key features discussed were as follows:

It was understood that the site is a contiguous land parcel with access to zila road, Z8012 around 2-3 km from its western and southern boundary. There is a water channel along the northern boundary of the EZ site and a zila road, Z8065 along the eastern boundary of the site. A few village roads cross the site currently and there are some hutments near the western boundary of the proposed EZ site location.

Currently, the proposed EZ site location is under cultivation with 2-3 crop rotation being practised on the land. It is a low lying land which gets inundated during monsoons with water rising to around 6-10 feet over the land.

Water availability is not an issue near the site as there are river channels which flow in the vicinity of the site location and also ground water is available at a depth of 40-50 feet. Padma River flows around 4-5 km north of proposed EZ site boundary, which can serve as an important source of water.

Currently Jajira has 2 operational 33/11 KV substation with a capacity of 10 MVA each, these substations can be upgraded to 40 MVA each on basis of requirement. These substations are around 3 km from the proposed EZ site location. Currently the demand of power from these substations is of around 8 MVA, rest of the electricity can be provided to the EZ site. There are 2 more 33/11 KV substations under various stages of construction on the Eastern and Western boundaries of the site location. These substations will also be of 10 MVA capacity, upgradable to 40 MVA. These substations are currently drawing power from grid located at Madaripur town having a capacity of 125/191 MVA. However another grid having capacity of 160/240 MVA is under construction at Shariatpur town around 20 km away. Once ready, this grid will supply power to the substations in Jajira.

11.18.4. Focused Group Discussions (FGD)

In spite of hindrance faced due to agitation of the local populace on the site area, some people of the village attended the FGD session and shared their valuable opinion. At the beginning of the session, the villagers wanted to know the extent of land to be acquired with delineation of proper boundary of the acquired land.

The Focused Group Discussions (FGD) were carried out with different group at the proposed EZ area on 6th, 7th and 8th August 2018. PwC personnel discussed about the future developments and benefits to the community due to the development of the EZ. Due to the agitation of the local populace, the FGD session were not formal. The details of the Focused Group Discussions are furnished below and the record of attendees have been attached in Annexure.

Table 112: Details of Focused Group Discussion

Stakeholder s Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
Land Owners, Farmers, Youth Group and Social Elites (Number of attendees could not be counted due to	Affected and adjacent residential settlements	<ul style="list-style-type: none"> Loss of Agriculture land Loss of Livelihood 	<ul style="list-style-type: none"> Acquisition of cultivable agricultural land should be avoided for the development of economic Zone. The economic zone needs to be developed over barren land. The agricultural land is significant livelihood income 	Employment opportunities for the youths to be provided on a priority

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
informal setting of the FGD)		<ul style="list-style-type: none"> • Employment opportunity • Development of social infrastructure • Skills training to enhance the competency • Priority for local population 	<p>source and employment generation mode for the inhabitants. Acquisition of the agricultural land will render the inhabitants unemployed. Also, most of the inhabitants are illiterate which will further attenuate the difficulty in finding employment opportunities. Therefore, without making arrangement for employment of these people, agricultural land should not be acquired for EZ.</p> <ul style="list-style-type: none"> • If the project is developed, various job opportunities may be created, however there should be sufficient skill development training that needs to be imparted. The skill training should focus on soft skills development, community-oriented courses, craftsman training (for semi-skilled opportunities • The training system should lead to train young people in employable skills who are open to immediate employment opportunities • The project affected youths should be prioritized for employment opportunities 	
Women Group (Number of attendees could not be counted due to informal setting of the FGD)	Affected and adjacent residential settlements	<ul style="list-style-type: none"> • Loss employment • Loss of homestead gardening • Loss of social benefit • Equal opportunity of employment 	<ul style="list-style-type: none"> • Apart from men, women also participate in farming, which is economically profitable. If these agricultural lands are acquired, these women stand to lose working opportunities. • There should be sufficient scope for women's employment for the development of the EZ. There should be equal opportunity for women as well as men. • Ensure the safety and security of the people especially the women considering the large influx of migrants during the construction activities of EZ. 	<p>Women to be provided with equal opportunities.</p> <p>No gender bias decision should be made</p>

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
		<ul style="list-style-type: none"> • Keeping in mind the opportunities to the affected persons • Ensure Family security 		

Figure 93: Focused Group Discussions



FGD with land owners and farmers



FGD with women group at the project site

11.19. Key takeaway from Stakeholder Consultations

For the development of EZ, the authority of BEZA proposes to obtain 532.14 acres land. 398.075 acres of this land will involve acquiring private land while the rest of the land is khas (government owned), alluvium (government owned) and waterbody (which was not included DC proposal sent to BEZA). **Total land cost obtained from Govt. mouza rate was found to be BDT 4.01 Billion** (including 200% premium for private land). On the other hand, CMP survey result indicates difference between CMP and CUL, and the CMP survey findings recommended land cost to **be BDT 4.16 Billion** million (excluding registration cost and stamp duty). According to AC land office records, the proposed land for acquisition is mostly agricultural/Nul land. More than 2,000 persons are dependent on the land proposed for EZ development. A detailed social impact assessment (SIA) should be carried out and Resettlement Action Plan (RAP) needs to be prepared for the PAPs in accordance to World Bank’s safeguard standard and Government of Bangladesh’s Social and Resettlement rules to assess the standard of living of this population, and hence arrive at an estimate of the losses that they would have to face in terms of fixed assets and loss of livelihood opportunities. The SIA report may be further used for putting together

a resettlement action plan to diminish the adverse impacts to the affected population, as well as provide compensation as required. The SIA report can also be used to understand the existing social fabric amongst the affected population, and this can deepen the understanding of what an R&R plan will require.

Summary of Environmental Impacts

- Impact due to dredging from Padma River: It may cause erosion of river bank, bottom disturbance, impact on habitat of fish, benthos and other aquatic fauna
- Site gets flooded during monsoon: backfilling of the land to a level higher than the HFL of Padma River is proposed. During construction /operation stage, surface runoff from EZ area may contaminate nearby surface water bodies if proper mitigation not taken
- Loss of Waterbody: Acquisition of 6.905 acres of land categorized as waterbody out of total proposed acquisition i.e. 532.14 acres
- Pollution: Likely impact on neighbouring settlements due to noise generation, Air emission and effluent discharge during construction/operation stage if proper mitigation measure not taken

11.20. Environmental Management Plan and Monitoring Indicator

The environmental impacts associated with any development project are eliminated or minimized to an acceptable level through development of appropriate mitigation measures based on most suitable techno-economic options. The Environmental Management Plan (EMP) is a well-established tool to ensure effective implementation of the recommended mitigations measures throughout the subsequent project development stages. The EMP also ensures that the positive impacts are conserved and enhanced. An EMP provides location and time specific actions to be taken with defined responsibility.

11.20.1. Institutional Arrangement

BEZA has developed Environmental Social Management Framework (ESMF²²⁶) with the help of World Bank. The institutional arrangement of EZ shall be aligned as per this framework. Proposed EZ will have an Environmental and social cell which will coordinate with site engineers and PMC.

Overall Project Implementation Arrangements

The overall management of the project will be carried out by EZ which is the project implementing unit (PIU).

Institutional Set Up For Environment Management

The institutional arrangements for the implementation of various aspects of ESMF and environment management of the proposed project envisaged to be implemented as part of the Private Sector Development and Support Project (PSDSP) comprise the following.

- Project Environment Cell (PEC) at PIU to ensure adequate integration of environment management measures in the design phase and supervise implementation of ESMF and specific requirements of EMP
- Environment Management Unit (EMU) at EZ to implement EMP and other regulatory requirements during construction & operation phase of EZ.

Project Environment Management Cell (PEC) at PIU

The Project Implementation Unit (PIU) will establish a Project Environmental Cell (PEC) headed by a 'Manager – Environment' and supported by environmental engineers. The PEC will function to:

²²⁶ <http://www.beza.gov.bd/wp-content/uploads/2015/10/ESMF-of-BEZA.pdf>

- Supervise implementation of ESMF throughout project implementation period;
- Ensure integration of the EA and the EMP measures into the sub-project design and implementation plans such as contract documents, maintenance contracts, tenant lease agreements, etc;
- Supervise the implementation of the mitigation measures by the Master developers / Contractors;
- Assist the engineering staff and other PIU staff in addressing environmental issues during planning, design and implementation of the sub-projects;
- Prepare periodic progress reports on the implementation of the EMP throughout the project period.

Environment Management Unit (EMU)

In order to implement various environmental management measures at EZ, the master developer / contractor / operator will set up an Environment Management Unit (EMU). The EMU will consist of environmental engineers with relevant experience on environmental issues associated with EZ. The EMU will function all through construction and operation phase of the EZ and perform the following functions.

- Identify regulatory requirements of the sub-project and initiate necessary actions / studies to ensure compliance to the same;
- Co-ordinate with DoE and PIU and ensure securing SCC and ECC as applicable for the project(s);
- Co-ordinate with the contractors / sub-contractors and all other agencies involved in the development and operation of EZ / EPZ and ensure that all the requirements of EMP are fully complied;
- Ensure that all the common environmental infrastructure in EZ / EPZ is operated and maintained in compliance with the regulatory requirements of GoB;
- Liaise with individual enterprise/tenants and ensure that all environmental management conditions of the tenant lease agreement are fully complied;
- Prepare regular reports on environment management and submit to PIU/GoB.

11.21. Monitoring Indicators

The physical, biological and social components which are of particular significance to the proposed project are listed below:

- Air quality
- Water quality
- Noise levels
- Soil quality
- Solid & Hazardous Waste Management
- Plantation success / survival rate
- Soil Erosion
- Siltation
- Contamination of area surrounding to the project site
- Record of accidents
- Recorded public grievance

These indicators will be evaluated periodically based on the monitoring results, baseline conditions, predicted impacts and mitigation measures.

11.22. Monitoring Plan

The objective of environmental monitoring during the preconstruction, construction and operation phases is to compare the monitored data against the baseline condition collected during the study period to assess the effectiveness of the mitigation measures and the protection of the surrounding environment based on national standards. A monitoring schedule has been sketched based on the environmental components that may be affected during the various phases of the project and is given below.

Table 113: Environmental Monitoring Plan

S. No	Aspect	Source of Impact	Monitoring Methods and Parameters	Frequency	Executing Agency	Enforcement Agency
1.0	Preconstruction and Construction Phase					
1.1	Local Manpower Absorption	Construction Works	Contractor's report No. of people working in the project	Monthly	Contractor	BEZA & PMC
1.2	Soil Erosion	Excavation, disposal, cut & fill and land clearing activities for site levelling and internal roads, disposal	Survey & observation; Extent and degree of erosion; Structures for controlling soil erosion	Monthly	Contractor	BEZA & PMC
1.3	Greenbelt Development	-	Survival rate of species planted; Density of vegetation	Half Yearly	Contractor	BEZA & PMC
1.4	Air Quality	Transportation of construction materials, road construction, construction of utilities	Survey & observations; Levels of PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO	Once in each season for two weeks at 3 locations	Contractor	BEZA & PMC
1.5	Waste Management	Restoration of disposal sites and construction areas	Status of protection measures	Quarterly	Contractors	BEZA & PMC
1.6	Noise Level	Noise levels compliance with respect to industrial standards	Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time at 6 to 8 locations	Monthly	Contractors	BEZA & PMC
1.7	Drinking Water	Contamination due to seepage	All physio-chemical & biological parameters	Monthly	Contractor	BEZA & PMC
1.8	Surface Water	Transportation of construction materials, various construction works, runoff from camp	All physio-chemical & biological parameters	Monthly	Contractor	BEZA & PMC
2.0	Operation Phase					
2.1	Noise Levels	Noise levels compliance with respect to industrial standards	Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time at 6 to 8 locations	Monthly	Individual Industrial Units	BEZA
			Plant periphery and near noise generation sources	Monthly	Individual Industrial Units	BEZA
2.2	Biological Environment		Survival rate of plants and shrubs	Quarterly	BEZA	BEZA

S. No	Aspect	Source of Impact	Monitoring Methods and Parameters	Frequency	Executing Agency	Enforcement Agency
		Horticulture/ Greenbelt Development	Survival rate of plants and shrubs at individual unit	Quarterly	Individual unit	BEZA
2.3	Ambient air quality	Ambient air quality levels compliance with respect to industrial standards	Ambient air quality monitoring at individual industries – Monitor levels of PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO	Monthly	Individual Industrial Units	BEZA
2.4	Ground /Drinking water quality	water quality levels compliance with respect to industrial standards	Bore-wells installed/ Drinking water source at site (All physio-chemical & biological parameters)	Monthly	Individual Industrial Units/BEZA	SEZL
2.5	Surface Water quality	To cross check accidental contamination	Madhumati River (All physio-chemical & biological parameters)	Quarterly	BEZA	BEZA
2.6	Soil Erosion	Padma River	Survey & observation;	Monthly	BEZA	BEZA
2.7	Ecological Assessment of surrounding area covering 5 Km radius	Various construction activity	Status of floral & Faunal community, Species richness, species diversity,	6 monthly (winter and monsoon)	BEZA	BEZA

11.23. Community development plan

It is recommended the EZ owners to involve the local community during the project development. The EZ owner/its contractors may recruit local workforce to the extent possible during construction phase. The EZ owner would identify technically qualified unemployed youth around the project location and other nearby areas, and employ as far as practical. The EZ owner should form a forum/ association/ trust along with its industrial units to look after community development activities of EZ. All the industrial units should periodically contribute to this Trust. The Trust would represent EZ and its industries for all matters related to community and its development. This would act as interface between EZ and community. The Trust should encourage its industrial units to recruit local unemployed youth in the jobs during operational phase. For this if required arrange training for the local people to develop skilled manpower required if sufficient skilled manpower is not available to carry out technical work in the industrial units during operational phase.

The Trust will organize a community advisory group involving local representatives, representatives from EZ industries and neighbouring industries; that would help them in finding ways to participate with its neighbors in addressing socio-economic concerns. With the advice of its community advisory panel, local officials, and other key individuals and groups, the Trust along with its constituent industries may sponsor appropriate programs and projects to benefit its community as a whole.

Some specific community development programs that could be considered by the Trust in coordination with other industries in the locality are suggested here:

- Conducting awareness programs in surrounding villages on health impacts due to environmental pollution (air, noise, water, solid waste, etc.), and precautions to be taken to minimize health impacts.
- Conducting periodic health check-ups to the EZ (including industries) staff and in the surrounding villages to identify pollution related diseases.

- Encouragement to residents in the nearby localities for self-employment ventures, such as by assisting them in arranging micro finances to develop them as artisans/ skilled personnel.
- Periodic training programs on health and sanitary education, women and child development, and income generation schemes.
- Participation in improving the existing medical and educational facilities of the area - for this purpose, it is suggested that the Trust provide funds for facilities improvement (providing toilets, furniture, additional space creation, any other needed) to the local hospitals and schools
- Development of greenbelt/greenery or tree plantation in the nearby vacant government lands to build a green and clean environment in the surrounding areas and to reduce pollution impacts to some extent.
- Sponsoring fellowships to students in surrounding villages to encourage them to go for higher education
- Construction of a hospital in collaboration with other industries to improve health status
- Conduct or sponsor camps to clean up river ghats, jetties and terminals in the surrounding areas.

11.24. Compensation Plan

For the development of EZ, the authority of BEZA proposes to acquire 532.14 acres land. The proposed land parcel is spread across four Mouza's in Jajira Upazila. The proposed land for acquisition is mostly agricultural land. The stakeholders' discussion with the local farmers and Upazila Agricultural Officer indicated that, crop rotation is being practiced in the region. Three crop cultivations and two crop cultivation are being predominantly undertaken. Based on Assistant Commissioner land office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the landowners. The project will impact above 2 household structure which are constructed on private lands. All the agricultural lands falling within the site boundary shall be acquired by BEZA and properties located inside shall be affected. Hence proper compensation based on present market rates to be provided to the PAPs. Based on stakeholders consultation meeting, the total number of project affected persons (PAPs) are higher than 2000 directly and indirectly. A Resettlement Action Plan needs to be prepared.

11.25. Emergency Preparedness Plan (Contingency Plan)

In order to be in a state of readiness to face adverse effects of accidents, an emergency preparedness plan is required to be prepared which includes on-site and off-site emergency plan by the individual industry and industrial estate.

The Emergency Preparedness Plan will have the following minimal components:

- Accidents preventions procedures/ measures
- Fire prevention planning and measures
- Fire water storage and foam system
- Accident/emergency response planning procedure
- Grievance redressal mechanism
- Emergency control centre
- Emergency information system with role & responsibility and command structure
- Recovery procedure
- Assessment of damages and rectification
- Evaluation of functioning of disaster management plan
- Accident investigation
- Clean-up and restoration

11.26. Cost of EMP

The cost of EMP given here includes only that for the CETP, Environmental Monitoring, Audit, and greenbelt development. The costs are approximate and need calibration at the time of detailed design and estimation stage.

Table 114: Cost for EMP Implementation

S. No	Components	Unit Cost (Tk)	Cost (million BDT)
A	Fixed Cost		
A.1.	Construction Phase (6 Years)		
A.1.1.	PPEs for staffs of Project Proponent	40,000/year	0.24
A.1.2.	CETP/STP construction	To be covered under engineering cost	-
A.1.3.	Environmental Monitoring (Quarterly) from site and surrounding area Ambient Air Ambient Noise Surface Water Ground/Drinking Water Soil Quality	400,000/Quarter	9.60
A.1.4.	Greenbelt along the boundary and plantation along the roads	Lump sum	9.00
A.1.5.	Flora and Fauna study	Lump sum	1.50
A.1.6.	Environmental Audit (Half Yearly)	50,000/half year	0.60
A.1.7.	Environmental Specialist - Full Time	50,000/year	3.00
A.1.8.	Social Analyst- - Full Time	450,000/year	2.70
A.1.9.	occupational health specialist and a safety specialist- Full Time	450,000/year	2.70
A.2.	Fund for proposed community development activities	Lump sum	7.50
Total Fixed Cost (BDT million)			36.84
B	Recurring Cost (Yearly)		
B.1.	Operation Phase (per year)		
B.1.1.	PPEs for staffs of Project Proponent	50,000/year	0.05
B.1.2.	Solid waste bins for common areas	20,000/year	0.02
B.1.3.	CETP/STP operation	To be covered under project cost	-
B.1.4.	Environmental Monitoring (Quarterly) from site and surrounding area Ambient Air Ambient Noise Surface Water Ground/Drinking Water Soil Quality	500,000/Quarter	2.00
B.1.5.	Maintenance of Green Belt	Lump sum	0.75
B.1.6.	Environmental Audit (Half Yearly)	60,000/half	0.12
B.1.7.	Environmental Specialist - Full Time	600,000/year	0.60
B.1.8.	Social Analyst- - Full Time	550,000/year	0.55
B.1.9.	occupational health specialist and a safety specialist- Full Time	550,000/year	0.55
B.1.10.	One CETP/STP In charge	500,000/year	0.50

S. No	Components	Unit Cost (Tk)	Cost (million BDT)
	Total Yearly Recurring Cost (BDT million)		5.14

* Monitoring cost at individual industry level has not been covered

11.27. Conclusion and Recommendation

Environmental review indicates that the overall the impacts from preconstruction, construction and operation phase have limited adverse environmental impacts, and can be readily addressed through wise mitigation measures as suggested as mitigation. BEZA will invest in land and related off-site infrastructure development so as to make zone accessible and resourceful. Thereafter economic zone development will be responsibility of private developers. The off-site facilities proposed to be developed by BEZA including development of administration building, boundary wall, electrical supply, and access road. The project falls under Red category as per ECA, 1995 and requires prior environment clearance from DoE, Bangladesh.

The recommendations made for the project development on the basis of Environmental and Social Review study are given below:

- A detailed Environmental and Social impact assessment should be carried out by BEZA prior to any site preparation/construction activity and prior environment clearance certificate from DoE, Bangladesh should be taken
- Proposed environment management plan should be implemented strictly during preconstruction, construction and operation phase of the project.
- Green area development should be carried out
- Proper training of maintaining environment, health and safety should be given to Project management unit in preconstruction, construction and operation phase
- Provision of garland drain, thick green belt, ETP, STP, segregated storm water shall be adhered to.
- Environmental monitoring should be conducted as suggested in environment management plan
- Separate environment impact assessment study is to be carried out by developer for whole zone before developing the EZ.
- Ecological survey should be conducted before developing the EZ.

12. Financial Modelling

12.1. Purpose and Objective

Establishing of economic zone regime in Bangladesh is an effort by the GoB to boost manufacturing activity and employment in the country. BEZA intends to attract manufacturers who are interested in setting up manufacturing plants in Bangladesh through development of plug and play infrastructure, industrial land, supply of utilities (water, power and gas), transport connectivity and business friendly policies.

However, in order to develop the infrastructure it is paramount to understand the financial costs involved in developing such infrastructure and the expected returns that could be expected from operating economic zones. This chapter assesses the financial feasibility of developing the proposed economic zone which has been determined based on net financial benefits under different scenarios (conservative, base and aggressive) of land uptake in the proposed EZ and level of cash flows accruing to the developer. The rate of land uptake has been captured in the demand forecasting chapter of this report.

The major sources of revenue accruing to the developer of this proposed EZ has been considered from (1) lease rental for land uptake and (2) charges on utility (power, water, gas, effluent) provided to manufacturers. In addition, the developer could earn revenue from support amenities such as leasing out the land plot for logistics zone and commercial projects, and from economic zone service fees charged from the industrial tenants. In addition to the capital expenditure for developing this project, the developer also needs to incur operational expenditure towards operation and maintenance (O&M) of this project. Assumptions with respect to inputs for the model taken with due consultations with BEZA officers have been listed out in the later part of this chapter.

This model is developed to analyze revenues generating sources and consequently Internal Rate of Return (IRR) & Debt Service Coverage Ratio (DSCR) to the PPP developer of this economic zone. In this case, BEZA shall transfer the land to the PPP developer (preferred bidder selected through competitive bidding) on leasehold basis and develop off-site infrastructure as condition precedent.

While analyzing the returns accrued from the above stated scenario, impact assessment of the following project structuring options will also be undertaken:

- BEZA acquiring equity stake (in lieu of providing EZ land to the PPP developer) in the Special Purpose Company (SPC) formed by the developer.
- BEZA acting as a developer of the Economic Zone i.e. BEZA undertaking construction and operation of the EZ.

12.2. Methodology of Financial Modelling

The financial model created as a part this engagement takes into consideration financial return to the private developer when the developer is selected by BEZA to finance, develop and operate the EZ

This scenario captures the rate of return earned by the developer after considering the costs incurred and revenue generated over a period of 50 years.²²⁷ Following table captures the key responsibilities of the private developer in this project.

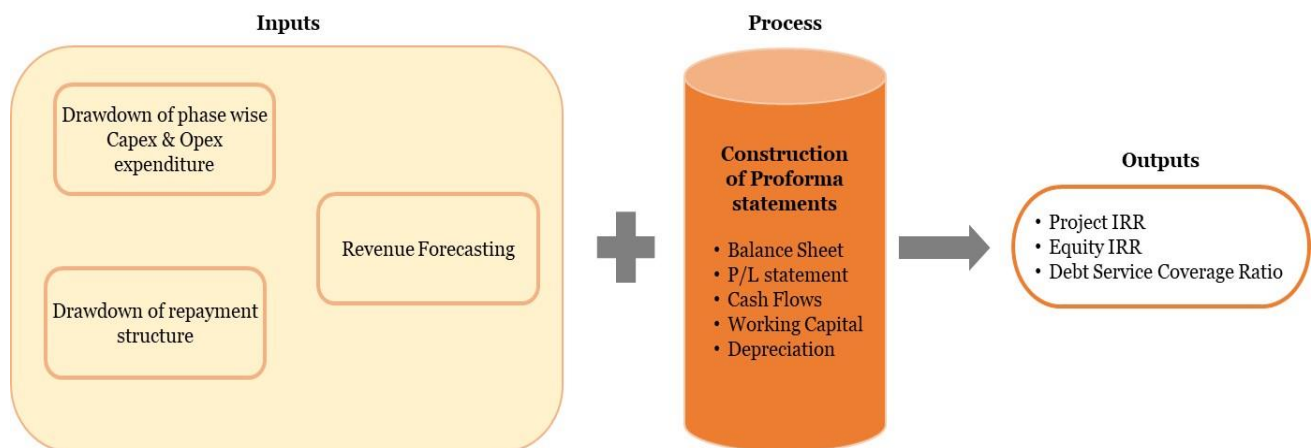
²²⁷ As per the Governing Board of BEZA approved guidelines

Table 115: Responsibilities of private developer

Aspects	Private Developer through PPP route
Land acquisition and ownership	BEZA would acquire the land parcel and transfer the land parcel to the private developer on leasehold basis
Off-site infrastructure development	Responsibility of BEZA as condition precedent
On-site infrastructure development	Responsibility of the private developer
Financing	Responsibility of the private developer
O&M	Responsibility of the private developer

To have a robust model in place, an exhaustive list of assumptions has been developed which duly indicates all the inputs considered for determining the expected return on the investment. Consent has been obtained from BEZA officers about these assumptions. A graphical diagram depicting the functionalities of financial model is shown below.

Figure 94: Process flow of the Financial Model



Source: PwC Analysis

Inputs

A quarterly model has been developed to depict the capex and opex expenses along with debt (both commercial borrowing and concessional loan) drawdown structure, in order to have a granular insight into the capital cash outflows. Revenue Forecasting has been done on an annual basis to understand the cash inflows accruing to the developer through lease of industrial land, Standard Factory Buildings (SFBs), support amenities like Vocational Training Centre, Child care and healthcare units, commercial space, logistics zone etc., surcharge on supply of utility services (like water, power, gas, and effluent treatment), and EZ service fees.

Process

Considering the expenses and revenue sources above, pro-forma statements have been calculated which captures the assets, liabilities, profits/loss and cash flows accruing to the developer. This process forms the backbone of the financial model which is used to determine the returns to the developer.

Outputs

As a measure of calculating returns to the developer on its investment in this project, parameters that have been considered are Rate of Return to providers of capital (debt + equity) i.e. project IRR, Rate of Return to providers of Equity i.e. equity IRR, and Debt Service Coverage Ratio (DSCR) of the cash flows.

Three scenarios (viz. conservative, base and aggressive) have been considered in this model based on the anticipated occupancy (land demand uptake) of the proposed economic zone in order to make provision for a dynamic investment climate. These scenarios would assist the developer in assessing the range of expected return that it could anticipate through its investment in the proposed EZ.

Aggressive case assumes macro-economic conditions of Bangladesh and the region are improving; Potential infrastructure projects are commencing prior to Commercial Date of Operations (CoD). Base case assumes macro-economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; potential infrastructure projects are commencing as scheduled. Conservative case considers macro-economic conditions of Bangladesh and the region are showing declining trend; potential infrastructure projects are delayed.

The broad level commercial aspects considered while developing this model are –

- Economic zone developer is responsible for financing, constructing and developing the project site and consequently the O&M.
- Complete ownership of the land demarcated for this project belongs to BEZA. The private developer who would be contracted to develop the EZ would be required to pay BEZA an upfront fees, annual fees and a share of the gross revenue during the concession period for developing and operating the EZ.
- Cost of land acquisition has been considered to be the prerogative of BEZA and not the private developer.
- Construction of the EZ site would take place in 3 phases, each phase is of 2 years.
- The project would be financed by developer's own equity and loans from commercial lenders & financial institutions (i.e. concessional loan).
- The developer will market the plot to industrial units.
- The developer will enter into lease agreement with the industrial units. These industrial units will be the end users/tenants at the plots in economic zone.
- Major sources of revenue earned from economic zone operations are: (i) land lease rental from land plots, (ii) land lease rental from standard factory buildings (SFB), (iii) revenue from support amenities (such as logistics zone, healthcare, vocational training institute, and commercial space), and (iv) mark-up on utility connections.
- Sources of revenue for providing utility connections to the developer from economic zone include:
 - Power and Water tariffs from tenants
 - Water Treatment and Effluent Treatment charges from industries
- In addition to rentals, EZ Service fee will be charged by developer as per industry practice.

In the light of methodology elaborated above, a detailed guide on how to operate the financial model is captured in the next section.

Guide for operating this financial model is placed as annexure. Assumptions in the financial model (as outlined in this guide) is captured in the next section.

12.3. Assumptions, Inputs and Variables

In this section, the key assumptions used in developing the financial model (to assess the financial viability of the proposed project) have been elucidated.

12.3.1. Revenue Assumptions

Developer will earn revenues through land leasing, provision of utilities and overall maintenance and operation of the economic zone related activities. This includes- (i) revenue from industrial space (i.e. industrial land and SFB), (ii) revenue from support amenities (like commercial space, healthcare space, vocational training institute, and logistics zone), (iii) EZ Service Fees, (iv) utility charges (Power tariff, Water tariff, sewerage and effluent treatment charges).

Assumptions for revenue generating from industrial space

In order to arrive at annual land lease rent that the developer may charge from tenants, prevailing rentals of all the export processing zones (EPZs) under BEPZA were analysed.

Table 116: BEPZA operated EPZ land plot tariffs

Sl. No	EPZ	Tariff ²²⁸ (USD /sq.mt./year)	Tariff ²²⁹ (BDT /sq. ft./year)
1	Chittagong, Dhaka, Comilla, Karnaphuli & Adamjee	2.20	~17
2	Ishwardi, Uttara and Mongla	1.25	~10

Source: Data obtained from BEPZA

Based on the above data the prevailing land lease rental at Dhaka EPZ has been considered as the base since it is envisaged that the developer would provide facilities within the EZ which is at par with Dhaka EPZ. Land Lease Rental of Dhaka EPZ is USD 2.20/ sq. m. / year i.e. ~17 BDT/ sq. ft. / year (1 USD=82 BDT).

Considering the private sector service quality, land lease rental charged by the developer for the proposed EZ have been considered as 22 BDT/ sq. ft. / year (i.e. 0.27 USD/ sq. ft. / year) in the financial model. This lease rental is in line with the prevailing market rate as offered by private EZ developers elsewhere in the country.

In addition to the land lease rental, rental can also be charged from operations of the SFBs. Table below shows the rental of SFB facilities at the EPZs under BEPZA.

Table 117: BEPZA operated EPZ SFB plot tariffs

Sl. No	EPZ	Tariff ²³⁰	Tariff ²³¹
1	Chittagong, Dhaka, Comilla, Karnaphuli & Adamjee	2.75 USD/ sq. mt. / month	~251 BDT/ sq. ft./ year
2	Ishwardi, Uttara and Mongla	1.60 USD/ sq. mt. / month	~147 BDT/ sq. ft./ year

Based on the data in the preceding table, prevailing SFB lease rental at Dhaka EPZ has been considered as the base since it is envisaged that the developer would provide facilities within the EZ which is at par with Dhaka EPZ. SFB plot Lease Rental of Dhaka EPZ is USD 2.75/ sq. m. / month i.e. ~251 BDT/ sq. ft. / year (1 USD=82 BDT).

Considering the private sector service quality, SFB plot rental charged by the developer for the proposed EZ have been considered as 300 BDT/ sq. ft. / year (i.e. 3.66 USD/ sq. ft. / year) in the financial model. This lease rental is in line with the prevailing market rate as offered by private EZ developers elsewhere in the country.

²²⁸ for average 2,000 sq. m. plot size

²²⁹ USD to BDT conversion= 82

²³⁰ for Standard Factory Building Facilities

²³¹ USD to BDT conversion= 82

The annual escalation of lease rent (for both industrial land and SFB) has been considered as 12% in a block of 3 years (i.e. after every 3 years, the land lease rental value would be inflated by 12%). This assumption has been drawn based on prevailing charges in economic zones worldwide and taking consent from BEZA officers. It may however be noted that the land rent for EPZs under BEPZA increased several times; 2001, 2007 and 2011 respectively in Bangladesh. The escalation rate was in the range of 10%-25%. Accordingly, this assumption has been on the conservative side.

After running the financial model and sensitivity analysis on the same, these revenue drivers can be adjusted in order to arrive at a sound financial return accruing from the project.

Assumptions for revenue generating from support amenities

In addition to the land lease rental and SFB rental, base assumptions of revenue generating from support amenities have been considered as below:

- Rent from logistics zone- BDT 22/ sq. ft. per annum i.e. USD 0.27/ sq. ft. per annum (subjected to inflation of 10% in a block of three years). It has been assumed that the developer would sublet the land parcel to a logistics players for developing the logistics zone.
- Rent other support amenities – BDT 24/sq. ft. per annum i.e. USD 0.29/ sq. ft. per annum (subjected to inflation of 10% in a block of three years). Land parcel measuring an area of 21.54 acres has been earmarked for development of support amenities like Child care and healthcare units, vocational training centre, commercial space etc.

The above stated assumptions have been finalised based on market information obtained through secondary sources in the context of Shariatpur and Dhaka area. Due consent have been obtained from BEZA officers on the same.

Assumptions for utility tariffs

Other revenue streams to the developer include utility tariffs on water, power, gas and effluent treatment. The model is built on the assumption that Power and Water will be supplied to the Developer by the local nodal agency such as Rural Electrification Board (REB), City Corporation, Water Supply and Sewerage Authority (WASA).

Energy Regulatory Commission Bangladesh has fixed the electricity tariff for industrial connection. **This fixed tariff is BDT 7.90 per kWh (i.e. USD 0.10 per kWh).**

Since no pertinent data is available for water supply in the region surrounding Jajira, prevailing water tariff of Dhaka EPZ has been considered. **This tariff is BDT 33,210 per MLD (i.e. USD 405 per MLD).**²³²

Effluent treatment will also be charged by developer as per prevailing rates. Effluent volume for treatment as % of water intake is considered at 60%. Based on prevailing effluent treatment charges in Dhaka EPZ, base tariff of BDT 36,950 per MLD (i.e. USD 450 per MLD) of sewage treated has been considered.

Owing to lack of information of industrial gas supply tariff in this region, **prevailing gas supply tariff for Dhaka EPZ has been considered i.e. BDT 8.54 per cum.**

Developer will be responsible for operation and maintenance of these utilities and in turn sell to the industrial tenants with 10% surcharge as service fees.

The above utility tariffs are subjected to inflation rate of 15% applicable in a block of every three years (i.e. the utility tariffs would be increased by 15% after every three years).

Assumptions for economic zone service fees

Economic Zone service fees has been considered as BDT 2/ sq. ft. / year (i.e. USD 0.02/ sq. ft. / per annum) considering the private sector efficiency factor. This is based on the standard benchmarking and it is subjected to the discretion of the developer. On ground scenario could be different than this assumption.

²³² Data obtained from BEPZA

12.3.2. Cost Assumptions

Capital Expenditure

Capital costs are based on the market value of developing the land demarcated for development of the proposed EZ, which includes the costs of infrastructure development for the proposed EZ, including earthworks, roads, institutional buildings, utilities, water supply system and waste water treatment plant in line with the master plan. As per the master plan for this EZ site, the capital cost has been divided into 3 phases of 2 years each. Breakup of the cumulative capital cost is mentioned in the table below.

Table 118: Break-up of Project Cost

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Phase III Cost Breakdown	Price without tax (In Taka)	Price without tax (In USD)
Road Network							
Road (30 m)	5181	RM	96.36	96.36	99.28	292	3.56
Road (25 m)	7748	RM	115.5	115.5	119	350	4.27
Sub-total	12929	RM	211.86	211.86	218.28	642	7.83
Footpath and plot entry culvert							
			81.18	81.18	83.64	246	3.00
Total			293.04	293.04	301.92	888	10.83
Storm Water Network							
	12929	RM	29.04	29.04	29.92	88	1.07
Total	12929	RM	29.04	29.04	29.92	88	1.07
Power Network							
Internal Power Distribution (OHT)	12929	RM	10.25	10.25	10.56	31.06	0.38
Distribution Transformer			28.08	28.08	28.93	85.09	1.04
Street Light	12929	RM	9.42	9.42	9.71	28.55	0.35
Internal Substation	58	MVA	198	198	204	600	7.32
Fire Hydrant							
			0.41	0.41	0.41	1.23	0.02
Total			246.16	246.16	253.61	745.93	9.10
Water Network							
Water Supply Network	12929	RM	36.63	36.63	37.74	111	1.35
Sump, Overhead Tank, Pumps			104.66	104.66	107.82	317.14	3.87
Water Treatment Plant	16	MLD	51.25	51.25	52.82	155.32	1.89
Total			192.54	192.54	198.38	583.46	7.12
Sewer Network							
Sewer Network	12929	RM	10.43	10.43	10.73	31.59	0.39
Waste Water Treatment Plant	13	MLD	153.52	153.52	158.16	465.2	5.67
Effluent Treatment Plant	11	MLD	270.91	270.91	279.12	820.94	10.01

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Phase III Cost Breakdown	Price without tax (In Taka)	Price without tax (In USD)
Solid waste Management	52	TPD	269.61	269.61	277.77	816.99	9.96
Total			704.47	704.47	725.78	2134.72	26.03
Telecom	12929	RM	25.86	25.86	26.64	78.36	0.96
Total	12929	RM	25.86	25.86	26.64	78.36	0.96
Sustainable Infrastructure elements							
Open Space/ Land scaping	158881	Sqm	2.41	2.41	2.5	7.32	0.09
Greenery along road	12929	RM	0.13	0.13	0.13	0.39	0.00
Percolation Pits	862	Nos	0.41	0.41	0.43	1.25	0.02
Total			2.95	2.95	3.06	8.96	0.11
Support Amenities							
Admin Building	2000	Sqm	70	0	0	70	0.85
Maintenance Buildings	100	Sqm	1.3	1.3	0	2.6	0.03
Total			71.3	1.3	0	72.6	0.89
Standard Factory Building							
Total	35	acres	731.81	365.90	365.90	1463.62	17.85
EMP							
Total			12.16	12.16	12.53	36.84	0.45
Project Sub-total			2,309.33	1,873.42	1,917.74	6,100.48	74.40

Source: MACE Analysis

Above elucidated project costing has been estimated considering 35 acres of SFB construction. This project cost may vary depending on the area of SFB.

Cost of SFB development has been considered as BDT 1,600/ sq. ft. as per the prevailing market rates. Ground coverage for SFB has been considered as 60% as per the prevailing practices.

Interest during construction for this project has been estimated as BDT 519 million (i.e. ~USD 6.3 million).

Above stated estimated capital expenses have been adjusted for inflation. Historical trend of Consumer Price Index (CPI) available in Bangladesh Bank has been synthesized with long term inflation rate data available in World Bank database. Basis this, yearly inflation rate of 5% has been applied on the estimated capital expenses.

Off-site infrastructure development is the responsibility of BEZA and not part of project cost (which is to be incurred by the PPP developer). Following table (in the next page) elucidates the off-site infrastructure cost estimation.

Table 119: Break-up of off-site infrastructure Cost

Description of Item	Quantity	Unit	Price without tax (In million Taka)	Price without tax (In million USD)
Site Development				
Land filling	604381983	Cum	604.38	7.37
Total			604.4	7.37
Road Network				
Road (30m)	200	RM	14	0.17
Total			14	0.17
Storm Water drain Network	7	KM	175	2.13
Power Network				
33 kV line	5	KM	10	0.12
133 kV line	35	KM	218.75	2.67
Total			228.8	2.79
Water Network				
Water Supply Network	5	KM	78.82	0.96
Infiltration Gallery	16	MLD	256	3.12
Total			334.8	4.08
Boundary wall	7	KM	70	0.85
Project Sub-total			1,427	17.40

Source: MACE analysis

Operations and Maintenance Expenditure

In addition to this capital cost, Operation and Maintenance (O&M) costs during the operational stage of the project is presented in the table below. These expenses are assumed as certain percentage of the capital expenditure and the same to be incurred on yearly basis. These are based on standard industry benchmarks.

Table 120: Break-up of Operational Expenditure

Total Operation Cost	% of Capex
Roads and associated infrastructure	2%
Decentralized water supply, treatment and distribution	2.5%
Electrical, street lighting & fire fighting	2%
Telecom & communication systems	0%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	2%
Decentralized wastewater, network and solid waste management	4%
Buildings - industrial / business, commercial, residential, MEP	0%
SFB	0%
EMP	7%
Total Maintenance Cost	% of Capex
Roads and associated infrastructure	5%
Decentralized water supply, treatment and distribution	2%
Electrical, street lighting & fire fighting	5%
Telecom & communication systems	2%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	2%

Decentralized wastewater, network and solid waste management	2%
Buildings - industrial / business	5%
Buildings – commercial	5%
Buildings – residential	5%
Buildings – MEP	5%
SFB	5%
EMP	7%

Source: MACE Analysis

Apart from the operating cost listed in the previous page, 2% of the opex expenditure has been considered as miscellaneous cost and 2 million BDT has been considered as pre-operating expenses.

Table below indicates the proposed organogram of the EZ and manpower remuneration related expenses.

Table 121: Details of Manpower Cost

Designation	Number of Manpower	Salary (BDT million per year)	Per annum cost (million BDT)
CEO	5	1	5
GM-Finance	3	1	3
GM-Marketing	3	1	3
GM-Engineering & Procurement	3	1	3
GM-HR and IT	3	1	3
GM-Operations	3	1	3
Manager-Finance	1.5	1	1.5
Manager-Marketing	1.5	1	1.5
Manager-Engineering & Procurement	1.5	1	1.5
Manager-HR and IT	1.5	1	1.5
Manager-Operations	1.5	2	3
Assistant Manager-Finance	0.72	2	1.44
Assistant Manager-Marketing	0.72	2	1.44
Assistant Manager-Engineering & Procurement	0.72	4	2.88
Assistant Manager-HR and IT	0.72	2	1.44
Assistant Manager-Operations	0.72	4	2.88
Security Supervisors	0.36	6	2.16
Security Staffs	0.24	48	11.52
Peons and Clerks	0.18	10	1.8
Office Boys	0.12	15	1.8
Total			56.36
Total (in USD million)			0.69

Source: PwC Analysis

The cost elements constitute both; infrastructure development and Operation & Maintenance cost in processing area as well as non-processing area. The processing area consists of industrial buildings, specialized infrastructure, public amenities and utilities. The non-processing area has admin buildings, road, green space etc. The detailed land use planning has already been covered in Master Planning section of the report.

Above stated estimated operations and maintenance expenses have been adjusted for inflation. Historical trend of Consumer Price Index (CPI) available in Bangladesh Bank has been synthesized with long term inflation rate data available in World Bank database. Based on this, yearly inflation rate of 5% has been applied on the estimated operations and maintenance expenses.

Revenue for BEZA

The 3 parameters considered as revenue to be paid to BEZA by the developer are i) Upfront Payment in lieu of license to develop EZ, ii) Annual land lease and iii) Percentage share of the gross revenue accrued to developer.

Base values for these cost parameters are as listed below –

- Upfront payment to BEZA – 150 million BDT (i.e. 1.83 million USD)
- Annual land lease – 35.3 million BDT/ year (1.52 BDT/ sq. ft./ year) i.e. 0.43 million USD/ year
- Percentage gross revenue share – 5%

12.3.3. Financing Assumptions

Various financing assumptions in-built in this financial model have been outlined below:

- Interest on Working Capital- 14%
- Debt: Equity= 70:30; Debt could be sourced from either commercial borrowing or through concessional loan/ grant
- For commercial borrowing: moratorium period- 1 Year (after loan disbursement for the respective phase); rate of interest- 10% per year; repayment period- 10 years
- For concessional loan: moratorium period- 1 Year (after loan disbursement for the respective phase); rate of interest- 2% per year; repayment period- 20 years

An equal spread repayment of principal has also been assumed towards repayment of the loan (i.e. 10% principal repayment every year over 10 years of repayment period or 5% principal repayment every year over 20 years of repayment period).

Private Developer will have to pay income taxes on ‘Income from Business or Profession’ as per the Income Tax Ordinance, 1984. The ordinance allows deductions from total income or revenue for cash and non-cash expenses (i.e. depreciation and amortization), to arrive at Net Income before Tax (NIBT). The applicable corporate tax rate is then applied to NIBT to derive income tax to be paid. As per prevailing tax regulations, Income Tax rate of 35% has been considered in the financial model for calculating the income tax payable to National Board of Revenue, Bangladesh. According to the incentive package approved by the BEZA’s Governing Board, economic zone developer shall have tax exemption for 10 years from COD, 70% tax exemption for 11th year and 30% tax exemption for 12th year. The same is incorporated in the model as fiscal benefit due to tax holiday.

Straight Line Method (SLM) of depreciation has been considered and annual depreciation rate of 2% has been taken in the model for a project tenure of 50 years. Depreciation assumptions for tax treatment are in line with prevailing corporate income tax ordinance 1984 guidelines in Bangladesh.

12.3.4. Other Assumptions

Timing related assumptions

It has been assumed that one year timeframe i.e. from present to 1st July 2019 (year 2020) would be required towards regulatory activities essential for kick starting the project. Construction would take place from 2020 to 2026 spread over three phases, each of two years. Industrial space uptake will commence from year 2021.

Usage Norms for utilities

In furtherance to the utility consumption data obtained from the primary survey, ultimate water and power requirement for each of the industries are based on the applicable industry norms in Bangladesh.

A summary of usages norms included as part of our financial analysis is indicated in the following table placed at next page. Detailed rationale behind the same is duly captured in the Infrastructure Plans chapter.

Table 122: Utility Usage Norms

Power Requirement (MW per acre)	Water Requirement (MLD per acre)
0.16	0.013

Source: MACE Analysis

Based on standard industry benchmarks, 60% of water demand is considered as effluent generated.

Basis our primary interactions with manufacturers in Bangladesh and analysing the gas consumption information of unit investors in Chittagong and Dhaka EPZs of Bangladesh, gas requirement of 1,836 cum/ hectare/ day (i.e. 76.5 cum/ acre/ day) has been considered as gas requirement for industries in the proposed EZ.

Industrial space uptake rates

In line with the best practices prevailing in economic zone development, it has been assumed that developer will construct the basic shell infrastructure- public amenities, utilities and roads. This developed land in the proposed EZ will be provided on long-term lease to the industrial tenants. It has also been considered that during the construction period, developer will simultaneously undertake marketing activities for unit plots, to attract investors. Once all infrastructure development is complete, services installed and the proposed EZ is completely ready for operation, the industrial tenants will start moving onto their respective plots. Three scenarios have been created for the industrial space fill rate. Detailed calculation for each of these scenarios are duly captured in the Demand Forecasting chapter.

Aggressive case assumes macro-economic conditions of Bangladesh and the region are improving; Potential infrastructure projects are commencing prior to Commercial Date of Operations (CoD). Base case assumes macro-economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; potential infrastructure projects are commencing as scheduled. Conservative case considers macro-economic conditions of Bangladesh and the region are showing declining trend; potential infrastructure projects are delayed.

As per demand forecasting exercise, complete industrial space (land and SFB) uptake would take place in 11 years, 8 years, and 5 years respectively for conservative, base, and aggressive cases.

Uptake rates for support amenities

For support amenities, full land uptake has been considered in the year 2024 (once the industries commence operations within the proposed EZ).

12.4. Sensitivity Testing on Key Inputs

Figure below summarises the revenue and cost drivers, and the decision making parameters of this financial model.

Figure 95: Revenue and Cost Drivers

Revenue Drivers	Cost Drivers
Parameters	Parameters
Industrial Land annual lease rental	Capital Expenditure (capex)
SFB annual lease rental	Interest Expenses
Rent from support amenities	O&M Expenditure (opex)
Logistic Zone Rent	Pre-Operating Expenses
Surcharge on utility	Miscellaneous Cost
Revenue from EZ service fees	Cost of Manpower
Escalation rate on revenue	Inflation rate on capex and opex
	Upfront payment, annual fees and revenue share to be paid by PPP developer to BEZA

Source: PwC Analysis

Following parameters have been varied in the sensitivity analysis to assess the most sensitive variable in the financial model.

- Land lease rental for industrial land plots
- Land lease rental for SFB
- Area allocation for SFB
- Escalation rate for industrial land and SFB
- Upfront payment, land lease fees and % of gross revenue share paid by PPP developer to BEZA

Based on the same, a sensitivity check has been carried out to understand the most sensitive parameter, where each of the above mentioned parameters have been varied by +/- 25% (keeping the other parameters constant) to understand the impact on the project IRR.

On carrying out the above mentioned exercise, we observed on varying factors like revenue share paid by developer, annual land lease fees, escalation rates for rent, lease rentals for industrial land and SFB (keeping other parameters constant), returns generated from the project displayed significant variations. The tornado chart constructed to evaluate sensitivity of varying each parameter on a stand-alone basis is shown on the next page.

Table 123: Sensitivity variation of Project IRR across the three scenarios

Parameters	Conservative Scenario			Base Scenario			Aggressive Scenario		
	-25%	0%	+25%	-25%	0%	+25%	-25%	0%	+25%
% revenue share by developer	9.3%	9.1%	9.0%	11.5%	11.3%	11.1%	12.8%	12.6%	12.4%
Land lease rental to BEZA	9.2%	9.1%	9.1%	11.4%	11.3%	11.2%	12.7%	12.6%	12.5%
Upfront payment to BEZA	9.2%	9.1%	9.1%	11.3%	11.3%	11.2%	12.7%	12.6%	12.5%
Logistics zone rental	9.1%	9.1%	9.1%	11.3%	11.3%	11.3%	12.6%	12.6%	12.6%
Support amenity rental	9.1%	9.1%	9.2%	11.2%	11.3%	11.3%	12.5%	12.6%	12.7%
Area allocation for SFB	8.8%	9.1%	9.5%	10.7%	11.3%	11.8%	12.0%	12.6%	13.2%
Escalation rate of rentals	8.8%	9.1%	9.5%	10.9%	11.3%	11.7%	12.2%	12.6%	13.0%
Lease rental for SFB	8.2%	9.1%	10.0%	9.9%	11.3%	12.6%	11.1%	12.6%	14.2%
Lease rental for industrial	8.7%	9.1%	9.6%	10.6%	11.3%	11.9%	11.8%	12.6%	13.4%

Source: PwC Analysis

Lease Rental for SFB and % of gross revenue share paid by developer have emerged out to be the most sensitive revenue and cost driver determining the rate of return from the project

In order to maximise the return from this project, levying high lease rental for the Standard Factory Buildings and minimizing gross revenue share would result in maximum return (keeping all other parameters constant).

12.4.1. Project Return Calculations and Project Structuring

Based on the above stated methodology and assumptions, project return has been calculated from the financial model as per the three scenarios viz. (i) base, (ii) aggressive and (iii) conservative. These calculations have been done on basis of the base parameters, which were considered in line with the assumptions highlighted in the previous sub-section of this chapter.

Tables below captures the returns accruing from this project for the three scenarios and the base values considered for different revenue and cost drivers.

Table 124: Returns accruing to developer of EZ from cost and revenue drivers

Parameters	Conservative Scenario	Base Scenario	Aggressive Scenario
Project IRR	9.1%	11.3%	12.6%
Equity IRR	6.8%	10.2%	14.5%
Average DSCR	8.39	8.86	9.07
Minimum DSCR	1.00	1.00	1.00
Year of min. DSCR	2026	2025	2025

Source: PwC analysis

Revenue Drivers	Values	Cost Driver	Values
Industrial land lease rental	22 BDT/sq. ft. /year i.e. 0.27 USD/ sq. ft. / year	% Revenue Share paid by developer	5%
SFB lease rental	300 BDT/ sq. ft. /year i.e. 3.66 USD/ sq. ft. / year	Annual land lease fees paid by developer	35.3 million BDT i.e. 0.43 million USD
Escalation rate of rentals	12% in a block of 3 years	Upfront payment made by developer	150 million BDT i.e. 1.83 million USD
Area allocation for SFB	35 acres		
Support Amenities	24 BDT/ sq. ft. /year i.e. 0.29 USD/ sq. ft. / year		
Logistics zone rent	22 BDT/sq. ft. /year i.e. 0.27 USD/ sq. ft. / year		

Source: PwC analysis

In order to assess the impact of revenue driver and cost driver on the returns of the project, most sensitive revenue and cost drivers have been varied and the results on Project IRR have been tabulated for all 3 cases i.e. i) Conservative ii) Base and iii) Aggressive.

Table 125: Impact on return due to revenue and cost drivers

Lease Rental for SFB	Revenue Share with BEZA	Conservative Scenario		Base Scenario		Aggressive Scenario	
		Project IRR	Equity IRR	Project IRR	Equity IRR	Project IRR	Equity IRR
200	10%	7.9%	5.3%	9.5%	7.7%	10.6%	11.3%
230	7%	8.3%	5.8%	10.0%	8.4%	11.2%	12.2%
250	5%	8.5%	6.1%	10.4%	8.9%	11.6%	12.9%
270	2%	8.8%	6.4%	10.7%	9.4%	12.0%	13.5%
300	0%	9.1%	6.8%	11.3%	10.2%	12.6%	14.5%

Source: PwC analysis

The above table indicates the increasing returns generated as lease rental for SFB (revenue driver) is gradually increased and revenue share with BEZA (cost driver) is gradually decreased. All other parameters have been kept constant during the calculation of the above based scenarios.

Analysis of different project structuring options

Above calculations demonstrate the project returns accrued under different scenarios for the as-is case where the PPP developer would be developing the proposed EZ.

There could be three project structuring options for this project. These options are outlined in the following-

- As-Is case where PPP developer would develop the EZ site
- BEZA gets equity stake in developer's SPC
- BEZA takes the responsibility of financing, constructing and operating the EZ through its own resources

Keeping other parameters as constant, following cost and revenue assumptions have been made to evaluate the project structuring outcomes under the options listed above.

Table 126: Cost and Revenue drivers for project structuring options

Scenarios	Cost	Revenue
a) As-is case where PPP developer would develop the EZ site	Hard cost of developing the EZ site - BDT 6,100 million	Sources of revenue remain unchanged across the three scenarios in line with "Revenue Assumption" section of this chapter.
b) BEZA gets equity stake in developer's SPC	Hard cost of developing the EZ site – BDT 6,100 million + Cost of acquiring land for EZ site – BDT 4.01 billion*	
c) BEZA takes the responsibility of financing, constructing and operating the EZ through its own resources	Hard cost of developing the EZ site – BDT 6,100 million + Cost of acquiring land for EZ site – BDT 4.01 billion* + Cost of developing offsite infrastructure – BDT 1,427 million	

*Using cash compensation under law method

The returns calculated in this chapter under **option a)**, indicates the returns are moderate for the developer to undertake development of the EZ site. However, a comparison of the first option with other two options listed above, indicates that the returns could further deteriorate under **option b) and c)** since although the revenue drivers have remained unchanged under these options, other cost drivers i.e. cost of acquiring land for EZ site (BDT 4.01 billion) and cost of developing offsite infrastructure (~BDT 1,427 million) is getting added to the cost of developing the EZ.

Thus, the as-is case (where PPP developer would be developing the EZ site) is financially a better option (generating comparatively higher returns) as compared to the other project structuring options.

12.5. Conclusions and Recommendations

Financial modelling exercise highlights the entire gamut of cost and revenue assumptions taken in order to evaluate the financial feasibility for the PPP developer who would envisage construction and operation of the proposed EZ. Given the interest rate of borrowing fund for undertaking construction of Economic Zone, which is 10%, the return generated from the project (project IRR of 11.3% and equity IRR of 10.2% in the base scenario) is decent in nature.

Given the positive impact on Bangladesh's economy (as discussed in Economic Modelling chapter) expected out of establishing an EZ site in Shariatpur, private developer could also consider approaching donor agencies like

World Bank, Asian Development Bank or applying for external commercial borrowing (ECB) to bring down the cost of debt. This would subsequently improve returns generating from the project.

Development of economic zones in Bangladesh is in line with BEZA's end objective of promoting industrial development and employment generation in Bangladesh. Getting a PPP private developer to construct and operate the EZ site would result in better quality and improved operational efficiency in the service provided to the manufacturers who would invest in the EZ site. PPP private developer has better access to following key resources as compared to BEZA:

- **Human Resources:** The Developer has a better access to human resources, and does not have to go through government bureaucracy for deployment of human resources, which gives it better access to human resources, and more efficient operations;
- **Finance:** The developer has full access to diversified project finance instruments with limited or no constraints. This provides flexibility on capital structures and capital costs;
- **Expertise:** The developer will have better access to resources such as the required expertise in project preparation, design, management and implementation;
- **Experience:** The developer's team may have better experience in developing and managing SEZs, especially on facility management and operation;
- **Technologies:** The Developer has better access to cutting edge technologies.

By dint of having better access to the above outlined resources, PPP private developer can provide BEZA the following advantages:

- **Better financial discipline**, since a developer has to operate efficiently to stay in business, while government agencies are protected against bankruptcy
- **Rapid project implementation** through better access to additional human resources and expertise
- **Removal of financial constraints** through better access to private finance
- **Ability to change plans and resources** during implementation/ operations of the project to adapt to changes in market conditions and other variables affecting the project.

As a private developer is better placed to finance, construct, and operate the proposed EZ, BEZA may explore the possibility of getting on-board a private developer through PPP route. This option is better placed with respect to other structuring options discussed earlier.

In order to increase the returns from the project, private developer could consider possibility of obtaining concessional loans or BEZA could support the developer by adopting the following approaches –

- **Exploring possibility of obtaining concessional loan through external commercial borrowing and funding from multilaterals** – Lower the rate of borrowing, higher is the project returns. In order to increase the equity IRR, private developer may approach multilateral/ funding agencies and may also explore the possibility of obtaining commercial borrowing through External Commercial Borrowing (ECB) route.
- **BEZA deciding to modify bid parameters** - The financial model has provision for considering 3 parameters which could be used by BEZA for selection of developer, which are –
 - Upfront payment by developer to BEZA
 - Annual land lease to be paid by developer to BEZA during concession period
 - % of gross revenue accruing from the EZ to be shared by developer with BEZA

Key objective of this economic zone project is to generate employment and improve the overall socio-economic conditions of the region surrounding the project site. BEZA, keeping cognizance of the ultimate

objective of this project, may decide to forego one of the bid parameters. Such modification in bid parameters would result in higher project return, thus making the project financially more profitable for the private developer.

Implementation of the recommendations outlined above would improve the returns accruing from this project for the private developer.

13. Economic Modelling

13.1. Purpose and Objective

The objective of this analysis is to quantify the impact of the development of the proposed EZ on the economy of Bangladesh. Financial analysis (or Financial IRR) estimates the return accruing to the project operating entity (EZ developer), whereas Economic Internal Rate of Return (EIRR) estimates the return on the investment to the national economy. Economic analysis is essential to develop a rationale for Government of Bangladesh to support the development of the proposed EZ and illustrate the measure of the accrued economic benefits.

13.2. Methodology of Economic Modelling

13.2.1. EIRR Framework

EIRR is a holistic approach which takes into consideration the following stakeholders (directly/ indirectly) associated with the project:

- The project financiers (whose return was calculated as the financial internal rate of return),
- The employment (both direct and indirect employment) generated because of the project,
- The suppliers and customers of the project,
- Competitors of the project,
- Residents who are being affected by the implementation of the project and
- Others

Determination of EIRR is directly aligned with the objectives of the multilateral agencies i.e. alleviation of poverty, employment generation and overall development of the country.

A two-stage process has been adopted for the calculation of EIRR.²³³

$EIRR = \text{Private Returns} + \text{Cost Gains}$

Where, $\text{Private Returns} = \text{Actual Revenues} - \text{Actual Costs}$

$\text{Cost Gains} = \text{Actual Cost} - \text{Opportunity Cost}$

All taxes and subsidies have been excluded for computation of EIRR. The impact of inflation has been excluded while calculating the EIRR.

Economic analysis requires quantification of various costs and benefits converted to 'economic equivalent' terms. EIRR also requires identification of 'externalities' and valuation of inputs and outputs at their true economic prices, or the 'opportunity costs'.

Financial analysis only looks at the project from the perspective of the implementing agency (the private developer). Financial analysis is only concerned with line items that entail monetary outlays. Economic analysis on the other hand looks at cost and associated benefits to the economy. In economic analysis, a resource must be priced at its opportunity cost (its value in the best possible use), even if it is obtained free since use of the resource is a cost to the economy. Economic analysis measures both the positive and negative impact of the project.

The economic cost reflects the degree to which the consumption elsewhere in the ecosystem is sacrificed due to the diversion of the resources required for the project. Whereas, the economic benefit portrays the extent to which the project contributes to the increasing value of consumption available to the society.

Some important aspects to be considered while undertaking economic analysis are:

²³³ Benjamin Esty, Frank Lysy, & Carrie Ferman, "An Economic Framework for Assessing Development Impact", Harvard Business School Case 9-202-052, February 7, 2003.

- Economic analysis is considered at constant prices in local currency terms. Thus, in case of accounting for economic costs and benefits, all costs and benefits must be measured in ‘real’ terms. In such analysis, all the costs and benefits are considered at the commencement year i.e. 2018.
- For undertaking the economic analysis, financial costs are to be converted to their economic cost equivalents. By and large the financial components are capex (capital investment in land, construction cost etc.) and Opex (operational expenditure).
- Items like taxes, duties and subsidies included in the financial cost are excluded as these are market distortions.
- Debt service costs (interest during construction) are not included as economic cost in the analysis as the same doesn’t require usage of resources.
- Cost owing to Environmental Management Plan has been included in the economic cost calculation.

13.2.2. Methodology Adopted

The economic analysis for proposed EZ was undertaken in three major steps:

- Step 1:** In this step, the total economic cost for the project was calculated. All the direct costs (both capital expenditure and operational expenditure) associated with the project development were enlisted and broken down into the three factors of production viz. capital (material and equipment), land and labour. The pertinent financial costs were converted to the economic costs using conversion factors as elucidated above.
- Step 2:** The financial benefits from the proposed EZ project was calculated and converted to economic terms to capture the economic benefits which (directly/indirectly) impact the economy of Bangladesh. In this step, the cumulative economic benefit accrued from this project was computed.

Economic benefits considered are:

- 1) Value added in export owing to the industrial activities within the economic zone.
 - 2) Economic benefit (through gains for the exchequer) as a result of the industrial operations within the proposed EZ
 - 3) Employment generation owing to the development of the proposed economic zone. Minimum wage rate of BEPZA, SWRF, and SERF have been considered to arrive at the economic value of the total employment generated.
 - 4) Tax incentive availed by the developer is a loss (economic cost) for the exchequer and tax paid by the developer is a gain (economic benefit) for the exchequer.
- Step 3:** Economic return for the project tenure was calculated by deducting the economic cost from the total economic benefit. IRR was calculated considering the base case.

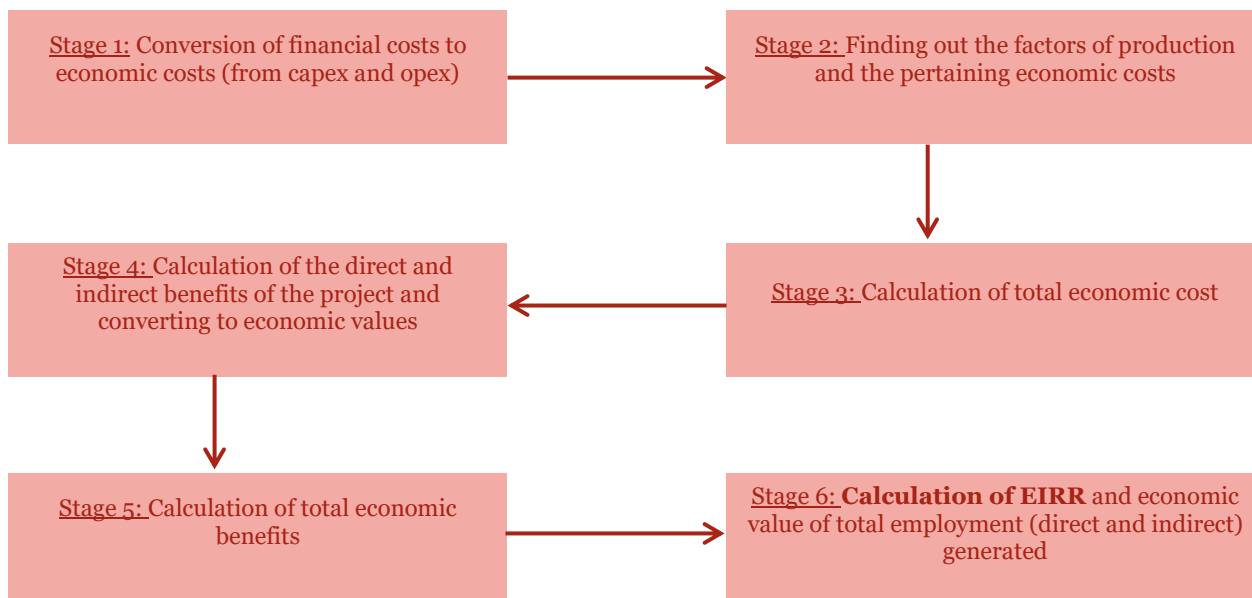
Economic modelling exercise has been undertaken for three scenarios as elucidated in the following-

- Aggressive scenario: Macro-economic conditions of Bangladesh and the region are improving; Potential infrastructure projects are commencing prior to CoD
- Base scenario: Macro-economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; potential infrastructure projects are commencing as scheduled
- Conservative scenario: Macro-economic conditions of Bangladesh and the region are showing declining trend; potential infrastructure projects are delayed

Proceeds from the demand forecasting exercise have been taken into cognizance to undertake the economic modelling exercise for the above stated three scenarios. Industrial space uptake rates and number of industrial establishments have been considered to undertake this economic modelling.

The approach & methodology adopted for each of the three scenarios has been illustrated in the diagram on the next page.

Figure 96: Framework for Economic IRR calculation



13.3. Assumptions, Inputs and Variables

The Economic IRR for the project has been calculated considering economic costs and benefits generating out of the project over the project tenure. The assumptions adopted for computation of economic IRR are based on the assumptions as depicted in our financial analysis. Base case was used for calculating the EIRR for the project. In addition to the above, the following assumptions were considered for arriving at the EIRR:

- **Cost of land:** Since this project envisages land being transferred from BEZA to the private developer, cost of land has not been considered in this economic model.
- **Environmental costs:** Costs related to Environment have been also included in the model. Costs associated with technical support, development of green belt, solid and hazardous waste management, waste and waste water, construction safety etc. have been included as part of capital expenditure. In the operational expenditure section, maintenance costs for heads like operation of CETP/ STP/ waste facilities, establishment & training and monitoring of performance indicators have been considered.
- **Capital Expenditure (Capex):** The capex incurred for various components of the project is obtained from the financial model. This has further been segregated into three components:
 - a) Material – 50% of total capex
 - b) Equipment – 30% of total capex
 - c) Labour – 20% of total capex
- **Operating Expenditure (Opex):** We have assumed that 90% Opex will generate on account of the materials and the consumables; 10% of opex will generate on account of the equipment. The operating cost for personnel is calculated separately in the economic model.
- **Land lease expenses:** Land lease expense is not included in the economic analysis
- **Import of Equipment:** We have assumed that 75% of the equipment and machinery used for the project would be imported. This is based on the standard practice and market benchmark of similar industries in Bangladesh.
- Capex and Opex have been converted to economic equivalents/ market costs using the following assumptions:

- *Shadow Exchange Rate Factor (SERF)* of 1.05 was considered. The basis is that BDT is overvalued by about 5%.²³⁴
SERF is the ratio of economic price of foreign currency to its market price. Alternatively, it is the ratio of the shadow to the official exchange rate. For economic analysis using the domestic price numeraire, the SERF is applied to all outputs and inputs, including labour and land that have been valued at border price equivalent values, with project effects measured at domestic market price values left unadjusted.
- *Shadow Wage Rate Factor (SWRF)* of 1.00 for skilled labour and 0.75 for unskilled labour was assumed.²³⁵ Further it was considered that the project will have a mix of 60% skilled labour and 40% unskilled labour. Hence, SWRF of 0.90 has been arrived.
SWRF is the ratio of the shadow wage rate of a unit of a certain type of labour, measured in the appropriate numeraire, and the project wage for the same category of labour. Alternatively, the ratio of the economic and the SWRF can be used to convert the financial cost of labour into its economic cost.

These figures are in conformity with the information provided by Bangladesh Planning Commission and ADB economic analysis reports for Bangladesh. These were applied to tradable inputs and labour component to get domestic equivalents. It may be noted that since SERF is applied on the costs, factors such as the import duty is considered to be adjusted in the SERF and hence import duty has not been considered separately.

- VAT rate (for both capex and opex) has been considered as 15% according to the prevailing rate for Bangladesh.
- Estimation of indirect and induced employment generation (due to generation of downstream industries) is based on Employment Multiplier Coefficient of 0.7. The coefficient was extracted from Background Paper for World Development Report 2013 “Structural Transformation and Employment Creation”²³⁶. The indirect employment generation coefficient for several developing countries (size and geography similar to Bangladesh) was considered to arrive at this figure.
- *Tax Treatment*: Since tax, subsidies and incentives are distortionary in nature; their impact needs to be nullified by making necessary adjustments.
- It has been assumed that each of the industrial units will operate at 80% capacity utilization level and the plant efficiency level is 80%; export contribution of each of the industrial units is 25% of its Gross Value Added.

Guide for operating this economic model is placed as annexure to this report.

13.4. Results and Conclusions

Base case Economic Internal Rate of Return (EIRR) has been calculated as **16.17%**, which indicates that the project is providing economically good returns throughout the tenure of the project. Following table depicts the scenario analysis of the proposed EZ.

Table 127: Scenario Analysis of the Proposed EZ

Scenario	EIRR
Base Scenario	16.17%
Aggressive Scenario	18.89%
Conservative Scenario	12.86%

²³⁴ Additional Financing to the Third Primary Education Development Project RRP BAN 42122 by ADB (2015)

²³⁵ Similar assumption was taken for ADB-Khulna water supply project

²³⁶ Background Paper for World Development Report 2013 “Structural Transformation and Employment Creation” by Christian Kingombe and Dirk Willem te Velde, Overseas Development Institute

Table on the previous page indicates that in conservative case, the project generates **12.86%** economic return which is fair in nature. Aggressive scenario indicates that the economic return of the project is **18.89%**, which is attractive.

It appears from the above analysis that the proposed EZ generates good to attractive economic return in the context of Bangladesh's economy and growth targets.

14. Way Forward

Through this section, we take this opportunity of highlighting our next steps to be undertaken in this project. The same are elucidated below:

- We have tried our best to address all the concerns raised by BEZA and World Bank in this Final report, however we request you to kindly provide any further comments that you might be having, so that we can incorporate the same in the Final Report for your kind perusal within 10 days from receipt of the same.
- A detailed Environmental and Social impact assessment should be carried out by BEZA prior to any site preparation/construction activity and to obtain environment clearance certificate from Department of Environment, Bangladesh.

15. Annexure

15.1. Annexure 1 – Site Photographs

The photographs taken during the site visits have been shown below.



View of EZ site from South-Eastern side



Power transmission line passing through EZ site



Operational substation towards south of EZ site



Operational substation on north of EZ site



Road to the west of EZ site



Road along eastern boundary of the EZ site

15.2. Annexure 2 – Import Trend of Bangladesh

Figures in USD million

Highlighted cells belong to top 75% products

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Cotton	5,921	6,095	7,150	5,383
Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	3,405	3,321	4,792	5,314
Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television ...	1,941	1,799	2,451	3,059
Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral ...	3,216	2,858	5,220	2,079
Iron and steel	1,886	1,714	2,408	2,054
Plastics and articles thereof	1,293	1,380	1,795	1,958
Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	885	759	1,144	1,675
Man-made staple fibres	1,090	1,206	1,624	1,509
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal ...	2,971	2,705	2,770	1,459
Knitted or crocheted fabrics	297	300	590	1,003
Man-made filaments; strip and the like of man-made textile materials	660	728	1,103	912
Cereals	618	781	1,521	858
Fertilizers	1,107	956	1,256	736
Sugars and sugar confectionery	1,013	678	838	697
Paper and paperboard; articles of paper pulp, of paper or of paperboard	460	455	581	656
Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring ...	402	423	588	626
Edible vegetables and certain roots and tubers	371	517	705	606
Organic chemicals	499	458	657	599
Commodities not elsewhere specified	1	0	1	595
Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical ...	287	287	400	576
Articles of iron or steel	327	685	445	569
Miscellaneous chemical products	358	366	505	533
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad ...	6	6	8	496
Salt; sulphur; earths and stone; plastering materials, lime and cement	759	778	992	483
Miscellaneous manufactured articles	192	182	258	430
Residues and waste from the food industries; prepared animal fodder	185	283	491	410
Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	98	95	163	386

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ...	339	394	592	375
Edible fruit and nuts; peel of citrus fruit or melons	132	103	274	313
Aluminium and articles thereof	192	223	262	307
Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable ...	85	86	138	305
Rubber and articles thereof	228	216	299	278
Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, ...	274	261	375	259
Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or ...	143	143	166	257
Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere ...	267	228	290	239
Articles of apparel and clothing accessories, not knitted or crocheted	683	707	887	236
Pharmaceutical products	198	169	187	230
Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; ...	77	85	74	218
Miscellaneous articles of base metal	43	41	59	196
Footwear, gaiters and the like; parts of such articles	95	96	153	187
Copper and articles thereof	150	128	210	177
Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial ...	129	131	161	174
Zinc and articles thereof	103	104	159	164
Ships, boats and floating structures	1,353	1,005	994	155
Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	14	15	42	151
Coffee, tea, maté and spices	92	114	230	150
Ceramic products	53	55	68	138
Raw hides and skins (other than furskins) and leather	69	80	169	137
Essential oils and resinoids; perfumery, cosmetic or toilet preparations	77	71	74	137
Railway or tramway locomotives, rolling stock and parts thereof; railway or tramway track fixtures ...	21	112	7	118
Glass and glassware	61	57	73	118
Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof	28	28	46	110
Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles ...	19	12	29	100
Albuminoidal substances; modified starches; glues; enzymes	47	52	76	94

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Articles of apparel and clothing accessories, knitted or crocheted	17	12	23	90
Miscellaneous edible preparations	49	42	74	89
Preparations of cereals, flour, starch or milk; pastrycooks' products	60	60	71	85
Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	29	28	55	76
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	52	46	43	62
Toys, games and sports requisites; parts and accessories thereof	19	17	24	62
Articles of stone, plaster, cement, asbestos, mica or similar materials	29	33	36	60
Aircraft, spacecraft, and parts thereof	237	138	201	59
Wood and articles of wood; wood charcoal	109	92	114	58
Other made-up textile articles; sets; worn clothing and worn textile articles; rags	40	28	34	56
Printed books, newspapers, pictures and other products of the printing industry; manuscripts, ...	59	35	297	54
Lead and articles thereof	39	39	55	42
Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles ...	41	42	4	41
Photographic or cinematographic goods	22	24	29	41
Fish and crustaceans, molluscs and other aquatic invertebrates	17	30	55	41
Umbrellas, sun umbrellas, walking sticks, seat-sticks, whips, riding-crops and parts thereof	8	4	5	40
Products of animal origin, not elsewhere specified or included	12	12	60	32
Ores, slag and ash	58	64	72	31
Lac; gums, resins and other vegetable saps and extracts	6	5	8	28
Clocks and watches and parts thereof	4	4	6	27
Products of the milling industry; malt; starches; inulin; wheat gluten	26	27	32	26
Live animals	12	12	10	18
Headgear and parts thereof	2	2	3	18
Tobacco and manufactured tobacco substitutes	15	10	12	16
Cocoa and cocoa preparations	4	4	7	15
Beverages, spirits and vinegar	10	9	13	13
Preparations of vegetables, fruit, nuts or other parts of plants	10	7	8	13
Vegetable plaiting materials; vegetable products not elsewhere specified or included	1	2	5	13
Carpets and other textile floor coverings	3	4	5	12
Arms and ammunition; parts and accessories thereof	120	112	130	10
Silk	6	6	5	5
Tin and articles thereof	2	3	3	5
Nickel and articles thereof	3	2	1	4

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	2	1	2	4
Other base metals; cermet; articles thereof	6	5	5	4
Musical instruments; parts and accessories of such articles	2	1	0	2
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	2	2	1	1
Meat and edible meat offal	1	1	1	1
Furskins and artificial fur; manufactures thereof	0	0	1	1
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	0	0	0	0
Works of art, collectors' pieces and antiques	1	1	0	0
Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	0	0	1	0
Cork and articles of cork	0	0	0	0

Source: ITC Trade Database

15.3. Annexure 3 – Export Trend of Bangladesh

Figures in USD million

Highlighted cells belong to top 75% products

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Articles of apparel and clothing accessories, not knitted or crocheted	9,850	10,000	13,765	16,292
Articles of apparel and clothing accessories, knitted or crocheted	9,421	9,568	12,767	16,271
Other made-up textile articles; sets; worn clothing and worn textile articles; rags	1,067	876	819	987
Footwear, gaiters and the like; parts of such articles	349	429	697	912
Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	759	669	681	768
Fish and crustaceans, molluscs and other aquatic invertebrates	496	530	445	602
Headgear and parts thereof	51	43	76	279
Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles ...	139	164	293	257
Raw hides and skins (other than furskins) and leather	325	422	299	209
Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	117	113	131	90
Tobacco and manufactured tobacco substitutes	55	49	49	88
Plastics and articles thereof	89	72	80	82
Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical ...	40	50	53	70
Pharmaceutical products	50	61	70	69
Toys, games and sports requisites; parts and accessories thereof	15	22	27	58
Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles ...	8	9	15	58
Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television ...	76	45	60	57
Edible vegetables and certain roots and tubers	84	114	70	52
Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral ...	447	279	178	52
Ceramic products	36	40	37	47

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; ...	27	28	40	46
Commodities not elsewhere specified	0	2	1	42
Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof	22	21	30	37
Preparations of cereals, flour, starch or milk; pastrycooks' products	36	45	85	35
Carpets and other textile floor coverings	7	9	19	35
Lead and articles thereof	7	2	12	28
Edible fruit and nuts; peel of citrus fruit or melons	48	50	27	27
Copper and articles thereof	63	51	26	24
Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	120	80	171	24
Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, ...	41	13	22	23
Preparations of vegetables, fruit, nuts or other parts of plants	36	52	70	23
Cotton	107	105	92	22
Coffee, tea, maté and spices	27	20	26	19
Ships, boats and floating structures	3	5	20	19
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	2	7	2	18
Man-made staple fibres	44	37	26	15
Beverages, spirits and vinegar	7	7	25	15
Iron and steel	41	32	19	14
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ...	10	24	18	13
Salt; sulphur; earths and stone; plastering materials, lime and cement	4	4	2	13
Sugars and sugar confectionery	15	37	9	11
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal ...	10	13	18	11
Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	6	6	8	11
Ores, slag and ash	20	18	8	10
Rubber and articles thereof	18	12	22	10
Articles of iron or steel	19	19	27	9
Man-made filaments; strip and the like of man-made textile materials	27	31	37	8
Knitted or crocheted fabrics	17	16	34	8

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Miscellaneous edible preparations	1	0	0	7
Residues and waste from the food industries; prepared animal fodder	16	8	3	7
Miscellaneous manufactured articles	9	10	15	7
Miscellaneous chemical products	2	4	4	7
Cereals	4	4	6	7
Fertilisers	0	0	0	7
Wood and articles of wood; wood charcoal	1	2	4	6
Paper and paperboard; articles of paper pulp, of paper or of paperboard	29	33	36	6
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad ...	0	2	5	5
Zinc and articles thereof	4	2	3	4
Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	84	81	49	4
Organic chemicals	0	0	1	3
Umbrellas, sun umbrellas, walking sticks, seat-sticks, whips, riding-crops and parts thereof	0	0	0	3
Glass and glassware	0	0	2	3
Products of animal origin, not elsewhere specified or included	7	11	15	3
Railway or tramway locomotives, rolling stock and parts thereof; railway or tramway track fixtures ...	1	1	1	2
Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	4	5	6	2
Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring ...	0	0	0	2
Albuminoidal substances; modified starches; glues; enzymes	1	1	1	2
Articles of stone, plaster, cement, asbestos, mica or similar materials	0	2	0	2
Printed books, newspapers, pictures and other products of the printing industry; manuscripts, ...	1	1	1	2
Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable ...	9	9	13	2
Aluminium and articles thereof	0	0	2	2
Arms and ammunition; parts and accessories thereof	0	3	2	2

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Aircraft, spacecraft, and parts thereof	26	8	15	2
Miscellaneous articles of base metal	0	0	0	1
Essential oils and resinoids; perfumery, cosmetic or toilet preparations	1	0	1	1
Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere ...	1	0	2	1
Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial ...	2	2	3	1
Products of the milling industry; malt; starches; inulin; wheat gluten	1	1	2	1
Lac; gums, resins and other vegetable saps and extracts	0	0	0	1
Works of art, collectors' pieces and antiques	0	1	0	1
Vegetable plaiting materials; vegetable products not elsewhere specified or included	0	0	24	1
Meat and edible meat offal	1	7	1	1
Nickel and articles thereof	0	0	0	0
Cocoa and cocoa preparations	0	0	0	0
Other base metals; cermets; articles thereof	1	0	0	0
Clocks and watches and parts thereof	0	1	1	0
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	46	33	10	0
Silk	0	0	0	0
Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	0	0	0	0
Furskins and artificial fur; manufactures thereof	0	0	0	0
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	1	0	0	0
Musical instruments; parts and accessories of such articles	0	0	0	0
Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or ...	0	0	0	0
Photographic or cinematographic goods	0	0	0	0
Tin and articles thereof	0	0	0	0
Live animals	0	0	0	0
Cork and articles of cork	0	0	0	0

Source: ITC Trade Database

15.4. Annexure 4 – Gross Output of Manufacturing Sector in Bangladesh

Highlighted cells belong to top 80% products

BSIC code and description	Gross Output (in BDT Million)	Rank
Total	5,394,902	
10 Manufacture of food products	608777	4
11 Manufacture of beverages	52826	13
12 Manufacture of tobacco products	87197	9
13 Manufacture of textiles	715247	3
14 Manufacture of wearing apparel (Ready-made garments)	1819482	1
15 Manufacture of leather and related products	76147	10
16 Manufacture of wood and products of wood and cork,except furniture; manufacture of articles of straw and plaiting materials.	6912	22
17 Manufacture of paper and paper products	57187	12
18 Printing and reproduction of recorded media	10821	21
19 Manufacture of coke and refined petroleum products	3684	23
20 Manufacture of chemicals and chemical products	140184	7
21 Manufacture of pharmaceuticals, medicinal chemical and botanical products	113070	8
22 Manufacture of rubber and plastics products	51143	14
23 Manufacture of other non-metallic mineral products	351779	5
24 Manufacture of basic metals	905850	2
25 Manufacture of fabricated metal products, except machinery and equipment	71357	11
26 Manufacture of computer, electronic and optical products	39623	16
27 Manufacture of electrical equipment	145166	6
28 Manufacture of machinery and equipment n.e.c.	13141	19
29 Manufacture of motor vehicles, trailers and semitrailers	36780	17
30 Manufacture of other transport equipment	36291	18
31 Manufacture of furniture	39685	15
32 Other manufacturing	11263	20
33 Repair and installation of machinery and equipment	1134	24
34 Recycling	129	25

Source: Bangladesh Bureau of Statistics, Survey of Manufacturing Industries 2012

15.5. Annexure 5 – Respondents Primary Survey

Sl. No.	Name of Company	Sector	Origin
1	Pran RFL	Food & Beverages	Domestic
2	Transcom Beverages Ltd	Food & Beverages	Domestic
3	Oriental Fish Processing & Culture Ltd	Food & Beverages	Domestic
4	Bismillah Feed Mills Ltd	Food & Beverages	Domestic
5	Matrix Industries Ltd	Food & Beverages	Domestic
6	Bhai Bhai Consumer Products	Food & Beverages	Domestic
7	Md. Ali Food Products Ltd	Food & Beverages	Domestic
8	Country Field and Farmhouse	Food & Beverages	Domestic
9	Patwary Potato Flakes	Food & Beverages	Domestic
10	Amrita Food Products	Food & Beverages	Domestic
11	Apex Footwear Ltd.	Leather and Footwear	Domestic
12	Apex Tannery	Leather and Footwear	Domestic
13	Tannery Association	Leather and Footwear	Domestic
14	M/S Youko Leather Goods Ltd	Leather and Footwear	Domestic
15	M/S Wintex Gloves (DK) Ltd	Leather and Footwear	Domestic
16	Walk Leather Products	Leather and Footwear	Domestic
17	M/S Venezia Laeather Goods	Leather and Footwear	Domestic
18	M/S Peacock Crafts Ltd	Leather and Footwear	Domestic
19	B&B Leather Industries Ltd	Leather and Footwear	Domestic
20	Crescent Leather products Ltd	Leather and Footwear	Domestic
21	Walton Group	Electrical and Electronics	Domestic
22	BRD Cables	Electrical and Electronics	Domestic
23	Sunflower Cable Industries	Electrical and Electronics	Domestic
24	Jalal Engineering	Electrical and Electronics	Domestic
25	Apurbo Electronics	Electrical and Electronics	Domestic
26	T.B.S. Electrical Industries	Electrical and Electronics	Domestic
27	M/S Northern Trade International	Electrical and Electronics	Domestic

Sl. No.	Name of Company	Sector	Origin
28	Al Borak Electric Company	Electrical and Electronics	Domestic
29	R.R. Imperial Electrical Industry Ltd	Electrical and Electronics	Domestic
30	Super Sign Industry Ltd	Electrical and Electronics	Domestic
31	Nadia Furniture	Light Machinery, Equipment and Furniture	Domestic
32	Meghna Group	Light Machinery, Equipment and Furniture	Domestic
33	Alloy Aluminium Furniture	Light Machinery, Equipment and Furniture	Domestic
34	Emaco Bangladesh	Light Machinery, Equipment and Furniture	Domestic
35	Jifa Engineering Workshop	Light Machinery, Equipment and Furniture	Domestic
36	Raju Engineering Works	Light Machinery, Equipment and Furniture	Domestic
37	Sunrise Engineering	Light Machinery, Equipment and Furniture	Domestic
38	Alim Industries Ltd	Light Machinery, Equipment and Furniture	Domestic
39	New Rupali Engineering	Light Engineering	Domestic
40	M/S Progoti Engineering Ltd	Light Machinery, Equipment and Furniture	Domestic
41	Beximco Pharmaceuticals Ltd	Pharmaceuticals	Domestic
42	Pacific Pharmaceuticals	Pharmaceuticals	Domestic
43	Active Fine Chemicals Ltd.	Pharmaceuticals	Domestic
44	Globe Pharmaceuticals	Pharmaceuticals	Domestic
45	Aksim Laboratories	Pharmaceuticals	Domestic
46	Popular Pharmaceuticals Ltd.	Pharmaceuticals	Domestic
47	Ayurvedia Pharmacy Dhaka Limited	Pharmaceuticals	Domestic
48	Incepta Pharmaceuticals Limited	Pharmaceuticals	Domestic
49	Acme Laboratories Limited	Pharmaceuticals	Domestic
50	Essential Drugs Company Limited	Pharmaceuticals	Domestic
51	Atlas Toiletries Ltd.	Chemicals	Domestic
52	Standard Finis Oil	Chemicals	Domestic
53	Fertilizer Manufacturer Association	Chemicals	Domestic
54	Sabir Fertilizer & Chemical Complex	Chemicals	Domestic
55	Tarek Chemical Adhesive	Chemicals	Domestic
56	Mohammad Adhesive Company	Chemicals	Domestic

Sl. No.	Name of Company	Sector	Origin
57	Best One Chemical Company	Chemicals	Domestic
58	Rubel Chemical Bangladesh	Chemicals	Domestic
59	A-One Adhesive	Chemicals	Domestic
60	Nayema Chemical	Chemicals	Domestic
61	Megha Cashew Pvt. Ltd	Food & Beverages	India
62	GrainSpan Nutrients Pvt. Ltd.	Food & Beverages	India
63	Ceylon Biscuits Ltd.	Food & Beverages	Sri Lanka
64	Cheaney Shoes	Leather and Footwear	UK
65	Aero Leather Clothing Ltd.	Leather and Footwear	UK
66	Boss Shoe Industries Pvt. Ltd	Leather and Footwear	Nepal
67	Autonumis Ltd.	Electrical and Electronics	UK
68	Hilkar	Electrical and Electronics	Turkey
69	ISD Pvt. Ltd. - Verox Labs	Electrical and Electronics	Sri Lanka
70	Ferron Tubes Pvt. Ltd.	Light Machinery, Equipment and Furniture	India
71	Adarsh Plastic	Light Machinery, Equipment and Furniture	India
72	Hindustan Rubtex	Light Machinery, Equipment and Furniture	India
73	Rahul Pharma	Pharmaceuticals	India
74	Sami Direct	Pharmaceuticals	India
75	East India Chemical Works (P) Ltd.	Pharmaceuticals	India
76	Kanoria Chemicals & Industries Ltd.	Chemicals	India
77	Himadri Chemicals	Chemicals	India
78	Indofil Bangladesh Private Ltd.	Chemicals	India

15.6. Annexure 6 – Gross Value Added of Manufacturing Sector in Bangladesh

BSIC Code	Category	Gross Value Added ('000 BDT) 2012
10	Food products	173,959,169
11	Beverages	13,563,935
12	Tobacco products	24,103,009
13	Textiles	219,728,433
14	RMG	555,979,580
15	Leather & related products	22,180,319
16	Wood products & cork, except furniture; articles of straw & plaiting materials	2,305,861
17	Paper products	15,690,942
18	Printing and reproduction of recorded media	4,862,787
19	Coke & refined petroleum products	1,309,369
20	Chemical products	37,247,914
21	Pharmaceuticals, medicinal chemical & botanical products	33,880,955
22	Rubber & plastics products	16,903,205
23	Other non-metallic mineral products	110,552,682
24	Basic metals	216,992,159
25	Fabricated metal products, except machinery & equipment	22,258,815
26	Computer, electronic & optical products	10,776,985
27	Electrical equipment	41,146,392
28	Machinery & equipment n.e.c.	3,912,336
29	Motor vehicles, trailers & semi-trailers	9,970,559
30	Transport equipment	10,290,836
31	Furniture	11,321,651
32	Other manufacturing	3,497,927
33	Repair and installation of machinery and equipment	459,602
34	Recycling	51,653
Total		1,562,947,075

Source: Bangladesh Bureau of Statistics, Survey of Manufacturing Industries (2012) Table 5.2.2 (Page 35)

Based on the above table, following list of Gross Value Added for the initial bucket list of industries has been developed.

Industry Sectors	Gross Value Added ('000 BDT) at 2012
Textiles and RMG	775,708,013
Food and Beverages	187,523,104
Agro based products	24,103,009
Leather and Leather Products	22,180,319

Industry Sectors	Gross Value Added ('000 BDT) at 2012
Plastic and Rubber	16,903,205
Paper and Packaging	17,996,803
Chemicals	37,247,914
Non Metallic Minerals	110,552,682
Auto and Automobile Accessories	20,261,395
Heavy Machinery, Iron & Steel and Metals	239,250,974
Electrical & Electronics	51,923,377
Ship Building and Ship Breaking	511,255
Petroleum Products including Bottling	1,309,369
Pharmaceuticals	33,880,955
Light Machinery and Equipment & Furniture	18,731,914

15.7. Annexure 7 – Estimation of Industrial Growth Rate

Industrial growth rate (organic) has been derived based on data available in secondary domains.

Quantum Index of Major Industries:

BSIC Code	Category	2013-14	2014-15	2015-16	2016-17 (Jul-Dec)
10	Food products	241.52	333.07	385.10	360.82
11	Beverages	243.19	230.06	269.75	261.03
12	Tobacco products	149.65	147.37	135.48	136.82
13	Textiles	139.68	122.81	138.90	156.49
14	RMG	293.70	304.76	338.73	332.28
15	Leather & related products	147.83	140.48	125.44	160.23
16	Wood products & cork, except furniture; articles of straw & plaiting materials	243.39	269.88	301.72	321.11
17	Paper products	151.95	174.68	181.08	183.29
18	Printing and reproduction of recorded media	127.73	140.91	147.83	154.18
19	Coke & refined petroleum products	92.76	96.79	112.00	173.35
20	Chemical products	80.41	77.49	92.73	97.95
21	Pharmaceuticals, medicinal chemical & botanical products	230.60	290.98	319.26	359.37
22	Rubber & plastics products	263.84	292.69	338.14	360.10
23	Other non-metallic mineral products	144.18	182.78	258.34	298.31
24	Basic metals	150.20	187.13	202.85	171.74
25	Fabricated metal products, except machinery & equipment	164.33	182.30	200.53	229.84
26	Computer, electronic & optical products	105.46	148.37	231.89	219.00
27	Electrical equipment	132.06	164.56	214.12	352.52
28	Machinery & equipment n.e.c.	172.68	204.89	279.14	360.95
29	Motor vehicles, trailers & semi-trailers	205.84	178.83	331.63	744.63
30	Transport equipment	152.88	340.12	592.41	493.28
31	Furniture	101.12	116.35	132.02	148.71
Overall manufacturing sector growth (CAGR from 13-14 to 16-17)=		8.9%			

Source: Quantum Index of major industries (base: 2005-06) based on National Accounts Statistics May' 2017

Growth Rates based on secondary research:

Industry Sectors	Annual Growth Rate	Source
Textiles and RMG	13%	https://www.textiletoday.com.bd/overview-bangladesh-rmg-2016/
Food and Beverages	8%	http://katalyst.com.bd/wp-content/uploads/2017/01/Roles-and-

Industry Sectors	Annual Growth Rate	Source
		Opportunities-for-Private-Sector-in-Agro-food-Processing-Industry-of-Bangladesh.pdf
Agro based products		
Leather and Leather Products	44%	https://sourcingjournalonline.com/bangladesh-aims-grow-leather-exports-5-billion-2021/
Plastic and Rubber	20%	http://bida.gov.bd/plastic-industry
Paper and Packaging		Not Available
Chemicals	9%	http://www.thedailystar.net/supplements/painting-the-future-bright-1331338 https://factsweek.com/160464/asia-textile-chemicals-market-is-projected-to-exhibit-a-cagr-of-7-6-from-2014-2020/ https://advancedtextilesource.com/2014/07/23/bangladesh-textile-chemicals-market-growth-continues/
Non Metallic Minerals	24%	http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489
	9.60%	http://today.thefinancialexpress.com.bd/print/outlook-for-cement-industry-in-bangladesh-1510666253
Auto and Automobile Accessories		Not Available
Heavy Machinery, Iron & Steel and Metals	15%	http://www.thedailystar.net/business/bangladeshs-steel-sector-beating-global-market-186499
Electrical & Electronics		Not Available
Ship Building and Ship Breaking		Not Available
Petroleum Products including Bottling	10%	http://fpd-bd.com/wp-content/uploads/2016/10/Research-Report-on-Energy-Sector-of-Bangladesh-Initiation-Mar-15-11.pdf
Pharmaceuticals	15%	https://www.jetro.go.jp/ext_images/world/asia/bd/seminar_reports/20160413/p4.pdf
Light Machinery and Equipment & Furniture		Not Available

Rationale behind the assumptions related to Infrastructure Induced Industrial growth rates are indicated below.

Infrastructure Project	Project Cost (USD billion)	Forecasted boost in GDP and industrial growth	Source
Padma Bridge	3.77	1%-2%	<ul style="list-style-type: none"> http://www.dhakatribune.com/business/2017/02/22/tofail-bangladeshs-gdp-8-padma-bridge-built-2015/ https://mpira.ub.uni-muenchen.de/37904/ http://www.thedailystar.net/round-tables/padma-bridge-new-lifeline-development-203326 http://www.dhakatribune.com/bangladesh/development/2017/09/18/padma-bridge-cost-shoot/
Dhaka Chittagong Highway	0.48		<ul style="list-style-type: none"> https://textiletoday.com.bd/dhaka-chittagong-economic-corridor-new-economic-lifeline/

Infrastructure Project	Project Cost (USD billion)	Forecasted boost in GDP and industrial growth	Source
			<ul style="list-style-type: none"> • https://bdnews24.com/economy/2016/02/16/cost-of-four-lane-dhaka-chittagong-highway-escalates
Payra Port	20.00		<ul style="list-style-type: none"> • https://www.joc.com/regulation-policy/infrastructure-news/asia-infrastructure-news/bangladesh-opts-make-payra-deep-sea-port_20171121.html • http://www.theindependentbd.com/printversion/details/71603

15.8. Annexure 8 – Assumptions related to Investment Inflow

Greenfield Investment Inflow:

In developing countries, Greenfield investment inflow is 57.85% of total investment inflow.

Source:

http://documents.worldbank.org/curated/en/628261468781753575/110510322_20041117173021/additional/32578owps3192.pdf

GDP Share of Dhaka Division as a proxy of Investment share with respect to the country:

District	Per capita GDP at current price (2010-11)	Population (2011)	Total GDP (billion)
Dhaka	66548	12517361	833.01
Faridpur	30405	1988697	60.47
Gazipur	45481	3548115	161.37
Gopalganj	31984	1218319	38.97
Kishoreganj	29325	3028706	88.82
Madaripur	33895	1212198	41.09
Manikganj	35347	1447298	51.16
Munshiganj	29713	1502449	44.64
Narayanganj	47707	3074078	146.66
Narsinghdi	37021	2314889	85.70
Rajbari	32615	1091263	35.59
Shariatpur	30277	1201464	36.38
Tangail	30957	3749086	116.06
Bangladesh	37610	149772364	5632.94
		25.3%	30.9%

Source: http://www.plancomm.gov.bd/wp-content/uploads/2015/02/15_Lagging-Regions-Study.pdf

Incremental Capital Investment to Value Addition

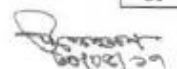



Industry Sectors	Fixed Asset to Value added ratio	Total Fixed Assets ('000 BDT)	Gross Value added ('000 BDT)
Textiles and RMG	0.74	573,327,458	775,708,013
Food and Beverages	0.84	158,186,759	187,523,104
Agro based products	0.45	10,944,170	24,103,009
Leather and Footwear	1.29	28,594,792	22,180,319
Plastic and Rubber	0.98	16,570,442	16,903,205
Paper and Packaging	1.05	18,811,995	17,996,803
Chemicals	1.40	52,263,666	37,247,914
Non Metallic Minerals	0.80	44,420,459	55,276,341
Auto and Automobile Accessories	0.67	13,660,300	20,261,395
Heavy Machinery, Iron & Steel and Metals	0.47	112,121,753	239,250,974
Electrical, Electronics and ICT	0.48	25,151,531	51,923,377
Ship Building and Ship Breaking	0.63	324,044	511,255
Petroleum Products including Bottling	1.71	2,240,206	1,309,369
Pharmaceuticals	2.05	69,381,054	33,880,955
Light Machinery and Equipment & Furniture	0.76	14,144,530	18,731,914

Source: Survey of Manufacturing Industries 2012

15.9. Annexure 9 – Affected plot details

অর্থনৈতিক অঞ্চলের জন্য প্রস্তাবিত জমির বিবরণী :
উপজেলা-জাজিরা, জেলা শরীয়তপুর।

ক্র নং	জে.এল নং ও মৌজার নাম	বক্তিয়ান	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ	মন্তব্য
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৩২		৪৩	৩২	নাল	১.০৬	১.০৬	
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৪৩		৩৭	৪৩	নাল	১.৭৮	১.৭৮	
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৪৬		৮১	৪৬	নাল	২.৬৫	২.৫৫	
৪৭		৮১	৪৭	নাল	১.০৬	১.০৩	
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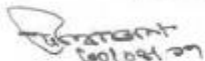
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 মুক্তি সচিব (অতিরিক্ত)
 ন্যূনতম উন্নয়ন কৃষি অধিদপ্তর
 ঢাকা-১০০০০১

ডি.এম. মোল্লাহর হোসেন
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 ঢাকা-১০০০০১

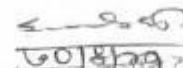
ডি.এম. মোল্লাহর হোসেন
 মুক্তি সচিব (অতিরিক্ত)
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 ঢাকা-১০০০০১


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 ঢাকা-১০০০০১

ক্র নং	জেলা নং ও মৌজার নাম	খতিয়ান	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ	মন্তব্য
৪৯	৪১ নং উত্তর জুবলাদিয়া	৮১	৫২	নাল	১.৫০	১.৪৬	
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৫১		৮১	৫৪	নাল	১.০৯	১.০৬	
৫২		০১	৫৫	নাল	১.৩৭	১.৩৩	
৫৩		৭২	৫৬	নাল	১.৮২	১.৭৮	
৫৪		২৪	৫৭	নাল	১.২০	১.১৭	
৫৫		৮১	৫৮	নাল	০.৭৫	০.৭২	
৫৬		১৮	৫৯	নাল	৩.১০	৩.০০	
৫৭		৫৪	৬০	নাল	২.৯৬	২.৮৬	
৫৮		৩৮	৬১	নাল	১.১২	১.০৯	
৫৯		৮২	৬২	নাল	৪.৭৪	৪.৫৯	
৬০		১৯	৬৩	নাল	৩.৯২	৩.২৩	
৬১		১৯	৬৪	নাল	০.৭৭	০.৫৮	
৬২		৮২	৬৫	নাল	০.৭৭	০.৫৮	
৬৩		৫৪	৬৬	নাল	১.৫১	১.২২	
৬৪		১৮	৬৭	নাল	১.৮৬	১.৫১	
৬৫		৪৫	৬৮	নাল	১.১৮	০.৯৫	
৬৬		৪৫	৬৯	নাল	১.৯২	১.৫৫	
৬৭		৭২	৭০	নাল	২.৫৯	২.০৭	
৬৮		২৪	৭১	নাল	১.৩০	১.০৭	
৬৯		৮৩	৭২	নাল	০.৯৬	০.৭৮	
৭০		২৩	৭৩	নাল	০.৮০	০.৬৫	
৭১		৮৪	৭৪	নাল	১.০৬	০.৮০	
৭২		৪	৭৫	নাল	০.৭২	০.৬০	
৭৩		১	৭৬	নাল	১.৭৭	১.৪২	
৭৪		৮১,১	৭৭	নাল	৪.৬৬	৩.৫৮	
৭৫		৩৭	১২৩	নাল	১.২১	১.২১	
৭৬		৪৩	১২৪	নাল	২.৯০	২.৮০	
৭৭		৪৩	২৭/৪৫১	নাল	০.৮৫	০.৮৫	
৭৮		৪৩	৭২/৪৫২	নাল	০.৬২	০.৬২	
৭৯		৪৪	২৩	নাল	০.৫৬	০.৫৬	
৮০		৪৪	২৪	নাল	২.৫৪	২.৫৪	
৮১		৪৪	২৫	নাল	০.৩৭	০.৩৭	
৮২		৪৪	২৬২	নাল	১.৯৪	১.৯৪	
৮৩		৪৪	২৬৩	নাল	৪.৯১	৪.৯১	
৮৪		৮৬	২৯৪	নাল	০.৭৭	০.৭৭	
৮৫		৭৩	২৯৭	সিকিডিমি	৪.৪০	৪.৪০	
৮৬		৪৮	২৯৮	নাল	৩২.৪০	৩২.৪০	
৮৭		৪৪	২৯৫	নাল	০.৩২	০.৩২	
৮৮		১২	২৯৬	সিকিডিমি	১৩.৩৩	১৩.৩৩	
৮৯		৭৩	৩০০	সিকিডিমি	৯.৫০	৯.৫০	
৯০		৮৬	২৯৯	সিকিডিমি	৩.১৩	৩.১৩	
৯১		৪৪	২৯১	নাল	১৯.১০	১৮.৮৪	
৯২		৬০	২৯০	নাল	১০.৩০	৮.৪০	
৯৩		৪৪	৪৫৩	নাল	০.৩৭	০.৩৭	
৯৪		৩৭	১২২	নাল	০.৪৯	০.৪৯	
৯৫	৩৭	১২১	নাল	০.৬২	০.৬২		
৯৬	৩৭	১২০	নাল	০.৬২	০.৬০		



 (ডি.এম. গোলমার হোসেন)
 জমি সহকারী কর্মকর্তা
 যত্নাঙ্গিক ইন্টিনিয়ন জমি অফিস
 জাজিরা, শরীয়তপুর।


 মোঃ সাইফুদ্দীন মিয়া
 সার্ভেয়ার
 উপজেলা জমি অফিস
 জাজিরা, শরীয়তপুর।

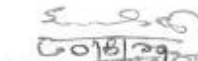

 (মুকুল কুমার) সৈয়দ
 সহকারী কমিশনার (জমি)
 জাজিরা, শরীয়তপুর।



 মোহাম্মদ রাহাত হোসেন
 উপজেলা নির্বাহী অফিসার
 জাজিরা, শরীয়তপুর।

ক্র নং	জেএল নং ও মৌজার নাম	খতিয়ান	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ	মন্তব্য
৯৭	৪১ নং উত্তর ডুবলিয়া	৩৭	১১৭	নাল	০.৪৮	০.০২	
৯৮		৩৭	১১৮	নাল	০.৪৮	০.১৪	
৯৯		৩৭	১১৯	নাল	০.৬৩	০.৩৫	
১০০		৩৭	১২৫	নাল	২.২৯	১.১৫	
১০১		৭৩	৩০২	সিকলি ভূমি	০.৬১	০.৬১	
১০২		১২	৩০৩	সিকলি ভূমি	০.৮৬	০.৮৬	
১০৩		৪৪	৩০৪	সিকলি ভূমি	১.৫৯	০.৮০	
১০৪		৩৭	১২৬	নাল	১.৩০	০.১২	
১০৫	৩৭	১২৭	নাল	১.৭৭	০.২০		
					মোট=	২২১.৯৫	
১০৬	৪২ নং চর খাঙ্গাটিয়া	৮৪	১	নাল	২.২৯	২.২৯	
১০৭		২১	২	নাল	০.২০	০.২০	
১০৮		২১	৩	নাল	১.২৩	১.২৩	
১০৯		২১	৪	নাল	০.২৬	০.২৬	
১১০		২১	৫	নাল	০.৩৯	০.৩৯	
১১১		২১	৭	নাল	০.৪৬	০.৪৬	
১১২		২১	৮	নাল	১.২১	১.২১	
১১৩		২১	৯	নাল	১.০৫	১.০৫	
১১৪		২১	১০	নাল	০.৮৬	০.৮৬	
১১৫		২১	১১	নাল	১.৬৪	১.৬৪	
১১৬		২১	১২	নাল	০.৫৮	০.৫৮	
১১৭		২১	১৩	নাল	১.০৫	১.০৫	
১১৮		২১	১৪	নাল	০.৯৩	০.৯৩	
১১৯		৯৫	১৫	নাল	০.৭৪	০.৭৪	
১২০		৯৫	১৬	নাল	১.৯০	১.৯০	
১২১		৯৫	১৭	নাল	০.৬৯	০.৬৯	
১২২		৯৫	১৮	নাল	০.৮৭	০.৮৭	
১২৩		৯৫	১৯	নাল	০.৮৪	০.৮৪	
১২৪		৯৬	২০	নাল	০.৮৫	০.৮০	
১২৫		৫০	২১	নাল	১.৩০	১.১৫	
১২৬		৬৮	২২	নাল	১.২১	১.০১	
১২৭		৬৮	২৩	নাল	১.০৫	০.৮১	
১২৮		৯৫	২৪	নাল	১.১১	০.৮৩	
১২৯		৯৫	২৫	নাল	১.০৯	০.৭২	
১৩০		৯৫	২৬	নাল	০.৬৪	০.৪৭	
১৩১		৯৫	২৭	নাল	০.৮১	০.৬১	
১৩২	৯৫	২৮	নাল	০.৯২	০.৭২		
১৩৩	৯৫	২৯	নাল	০.৯২	০.৭৭		
১৩৪	৯৫	৩০	নাল	০.৬০	০.৫১		
১৩৫	১	৩১	নাল	১.৩০	১.১৫		
১৩৬	৯৫	৩৬/২৮১	নাল	৪.৩৮	৩.৯১		
					মোট=	৩০.৬৫	


 (ডি.এম. মোমেনুল হোসেন)
 জুমি সহকারী কর্মকর্তা
 বঙ্গবন্ধু উন্নয়ন জুমি অফিস
 জাজিরা, শরীয়তপুর।


 মোঃ মমেনুল হোসেন
 সার্ভেয়ার
 উপজেলা জুমি অফিস
 জাজিরা, শরীয়তপুর।


 (মুকুল কুমার) মৈত্র
 সহকারী কমিশনার (জুমি)
 জাজিরা, শরীয়তপুর।


 রাহেলা রহমত উল্লাহ
 উপজেলা নিকরী অফিসার
 জাজিরা, শরীয়তপুর।

১৩৭		১২৮	১৪৫১/১৭৭৩	নাল	০.৯০	০.৯০		
১৩৮		১০৩	১৪৫০	নাল	২.০০	১.৮০		
১৩৯		১২৮	১৪৫১/১৭৭২	নাল	১.০৫	০.৮৭		
১৪০		১২৮	১৪৫১/১১৭৫	নাল	১.৫৫	১.৫৫		
১৪১		১২৮	১৪৫২	নাল	২.০০	২.০০		
১৪২		১০৩	১৪৫৩	নাল	১.০০	১.০০		
১৪৩		১০৩	১৪৫৪	নাল	০.৩৩	০.৩৩		
১৪৪		১০৩	১৪৫৫	নাল	১.৩০	১.২০		
১৪৫		১০৩	১৪৫৬	নাল	০.৮৪	০.৭৪		
১৪৬		১০৩	১৪৫৭	নাল	১.৬৯	১.৫৫		
১৪৭		১০৩	১৪৬২	নাল	০.৪৬	০.৪১		
১৪৮		২১	১৪৬৪	নাল	০.৫৯	০.৫৪		
১৪৯		২১	১৪৬৫	নাল	১.৩১	১.১০		
১৫০		২২	১৪৬৬	নাল	১.১৮	০.৯৭		
১৫১	৯৭ নং দিয়ারা গোপালপুর	১,৯৯	১৪৭৪	নাল	০.৮০	০.৬৫		
১৫২		৩২	১৪৭৭	নাল	০.৮১	০.৭৫		
১৫৩		১০২,৯৭	১৪৭৯	নাল	২.০৮	১.৭৯		
১৫৪		৩২	১৪৮০	নাল	০.৬৭	০.৫৮		
১৫৫		৩২	১৪৮৯	নাল	০.৫৯	০.৩৯		
১৫৬		৩২	১৪৯০	নাল	০.৫৪	০.৫৪		
১৫৭		৮০,৮১	১৪৯১	নাল	০.৬৫	০.৬৫		
১৫৮		২৮,৩২	১৪৯৮	নাল	২.৪৭	১.৮৪		
১৫৯		৮৯	১৪৯৯	নাল	২.৩৪	১.৪৭		
১৬০		১৫,৭৯	১৫০৭	নাল	১.০৭	০.৮৫		
১৬১		৬৮	১৫০৮	নাল	০.৮৩	০.৬৩		
১৬২		১৫	১৫১৩	নাল	১.২২	০.৭১		
১৬৩		১৫	১৫১৪	নাল	০.৯৭	০.১২		
১৬৪		১৫,২৪	১৫১৫	নাল	১.৫৪	০.১২		
১৬৫		১৫	১৫১৬	নাল	২.১২	০.১০		
১৬৬		১০৩	১৪৭৩	নাল	১.২১	০.৮৭		
১৬৭		৮০	১৪৯২	নাল	০.২৫	০.০৭		
মোট=						২৭.০৯		

৩৭/০৪/১৭ মোঃ শাহজালাল মিয়া
 প্রস রাশেদুল হাটিন শাহেয়ার
 ঃ সহকারী কর্মকর্তা উপজেলা কৃষি অফিস
 জোরা ইউনিয়ন কৃষি অফিস, পরীয়াতপুর।
 জিলা, শরীয়াতপুর।

৩০/৪/১৭
 (মুজিব কুমার মৈত্রী)
 সহকারী কমিশনার (কৃষি)
 জিলা, শরীয়াতপুর।

৩০/৪/১৭
 রাহেলা রহমান উল্লাহ
 উপজেলা নির্বাহী অফিসার
 জিলা, শরীয়াতপুর।

অর্থনৈতিক অঞ্চলের জন্য প্রস্তাবিত জমির পরিমাণ:
উপজেলা- জাজিরা, জেলা শরিয়তপুর

ক্রমিক নং	জেএল নং ও মৌজা	বিত্তিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য	
১	১ সেনের চর	১,৯৮৬, ১০৪৫	১২৭	নাল	১.২৪	১.২৪		
২		১,১১৫৩	১০২৮	নাল	১.৫০	১.৫০		
৩		১,৩৭৪	১০২৯	নাল	০.৫৭	.৫৭		
৪		১	১০৩০	বাড়ি	০.০৮	০.০৮		
৫		১	১০৩১	নাল	০.৯০	.৯০		
৬		১	১০৩১/১০৭৭	নাল	১.২৩	১.২৩		
৭		১,১০৪৬,১১৫০,১১৫৫	১০৩২	নাল	১.৫৮	১.৫৮		
৮		১,৪৯৫,১১৫০,১১৫৫,১১৫৭	১০৩৩	হাট	৩.৪৬	৩.৪৬		
৯		১,১১৪২	১৩৪	নাল	১.০০	১.০০		
১০		১১৪২	১৩৪	নাল	০.০৩	.০৩		
১১		১১৪৪	১৩৫	নাল	.৯৪	.৯৪		
১২		১১৫৭	১৩৬	নাল	.৫৮	.৫৮		
১৩		১১৫৮	১৩৭	নাল	.৮৫	.৮৫		
১৪		১১৫৮	১৩৮	নাল	.৩৫	.৩৫		
১৫		১	১৩৯	নাল	.৫৮	.৫৮		
১৬		১	১৪০	নাল	.২৭	.২৭		
১৭		১৪৯৫	১৪১	নাল	১.২২	১.২২		
১৮		১১৪৬	১৪২	নাল	.৪৭	.৪৭		
১৯		১১৫৪	১৪৩	নাল	.৭৭	.৭৭		
২০		১,১১৫৪	১৪৪	নাল	.৫৬	.৫৬		
২১		১	১৪৫	নাল	.৮৯	.৮৯		
২২		১	১৪৬	নাল	১.১৬	১.১৬		
২৩		১	১৪৭	নাল	১.০৩	১.০৩		
২৪		১	১৪৮	নাল	১.১৮	১.১৮		
২৫		১	১৪৯	নাল	.৬৫	.৬৫		
২৬		১	১৫০	নাল	.১৮	.১৮		
২৭		১	১৫১	নাল	.৫৩	.৫৩		
২৮		১	৯৯৬/১০৫৯	নাল	১.১৬	১.১৬		
২৯		১	৯৯৬	নাল	১.১৬	.৩৯		
৩০			১০২৮	৯৬৭	নাল	.৯৮	.০৫	
৩১			১৪৯৫	৯৯৫	নাল	.৬৫	.৬৫	

ক্রমিক নং	জেএল নং ও মৌজা	খতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
৩২		৪৯৫	৯৬৯	নাল	.১০	.০৮৫	
৩৩		১১৫৪	৯৭০	নাল	.১৩	.০৮৫	
৩৪		৪৯৫	৯৯৪	নাল	.৫০	.৫০	
৩৫		১১৫৪	৯৯৩	নাল	.৫০	.৫০	
৩৬		১১৪৬	৯৯২	নাল	১.১০	১.০৭	
৩৭		১৪৯৫	৯৯১	নাল	.৬৪	.৬২	
৩৮		১	৯৯০	নাল	.৩৩	.৩০	
৩৯		১,১১৫৮	৯৮৮	নাল	.৩৪	.৩৪	
৪০		১	৯৮৯	নাল	.২৭	.২৪৫	
৪১		১১৫৮	৯৮৭	নাল	.৮২	.৭৩৫	
৪২		১১৫৭	৯৮৬	নাল	.৭২	.৬৬৫	
৪৩		১১৪৪	৯৮৫	নাল	১.১৪	১.০৪৫	
৪৪		১১৪২	৯৮৩	নাল	১.০৫	.৯৪৫	
৪৫		১১৪২	৯৮৪	বাড়ি	.১৮	.১৮	
৪৬		৬২,১১৪৩,১১৪৮	৯৭৭	নাল	১.৬৮	১.৪৬	
৪৭		১১৪৬	৯৭৮	নাল	.৯৯	.৮৪৫	
৪৮		১১৪৬	৯৯৮	নাল	১.৯৬	১.৮৩৫	
৪৯		১১৪৬	৯৮০	নাল	১.৯৬	১.৭৬	
৫০		১	৯৮১	নাল	১.৩২	১.১৪৫	
৫১		১১৪৭,১১৪৯	৯৮২	নাল	১.২৮	১.১৩	
৫২		১০৬৪,১১৪৩	৯৯৯	নাল	৯.৬৬	৮.৫৫	
৫৩		১১৪৮,১০৬৪,১১৪৩	১০০০	নাল	.৭৪	.৭৪	
		১১৪৩,১০৪৬,১,১১৪৮	১০০১	নাল	.৩১	.৩১	
		১	১০০২	নাল	১.৮৯	১.৮৯	
		১১৪৫	১০০৫	নাল	২.৮৯	২.৫৮	
		১,১১৪২,১০৪৬	১০২২	নাল	২.১১	২.১১	
		১,৩৭৪	১০২৩	নাল	.২০	.২০	
		১,৩৭৪	১০২৪	নাল	.৫২	.৫২	
৫৪		১,১০৬৪,১১৪৫	১০২৫	নাল	২.০৮	২.০৮	
৫৫		৩৭৩	৬১১	নাল	.৮৮	.৮৮	
৫৬		৩৭২,৭৮৬,১১৪৫,১১৪২,১১৪৩, ১১৪৪	৬১২	নাল	৪.২৫	৪.২৫	
৫৭		৩৭২,৪৩১,১১৪৩,১১৪৮	৬১৩	নাল	.৫৬	.৫৬	

ক্রমিক নং	জেএল নং ও মৌজা	খতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
৫৮		৩৭২,৮৭৯,১১৪৩,১১৪৬,১১৪৮	৬১৪	নাল	৫.১৮	৫.১৮	
		৩৮০	৬০৬	নাল	.২৬	.২৬	
		৩৮০	৬০৭	নাল	.০৩	.০৩	
		৩৮০	৬০৮	নাল	.০৮	.০৮	
৫৯		৩৭৪	৬০৯	বাড়ি	.৫১	.৫১	
৬০		৩৭৪	৬১০	বাড়ি	.১০	.১০	
৬১		৩৭৬	৬০২	নাল	১.৩০	১.৩০	
৬২		৩৭৬	৬০৩	নাল	.৮১	.৮১	
৬৩		৩৭৯	৬০৮	নাল	.৪৪	.৪৪	
৬৪		৯৫০	৬০৫	নাল	.১৯	.১৯	
৬৫		৪৩২	৫৯১	নাল	১.২৫	১.২৫	
৬৬		৪৩২	৫৯০	নাল	.২৫	.২৫	
৬৭		৪৩২	৫৮৯	নাল	.১৩	.১৩	
৬৮		৩৭৯	৫৭৬/১০৬৫	নাল	.১৮	.১৮	
৬৯		৯৫৪	৫৭১	নাল	.০৫	.০৫	
৭০		৩	৫৭২	নাল	.০৬	.০৬	
৭১		৯৫৪	৫৭৩	নাল	.২৮	.২৮	
৭২		৩৬৬	৫৭৫	নাল	.৫১	.৫১	
৭৩		৩৬৫	৫৭৭	নাল	.৫১	.৫১	
৭৪		৩৬৫	৫৭৮	নাল	.১০	.১০	
৭৫		৪১৮	৫৭০	নাল	.৮৩	.৮৩	
৭৬		৪৮০	৫৬৬	নাল	১.৯৭	১.৯৭	
৭৭		৪৮০	৫৬৭	নাল	.৭৩	.৭৩	
৭৮		৩৮৯	৫৬৮	নাল	১.২৭	১.২৭	
৭৯		৪৭০	৫৮৩	নাল	১.৫৭	১.৫৭	
৮০		৪৪৭	৫৮৪	নাল	১.৫৪	১.৫৪	
৮১		৩৭৬	৫৮৮	নাল	১.৪৪	১.৪৪	
৮২		৩৭৫	৩৮৯	নাল	১.৭৩	১.৭৩	
৮৩		৩৯২	৩৭৩	নাল	১.৬৮	১.৬৮	
৮৪		৩৭০	৩৭২	নাল	১.১০	১.১০	
৮৫		৪৪৪	৩৬৫	নাল	১.৪৪	১.৪৪	
৮৬		৩৮৩	৩৬৪	নাল	১.৫০	১.৫০	
৮৭		৩৮৩	৩৬১	নাল	১.৫৩	১.৫৩	

ক্রমিক নং	জেএল নং ও মৌজা	খতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
৮৮		৩৭৫	৩৬০	নাল	১.১৮	১.১৮	
৮৯		৪৭৮	৩৫৯	নাল	.৭৬	.৭৬	
৯০		৪৭৩	৩৫৬	নাল	.৬১	.৬১	
৯১		৩৮৯	৩৫৫	নাল	.৫৩	.৫৩	
৯২		৩৮৬	৩৫১	নাল	.৩৯	.৩৯	
৯৩		৩৮৬	৩৫২	নাল	.০৪	.০৪	
৯৪		৩৮৯	৩৫৩	নাল	.০৬	.০৬	
৯৫		৩৮৯	৩৫৪	নাল	.০৫	.০৫	
৯৬		৩৭৩	৩৫৭	নাল	.১৬	.১৬	
৯৭		৩৭৬,৪১৯	৩৪৯	নাল	.৬৩	.৬৩	
৯৮		৩৭৬	৩৫০	নাল	.১৫	.১৫	
৯৯		৪১৮	১৯৯	নাল	১.৩২	১.৩২	
১০০		৪৬২	১৯৮	নাল	.৬৮	.৬৮	
১০১		৪২৪	১৯৭	নাল	.৫৯	.৫৯	
১০২		৩৮৭	১৯৬	নাল	.৫৮	.৫৮	
১০৩		৩৮৭	১৯৫	নাল	.৭০	.৭০	
১০৪		৪৬২	১৯৪	নাল	১.৩৫	১.০৬	
১০৫		৩৭৭,৪৫৯	১৯৩	নাল	.৭৪	.৩৭	
১০৬		৩৭৭,৪৫৯	১৯১	নাল	.২৫	.০৫৫	
১০৭		৪৬৬	১৯০	নাল	.৭২	.০৮	
১০৮		৪১৮	১৭৪	নাল	.৬৪	.৬৪	
১০৯		৩৭৬	১৭৩	নাল	২.৩১	২.৩১	
১১০		৪৫২	১৭২	নাল	২.৮৪	২.৮৪	
১১১		৪৫২	১৭১	নাল	১.৫৮	১.৫৮	
১১২		৩৯৩	১৬৬	নাল	১.৭৭	১.৭৭	
১১৩		৪৬২	১৬৩	নাল	.৩০	.৩০	
১১৪		৪৬২	১৬৪	নাল	.২৪	.২৪	
১১৫		৩৯৬	১৬২	নাল	.৫৯	.৫৯	
১১৬		৪৭৭	১৫৯	নাল	.২৬	.২৬	
১১৭		৪৭৭	১৬০	নাল	.২৫	.২৫	
		৪৫৮	১৫৮	নাল	.৮২	.৮২	
		৪৬৬	১৫৭	নাল	১.০৮	১.০৮	
		৩৯৯	১৫৩	নাল	.৪১	.৪১	

ক্রমিক নং	জেএল নং ও মৌজা	খতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
		৩৮৮	১৫৪	নাল	.৫৪	.৫৪	
		৩৮৮	১৫৫	নাল	.১৭	.১৭	
		৩৯৯	১৫২	নাল	.১৭	.১৭	
		৩৮৪	১৪৮	নাল	.৯৪	.৭৮	
		৪৭৭	১৪৬	নাল	.৫৪	.৫৪	
		৪৭৭	১৪৭	নাল	.৯৩	.৬৭	
		৪৬৯	১২৯	নাল	.৪৪	.২৭	
		৪৬৯	১৩০	নাল	.২৯	.২৯	
		৪৬৬	১২৬	নাল	.৫৮	.৫৮	
		৪৬৬	১২৭	নাল	.১৫	.১৫	
		৪৬৬	১২৮	নাল	১.৪৩	১.৪৩	
		৪৬৬	১২৫	নাল	.৯০	.৯০	
		৪৭৮	১৫০	নাল	১.০২	.৯৮	অংশ
		৩৭৫	১৫১	নাল	১.০৮	.৯৬	
		৪১৯,৪৩১	১৪১	নাল	.৬৩	.৬০	
		৪১৯,৪৩১	১৫৬	নাল	২.৩০	২.৩০	
		৪৭৮	১৩৯	নাল	১.১৮	১.১৮	
		৩৭৫	১৪০	নাল	.৭১	.৭১	
		৪৫২	১৩৮	নাল	২.২৪	২.২৪	
		৪৩৯	১৬১	নাল	১.২৫	১.২৫	
		৩৭৬,৪১৯	১৬৫	নাল	১.০৩	১.০৩	
		৩৮৬	১৬৮	নাল	.৩৩	.৩৩	
		৩৮৯	১৬৯	নাল	.৩৫	.৩৫	
		৪৭৩	১৭০	নাল	.২৮	.২৮	
		৩৯৫	১০০	নাল	১.৯৩	১.৯৩	
		১	৫৭৬	নাল	.২৯	.২৯	
		৪৭৩	৩৫৮	নাল	.৩৫	.৩৫	
		১,৬২,৩৭৪,৪৯৫,৯৮৬,১০৪৫,১০৪৬ ১১৪১,১১৪২,১১৪৩,১১৫০,১১৪৯ ১১৪৬,১১৪৫,১১৪৪,১১৪৮,১১৫৩	১০২৬	নাল	২৮.০৬	২৮.০৬	

ক্রমিক নং	জেএল নং ও মৌজা	খতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
		১১৫৪,১১৫৫,১১৫৬,১১৫৭,১১৫৮					
		১,৬২,৩৭৪,৪৩১,৪৯৫,৯৮৬,৭৮৬,১১০৮ ১১৪২,১১৪১,১১০৭,১১০২,১০৪৫ ১১৪৫,১১৪৩,১১৪৬,১১৪৭,১১৪৯ ১১৫০,১১৫২,১১৫৩,১১৫৪,১১৫৬	৯৯৭	নাল	২৮.৭৫	২৮.৭৫	
						মোট = ১৯৫.৫৪৫	

অর্থনৈতিক অঞ্চলের জন্য প্রস্তাবিত জমির পরিমাণ:
উপজেলা- জাজিরা, জেলা শরিয়তপুর


ক্রমিক নং	জেএল নং ও মৌজা	বতিরান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
১	৪০	২২	১	নাল	২.১৬	২.১৬	
২	৪০	১৪২	২	নাল	.৬০	.৬০	
৩	৪০	২৪	৩	নাল	.৪৫	.৪৫	
৪	৪০	১১৮	৪	নাল	.৫৬	.৫৬	
৫	৪০	১১৮	৫	নাল	.২৩	.২৩	
৬	৪০	৮৬	৬	নাল	.৫০	.৫০	
৭	৪০	৮৬	৭	নাল	.৩৭	.৩৭	
৮	৪০	৩৯	৮	নাল	.৯৮	.৯৮	
৯	৪০	৩৯	৯	নাল	.৮৬	.৮৬	
১০	৪০	৮২	১০	নাল	.২১	.২১	
১১	৪০	৮২	১১	নাল	.৩৫	.৩৫	
১২	৪০	৯০	১২	নাল	১.৫৫	১.৫৫	
১৩	৪০	৯০	১৩	নাল	.৬৮	.৬৮	
১৪	৪০	৭৪	১৪	নাল	১.১৪	১.১৪	
১৫	৪০	৭৪	১৫	নাল	.২৫	.২৫	
১৬	৪০	৭৪	১৬	নাল	.১০	.১০	
১৭	৪০	৭৪	১৭	নাল	২.৯৪	২.৯৪	
১৮	৪০	৮২	১৮	নাল	২.৩৬	২.৩৬	
১৯	৪০	৭৪	১৯	নাল	১.০৯	১.০৯	
২০	৪০	১৪৯,১৫০	১২৪	নাল	.৭০	.৭০	
২১	৪০	১৪৯,১৫০	১২৩	নাল	.২২	.২২	
২২	৪০	২২	১২২	নাল	.৪০	.৪০	
২৩	৪০	২২	১২১	নাল	.৪৩	.৪৩	
২৪	৪০	১৪২	১২০	নাল	.৪৮	.৪৮	
২৫	৪০	১৪২	১১৯	নাল	.৩৮	.৩৮	
২৬	৪০	২৪	১১৮	নাল	.৪১	.৪১	
২৭	৪০	২৪	১১৭	নাল	.৪৩	.৪৩	
২৮	৪০	১১৮	১১৬	নাল	.৫৮	.৫৮	
২৯	৪০	১১৮	১১৫	নাল	.৩৫	.৩৫	
৩০	৪০	৯৬	১১৪		.১৮	.১৮	
						২১.৯৪	

ক্রমিক নং	জেএল নং ও মোজা	বতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
৩১	৪০	৯৬	১১৩	নাল	.১২	.১২	
৩২	৪০	৮৬	১১২	নাল	.৪৮	.৪৮	
৩৩	৪০	৩৯	১১১	নাল	২.১৭	২.১৭	
৩৪	৪০	৩৯	১১০	নাল	১.৪১	১.৪১	
৩৫	৪০	৯০	১০৯	নাল	.০৯	.০৯	
৩৬	৪০	৯০	১০৮	নাল	.৮৩	.৮৩	
৩৭	৪০	৯০	১০৭	নাল	২.২২	২.২২	
৩৮	৪০	৭৪	১০৬	নাল	১.৪২	১.৪২	
৩৯	৪০	৭৪	১০৫	নাল	.৩৩	.৩৩	
৪০	৪০	৭৪	১০৪	নাল	.১১	.১১	
৪১	৪০	৭৪	১০৩	নাল	.৩১	.৩১	
৪২	৪০	৭৪	১০২	নাল	.২৭	.২৭	
৪৩	৪০	৭৪	১০১	নাল	৩.০৮	৩.০৮	
৪৪	৪০	৮২	১০০	নাল	২.৩৮	২.৩৮	
৪৫	৪০	৮২	৯৯	বাড়ি	.১১	.১১	
৪৬	৪০	৭৪	২০	নাল	.৬৭	.৬৭	
৪৭	৪০	৬৪	২১	নাল	.২৭	.২৭	
৪৮	৪০	৬৪	২২	নাল	১.১৪	১.১৪	
৪৯	৪০	১৩	১৭৩	নাল	.২৭	.২৭	
৫০	৪০	১৪	১৭২	নাল	১.১৪	১.১৪	
৫১	৪০	২২	১,১৭১	নাল	.৩৫	.৩৫	
৫২	৪০	১৪২	১৭০	নাল	.৬০	.৬০	
৫৩	৪০	১৪	১৩৭	নাল	.২০	.২০	
৫৪	৪০	১৩	১৩৮	নাল	.২১	.২১	
৫৫	৪০	১৩	১৩৯	নাল	.০৬	.০৬	
৫৬	৪০	৬৯	১৪০	নাল	.০৮	.০৮	
৫৭	৪০	৪	১৪১	নাল	.০৫	.০৫	
৫৮	৪০	৩	১৪২	নাল	২.০৬	২.০৬	
৫৯	৪০	৩	১৭৫	বাড়ি	.০৬	.০৬	
৬০	৪০	৫৯	১, ১৭৪	বাড়ি	.০২	.০২	
৬১	৪০	১২	১৩৫	নাল	১.৩৬	১.৩৬	
৬২	৪০	৩	১৪৩	নাল	.১২	.১২	
৬৩	৪০	১২	১৩৪	নাল	.৮৬	.৮৬	
						২৪.৮৫	

ক্রমিক নং	জেএল নং ও মৌজা	খতিয়ান নং	দাগ	শ্রেণী	দাগের মধ্যে জমির পরিমাণ (একর)	প্রস্তাবিত জমির পরিমাণ (একর)	মন্তব্য
৬৪	৪০	১১৮	১২৮	নাল	.৩৭	.৩৭	
৬৫	৪০	১১৮	১২৯	নাল	.১২	.১২	
৬৬	৪০	২৪	১৩০	নাল	.১১	.১১	
৬৭	৪০	২৪	১৩১	নাল	.৩১	.৩১	
৬৮	৪০	২২	১২৭	নাল	.৩১	.৩১	
৬৯	৪০	২২	১২৬	নাল	.১২	.১২	
৭০	৪০	১৪৯,১৫০	১২৫	নাল	.৯৫	.৯৫	
৭১	৪০	৮২	৯৮	নাল	.০৯	.০৯	
৭২	৪০	৭৪	৯৭	নাল	.০৫	.০৫	
৭৩	৪০	৭৪	৯৬	নাল	২.৩৪	২.৩৪	
৭৪	৪০	১৩৫	৯৫	নাল	১.০৮	১.০৮	
৭৫	৪০	১৪৪	৯৫	নাল	১.১৩	১.১৩	
৭৬	৪০	১৩৫	১৪৫	নাল	৭.১৫	৭.১৫	
৭৭	৪০	৫৩	১৪৪	নাল	১.১৩	১.১৩	
৭৮	৪০	১১৫	৫৯৪	নাল	১.৩০	১.৩০	
৭৯	৪০	৫৭	৩৪০	নাল	২.৭৪	২.৭৪	
৮০	৪০	৭৩	৩৩৯	নাল	২.৫৬	২.৫৬	
৮১	৪০	৫৩	৩৩৮	নাল	১.৭১	১.৭১	
৮২	৪০	৭২	৩৩৭	নাল	.৭৮	.৭৮	
৮৩	৪০	৬৯	৩৩৫	নাল	.৭০	.৭০	
৮৪	৪০	১৩৬	৩০১	নাল	১.৭১	১.৭১	
৮৫	৪০	৭৭	৩৪২	নাল	১.০৮	১.০৮	
৮৬	৪০	৫৬	৩৩৬	নাল	১.৮০	১.৮০	
৮৭	৭৪০	৪৩	৫৯৭	নাল	.৪৪	.৪৪	
৮৮	৪০	৪১	৩০২	নাল	৪.৫২	৪.৫২	
৮৯	৪০	৮৫	৩৩৪	নাল	.৮৫	.৮৫	
৯০	৪০	৪১	৩০৩	নাল	.০২	.০২	
৯১	৪০	১,১৫৭	৩৩৪/৩৪৫	নাল	১.১০	১.১০	
৯২	৪০	১৫৪	৩৪৬	নাল	৩.৭৪	৩.৭৪	

15.10. Annexure 10 – Attendee details of focused group discussions

জাজিরা- ইকোনোমিক-জোন
-স্ট্রাকচার-ডিটেইল
তাং ৭-৮-২০১৮- দিনঃ যুবক ও গণ্যমান্য ব্যক্তি-
স্থানঃ -সেনের চর, জাজিরা, মাতিয়াপুর

নাম	পিতার নাম	স্বাক্ষর	স্বাক্ষর
১। মোঃ হেলা আলম	জালাল আলম	০১৯০৫৫৬০৮৫৫	
২। মাহমুদ আলম	হাবিব আলম	০১৯৯৬৪৭৭৫৫৯	মাহমুদ
৩। জুয়েল আলম	জালাল আলম	০১৯৫৫৫৫৫৫৫৫	জুয়েল
৪। ইকবাল আলম	হাবিব আলম	০১৯৬৫৫৫৫৫৫৫৫	ইকবাল
৫। মিজানুর রহমান	আব্দুল হান্নান	০১৯২৭০০৪৬৪৫	মিজান
৬। হাবিব আলম	মুহাম্মদ আলম	০১৭২৬২২৬৫৭৫	হাবিব
৭। মাহিদ আলম	আব্দুল হান্নান	০১৭৬৫৫৫৫৫৫৫৫	মাহিদ
৮। নূর আলম	আব্দুল হান্নান	০১৯৬৫৫৫৫৫৫৫৫	নূর আলম
৯। উজ্জ্বল আলম	আব্দুল হান্নান	০১৭৬৪৬৫৫৫৫৫৫	উজ্জ্বল
১০। হাবিব আলম	আব্দুল হান্নান	০১৭৬৪২৬৫৫৫৫৫৫	হাবিব
১১। মাহমুদ আলম	হাবিব আলম	০১৭৭৩৬৫৫৫৫৫৫	মাহমুদ

১২।

A.H. Alam
7-8-2018

স্বাক্ষর-সিটিং

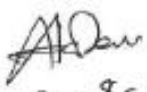
তারিখ ৭-৬-২০১৮

স্থান: - (আবদুল হক, জাজিরা, মারিচতপুর।)

উল্লেখ্য: কুমিল্লা জেলায় আনিকরণ

নাম - মিজাব নাম - মোস্তাফিজ - স্বাক্ষর

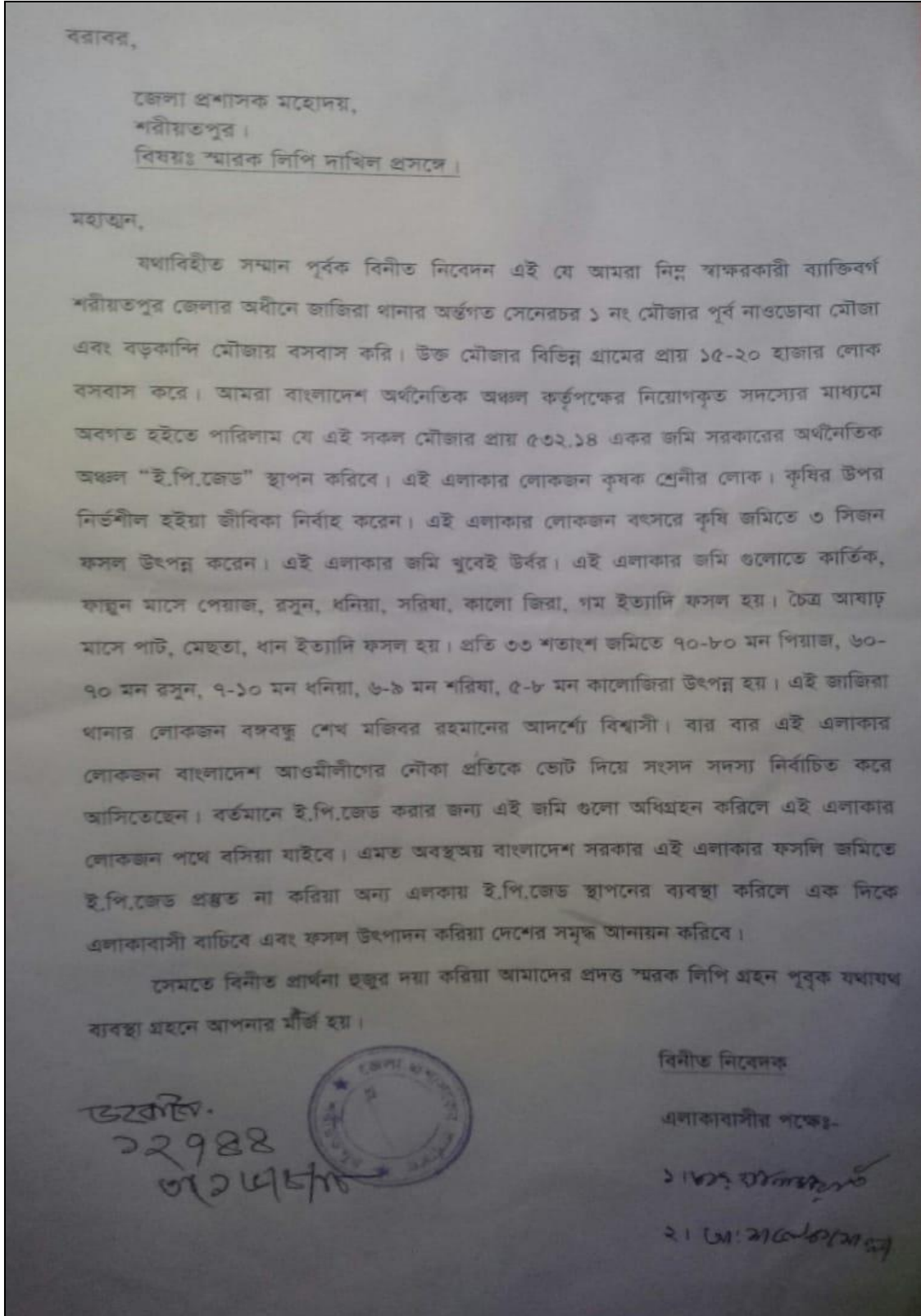
- ১/ মিস্টার মিজাব নাম - মোস্তাফিজ - ০১২৩২৫৫০২০০ - মোস্তাফিজ
- ২/ মিস্টার মিজাব নাম - মোস্তাফিজ - ০১২৩০২০৫২৪ - মোস্তাফিজ
- ৩/ মা: মিজাব নাম - মোস্তাফিজ - ০১২৩১০০২৫৪ - মিজাব নাম
- ৪/ মা: মিজাব নাম - মোস্তাফিজ - ০১২৩২৩০৫৬৩ - মিজাব নাম
- ৫/ মা: মিজাব নাম - মোস্তাফিজ - ০১৩৪৬৩৪১৪৬২ - মিজাব নাম
- ৬/ মা: মিজাব নাম - মোস্তাফিজ - ০১৪৫২৩৩৩৩৩ - মিজাব নাম
- ৭/ মা: মিজাব নাম - মোস্তাফিজ - ০১২৩৩৩৪৫৫৬ - মিজাব নাম
- ৮/ মা: মিজাব নাম - মোস্তাফিজ - ০১৩৩৪৫৫৬৬৬ - মিজাব নাম
- ৯/ মিস্টার মিজাব নাম - মোস্তাফিজ - ০১২৩৪৫৫৬৬৬ - মিজাব নাম
- ১০/ মিস্টার মিজাব নাম - মোস্তাফিজ - ০১৩৪৫৬৬৬৬৬ - মিজাব নাম


 3-8-2018

পূর্ব মেসেজের ৮৪ জোলা কান্দি, রায়গী কান্দি, বঙ্কনআলী মুন্সি কান্দি
 মহিলা মিটিং
 সময়ঃ ৩.৩০-৩.৪৫ বিকাল

ক্রমিক নং	নাম	পিতা / স্বামী	স্বাক্ষর
০১	মিস্টার জাহান	স্বামী. আজিদ মুন্সি	মিস্টার
০২	আলমগীর বেগম	স্বত. জব্বার ফকির	আলমগীর
০৩	বেগম	" বিনু ফকির	বেগম
০৪	ছকিমা	" হামেদ জোলা	ছকিমা
০৫	হানিম	স্বামী. দেলোয়ার কান্তী	হানিম
০৬	নূর-জাহান	" হানিম "	নূর-জাহান
০৭	মাহিনা	" মাহিব "	মাহিনা
০৮	রুজ্বিনা	" মিজানুর "	রুজ্বিনা
০৯	তানজিয়া	" আবুল-বাকার জোলা	তানজিয়া
১০	শুভা	" মিজানুর মুন্সি	শুভা
১১	মেলিকা	" স্বপন "	মেলিকা
১২	আছমিয়া	" দেলোয়ার আকন	আছমিয়া
১৩	মনর বেগম	" মিয়াছ উদ্দিন হোসেন	মনর
১৪	আছমিয়া	" কবেল শেখ	আছমিয়া
১৫	মেলিকা	" উমর জোলা	মেলিকা
১৬	ইয়াব্বুন	" মোজাম্মেল মাদবর	ইয়াব্বুন
১৭	নয়ন তারা	" হাব্বজ "	নয়ন তারা
১৮	শ্যাদিজা	" স্বত. হলেম মুন্সি	শ্যাদিজা
১৯	শুকুর-জান	" মাহিবর আকন	শুকুর-জান
২০	বোকাহানা	" মাসুদ জোলা	বোকাহানা
২১	মানিক জা	" হাশির মাদবর	মানিক জা

15.11. Annexure 11 – Public Protest Against land acquisition



বরাবর,

উপজেলা নির্বাহী অফিসার, জাজিরা,
শরীয়তপুর।
নিম্নায় শ্রমিক লিপি দাখিল প্রসঙ্গে।

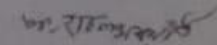
মহাশয়,

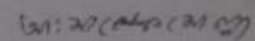
যথাবিহীত সম্মান পূর্বক বিনীত নিবেদন এই যে আমরা নিম্ন স্বাক্ষরকারী ব্যক্তিগণ শরীয়তপুর জেলার অধীনে জাজিরা থানার অন্তর্গত সেনেরচর ১ নং মৌজার পূর্ব নাওডোবা মৌজা এবং বাড়কান্দি মৌজায় বসবাস করি। উক্ত মৌজার বিভিন্ন গ্রামের প্রায় ১৫-২০ হাজার লোক বসবাস করে। আমরা বাংলাদেশ অর্থনৈতিক অঞ্চল কর্তৃপক্ষের নিয়োগকৃত সদস্যের মাধ্যমে অবগত হইতে পারিলাম যে এই সকল মৌজার প্রায় ৫৩২.১৪ একর জমি সরকারের অর্থনৈতিক অঞ্চল "ই.পি.জেড" স্থাপন করিবে। এই এলাকার লোকজন কৃষক শ্রেণীর লোক। কৃষির উপর নির্ভরশীল হইয়া জীবিকা নির্বাহ করেন। এই এলাকার লোকজন বৎসরে কৃষি জমিতে ৩ সিজন ফসল উৎপন্ন করেন। এই এলাকার জমি খুবেই উর্বর। এই এলাকার জমি গুলোতে কার্তিক, ফাল্গুন মাসে পেয়াজ, রসুন, ধনিয়া, সরিষা, কালো জিরা, গম ইত্যাদি ফসল হয়। চৈত্র আষাঢ় মাসে পাট, মেছতা, ধান ইত্যাদি ফসল হয়। প্রতি ৩৩ শতাংশ জমিতে ৭০-৮০ মন পিয়াজ, ৬০-৭০ মন রসুন, ৭-১০ মন ধনিয়া, ৬-৯ মন সরিষা, ৫-৮ মন কালোজিরা উৎপন্ন হয়। এই জাজিরা থানার লোকজন বঙ্গবন্ধু শেখ মজিবুর রহমানের আদর্শ্যে বিশ্বাসী। বার বার এই এলাকার লোকজন বাংলাদেশ আওয়ামীলীগের নৌকা প্রতিকে ভোট দিয়ে সংসদ সদস্য নির্বাচিত করে আসিতেছেন। বর্তমানে ই.পি.জেড করার জন্য এই জমি গুলো অধিগ্রহণ করিলে এই এলাকার লোকজন পথে বসিয়া যাইবে। এমত অবস্থায় বাংলাদেশ সরকার এই এলাকার ফসলি জমিতে ই.পি.জেড প্রস্তুত না করিয়া অন্য এলাকায় ই.পি.জেড স্থাপনের ব্যবস্থা করিলে এক দিকে এলাকাবাসী বাচিবে এবং ফসল উৎপাদন করিয়া দেশের সমৃদ্ধ আনয়ন করিবে।

সেমতে বিনীত প্রার্থনা হজুর দয়া করিয়া আমাদের প্রদত্ত শ্রমিক লিপি গ্রহণ পূর্বক যথাযথ ব্যবস্থা গ্রহণে আপনার মর্জি হয়।

বিনীত নিবেদক

এলাকাবাসীর পক্ষে-

১। 

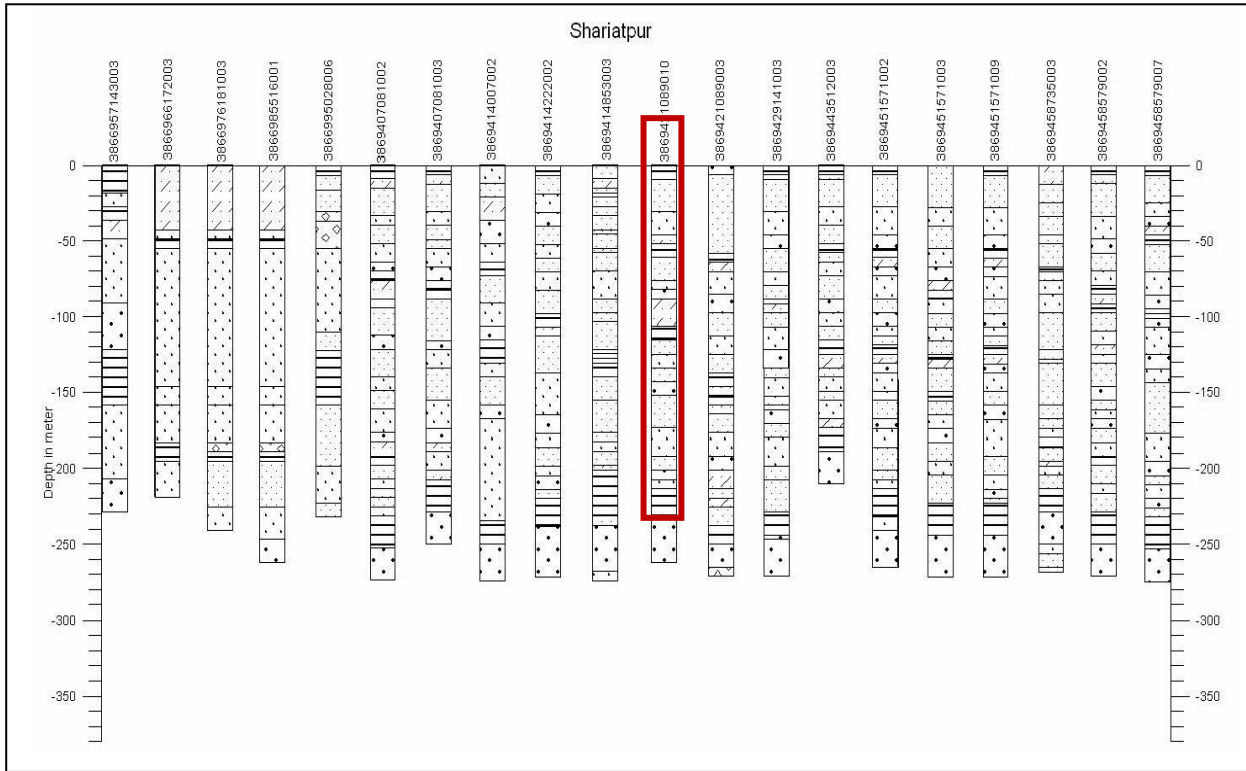
২। 

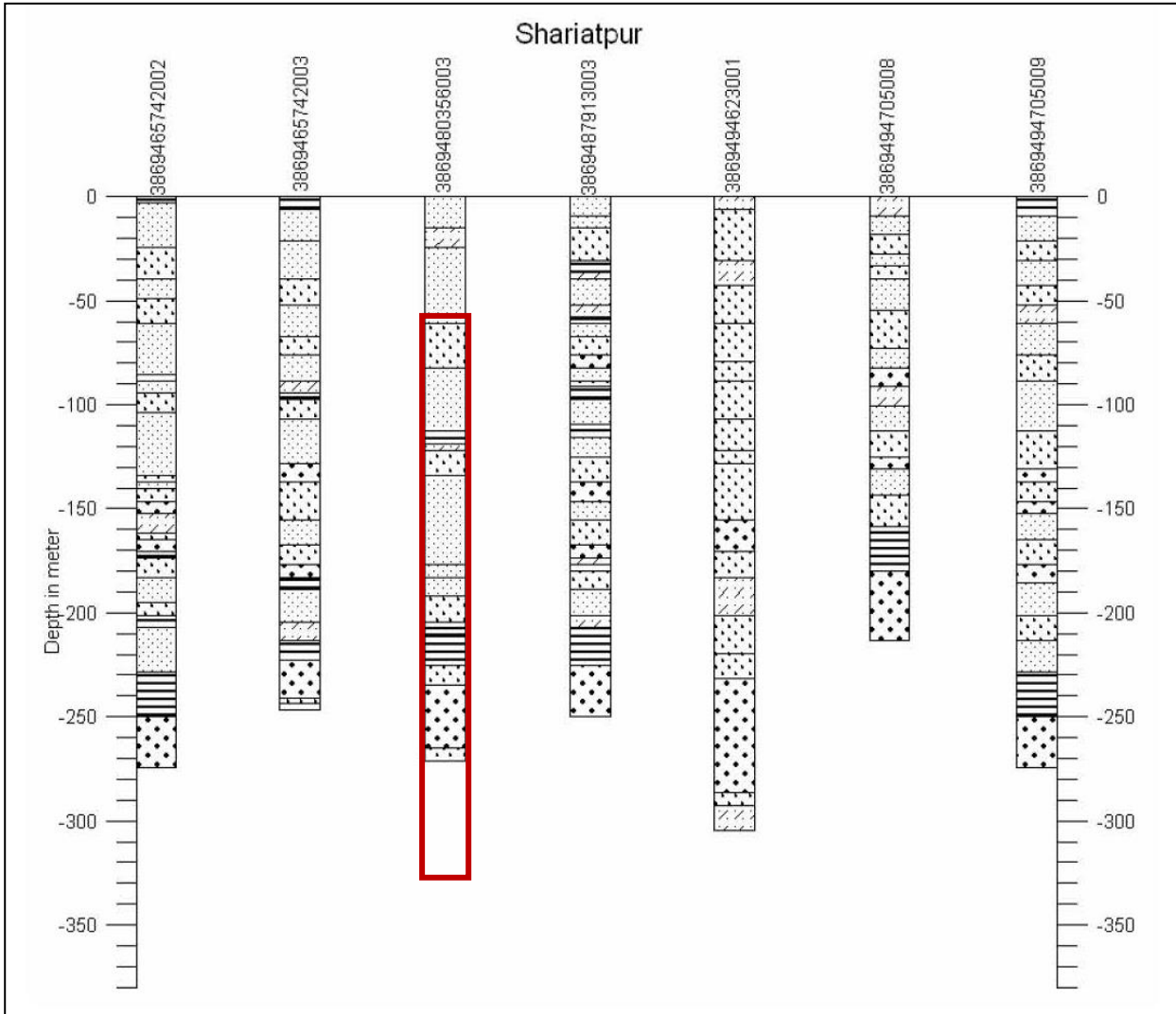




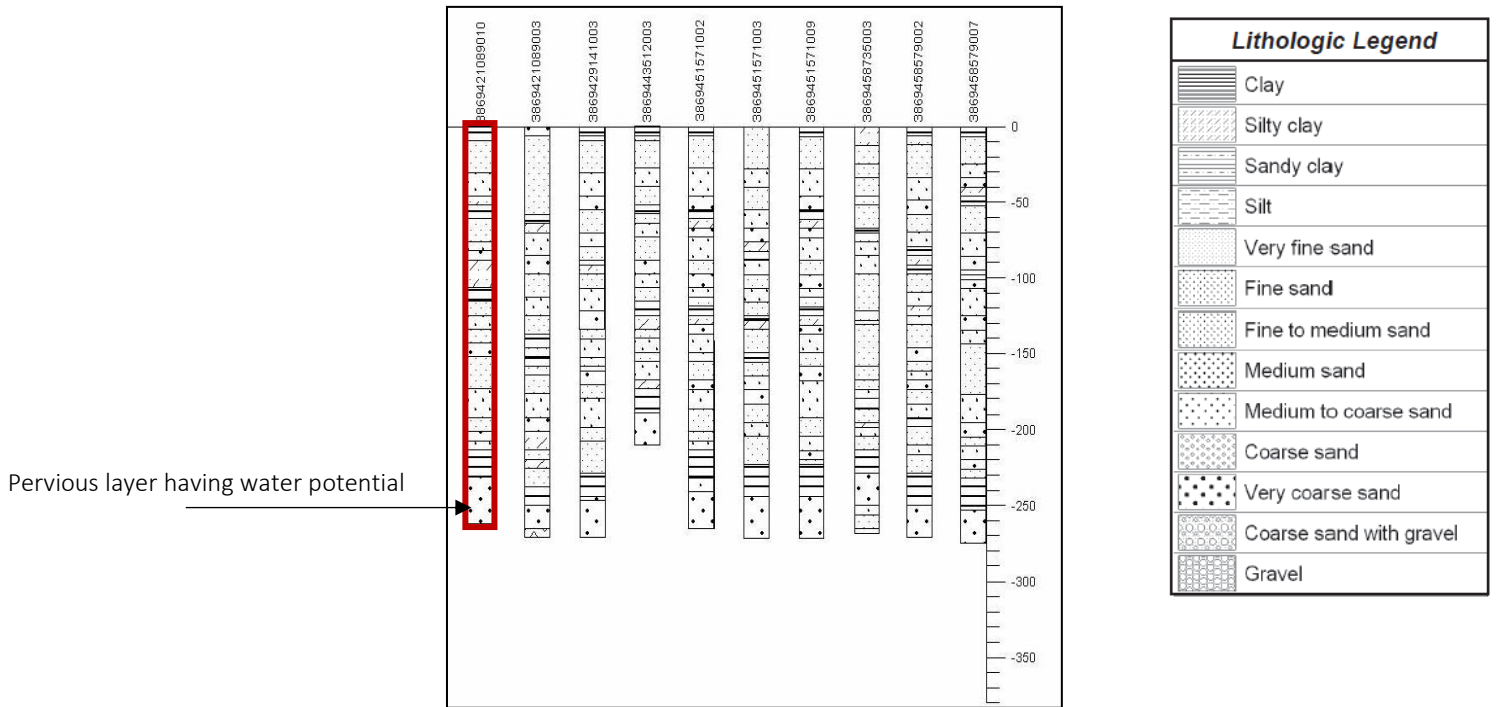
15.12. Annexure 12 – Information on bore wells








Bore Well Profile of Project Area - 23°21'41.40"N, 90°15'35.64"E



GeoCode	District	Upazila	Union	Mouza	Village	OwnerName	Year of Installation	Boring Depth (m)	Screen Centre Depth (m)	Long	Lat
3862511928003	Shariatpur	Damudya	Purba Damudya	Thengarbari	Char thengar bari	Sheikh Manik Sardar	2008	240.79	235.45	90.4412	23.1204
3862571082002	Shariatpur	Damudya	Sidulkura	Bara Sidulkura	Bara Sidulkura	Abul Hossain Masud	2007	259.08	251.00	90.4294	23.1148
3862571082002	Shariatpur	Damudya	Sidulkura	Bara Sidulkura	Bara Sidulkura	Md. Jahangir Sardar	2008		231.49	90.4294	23.1148
3862583895002	Shariatpur	Damudya	Sidya	Sidya	Sidya	Abdul Jalil Madbor	2008	219.46	213.50	90.4490	23.1664
3866506197003	Shariatpur	Naria	Bhojeshwar	Chandani	Chandani	Sukur Khan	2008	250.00	239.50	90.3777	23.2402
3866512797003	Shariatpur	Naria	Bhumkhara	Nitira	Nitira	Shahjahan Payeda	2008	244.00	237.50	90.4399	23.2849
3866518789001	Shariatpur	Naria	Bijhari	Nilgun	Nilgun		2008	228.00	217.50	90.4275	23.2163
3866525972001	Shariatpur	Naria	Chamta	Teli Para	Teli Para	Abul Kalam Dewan	2008	244.00	234.50	90.4373	23.2494
3866537341003	Shariatpur	Naria	Dinga Manik	Dinga Manik	South Dinga Manik	Md Abul Shek	2008	252.00	242.50	90.4704	23.2517
3866544486001	Shariatpur	Naria	Fateh Jangapur	Jugpata	Jugpata	Abdul Aziz Mridha	2008	247.00	237.50	90.4187	23.2719
3866550425003	Shariatpur	Naria	Gharisar	Halaisar	Halaisar	Mrs. Sahida Begum	2008	250.00	238.50	90.4795	23.2995
3866556688003	Shariatpur	Naria	Japsa	Maij Para	Maij Para	Ala-uddin gorari	2008	241.00	233.50	90.3698	23.2544
3866563220003	Shariatpur	Naria	Kedarpur	Char Juzira	Char Juzira	Ali Hossain Sajal	2008	253.00	244.50	90.4369	23.3126
3866569721001	Shariatpur	Naria	Muktarer Char	Mulpara	Mulpara	Majibar Sayal	2008	238.00	229.50	90.4034	23.3103
3866575759002	Shariatpur	Naria	Naria	Naria	Naria	Naria Paurashava Taxi stand	2002	304.79		90.4176	23.3004
3866575759003	Shariatpur	Naria	Naria	Naria	Naria	West Naria Rishi Bari	2003	304.79		90.4176	23.3005
3866582265001	Shariatpur	Naria	Nasasan	Dagri	Dhalikandi	Master Ali Munshi	2008	232.00	222.00	90.3480	23.2786
38665856858003	Shariatpur	Naria	Rajnagar	Punai Kharkandi	Punai Kharkandi	Abdul Kader Munshi	2008	262.00	254.50	90.3502	23.3051
3866575759001	Shariatpur	Naria	Naria	Naria	Naria	DPHE office compound	2002	304.79		90.4177	23.3004
3866909765008	Shariatpur	Shariatpur Sadar	Angaria		West Parasaddi	Faruk Bapari	2008	249.94	236.43	90.3230	23.1903
3866919774007	Shariatpur	Shariatpur Sadar	Binodpur		Kacharikandi	Razal Sardar	2008	234.70	221.10	90.2941	23.2287
3866928191007	Shariatpur	Shariatpur Sadar	Chandrapur	Chandrapur	Chandrapur	Eskan Matbar	2008	231.65	211.43	90.2608	23.2453
3866938899005	Shariatpur	Shariatpur Sadar	Chikandi		Sree Pasha	Samsul Haque Bapari	2008	213.36	226.85	90.3048	23.2779
3866947363003	Shariatpur	Shariatpur Sadar	Chitalia	Chitalia	Paschimpar	Hazrat Bashar	2008	252.98	246.36	90.3000	23.1871
3866957143003	Shariatpur	Shariatpur Sadar	Domsar	Bhartaisar	Bhartaisar	Abu Matbar	2008	228.60	219.06	90.3333	23.2383
3866919999003	Shariatpur	Shariatpur Sadar	Mahmudpur		Kadamtali	Halima Begum	2008	225.55	216.09	90.2648	23.2121
3866966172003	Shariatpur	Shariatpur Sadar	Palong	Bhuchura	Bhuchura	A. Rahman Khalifa	2008	219.46	214.48	90.3814	23.2133
3866976181003	Shariatpur	Shariatpur Sadar	Rudrakar	Chandankar	Chandankar	Badal Kobiraj	2008	240.79	230.10	90.3928	23.1825
3866985516001	Shariatpur	Shariatpur Sadar	Soulpara		Gayghar	Mojibar Rahman Mollik	2008	262.13	258.20	90.2920	23.2952
3866985526000	Shariatpur	Shariatpur Sadar	Talsar	Paigwan	Paigwan	Hannan Bapan	2008	251.38	236.92	90.3286	23.2227
3869407081002	Shariatpur	Zanjira	Bara Gopalpur	Bara Gopalpur	Aizaddi Sikkarkandi	Abul Hashem Sikder	2007	274.32	268.50	90.2529	23.3093
3869407081003	Shariatpur	Zanjira	Bara Gopalpur	Bara Gopalpur	Hazi komoruddin Matbor	Abdur Razzak Madbor	2008	249.94	237.50	90.2529	23.3093
3869421089010	Shariatpur	Zanjira	Bara Krishnagar	Bara Krishnagar	Mridha Kandi	Abul Kalam Mridha	2007	262.13	246.50	90.2599	23.3615
3869421089003	Shariatpur	Zanjira	Bara Krishnagar	Bara Krishnapur	Nomo Shudro Kandi	Abdur rahman Kobiraz	2008	271.27	260.50	90.2599	23.3615
3869414007002	Shariatpur	Zanjira	Barakandi	Abdul Beparirkandi			2007	274.32	267.50	90.3548	23.3541
3869414222002	Shariatpur	Zanjira	Barakandi	Charu Mollarkandi	Charu Mollarkandi	Md. Kalam Shikder	2007	271.27	266.50	90.3195	23.3569
3869414853003	Shariatpur	Zanjira	Barakandi	Ramkrishnapur	Ramkrishnapur	Delowar Madbor	2008	274.32	246.50	90.2873	23.3397
3869429141003	Shariatpur	Zanjira	Bilaspur	Bilaspur	Pachukhar Kandi	Md. Babu Madbor	2008	271.27	258.50	90.3751	23.3202


15.13. Annexure 13 – Baseline monitoring Reports

শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ



গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ঢাকা গবেষণাগার
ই-১৬, আদারশীও, শেরে বাংলা নগর, ঢাকা-১২০৭
www.doe.gov.bd

শেখ হাসিনার বাংলাদেশ
পরিচ্ছন্ন পরিবেশ



স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০১.১৩.৮-৪৫ তারিখ: ২০/০৬/১৮ইং

প্রাপ্তক : ব্যবস্থাপনা পরিচালক
গ্রাইস ওয়াটারহাউজ কোম্পানিস বাংলাদেশ প্রাই লিমিটেড
জাজিরা, শরীয়তপুর।

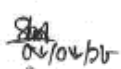
বিষয় : ছাত্রীরা ইকোনোমিক জোন প্রকল্প জাজিরা, শরীয়তপুর -এ অবস্থিত “ গ্রাইস ওয়াটারহাউজ কোম্পানিস বাংলাদেশ প্রাই লিমিটেড ” এর পরিবেষ্টক বায়ুর নমুনা বিশ্লেষিত ফলাফল।

সূত্র ৪- আবেদন নং: T-১২০৪; তারিখ-২১/০৩/১৮ ইং।

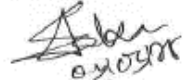
Sample Location	Date	Ambient Air Pollutant Concentration in micro gram/cubic meter			Remarks
		SPM	NO _x	SO ₂	
North side of Project Area	15.05.18	84	23	ND	<ul style="list-style-type: none"> • Wind direction was from south to north. • Weather was Sunny.
Air Quality Standard		200	100	365	

Note:- 1. SPM- suspended Particulate Matter 2. SO₂ - Sulfur dioxide 3. NO_x - Oxides of Nitrogen 4. ND-Not detected.

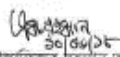
- বাংলাদেশ পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭(সংশোধনী-২০০৫) অনুযায়ী, সকল প্যারামিটার এর মান গ্রহণযোগ্য মনে হয়।



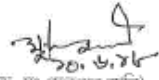
(এস. এম. শরীফুর রহমান)
জুনিয়র কেমিস্ট



(সৈয়দ আহমদ কবীর)
সিনিয়র কেমিস্ট



(মোঃ মোজাফ্ফর হোসেন আবন্দ)
উপপরিচালক



(ড. মুঃ শৌকাত আলি)
পরিচালক

শেখ হাসিনার সচিবালয়
জলবায়ু সচিবালয় বাংলাদেশ

Dhaka Laboratory

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
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ই/১৬, আগারগাঁও, শেরেবাংলা নগর, ঢাকা-১২০৭।
www.doe.gov.bd

শেখ হাসিনার বাংলাদেশ
পরিষ্কৃত পরিবেশ





তারিখ- ১১/০৬/১৮ইং

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০৯.১০. ১০৬৭

প্রাপকঃ ব্যবস্থাপনা পরিচালক
প্রাইস ওয়াটার হাউজ কুপারস বাংলাদেশ প্রাইস লিমিটেড
লায়লা টাওয়ার (১২তম তলা), ৮ ওলশান এভিনিউ, ওলশান-১, ঢাকা।
বিষয়ঃ পোপালপল্ল ও জাজিরা ইকোনোমিক জোনের ভূবর্তস্থ পানির নমুনা বিশ্লেষিত ফলাফল।
সূত্রঃ- আবেদন নং: T-১২০৩, ১২০৪ তারিখ- ২১/০৩/১৮ইং
উপর্যুক্ত বিষয় ও সূত্রের বরাতে পত্রের চাহিদা মোতাবেক পানির নমুনা সংগ্রহপূর্বক বিশ্লেষিত ফলাফলের উপাত্তসীট নিম্নে প্রদত্ত হলো-

Sample Location	Type of Sample	Date	Lab code No	Coliform	BOD mg/L	COD mg/L	TDS mg/L	Turbidity NTU	Chloride mg/L
Gopalganj Economic Zone, Gobra Union, Gopalganj	Ground Water	13.05.18	Y-46	0.0	02	N.D	622	7.32	114
Zajira Economic Zone at Saner chor, Uttar Duboldia, Khagutia, Gopalpur, Shariatpur.	Ground Water	13.05.18	Y-48	0.0	02	N.D	1034	98.1	440

• বাংলাদেশ পরিবেশ সুরক্ষণ বিধিমালা, ১৯৯৭ এ ভূবর্তস্থ পানির জন্য কোন মানমাত্রা দেওয়া নেই।

 ১০.০৬.১৮
সহকারী বায়োকেমিস্ট
  ১১.০৬.১৮
শাহেদা বেগম
সিনিয়র কেমিস্ট
  ১১.০৬.১৮
মোঃ মোস্তাফিজুর রহমান আখন্দ
উপপরিচালক
  ১১.০৬.১৮
ড. মু. সোহাব আলি
পরিচালক

শেখ হাসিনার সচিবালয়
জলবায়ু সচিবালয় বাংলাদেশ

Dhaka Laboratory

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ঢাকা গবেষণাগার
ই/১৬, আগারগাঁও, শেরেবাংলা নগর, ঢাকা-১২০৭।
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শেখ হাসিনার বাংলাদেশ
পরিষ্কৃত পরিবেশ





তারিখ- ১১/০৬/১৮ইং

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০৯.১০. ১০৬৮

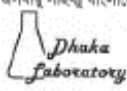
প্রাপকঃ ব্যবস্থাপনা পরিচালক
প্রাইস ওয়াটার হাউজ কুপারস বাংলাদেশ প্রাইস লিমিটেড
লায়লা টাওয়ার (১২তম তলা), ৮ ওলশান এভিনিউ, ওলশান-১, ঢাকা।
বিষয়ঃ পোপালপল্ল ও জাজিরা ইকোনোমিক জোনের ভূপৃষ্ঠস্থ পানির নমুনা বিশ্লেষিত ফলাফল।
সূত্রঃ- আবেদন নং: T-১২০৩, ১২০৪ তারিখ- ২১/০৩/১৮ইং
উপর্যুক্ত বিষয় ও সূত্রের বরাতে পত্রের চাহিদা মোতাবেক পানির নমুনা সংগ্রহপূর্বক বিশ্লেষিত ফলাফলের উপাত্তসীট নিম্নে প্রদত্ত হলো-

Sample Location	Type of Sample	Date	Lab code No	pH	BOD mg/L	COD mg/L	TDS mg/L	EC μ S/cm	Chloride mg/L
Gopalganj Economic Zone, Gobra Union, Gopalganj	Surface Water	13.05.18	Y-45	6.78	15	46	163	318	30
Zajira Economic Zone at Saner chor, Uttar Duboldia, Khagutia, Gopalpur, Shariatpur.	Surface Water	13.05.18	Y-47	7.62	15	46	333	636	35
STD for surface water				6.5-8.5	≤ 6	--	--	--	--


• বাংলাদেশ পরিবেশ সুরক্ষণ বিধিমালা, ১৯৯৭ অনুযায়ী BOD প্যারামিটার গ্রহণযোগ্য মানমাত্রার বাহিরে আছে।

 ১০.০৬.১৮
সহকারী বায়োকেমিস্ট
  ১১.০৬.১৮
শাহেদা বেগম
সিনিয়র কেমিস্ট
  ১১.০৬.১৮
মোঃ মোস্তাফিজুর রহমান আখন্দ
উপপরিচালক
  ১১.০৬.১৮
ড. মু. সোহাব আলি
পরিচালক

শেখ হাসিনার নির্দেশ
জলবায়ু সচিবালয় বাংলাদেশ



শেখ হাসিনার বাংলাদেশ
পরিষ্কৃত বাংলাদেশ



গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ঢাকা গবেষণাগার
ই-১৬, আপারপাও, শেরে বাংলা নগর, ঢাকা-১২০৭
www.doe.gov.bd

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০১.১৩.৮৪৬

তারিখঃ ১০/০৬/১৮ ইং


প্রাপকঃ যাবস্থাপক
গ্রাইস ওয়াটারহাউজ কোয়ার্টার্স বাংলাদেশ প্রাইভেট লিমিটেড
জামিরা, শরীয়তপুর।


বিষয়ঃ জামিরা, শরীয়তপুর -এ অবস্থিত "গ্রাইস ওয়াটারহাউজ কোয়ার্টার্স বাংলাদেশ প্রাইভেট লিমিটেড" এর নামক কারখানার শব্দের নমুনা
নিম্নোক্ত ফলাফল।
স্মরণঃ T-১২০৪; তারিখঃ ২১/০৩/১৮ইং।

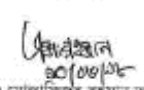
উপর্যুক্ত বিষয় ও সূত্রের বন্ধিতে পত্রের চাহিদা মোতাবেক শব্দ পরিমাপের ফলাফলের উপাত্তসমূহ নিম্নে প্রদত্ত হলোঃ

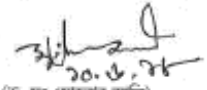
Location	Date	Time	Sound Level in dBA	Remarks.
West side (Outside of boundary)	15.05.18	2.35 PM	52.2	Industry was in running condition.
South side (Outside of boundary)	15.05.18	2.40 PM	51.6	
Bangladesh Standard at day time for mixed Area as per Noise pollution (control) rules, 2006.		6:00 AM to 9:00 PM	60.0	

* শব্দ স্তর নিয়ন্ত্রণ বিধিমালা-২০০৬ অনুযায়ী, সকল পার্শ্বের শব্দের মান গ্রহণযোগ্য মানমাত্রার মধ্যে আছে।


০৬.০৬.১৮
(মোহাম্মদ সাফিয়ার আক্তার)
স্বনিয়ন্ত্রক কমিটি


০৬/০৬/১৮
(সৈয়দ আহমদ কবীর)
স্বনিয়ন্ত্রক কমিটি


০৬/০৬/১৮
(মোঃ মোতাক্কিলুর রহমান আশন্দ)
উপপরিচালক


২০.৬.১৮
(ড. মুঃ সোহরাব আলি)
পরিচালক

15.14. Annexure 14 – Competition Phase Out Plan

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2017	2018	2019	2020	2021	2022	2023	2024
Dhaka EZ	Dohar	316	206					10%	10%	10%	20%
Dhaka SEZ	Karanigonj	105	68						10%	10%	15%
Shreepur EZ	(Nayanpur), Shreepur	510	332								10%
Gopalganj EZ	Kotalipara	202	131						10%	10%	10%
Gopalganj EZ - 2	Gopalganj Sadar	200	130						5%	5%	10%
Manikgnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	300	195							10%	10%
Munshiganj Gazaria EZ	Gazaria	98	64						10%	10%	10%
Araihazar -2 Economic Zone	Araihazar	413	268								
Araihazar EZ	Araihazar	1011	657						10%	10%	10%
Narayanganj EZ	Bandar & Sonarga	876	569								
Narsingdi EZ	Narsingdi Sadar	690	449								
Shariatpur EZ	Gosharhat	750	488								
Narayanganj EZ Sonargaon	Sonargaon	1000	650								
Madaripur EZ	Madaripur	667	434								
Faridpur EZ	Faridpur	888	577								
A K Khan PEZ	Polash	200	130					10%	10%	10%	15%
Megna Industrial Economic Zone PEZ	Sonargaon	80	52	5%	5%	10%	15%	20%	20%	10%	15%
Megna PEZ	Sonargaon	68	44		5%	5%	10%	20%	20%	20%	15%
Aman Private EZ	Sonargaon	150	98		5%	10%	10%	10%	15%	15%	20%
Abdul Monem PEZ, Bay Private EZ	Gojaria Gazipur	197	128		5%	10%	10%	10%	15%	15%	25%
Arisha Private EZ	Keranigonj, Savar	85	55			5%	15%	15%	20%	15%	30%
East-West Special EZ	Keranigonj	54	35			5%	15%	15%	20%	15%	30%

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2017	2018	2019	2020	2021	2022	2023	2024
Bosundhora Special EZ	Keranigonj	56	36			5%	15%	15%	20%	15%	30%
City EZ	Narayangonj	92	60			5%	15%	15%	20%	15%	30%
City SEZ	Dhaka	110	72				5%	15%	20%	20%	40%
Sonargaon EZ	Narayangonj	350	228				5%	15%	20%	20%	40%

Source: BEZA website and discussion with BEZA officials

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2025	2026	2027	2028	2029	2030	2031	2032
Dhaka EZ	Dohar	316	206	15%	15%	10%	10%				
Dhaka SEZ	Karanigonj	105	68	15%	15%	15%	10%	10%			
Shreepur EZ	(Nayanpur), Shreepur	510	332	10%	10%	10%	10%	10%	10%	10%	10%
Gopalganj EZ	Kotalipara	202	131	10%	10%	10%	10%	10%	10%	10%	
Gopalganj EZ - 2	Gopalganj Sadar	200	130	10%	10%	10%	10%	10%	10%	10%	10%
Manikgannj EZ	(BIWTA old Aricha Ferighat), Shibaloy	300	195	10%	10%	10%	10%	10%	10%	10%	10%
Munshiganj Gazaria EZ	Gazaria	98	64	10%	10%	10%	15%	15%	10%		
Araihazar -2 Economic Zone	Araihazar	413	268		5%	5%	10%	15%	15%	15%	15%
Araihazar EZ	Araihazar	1011	657	10%	10%	10%	10%	10%	10%	10%	
Narayanganj EZ	Bandar & Sonarga	876	569			5%	10%	10%	10%	10%	10%
Narsingdi EZ	Narsingdi Sadar	690	449		5%	10%	10%	10%	10%	10%	10%
Shariatpur EZ	Gosharhat	750	488				5%	10%	10%	10%	10%
Narayanganj EZ Sonargaon	Sonargaon	1000	650		5%	10%	10%	10%	10%	10%	10%
Madaripur EZ	Madaripur	667	434				5%	10%	10%	10%	10%
Faridpur EZ	Faridpur	888	577						5%	10%	10%
A K Khan PEZ	Polash	200	130	15%	15%	15%	10%				

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2025	2026	2027	2028	2029	2030	2031	2032
Megna Industrial Economic Zone PEZ	Sonargaon	80	52								
Megna PEZ	Sonargaon	68	44	5%							
Aman Private EZ	Sonargaon	150	98	15%							
Abdul Monem PEZ,	Gojaria	197	128	10%							
Bay Private EZ	Gazipur	65	42								
Arisha Private EZ	Keranigonj, Savar	85	55								
East-West Special EZ	Keranigonj	54	35								
Bosundhora Special EZ	Keranigonj	56	36								
City EZ	Narayangonj	92	60								
City SEZ	Dhaka	110	72								
Sonargaon EZ	Narayangonj	350	228								

Source: BEZA website and discussion with BEZA officials

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2033	2034	2035	2036	2037	2038	2039	2040
Dhaka EZ	Dohar	316	206								
Dhaka SEZ	Keranigonj	105	68								
Shreepur EZ	(Nayanpur), Shreepur	510	332	10%							
Gopalganj EZ	Kotalipara	202	131								
Gopalganj EZ - 2	Gopalganj Sadar	200	130								
Manikgnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	300	195								
Munshiganj Gazaria EZ	Gazaria	98	64								

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2033	2034	2035	2036	2037	2038	2039	2040
Araihazar -2 Economic Zone	Araihazar	413	268	20%							
Araihazar EZ	Araihazar	1011	657								
Narayanganj EZ	Bandar & Sonarga	876	569	10%	10%	10%	10%	5%			
Narsingdi EZ	Narsingdi Sadar	690	449	10%	10%	10%	5%				
Shariatpur EZ	Gosharhat	750	488	10%	10%	10%	10%	10%	5%		
Narayanganj EZ Sonargaon	Sonargaon	1000	650	10%	10%	10%	5%				
Madaripur EZ	Madaripur	667	434	10%	10%	10%	10%	10%	5%		
Faridpur EZ	Faridpur	888	577	10%	10%	10%	10%	10%	10%	10%	5%
A K Khan PEZ	Polash	200	130								
Megna Industrial Economic Zone PEZ	Sonargaon	80	52								
Megna PEZ	Sonargaon	68	44								
Aman Private EZ	Sonargaon	150	98								
Abdul Monem PEZ,	Gojaria	197	128								
Bay Private EZ	Gazipur	65	42								
Arisha Private EZ	Keranigonj, Savar	85	55								
East-West Special EZ	Keranigonj	54	35								
Bosundhora Special EZ	Keranigonj	56	36								
City EZ	Narayanganj	92	60								
City SEZ	Dhaka	110	72								
Sonargaon EZ	Narayanganj	350	228								

Source: BEZA website and discussion with BEZA officials

15.15. Annexure 15 – Demand Forecasting Calculations

Cumulative power demand (Conservative) - figures in MVA

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	1.8	2.2	6.0	10.2	13.5	14.9	16.6	19.3	22.4	27.3
Chemicals	0.2	0.2	0.3	0.5	0.7	0.7	0.8	0.9	1.0	1.2
Pharmaceuticals	0.7	0.8	2.5	4.7	6.1	6.8	7.6	9.1	10.9	14.6
Light Machinery and Equipment & Furniture	0.1	0.1	0.4	0.7	0.8	1.0	1.2	1.5	1.7	2.3
Total	2.8	3.3	9.2	16.1	21.1	23.4	26.2	30.7	36.0	45.4

Cumulative power demand (Base) - figures in MVA

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	3.8	6.2	12.4	19.3	25.7	25.7	30.8	35.5	35.5	35.5
Chemicals	0.2	0.4	0.7	0.9	1.3	1.3	1.5	1.6	1.6	1.6
Pharmaceuticals	1.4	2.4	5.2	8.5	11.3	11.3	13.9	16.4	16.4	16.4
Light Machinery and Equipment & Furniture	0.2	0.4	0.7	1.2	1.7	1.7	2.2	2.5	2.5	2.5
Total	5.7	9.3	19.1	29.9	40.0	40.0	48.3	56.1	56.1	56.1

Cumulative power demand (Aggressive) - figures in MVA

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	6.2	11.1	20.0	30.0	36.2	36.2	36.2	36.2	36.2	36.2
Chemicals	0.4	0.5	1.1	1.5	1.8	1.8	1.8	1.8	1.8	1.8
Pharmaceuticals	2.3	4.2	8.2	13.2	15.9	15.9	15.9	15.9	15.9	15.9
Light Machinery and Equipment & Furniture	0.4	0.6	1.2	1.9	2.4	2.4	2.4	2.4	2.4	2.4
Total	9.2	16.5	30.6	46.6	56.4	56.4	56.4	56.4	56.4	56.4

Cumulative water demand (Conservative) - figures in thousand cum/ day

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	0.1	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.1
Chemicals	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals	0.1	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.3
Light Machinery and Equipment & Furniture	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Total	0.2	0.2	0.5	0.9	1.2	1.3	1.5	1.7	2.0	2.6

Cumulative water demand (Base) - figures in cum/ day

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	0.2	0.2	0.5	0.8	1.0	1.0	1.2	1.4	1.4	1.4
Chemicals	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals	0.1	0.2	0.4	0.7	1.0	1.0	1.2	1.4	1.4	1.4
Light Machinery and Equipment & Furniture	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Total	0.3	0.5	1.1	1.7	2.2	2.2	2.7	3.2	3.2	3.2

Cumulative water demand (Aggressive) - figures in thousand cum/ day

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	0.2	0.4	0.8	1.2	1.4	1.4	1.4	1.4	1.4	1.4
Chemicals	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals	0.2	0.4	0.7	1.1	1.4	1.4	1.4	1.4	1.4	1.4
Light Machinery and Equipment & Furniture	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total	0.5	0.9	1.7	2.6	3.1	3.1	3.1	3.1	3.1	3.1

Cumulative employment generation (Conservative) - figures in nos.

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	230	276	759	1288	1702	1886	2093	2438	2829	3450
Chemicals	164	164	279	472	595	649	713	806	913	1113
Pharmaceuticals	745	894	2682	4917	6407	7152	8046	9536	11473	15347
Light Machinery and Equipment & Furniture	186	186	558	1116	1302	1488	1860	2232	2604	3534
Total	1325	1520	4278	7793	10006	11175	12712	15012	17819	23444

Cumulative employment generation (Base) - figures in nos.

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	483	782	1564	2438	3243	3243	3887	4485	4485	4485
Chemicals	164	328	656	820	1148	1148	1312	1476	1476	1476
Pharmaceuticals	1490	2533	5513	8940	11920	11920	14602	17284	17284	17284
Light Machinery and Equipment & Furniture	372	558	1116	1860	2604	2604	3348	3906	3906	3906
Total	2509	4201	8849	14058	18915	18915	23149	27151	27151	27151

Cumulative employment generation (Aggressive) - figures in nos.

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	782	1403	2530	3795	4577	4577	4577	4577	4577	4577
Chemicals	328	492	984	1312	1640	1640	1640	1640	1640	1640
Pharmaceuticals	2384	4470	8642	13857	16688	16688	16688	16688	16688	16688
Light Machinery and Equipment & Furniture	558	930	1860	2976	3720	3720	3720	3720	3720	3720
Total	4052	7295	14016	21940	26625	26625	26625	26625	26625	26625

Cumulative no. of establishments (Conservative) - figures in nos.

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	5	6	17	28	37	41	46	53	62	75
Chemicals	1	1	2	3	4	4	4	5	6	7
Pharmaceuticals	5	6	18	33	43	48	54	64	77	103
Light Machinery and Equipment & Furniture	1	1	3	6	7	8	10	12	14	19
Total	12	14	39	70	91	101	114	134	158	204

Cumulative no. of establishments (Base) - figures in nos.

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	11	17	34	53	71	71	85	98	98	98
Chemicals	1	2	4	5	7	7	8	9	9	9
Pharmaceuticals	10	17	37	60	80	80	98	116	116	116
Light Machinery and Equipment & Furniture	2	3	6	10	14	14	18	21	21	21
Total	24	39	81	128	172	172	209	244	244	244

Cumulative no. of establishments (Aggressive) - figures in nos.

Industries	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Food & Beverages	17	31	55	83	100	100	100	100	100	100
Chemicals	2	3	6	8	10	10	10	10	10	10
Pharmaceuticals	16	30	58	93	112	112	112	112	112	112
Light Machinery and Equipment & Furniture	3	5	10	16	20	20	20	20	20	20
Total	38	69	129	200	242	242	242	242	242	242

15.16. Annexure 16 – Mouza Map



15.17. Annexure 17 – Guide for Economic Model

As part of our deliverable, we have submitted the excel files of the economic modelling. The calculations are self-explanatory where there are two tabs:

- a) **Economic assumptions:** This tab outlines all the key assumptions, which drive the modelling exercise. Calculation of economic benefits for the three mentioned scenarios also form part of this tab.
 - b) **EIRR calculations:** This tab calculates the economic cost and EIRR for the three scenarios.
- Figures in the subsequent pages elaborate the functionalities of these tabs.

Figure 97: Functionalities of “Economic Assumptions” tab (Part -1)

Assumptions		
Shadow Exchange Rate Factor	1.05	Refer section 1.1
Shadow Wage Rate	0.9	Refer section 1.2
Economic Discount Rate	0.12	Assumed
Currency conversion rate (BDT to US\$)	82	
	<u>Capex</u>	<u>Opex</u>
Material	0.5	0.9
Equipment	0.3	0.1
Labor	0.2	N/A
Equipment imported (% of total import)	0.75	
VAT Rate (for Capex and Opex)	0.15	Refer section 1.3
Income multiplier for indirect employment	0.7	Refer section 1.4
Capacity Utilization of Industrial Units	80%	
Plant efficiency factor of industrial units	80%	
Export contribution	25%	

As per the figure above, the coloured cells contain the assumptions. The model is operated by changing values in these cells.

Figure 98: Functionalities of "Economic Assumptions" tab (Part-2)

Calculation of economic benefits

Economic Benefit Calculations										
Gain of exchequer from Industrial Production										
<i>Source: Survey of Manufacturing Industries 2012</i>										
Number of establishments	42792									
Gain for the exchequer (BDT million)	75872									
	1.69 Contribution to economy per establishment (BDT million per establishment)									
Conservative Case (no. of establishments)	0	0	0	11	13	39	69	90	101	114
Gain for the exchequer in conservative case (BDT million)	0	0	0	19	22	67	117	153	170	192
Base Case (no. of establishments)	0	0	0	23	39	81	129	171	171	209
Gain for the exchequer in base case (BDT million)	0	0	0	39	65	136	218	289	289	352
Aggressive Case (no. of establishments)	0	0	0	37	69	129	199	241	241	241
Gain for the exchequer in aggressive case (BDT million)	0	0	0	63	116	218	337	408	408	408
Export Boost from Industrial Production										
<i>Source: Survey of Manufacturing Industries 2012</i>										
Gross Value Added (BDT million)=	1562947									
Net Fixed Asset (BDT million)=	1188108									
Net Value Added (BDT million)=	374839									
Net Value Added (BDT million) per industrial Unit=	5.34									
Export boost (BDT million) per industrial unit=	1.33									
Conservative Case (BDT million)	0	0	0	15	17	53	92	121	134	152
Base Case (BDT million)	0	0	0	31	51	108	172	229	229	278
Aggressive Case (BDT million)	0	0	0	49	92	173	266	322	322	322
Total Contribution to economy by industrial production in the SEZ										
Conservative case	0	0	0	35	39	119	209	274	304	344
Base case	0	0	0	70	117	244	390	518	518	630
Aggressive case	0	0	0	112	207	391	603	730	730	730

Figure above captures a snapshot of the economic benefit calculations. Based on the inputs/ assumptions provided, the calculations take place automatically.

Figure 99: Functionalities of "EIRR calculations" tab (Part-1)

Total Economic Cost										
Economic Cost calculations										
Capital Expenditure:										
Details	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capex expenses	1251	1404	1119	1256	1263	1418	0	0	0	0
Total (cost of the private developer)	1251	1404	1119	1256	1263	1418	0	0	0	0
(1) Material	532	597	476	534	537	602	0	0	0	0
(2) Equipment	377	423	337	379	381	427	0	0	0	0
(3) Labor	383	430	342	384	386	434	0	0	0	0
Operating Expenditure:										
Details	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
O&M Cost	0	0	0	271	357	451	503	528	555	582
Manpower Cost	0	0	0	68	72	75	79	83	87	91
(4) Material	0	0	0	207	273	345	385	404	424	446
(5) Equipment	0	0	0	27	36	45	51	53	56	59
(6) Labor (Cost of Personnel)	0	0	0	68	72	75	79	83	87	91
(A) Total Economic Costs (=1+2+3+4+5+6)	1292	1450	1155	1600	1685	1929	514	549	567	596

Above figure elucidates the economic cost calculations. As per the assumptions/ inputs entered in the earlier tab, the calculations take place.

Figure 100: Functionalities of "EIRR Calculations" tab (Part-2)

(D) Total Economic Benefits (=15+16+17+18)	0	0	0	420	782	1492
Conservative Case						
Economic Return = (B) - (A)	(1,291.6)	(1,449.8)	(1,155.2)	(1,469.3)	(1,536.7)	(1,471.3)
Economic Internal Rate of Return (EIRR)=	12.86%			Cost Benefit Ratio	1.84	
Base Case						
Economic Return = (C) - (A)	(1,291.6)	(1,449.8)	(1,155.2)	(1,336.0)	(1,244.7)	(995.1)
Economic Internal Rate of Return (EIRR)=	16.17%			Cost Benefit Ratio	1.83	
Aggressive Case						
Economic Return = (D) - (A)	(1,291.6)	(1,449.8)	(1,155.2)	(1,179.9)	(902.8)	(437.2)
Economic Internal Rate of Return (EIRR)=	18.89%			Cost Benefit Ratio	1.84	

In addition to the economic cost calculations, calculation of EIRR is also undertaken in this tab. Figure above indicates a screenshot of the same.

15.18. Annexure 18 – Guide for Financial Model

A user guide has been prepared below in order to assist any individual who would use the financial model to determine the input parameters that could be modified and the impact of changing different parameters on the financial outputs.

The financial model has been constructed, keeping provisions for considering varying land uptake scenarios, phasing of the construction activity on the proposed EZ site and a quarterly drawdown of capex and repayment of debt taken for capex.

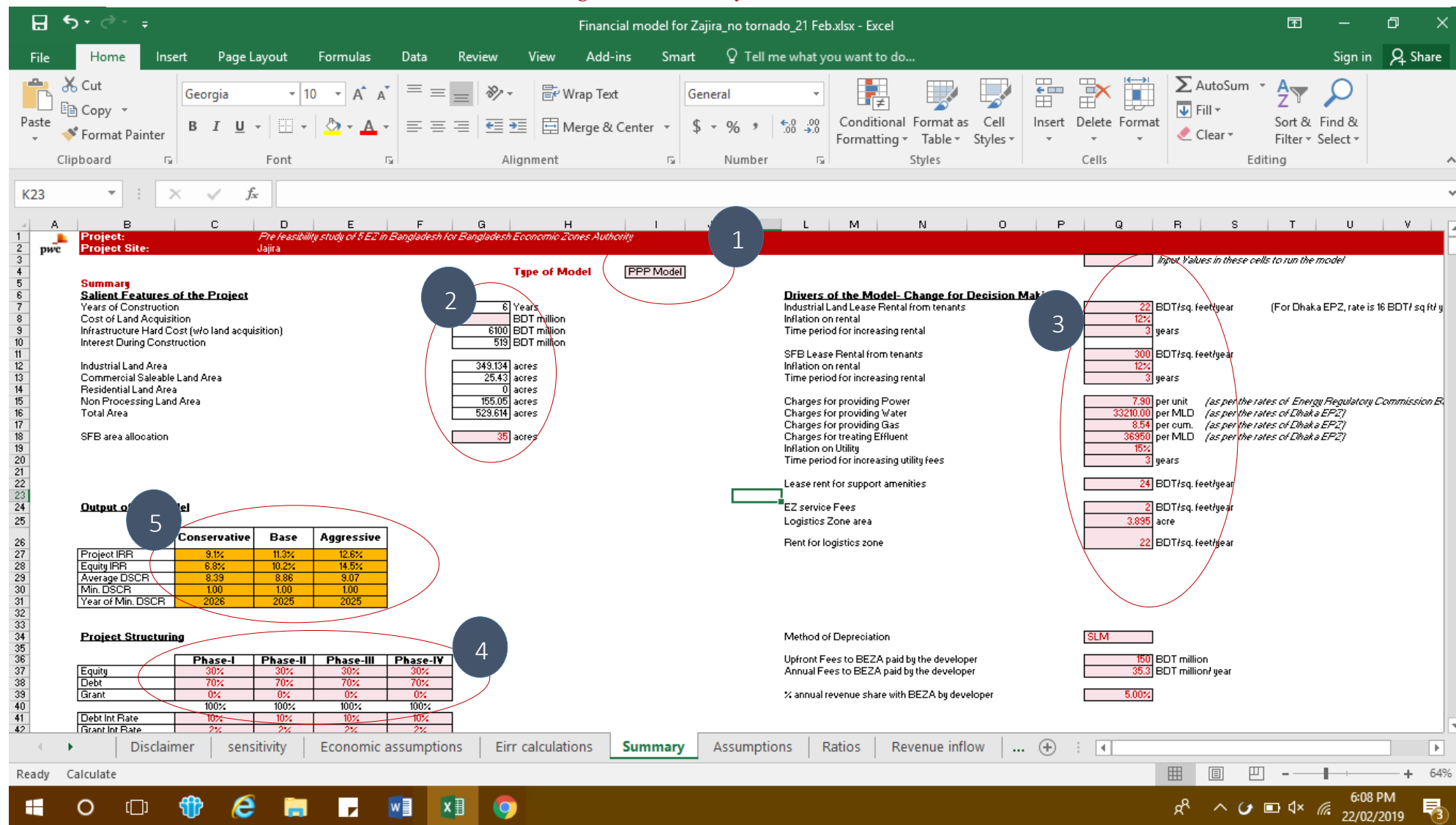
The financial model workbook comprises several worksheets performing specific functions, these worksheets have been listed below –

- Summary sheet: Captures the salient features of the EZ project, input parameters which would drive the returns for the financial model, project structuring and output of the financial model (like IRR, DSCR).
- Assumptions sheet: This sheet captures the gamut of assumptions and forecast made for the financial model. There are 15 major blocks in which the assumptions have been segregated, each of these blocks impact the outflow and inflow of resources for the project under consideration.
- Ratios sheet: This sheet calculates the expected returns accruing to the developer. Returns over a period of 50 years have been calculated, considerations have been made to keep provision to calculate returns for different case scenarios (conservative, base, and aggressive) of land uptake.
- Revenue Inflow sheet: This sheet takes into consideration all possible revenue streams from this project and calculates the revenue accrued to the developer.
- BS Conservative, BS Base, BS Aggressive sheets: These are the 3 balance sheets developed to capture the liability and assets of the developer over a period of fifty years for three different land uptake scenario.
- PL Conservative, PL Base, PL Aggressive sheets: These are the 3 P/L sheets developed to capture the profit and loss accruing to the developer over a period of fifty years for three different land uptake scenario.
- WC Conservative, WC Base, WC Aggressive sheets: These are the 3 working capital sheets developed to capture the changes in working capital required by the developer to operate the EZ site over a period of fifty years for three different land uptake scenario.
- CF Conservative, CF Base, CF Aggressive sheets: These are the 3 cash flow sheets developed to capture the cash flow generated from the EZ project over a period of fifty years for three different land uptake scenario.
- Depreciation sheet: This sheet performs the calculations required to understand the depreciation that takes place on the fixed assets constructed by the developer. Depreciation is calculated as per book value and also as per applicable Income Tax Act.
- Tax Calculation sheet: This sheet calculates the tax liability of the developer, over the period of fifty years on income generated from operating the EZ site for all three land uptake scenario. Applicable tax incentives to the developer has also been considered for purpose of tax calculation.
- Capex Cost sheet: This sheet captures the capex cost that would have to be borne by the developer for construction of different components of EZ site in 2 phases. Capital expenditure incurred by the developer in each quarter of the construction period has been charted out.
- Timing sheet: This sheet draws out the phase wise capex and opex expenditure incurred by the developer over the period of fifty years and also captures the repayment schedule of the debt taken to meet the capex expenses.
- Phase I – Repayment details, Phase II – Repayment details, Phase III – Repayment details, Phase IV – Repayment details sheets: This sheet contains the details of the repayment schedule of the loan taken during each phase of construction.

Calculations performed in the excel worksheets listed above, are interlinked to each other and flow from one sheet into another to deliver the final expected financial outcome of developing the proposed EZ site.

A detailed description of the significant parts of the financial model has been provided in this section, through screenshots of the relevant worksheets and further elaboration of various components.

Figure 101: Summary Sheet of the Financial Model



The screenshot of the summary table in the previous page shows the various input parameters taken for developing the financial model and the output parameters obtained through this model. These input parameters can be modified in order to obtain the desired output from the financial model. Different blocks of inputs and outputs have been encircled and numbered for detailed description, as shown below.

- 1 This cell reveals that the user of the financial model would evaluate returns on basis of the EZ being developed by a private developer.
- 2 This contains macro level details about the EZ site, in terms of cost of developing the site, years required for construction and details regarding break up of EZ site area into different components.
- 3 This contains inputs taken for lease rental, rate and time period over which rents would be increased, charges for utility that would be paid by the developer and upfront fees that would be paid by developer to BEZA.
- 4 This contains capital structure of the entity that would be developing the EZ site, in terms of debt, equity and grant and interest rate of debt and grant.
- 5 This contains returns that would earned by the developer over his investments in developing the EZ site over a period of 50 years. It also captures the debt servicing ability of the developer during the same time period.

The user of this financial model can make modifications to the 2nd, 3rd and 4th block of parameters in order to obtain the desired outcome captured in 5th block of parameters.

The inputs and outputs obtained in this summary worksheet is dependent on the assumptions made regarding different aspects related to different rate of land uptake, timing of construction phases, escalation rates, land use pattern, tax considerations, repayment schedule, revenue assumptions etc.

The components captured in the assumption sheet have been elaborated on the next page along with supporting screen shots of the same.

1 Timing Assumptions

Tenure of the Model (Years)	50
Model Start Date	July 1, 2019
Model End Date	June 30, 2069
Construction Start Date	July 1, 2019
Construction End Date	June 29, 2025
Years of Construction	6
Number of Phases	3
Phase I Start Date	July 1, 2019
Phase I End Date	June 30, 2021
Phase II Start Date	July 1, 2021
Phase II End Date	June 30, 2023
Phase III Start Date	July 1, 2023
Phase III End Date	June 30, 2025
Phase IV Start Date	January 0, 1900
Phase IV End Date	January 0, 1900
Quarterly Model (Months)	3
Operation Start Date (CoD)	July 1, 2022

Timing Assumptions – This block captures the tenure for which the financial model has been built, along with start and end dates of each construction phase. Quarterly model parameter captures number of months in each quarter. Operation Start Date captures the CoD date.

2 Escalation Rates

Escalation Rate (annual) for capex and opex	5.0%	Price Label	March 15, 2019
---	------	-------------	----------------

Escalation Rate – This block captures the escalation rate forecasted for the tenure of the project duration and base price considerations.

3 Project Cost (in BDT million)

Cost of land acquisition		
Site grading and other land development expenses	0.0	0%
Compound wall, fencing and gates	0.0	0%
Roads, culverts & drainage	976.0	16%
Decentralized water supply, treatment and distribution	583.5	10%
Electrical, street lighting & fire fighting	745.9	12%
Telecom & communication systems	78.4	1%
Sustainable infrastructure elements, RW harvesting, summer	9.0	0%
Decentralized wastewater, network and solid waste management	2134.7	35%
Admin Building	70.0	1%
Support amenities	0.0	0%
	0.0	0%
Buildings - MEP	2.6	0%
SFB	1463.6	24%
EMP Cost	36.8	1%
Offsite infra	0.0	0%
		100%
Total Hard Cost (without land acquisition)	6100.48	
Total Cost (Including land acquisition)	6100	
Interest During Construction	519	
Project Cost (without land acquisition)	6619.2	
Project Cost (Including land acquisition)	6619	

Project Cost – This block captures the break-up of construction expenditure for different components of the EZ site. Considering the scope of BEZA also developing the EZ site, provision has been kept to capture the land cost as well as a part of construction costs.

4 Industrial Land Use Pattern

Industrial Space (area in acres)- allocate higher area at the first

Textile & RMG	0
Food & Beverage	203
Agro Based Products	0
Leather & Leather Products	0
Plastic & Rubber	0
Paper & Packaging	0
Chemicals	9
Non-Metallic Minerals	0
Automobile & Accessories	0
Heavy Machinery, Iron & Steel	0
Electrical & Electronics	0
Shipbuilding & Ship breaking	0
Petroleum Products	0
Pharmaceuticals	118
Light Machinery, Equipment & Furniture	19

Number of Industries Input	15
Total Industrial Area (acres)	349.13

SFB to be allocated from (Input Yes OR No):

Textile & RMG	No
Food & Beverage	Yes
Agro Based Products	No
Leather & Leather Products	No
Plastic & Rubber	No
Paper & Packaging	No
Chemicals	No
Non-Metallic Minerals	No
Automobile & Accessories	No
Heavy Machinery, Iron & Steel	No
Electrical & Electronics	No
Shipbuilding & Ship breaking	No
Petroleum Products	No
Pharmaceuticals	Yes
Light Machinery, Equipment & Furniture	No

Number of Industries for SFB	2
------------------------------	---

Industrial Land Use Pattern – This block captures the breakup of industrial land into different industries and area allocation for each industry that would be expected to come up in the EZ site. This block also keeps provision for allocating SFBs for shortlisted industries.

5 Commercial and Other Land Use Pattern

Saleable Land Use Pattern (figures in acres):

Logistics Zone	3.895
Component-2	
Support Amenities	21.535
Component-4	
Component-5	
Component-6	
Component-7	
Component-8	
	25.43

Non-Processing Land Use Pattern (figures in acres):

Utility	17.743
Road	7.6.7
Green & Open Space	52.96
Admin & Customs	7.647
Component-5	
Component-6	
Component-7	0
Component-8	
	155.05
Total Area (acres)	529.61

Commercial and Other Land Use Pattern – This block captures the area occupied by other components of the EZ site and sum total of all land occupied.

6 O&M expenses for hard infrastructure (% of capex)

To commence from the start day of operation (CoD)

		Operations	Maintenance
Site grading and other land development expenses	0%	0%	0%
Compound wall, fencing and gates	0%	0%	0%
Roads, culverts & drainage	2%	2%	5%
Decentralized water supply, treatment and distribution	1%	2.5%	2%
Electrical, street lighting & fire fighting	2%	2%	5%
Telecom & communication systems	1%	0%	2%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	1%	2%	2%
Decentralized wastewater, network and solid waste management	2%	4%	2%
Admin Building	1%	0%	5%
Support amenities	1%	0%	5%
Buildings - MEP	1%	0%	5%
SFB	1%	0%	5%
EMP Cost	4%	7%	7%
Offsite infra	0%	0%	0%
Miscellaneous Cost (% of Opex)		2%	
Pre operating expenses (BDT million)		2	

Operations & Maintenance Expenses – This block captures the Operations and Maintenance expenditure for the fixed assets taken as a percentage of capital expenditure.

7 Cost of Manpower

Designation	Salary (BDT million/year)	Nos.	Total (BDT million)
CEO	5	1	5
GM-Finance	3	1	3
GM-Marketing	3	1	3
GM-Engineering & Procurement	3	1	3
GM-HR and IT	3	1	3
GM-Operations	3	1	3
Manager-Finance	1.5	1	1.5
Manager-Marketing	1.5	1	1.5
Manager-Engineering & Procurement	1.5	1	1.5
Manager-HR and IT	1.5	1	1.5
Manager-Operations	1.5	2	3
Assistant Manager-Finance	0.72	2	1.44
Assistant Manager-Marketing	0.72	2	1.44
Assistant Manager-Engineering & Procurement	0.72	4	2.88
Assistant Manager-HR and IT	0.72	2	1.44
Assistant Manager-Operations	0.72	4	2.88
Security Supervisors	0.36	6	2.16
Security Staffs	0.24	48	11.52
Peons and Clerks	0.18	10	1.8
Office Boys	0.12	15	1.8
			56.36

Cost of Manpower – The block above captures the annual expense to be incurred by the developer on account of hiring personnel for management and operations of the EZ site.

8 Financing Inputs

% of Equity	30%	Working Capital margin	0%
% of Grant	0%		
% of Debt (Commercial Borrowings)	70%		
Cost of Equity			
Interest Rate (Grant)	2%		
Interest Rate (Commercial Borrowings)	10%		
CB Repayment Period (quarters)	40	Grant Repayment Period (quarters)	80
Negligible Amount	0.0001	Negligible Amount	0.0001
% of debt paid in each installment	2.5%	% of debt paid in each installment	1.25%

Financing Inputs – This block captures the assumptions taken regarding the capital structure for this project, interest rate, Debt repayment period, % of debt paid and working capital margin. Project Structuring data flows into this block from the summary worksheet.

10 Industries	Utility Requirement (per acre)				Manpower Requirement (Number/acre)
	Power/acre (MW)	Water/acre (MLD)	Gas/acre (cum/hr)	Effluent/acre (MLD)	
Textile & RMG	0.16	0.012	76.50	0.01	0.00
Food & Beverage	0.16	0.013	76.50	0.01	0.00
Agro Based Products	0.13	0.007	76.50	0.00	0.00
Leather & Leather Products	0.11	0.012	76.50	0.01	0.00
Plastic & Rubber	0.11	0.012	76.50	0.01	0.00
Paper & Packaging	0.16	0.013	76.50	0.01	0.00
Chemicals	0.16	0.013	76.50	0.01	0.00
Non-Metallic Minerals	0.13	0.007	76.50	0.00	0.00
Automobile & Accessories	0.13	0.009	76.50	0.01	0.00
Heavy Machinery, Iron & Steel	0.16	0.013	76.50	0.01	0.00
Electical & Electronics	0.11	0.007	76.50	0.00	0.00
Shipbuilding & Ship breaking	0.13	0.011	76.50	0.01	0.00
Petroleum Products	0.16	0.009	76.50	0.01	0.00
Pharmaceuticals	0.16	0.013	76.50	0.01	0.00
Light Machinery, Equipment & Furnitu	0.16	0.013	76.50	0.01	0.00
Million Units per MW	8.76				

Utility Requirements – This block captures the per acre utility requirements for different industries, these utilities are power, water, gas and effluent treatment. Provision has also been kept to calculate manpower requirement per acre for different industries.

10 Revenue Assumptions	
Industrial land lease per quarter	958320 BDT/ year/acre
Inflation on rent	12%
Time period for increasing rentals	3 years
Revenue from utility	
Power Supply	0.79 per Unit
Water Supply	3321 per MLD
Gas Supply	0.854 per cum.
Effluent Treatment	3695 per MLD
Mark Up	
Power Supply	10%
Water Supply	10%
Gas Supply	10%
Effluent Treatment	10%
SFB lease per quarter	1306800 BDT/ year/acre
Inflation on rent	12%
Time period for increasing rentals	3 years
EZ service Fees	87120 BDT/ year/acre
Inflation on utility	15%
Time period for increasing utility fees	3 years
Land area of logistics zone	3.895 acre
Years Post COD	1
Rent from logistics zone	958320 BDT/year/acre
Lease from	2024
Lease from	2024
Area of support amenity	938064.6 sq. feet

Revenue Assumptions – This block captures the assumptions taken for all the sources of revenue that would flow to the developer of the EZ site. These are lease rent from industrial land, SFB, real estate, logistics zone, commercial space and supply of utility. Furthermore, rate of real estate uptake has been modified keeping in mind different real estate uptake scenarios.

15 Tax & Depreciation Assumptions	
SLM Depreciation Rate	2%
WDV Depreciation Rate	5%
Built Up Area Depreciation as per Inco	10%
SFB depreciation as per income tax	20%
Corporate Income Tax (PPP model)	35%
Working Capital Interest	14%
Income Tax (BEZA model)	25%
Cost of developing SFB	1600 BDT/sq. ft
Ground coverage under SFB	60%
Total cost of developing SFB	1463.616 million BDT

Tax & Depreciation Assumptions – This block captures the assumptions taken depreciation rates and rate of tax applicable.

Apart from the assumption blocks listed in this section, assumptions worksheet also captures the debt repayment schedule, rate of land uptake for industrial land and SFB.

The values from these parameters flow into the pro-forma sheets, revenue inflow calculations, capital expenditure calculations and debt repayment calculations in order to present the return that could be expected by the developer for designing, financing, constructing and operating this EZ site.

15.19. Annexure 19 – Proforma Statements

Conservative Scenario Balance Sheet

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	474	1005	1341	1717	2096	2521	2521	2521	2521	2521
Equity Infusion	0	0	144	805	1644	2574	3467	4384	5180	5721
Equity infusion to meet operating expenses	193	239	287	287	287	287	287	287	287	287
Reserves & surplus	-193	-193	-385	-886	-1579	-2214	-2810	-3244	-3557	-3614
Long term loan	1105	2345	3128	3773	4422	5014	4613	4025	3436	2848
Working Capital Loan	0	0	0	179	208	172	9	0	0	0
Total liabilities	1578	3396	4514	5876	7078	8354	8087	7973	7868	7763
Assets										
Fixed Assets	1578	3350	4469	5725	6914	8242	8137	8032	7927	7822
Less: Depreciation	0	0	0	74	89	105	105	105	105	105
Net Block	1578	3350	4469	5651	6824	8137	8032	7927	7822	7718
Net Working Capital	0	0	0	179	208	172	9	0	0	0
Cash and bank balance	0	45	45	45	45	45	45	45	45	45
Total assets	1578	3396	4514	5876	7078	8354	8087	7973	7868	7763

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2521	2521	2521	2521	2521	2521	2521	2521	2521	2521
Equity Infusion	6088	6334	6334	6334	6334	6334	6334	6334	6334	6334
Equity infusion to meet operating expenses	287	287	287	287	287	287	287	287	287	287
Reserves & surplus	-3498	-3260	-2616	-1739	-871	221	1284	2307	3297	4061
Long term loan	2260	1671	1083	729	375	188	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	7658	7553	7610	8132	8647	9551	10427	11449	12439	13203

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Assets										
Fixed Assets	2991	2945	2900	2855	2809	2764	2719	2673	2628	2583
Less: Depreciation	45	45	45	45	45	45	45	45	45	45
Net Block	2945	2900	2855	2809	2764	2719	2673	2628	2583	2537
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	0	0	90	308	517	909	1279	1624	2054	2369
Total assets	2945	2900	2944	3118	3281	3628	3952	4252	4636	4907

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2521	2521	2521	2521	2521	2521	2521	2521	2521	2521
Equity Infusion	6334	6334	6334	6334	6334	6334	6334	6334	6334	6334
Equity infusion to meet operating expenses	287	287	287	287	287	287	287	287	287	287
Reserves & surplus	4785	5666	6504	7296	8267	9188	10057	11127	12142	13097
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	13927	14809	15646	16438	17409	18330	19199	20270	21284	22239
Assets										
Fixed Assets	6669	6565	6460	6355	6250	6145	6041	5936	5831	5726
Less: Depreciation	105	105	105	105	105	105	105	105	105	105
Net Block	6565	6460	6355	6250	6145	6041	5936	5831	5726	5621
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	7363	8349	9291	10188	11264	12289	13263	14439	15558	16618
Total assets	13927	14809	15646	16438	17409	18330	19199	20270	21284	22239

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2521	2521	2521	2521	2521	2521	2521	2521	2521	2521
Equity Infusion	6334	6334	6334	6334	6334	6334	6334	6334	6334	6334

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Equity infusion to meet operating expenses	287	287	287	287	287	287	287	287	287	287
Reserves & surplus	14278	15395	16445	17749	18979	20130	21571	22924	24186	25774
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	23421	24537	25587	26891	28121	29273	30713	32066	33329	34916
Assets										
Fixed Assets	5621	5516	5412	5307	5202	5097	4992	4888	4783	4678
Less: Depreciation	105	105	105	105	105	105	105	105	105	105
Net Block	5516	5412	5307	5202	5097	4992	4888	4783	4678	4573
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	17904	19126	20280	21689	23024	24280	25826	27283	28651	30343
Total assets	23421	24537	25587	26891	28121	29273	30713	32066	33329	34916

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	4671	4671	4671	4671	4671	4671	4671	4671	4671	4671
Equity infusion to meet operating expenses	287	287	287	287	287	287	287	287	287	287
Reserves & surplus	40219	42410	45094	47666	50122	53134	56016	58763	62143	65372
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	47490	49682	52365	54937	57393	60405	63287	66034	69415	72643
Assets										
Fixed Assets	4326	4233	4140	4047	3955	3862	3769	3677	3584	3491

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	4233	4140	4047	3955	3862	3769	3677	3584	3491	3398
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	43257	45541	48318	50982	53531	56636	59611	62450	65923	69245
Total assets	47490	49682	52365	54937	57393	60405	63287	66034	69415	72643

Base Scenario Balance Sheet- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	375	797	1132	1509	1888	2313	2313	2313	2313	2313
Equity Infusion	0	0	0	317	678	997	1207	1398	1566	1566
Equity infusion to meet operating expenses	193	242	295	295	295	295	295	295	295	295
Reserves & surplus	-193	-142	-182	-375	-627	-687	-638	-382	-103	564
Long term loan	876	1859	2642	3335	4033	4673	4321	3782	3242	2702
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	1251	2755	3886	5081	6266	7591	7498	7406	7313	7440
Assets										
Fixed Assets	1251	2655	3774	5030	6231	7572	7479	7386	7293	7201
Less: Depreciation	0	0	0	62	77	93	93	93	93	93
Net Block	1251	2655	3774	4968	6154	7479	7386	7293	7201	7108
Net Working Capital	0	0	0	0	0	0	0	0	0	0

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cash and bank balance	0	99	112	112	112	112	112	112	112	332
Total assets	1251	2755	3886	5081	6266	7591	7498	7406	7313	7440

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	1566	1566	1566	1566	1566	1566	1566	1566	1566	1566
Equity infusion to meet operating expenses	295	295	295	295	295	295	295	295	295	295
Reserves & surplus	1420	2295	3443	4480	5356	6288	7198	8079	9138	10159
Long term loan	2162	1623	1083	729	375	188	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	7757	8092	8700	9383	9905	10650	11372	12253	13312	14333
Assets										
Fixed Assets	7108	7015	6922	6830	6737	6644	6551	6459	6366	6273
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	7015	6922	6830	6737	6644	6551	6459	6366	6273	6180
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	742	1169	1870	2647	3261	4098	4914	5887	7038	8152
Total assets	7757	8092	8700	9383	9905	10650	11372	12253	13312	14333

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	1566	1566	1566	1566	1566	1566	1566	1566	1566	1566
Equity infusion to meet operating expenses	295	295	295	295	295	295	295	295	295	295
Reserves & surplus	11141	12327	13470	14570	15902	17185	18419	19915	21358	22742
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	15315	16501	17644	18744	20076	21359	22593	24089	25532	26916
Assets										
Fixed Assets	6180	6088	5995	5902	5809	5717	5624	5531	5439	5346
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	6088	5995	5902	5809	5717	5624	5531	5439	5346	5253
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	9227	10506	11742	12934	14359	15735	17061	18651	20186	21663
Total assets	15315	16501	17644	18744	20076	21359	22593	24089	25532	26916

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Equity Infusion	1566	1566	1566	1566	1566	1566	1566	1566	1566	1566
Equity infusion to meet operating expenses	295	295	295	295	295	295	295	295	295	295
Reserves & surplus	24425	26045	27600	29493	31312	33056	35185	37228	39184	41573
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	28599	30219	31774	33667	35487	37230	39359	41402	43358	45748
Assets										
Fixed Assets	5253	5160	5068	4975	4882	4789	4697	4604	4511	4418
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	5160	5068	4975	4882	4789	4697	4604	4511	4418	4326
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	23439	25152	26800	28785	30697	32534	34755	36891	38939	41422
Total assets	28599	30219	31774	33667	35487	37230	39359	41402	43358	45748

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	1566	1566	1566	1566	1566	1566	1566	1566	1566	1566
Equity infusion to meet operating expenses	295	295	295	295	295	295	295	295	295	295

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Reserves & surplus	43868	46060	48743	51315	53771	56783	59665	62412	65793	69021
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	48042	50234	52917	55489	57945	60957	63840	66586	69967	73195
Assets										
Fixed Assets	4326	4233	4140	4047	3955	3862	3769	3677	3584	3491
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	4233	4140	4047	3955	3862	3769	3677	3584	3491	3398
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	43809	46093	48870	51535	54083	57188	60163	63002	66476	69797
Total assets	48042	50234	52917	55489	57945	60957	63840	66586	69967	73195

Aggressive Scenario Balance Sheet- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	375	797	1132	1509	1888	2313	2313	2313	2313	2313
Equity Infusion	0	0	0	177	305	436	436	436	436	436
Equity infusion to meet operating expenses	193	243	299	299	299	299	299	299	299	299
Reserves & surplus	-193	-118	-112	-165	-184	-55	314	881	1470	2306

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Long term loan	876	1859	2642	3335	4033	4673	4321	3782	3242	2702
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	1251	2780	3961	5155	6341	7666	7683	7710	7759	8056
Assets										
Fixed Assets	1251	2655	3774	5030	6231	7572	7479	7386	7293	7201
Less: Depreciation	0	0	0	62	77	93	93	93	93	93
Net Block	1251	2655	3774	4968	6154	7479	7386	7293	7201	7108
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	0	124	187	187	187	187	297	417	559	948
Total assets	1251	2780	3961	5155	6341	7666	7683	7710	7759	8056

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	436	436	436	436	436	436	436	436	436	436
Equity infusion to meet operating expenses	299	299	299	299	299	299	299	299	299	299
Reserves & surplus	3163	4037	5185	6223	7098	8031	8941	9821	10880	11901
Long term loan	2162	1623	1083	729	375	188	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	8373	8708	9316	10000	10521	11266	11989	12869	13928	14949

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Assets										
Fixed Assets	7108	7015	6922	6830	6737	6644	6551	6459	6366	6273
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	7015	6922	6830	6737	6644	6551	6459	6366	6273	6180
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	1358	1786	2486	3263	3877	4715	5530	6503	7655	8769
Total assets	8373	8708	9316	10000	10521	11266	11989	12869	13928	14949

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	436	436	436	436	436	436	436	436	436	436
Equity infusion to meet operating expenses	299	299	299	299	299	299	299	299	299	299
Reserves & surplus	12884	14070	15213	16313	17645	18928	20161	21658	23101	24485
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	15932	17117	18261	19360	20692	21976	23209	24706	26148	27533
Assets										
Fixed Assets	6180	6088	5995	5902	5809	5717	5624	5531	5439	5346
Less: Depreciation	93	93	93	93	93	93	93	93	93	93

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Net Block	6088	5995	5902	5809	5717	5624	5531	5439	5346	5253
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	9844	11122	12359	13551	14976	16352	17678	19267	20803	22280
Total assets	15932	17117	18261	19360	20692	21976	23209	24706	26148	27533

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	436	436	436	436	436	436	436	436	436	436
Equity infusion to meet operating expenses	299	299	299	299	299	299	299	299	299	299
Reserves & surplus	26168	27788	29343	31235	33055	34799	36927	38971	40926	43316
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	29216	30836	32391	34283	36103	37847	39975	42018	43974	46364
Assets										
Fixed Assets	5253	5160	5068	4975	4882	4789	4697	4604	4511	4418
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	5160	5068	4975	4882	4789	4697	4604	4511	4418	4326
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	24055	25768	27416	29401	31314	33150	35371	37507	39556	42038
Total assets	29216	30836	32391	34283	36103	37847	39975	42018	43974	46364

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
Equity Infusion	436	436	436	436	436	436	436	436	436	436
Equity infusion to meet operating expenses	299	299	299	299	299	299	299	299	299	299
Reserves & surplus	45611	47802	50486	53058	55514	58526	61408	64155	67535	70764
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	48659	50850	53534	56106	58562	61573	64456	67203	70583	73812
Assets										
Fixed Assets	4326	4233	4140	4047	3955	3862	3769	3677	3584	3491
Less: Depreciation	93	93	93	93	93	93	93	93	93	93
Net Block	4233	4140	4047	3955	3862	3769	3677	3584	3491	3398
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	44426	46710	49486	52151	54700	57804	60779	63619	67092	70413
Total assets	48659	50850	53534	56106	58562	61573	64456	67203	70583	73812

Conservative Scenario P&L Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue										
From Industrial Land	0	0	0	17	20	54	106	140	155	199
From SFB	0	46	91	154	205	256	344	402	459	578

From Utility	0	4	8	52	66	135	250	323	360	472
From EZ service Fees	0	0	0	1	2	4	8	10	11	13
From Logistics Zone	0	0	0	0	4	4	5	5	5	5
From Support Amenities	0	0	0	0	25	25	28	28	28	32
Total Revenue	0	50	99	224	322	479	740	907	1018	1299
Operating Expenses										
O&M Cost	0	0	0	271	357	451	503	528	555	582
Upfront Fees to BEZA	150									
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	0	2	5	11	16	24	37	45	51	65
Pre-operating Cost	8	8	8	0	0	0	0	0	0	0
Misc. Cost	0	0	0	5	7	9	10	11	11	12
Cost of Manpower	0	0	0	68	72	75	79	83	87	91
Total Cost	193	46	48	391	487	594	665	702	739	786
EBITDA	-193	4	51	-167	-165	-115	76	205	278	513
Depreciation	0	0	0	62	77	93	93	93	93	93
EBIT	-193	4	51	-229	-243	-208	-17	112	186	421
Interest expenses	0	0	186	177	325	297	450	405	352	297
Interest on W/C	0	0	0	23	23	16	0	0	0	0
Profit Before Tax	-193	4	-135	-429	-591	-522	-467	-293	-166	123
Tax	0	0	0	0	0	0	0	0	0	0

Profit After Tax	-193	4	-135	-429	-591	-522	-467	-293	-166	123
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	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue										
From Industrial Land	233	271	388	474	474	531	531	531	594	594
From SFB	643	643	720	720	720	806	806	806	903	903
From Utility	548	622	888	1059	1059	1217	1219	1217	1400	1400
From EZ service Fees	15	18	22	27	27	27	27	27	27	27
From Logistics Zone	5	5	6	6	6	7	7	7	7	7
From Support Amenities	32	32	35	35	35	40	40	40	44	44
Total Revenue	1475	1590	2060	2321	2321	2628	2629	2628	2976	2976
Operating Expenses										
O&M Cost	612	642	674	708	744	781	820	861	904	949
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	74	79	103	116	116	131	131	131	149	149
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	12	13	13	14	15	16	16	17	18	19
Cost of Manpower	96	101	106	111	117	123	129	135	142	149
Total Cost	829	871	932	985	1027	1086	1132	1180	1248	1301
EBITDA	646	719	1128	1336	1294	1542	1497	1448	1728	1675

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	553	626	1035	1243	1201	1449	1404	1355	1635	1582
Interest expenses	243	189	136	91	55	28	9	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	310	437	899	1152	1146	1421	1395	1355	1635	1582
Tax	0	0	0	0	0	58	484	475	577	561
Profit After Tax	310	437	899	1152	1146	1363	910	880	1059	1021

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Revenue										
From Industrial Land	594	666	666	666	745	745	745	835	835	835
From SFB	903	1011	1011	1011	1132	1132	1132	1268	1268	1268
From Utility	1401	1610	1610	1610	1853	1852	1852	2129	2131	2129
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	7	8	8	8	9	9	9	10	10	10
From Support Amenities	44	50	50	50	56	56	56	62	62	62
Total Revenue	2978	3372	3372	3372	3824	3822	3822	4333	4335	4333
Operating Expenses										
O&M Cost	997	1046	1099	1154	1212	1272	1336	1403	1473	1547
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	149	169	169	169	191	191	191	217	217	217

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	20	21	22	23	24	25	27	28	29	31
Cost of Manpower	157	164	173	181	191	200	210	220	232	243
Total Cost	1358	1436	1497	1562	1653	1724	1799	1903	1986	2072
EBITDA	1620	1936	1875	1810	2170	2098	2023	2430	2348	2260
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	1527	1844	1782	1717	2078	2005	1930	2337	2256	2168
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	1527	1844	1782	1717	2078	2005	1930	2337	2256	2168
Tax	545	658	639	618	746	722	697	840	813	783
Profit After Tax	982	1186	1143	1100	1332	1283	1233	1497	1443	1384

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue										
From Industrial Land	935	935	935	1047	1047	1047	1173	1173	1173	1314
From SFB	1421	1421	1421	1591	1591	1591	1782	1782	1782	1996
From Utility	2449	2449	2451	2816	2816	2816	3242	3238	3238	3724
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	12	12	12	13	13	13	15	15	15	16
From Support Amenities	70	70	70	78	78	78	88	88	88	98
Total Revenue	4913	4913	4915	5573	5573	5573	6326	6323	6323	7175

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Operating Expenses										
O&M Cost	1624	1705	1790	1880	1974	2073	2177	2286	2400	2520
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	246	246	246	279	279	279	316	316	316	359
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	32	34	36	38	39	41	44	46	48	50
Cost of Manpower	255	268	282	295	310	326	343	359	377	396
Total Cost	2192	2288	2389	2527	2638	2754	2915	3042	3176	3360
EBITDA	2721	2625	2526	3046	2935	2819	3411	3281	3147	3815
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	2628	2532	2433	2953	2843	2726	3319	3188	3054	3723
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	2628	2532	2433	2953	2843	2726	3319	3188	3054	3723
Tax	945	912	878	1061	1023	983	1190	1145	1098	1333
Profit After Tax	1683	1620	1555	1892	1820	1744	2128	2043	1956	2390

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Revenue										
From Industrial Land	1314	1314	1471	1471	1471	1648	1648	1648	1845	1845

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
From SFB	1996	1996	2235	2235	2235	2504	2504	2504	2804	2804
From Utility	3728	3724	4283	4283	4287	4925	4925	4925	5669	5664
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	16	16	18	18	18	20	20	20	23	23
From Support Amenities	98	98	110	110	110	123	123	123	138	138
Total Revenue	7179	7175	8145	8145	8149	9248	9248	9248	10507	10502
Operating Expenses										
O&M Cost	2646	2778	2917	3063	3217	3378	3547	3724	3910	4106
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	359	359	407	407	407	462	462	462	525	525
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	53	56	58	61	64	68	71	74	78	82
Cost of Manpower	417	436	458	481	507	531	557	585	616	645
Total Cost	3510	3665	3877	4048	4230	4473	4672	4881	5165	5394
EBITDA	3669	3511	4268	4097	3919	4774	4575	4367	5342	5108
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	3576	3418	4176	4004	3826	4681	4483	4274	5249	5015
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Profit Before Tax	3576	3418	4176	4004	3826	4681	4483	4274	5249	5015
Tax	1282	1227	1492	1432	1370	1669	1600	1527	1869	1787
Profit After Tax	2295	2192	2684	2572	2456	3012	2882	2747	3381	3228

Base Scenario P&L Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue										
From Industrial Land	0	0	0	34	54	115	200	268	268	364
From SFB	0	91	183	307	410	512	574	574	574	643
From Utility	0	8	16	104	156	283	462	592	592	805
From EZ service Fees	0	0	0	3	4	9	15	19	19	24
From Logistics Zone	0	0	0	0	4	4	5	5	5	5
From Support Amenities	0	0	0	0	25	25	28	28	28	32
Total Revenue	0	99	199	448	654	948	1283	1486	1486	1871
Operating Expenses										
O&M Cost	0	0	0	271	357	451	503	528	555	582
Upfront Fees to BEZA	150									
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	0	5	10	22	33	47	64	74	74	94
Pre-operating Cost	8	8	8	0	0	0	0	0	0	0
Misc. Cost	0	0	0	5	7	9	10	11	11	12
Cost of Manpower	0	0	0	68	72	75	79	83	87	91

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Total Cost	193	48	53	403	504	618	692	731	763	814
EBITDA	-193	51	146	46	150	330	592	754	724	1057
Depreciation	0	0	0	62	77	93	93	93	93	93
EBIT	-193	51	146	-16	73	238	499	662	631	964
Interest expenses	0	0	186	177	325	297	450	405	352	297
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	-193	51	-40	-193	-252	-60	49	256	279	667
Tax	0	0	0	0	0	0	0	0	0	0
Profit After Tax	-193	51	-40	-193	-252	-60	49	256	279	667

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue										
From Industrial Land	423	423	474	474	474	531	531	531	594	594
From SFB	643	643	720	720	720	806	806	806	903	903
From Utility	921	921	1060	1059	1059	1217	1219	1217	1400	1400
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	5	5	6	6	6	7	7	7	7	7
From Support Amenities	32	32	35	35	35	40	40	40	44	44
Total Revenue	2050	2050	2322	2321	2321	2628	2629	2628	2976	2976
Operating Expenses										
O&M Cost	612	642	674	708	744	781	820	861	904	949

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	103	103	116	116	116	131	131	131	149	149
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	12	13	13	14	15	16	16	17	18	19
Cost of Manpower	96	101	106	111	117	123	129	135	142	149
Total Cost	858	894	945	985	1027	1086	1132	1180	1248	1301
EBITDA	1193	1157	1376	1336	1294	1542	1497	1448	1728	1675
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	1100	1064	1284	1243	1201	1449	1404	1355	1635	1582
Interest expenses	243	189	136	91	55	28	9	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	857	875	1148	1152	1146	1421	1395	1355	1635	1582
Tax	0	0	0	115	271	489	484	475	577	561
Profit After Tax	857	875	1148	1038	875	932	910	880	1059	1021

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Revenue										
From Industrial Land	594	666	666	666	745	745	745	835	835	835
From SFB	903	1011	1011	1011	1132	1132	1132	1268	1268	1268
From Utility	1401	1610	1610	1610	1853	1852	1852	2129	2131	2129
From EZ service Fees	27	27	27	27	27	27	27	27	27	27

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
From Logistics Zone	7	8	8	8	9	9	9	10	10	10
From Support Amenities	44	50	50	50	56	56	56	62	62	62
Total Revenue	2978	3372	3372	3372	3824	3822	3822	4333	4335	4333
Operating Expenses										
O&M Cost	997	1046	1099	1154	1212	1272	1336	1403	1473	1547
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	149	169	169	169	191	191	191	217	217	217
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	20	21	22	23	24	25	27	28	29	31
Cost of Manpower	157	164	173	181	191	200	210	220	232	243
Total Cost	1358	1436	1497	1562	1653	1724	1799	1903	1986	2072
EBITDA	1620	1936	1875	1810	2170	2098	2023	2430	2348	2260
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	1527	1844	1782	1717	2078	2005	1930	2337	2256	2168
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	1527	1844	1782	1717	2078	2005	1930	2337	2256	2168
Tax	545	658	639	618	746	722	697	840	813	783
Profit After Tax	982	1186	1143	1100	1332	1283	1233	1497	1443	1384

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue										
From Industrial Land	935	935	935	1047	1047	1047	1173	1173	1173	1314
From SFB	1421	1421	1421	1591	1591	1591	1782	1782	1782	1996
From Utility	2449	2449	2451	2816	2816	2816	3242	3238	3238	3724
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	12	12	12	13	13	13	15	15	15	16
From Support Amenities	70	70	70	78	78	78	88	88	88	98
Total Revenue	4913	4913	4915	5573	5573	5573	6326	6323	6323	7175
Operating Expenses										
O&M Cost	1624	1705	1790	1880	1974	2073	2177	2286	2400	2520
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	246	246	246	279	279	279	316	316	316	359
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	32	34	36	38	39	41	44	46	48	50
Cost of Manpower	255	268	282	295	310	326	343	359	377	396
Total Cost	2192	2288	2389	2527	2638	2754	2915	3042	3176	3360
EBITDA	2721	2625	2526	3046	2935	2819	3411	3281	3147	3815
Depreciation	93	93	93	93	93	93	93	93	93	93

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
EBIT	2628	2532	2433	2953	2843	2726	3319	3188	3054	3723
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	2628	2532	2433	2953	2843	2726	3319	3188	3054	3723
Tax	945	912	878	1061	1023	983	1190	1145	1098	1333
Profit After Tax	1683	1620	1555	1892	1820	1744	2128	2043	1956	2390

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Revenue										
From Industrial Land	1314	1314	1471	1471	1471	1648	1648	1648	1845	1845
From SFB	1996	1996	2235	2235	2235	2504	2504	2504	2804	2804
From Utility	3728	3724	4283	4283	4287	4925	4925	4925	5669	5664
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	16	16	18	18	18	20	20	20	23	23
From Support Amenities	98	98	110	110	110	123	123	123	138	138
Total Revenue	7179	7175	8145	8145	8149	9248	9248	9248	10507	10502
Operating Expenses										
O&M Cost	2646	2778	2917	3063	3217	3378	3547	3724	3910	4106
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	359	359	407	407	407	462	462	462	525	525
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Misc. Cost	53	56	58	61	64	68	71	74	78	82
Cost of Manpower	417	436	458	481	507	531	557	585	616	645
Total Cost	3510	3665	3877	4048	4230	4473	4672	4881	5165	5394
EBITDA	3669	3511	4268	4097	3919	4774	4575	4367	5342	5108
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	3576	3418	4176	4004	3826	4681	4483	4274	5249	5015
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	3576	3418	4176	4004	3826	4681	4483	4274	5249	5015
Tax	1282	1227	1492	1432	1370	1669	1600	1527	1869	1787
Profit After Tax	2295	2192	2684	2572	2456	3012	2882	2747	3381	3228

Aggressive Scenario P&L Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue										
From Industrial Land	0	0	0	54	98	182	313	378	378	423
From SFB	0	114	229	384	512	512	574	574	574	643
From Utility	0	10	20	153	252	408	678	800	801	921
From EZ service Fees	0	0	0	4	8	15	23	27	27	27
From Logistics Zone	0	0	0	0	4	4	5	5	5	5
From Support Amenities	0	0	0	0	25	25	28	28	28	32
Total Revenue	0	124	248	595	899	1147	1621	1812	1813	2050

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Operating Expenses										
O&M Cost	0	0	0	271	357	451	503	528	555	582
Upfront Fees to BEZA	150									
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	0	6	12	30	45	57	81	91	91	103
Pre-operating Cost	8	8	8	0	0	0	0	0	0	0
Misc. Cost	0	0	0	5	7	9	10	11	11	12
Cost of Manpower	0	0	0	68	72	75	79	83	87	91
Total Cost	193	50	56	410	516	628	709	748	779	823
EBITDA	-193	75	193	185	383	519	912	1064	1034	1227
Depreciation	0	0	0	62	77	93	93	93	93	93
EBIT	-193	75	193	123	306	426	820	972	941	1134
Interest expenses	0	0	186	177	325	297	450	405	352	297
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	-193	75	7	-53	-19	129	370	566	589	837
Tax	0	0	0	0	0	0	0	0	0	0
Profit After Tax	-193	75	7	-53	-19	129	370	566	589	837

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue										
From Industrial Land	423	423	474	474	474	531	531	531	594	594

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
From SFB	643	643	720	720	720	806	806	806	903	903
From Utility	921	921	1060	1059	1059	1217	1219	1217	1400	1400
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	5	5	6	6	6	7	7	7	7	7
From Support Amenities	32	32	35	35	35	40	40	40	44	44
Total Revenue	2050	2050	2322	2321	2321	2628	2629	2628	2976	2976
Operating Expenses										
O&M Cost	612	642	674	708	744	781	820	861	904	949
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	103	103	116	116	116	131	131	131	149	149
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	12	13	13	14	15	16	16	17	18	19
Cost of Manpower	96	101	106	111	117	123	129	135	142	149
Total Cost	858	894	945	985	1027	1086	1132	1180	1248	1301
EBITDA	1193	1157	1376	1336	1294	1542	1497	1448	1728	1675
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	1100	1064	1284	1243	1201	1449	1404	1355	1635	1582
Interest expenses	243	189	136	91	55	28	9	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Profit Before Tax	857	875	1148	1152	1146	1421	1395	1355	1635	1582
Tax	0	0	0	115	271	489	484	475	577	561
Profit After Tax	857	875	1148	1038	875	932	910	880	1059	1021

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Revenue										
From Industrial Land	594	666	666	666	745	745	745	835	835	835
From SFB	903	1011	1011	1011	1132	1132	1132	1268	1268	1268
From Utility	1401	1610	1610	1610	1853	1852	1852	2129	2131	2129
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	7	8	8	8	9	9	9	10	10	10
From Support Amenities	44	50	50	50	56	56	56	62	62	62
Total Revenue	2978	3372	3372	3372	3824	3822	3822	4333	4335	4333
Operating Expenses										
O&M Cost	997	1046	1099	1154	1212	1272	1336	1403	1473	1547
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	149	169	169	169	191	191	191	217	217	217
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	20	21	22	23	24	25	27	28	29	31
Cost of Manpower	157	164	173	181	191	200	210	220	232	243
Total Cost	1358	1436	1497	1562	1653	1724	1799	1903	1986	2072

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
EBITDA	1620	1936	1875	1810	2170	2098	2023	2430	2348	2260
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	1527	1844	1782	1717	2078	2005	1930	2337	2256	2168
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	1527	1844	1782	1717	2078	2005	1930	2337	2256	2168
Tax	545	658	639	618	746	722	697	840	813	783
Profit After Tax	982	1186	1143	1100	1332	1283	1233	1497	1443	1384

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue										
From Industrial Land	935	935	935	1047	1047	1047	1173	1173	1173	1314
From SFB	1421	1421	1421	1591	1591	1591	1782	1782	1782	1996
From Utility	2449	2449	2451	2816	2816	2816	3242	3238	3238	3724
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	12	12	12	13	13	13	15	15	15	16
From Support Amenities	70	70	70	78	78	78	88	88	88	98
Total Revenue	4913	4913	4915	5573	5573	5573	6326	6323	6323	7175
Operating Expenses										
O&M Cost	1624	1705	1790	1880	1974	2073	2177	2286	2400	2520
Upfront Fees to BEZA										

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	246	246	246	279	279	279	316	316	316	359
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	32	34	36	38	39	41	44	46	48	50
Cost of Manpower	255	268	282	295	310	326	343	359	377	396
Total Cost	2192	2288	2389	2527	2638	2754	2915	3042	3176	3360
EBITDA	2721	2625	2526	3046	2935	2819	3411	3281	3147	3815
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	2628	2532	2433	2953	2843	2726	3319	3188	3054	3723
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	2628	2532	2433	2953	2843	2726	3319	3188	3054	3723
Tax	945	912	878	1061	1023	983	1190	1145	1098	1333
Profit After Tax	1683	1620	1555	1892	1820	1744	2128	2043	1956	2390

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Revenue										
From Industrial Land	1314	1314	1471	1471	1471	1648	1648	1648	1845	1845
From SFB	1996	1996	2235	2235	2235	2504	2504	2504	2804	2804
From Utility	3728	3724	4283	4283	4287	4925	4925	4925	5669	5664
From EZ service Fees	27	27	27	27	27	27	27	27	27	27
From Logistics Zone	16	16	18	18	18	20	20	20	23	23

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
From Support Amenities	98	98	110	110	110	123	123	123	138	138
Total Revenue	7179	7175	8145	8145	8149	9248	9248	9248	10507	10502
Operating Expenses										
O&M Cost	2646	2778	2917	3063	3217	3378	3547	3724	3910	4106
Upfront Fees to BEZA										
Annual Fees paid to BEZA	35	35	35	35	35	35	35	35	35	35
Revenue Share	359	359	407	407	407	462	462	462	525	525
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	53	56	58	61	64	68	71	74	78	82
Cost of Manpower	417	436	458	481	507	531	557	585	616	645
Total Cost	3510	3665	3877	4048	4230	4473	4672	4881	5165	5394
EBITDA	3669	3511	4268	4097	3919	4774	4575	4367	5342	5108
Depreciation	93	93	93	93	93	93	93	93	93	93
EBIT	3576	3418	4176	4004	3826	4681	4483	4274	5249	5015
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	3576	3418	4176	4004	3826	4681	4483	4274	5249	5015
Tax	1282	1227	1492	1432	1370	1669	1600	1527	1869	1787
Profit After Tax	2295	2192	2684	2572	2456	3012	2882	2747	3381	3228

Conservative Scenario Working Capital Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Receivables										
Revenue Collection	0	50	99	224	322	479	740	907	1018	1299
Payables										
Operating Expenses	193	46	48	391	487	594	665	702	739	786
Working Capital	0	0	0	167	165	115	0	0	0	0
Working Capital Loan	0	0	0	167	165	115	0	0	0	0
Interest on W/C Loan	0	0	0	23	23	16	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Receivables										
Revenue Collection	1475	1590	2060	2321	2321	2628	2629	2628	2976	2976
Payables										
Operating Expenses	829	871	932	985	1027	1086	1132	1180	1248	1301
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
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Receivables										
Revenue Collection	2978	3372	3372	3372	3824	3822	3822	4333	4335	4333
Payables										
Operating Expenses	1358	1436	1497	1562	1653	1724	1799	1903	1986	2072
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Receivables										
Revenue Collection	4913	4913	4915	5573	5573	5573	6326	6323	6323	7175
Payables										
Operating Expenses	2192	2288	2389	2527	2638	2754	2915	3042	3176	3360
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Receivables										

Revenue Collection	7179	7175	8145	8145	8149	9248	9248	9248	10507	10502
Payables										
Operating Expenses	3510	3665	3877	4048	4230	4473	4672	4881	5165	5394
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

Base Scenario Working Capital Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Receivables										
Revenue Collection	0	99	199	448	654	948	1283	1486	1486	1871
Payables										
Operating Expenses	193	48	53	403	504	618	692	731	763	814
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Receivables										

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue Collection	2050	2050	2322	2321	2321	2628	2629	2628	2976	2976
Payables										
Operating Expenses	858	894	945	985	1027	1086	1132	1180	1248	1301
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Receivables										
Revenue Collection	2978	3372	3372	3372	3824	3822	3822	4333	4335	4333
Payables										
Operating Expenses	1358	1436	1497	1562	1653	1724	1799	1903	1986	2072
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Receivables										
Revenue Collection	4913	4913	4915	5573	5573	5573	6326	6323	6323	7175

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Payables										
Operating Expenses	2192	2288	2389	2527	2638	2754	2915	3042	3176	3360
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Receivables										
Revenue Collection	7179	7175	8145	8145	8149	9248	9248	9248	10507	10502
Payables										
Operating Expenses	3510	3665	3877	4048	4230	4473	4672	4881	5165	5394
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

Aggressive Scenario Working Capital Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Receivables										
Revenue Collection	0	124	248	595	899	1147	1621	1812	1813	2050

Payables										
Operating Expenses	193	50	56	410	516	628	709	748	779	823
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Receivables										
Revenue Collection	2050	2050	2322	2321	2321	2628	2629	2628	2976	2976
Payables										
Operating Expenses	858	894	945	985	1027	1086	1132	1180	1248	1301
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Receivables										
Revenue Collection	2978	3372	3372	3372	3824	3822	3822	4333	4335	4333

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Payables										
Operating Expenses	1358	1436	1497	1562	1653	1724	1799	1903	1986	2072
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Receivables										
Revenue Collection	4913	4913	4915	5573	5573	5573	6326	6323	6323	7175
Payables										
Operating Expenses	2192	2288	2389	2527	2638	2754	2915	3042	3176	3360
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Receivables										
Revenue Collection	7179	7175	8145	8145	8149	9248	9248	9248	10507	10502
Payables										

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Operating Expenses	3510	3665	3877	4048	4230	4473	4672	4881	5165	5394
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

Conservative Scenario Cash Flow Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
<i>Cash inflow</i>										
PAT	-193.3	4.0	-134.8	-429.0	-591.0	-521.7	-466.7	-293.4	-166.5	123.2
Depreciation	0.0	0.0	0.0	61.7	77.2	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	375.3	421.3	335.6	376.8	378.9	425.3	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	193.3	45.8	48.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	875.7	982.9	783.2	879.1	884.0	992.3	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	167.2	-1.8	-50.0	-115.4	0.0	0.0	0.0
Total cash inflow	1251.0	1453.9	1032.3	1055.9	747.4	938.6	-489.3	-200.6	-73.7	216.0
<i>Cash outflow</i>										
Capital Expenditure	1251.0	1404.2	1118.8	1255.9	1262.9	1417.6	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	185.9	185.9	352.1	352.1	539.7	539.7	539.7
Working Capital	0.0	0.0	0.0	167.2	-1.8	-50.0	-115.4	0.0	0.0	0.0
Total cash outflow	1251.0	1404.2	1118.8	1609.0	1447.0	1719.6	236.7	539.7	539.7	539.7
Net Cash generation	0.0	49.8	-86.5	-553.1	-699.6	-781.0	-726.0	-740.4	-613.5	-323.8
Opening Balance of Cash and Bank Balance	0.0	0.0	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8

<i>Closing Balance of Cash and Bank Balance</i>	0.0	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8
Equity Infusion	0.0	0.0	86.5	553.1	699.6	781.0	726.0	740.4	613.5	323.8

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
<i>Cash inflow</i>										
PAT	310.0	437.1	899.1	1152.5	1146.2	1362.9	910.3	880.3	1058.9	1021.1
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	402.7	529.8	991.8	1245.2	1238.9	1455.6	1003.0	973.0	1151.6	1113.8
<i>Cash outflow</i>										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	539.7	539.7	539.7	353.9	353.9	187.6	187.6	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	539.7	539.7	539.7	353.9	353.9	187.6	187.6	0.0	0.0	0.0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Net Cash generation	-137.0	-9.9	452.1	891.3	885.0	1268.0	815.4	973.0	1151.6	1113.8
<i>Opening Balance of Cash and Bank Balance</i>	49.8	49.8	49.8	501.9	1393.2	2278.2	3546.2	4361.6	5334.6	6486.3
<i>Closing Balance of Cash and Bank Balance</i>	49.8	49.8	501.9	1393.2	2278.2	3546.2	4361.6	5334.6	6486.3	7600.1
Equity Infusion	137.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash inflow										
PAT	982.5	1185.7	1143.5	1099.5	1332.1	1283.4	1233.4	1496.6	1442.6	1384.4
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1075.2	1278.4	1236.2	1192.3	1424.8	1376.1	1326.1	1589.3	1535.4	1477.2
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	1075.2	1278.4	1236.2	1192.3	1424.8	1376.1	1326.1	1589.3	1535.4	1477.2
Opening Balance of Cash and Bank Balance	7600.1	8675.3	9953.8	11190.0	12382.3	13807.0	15183.2	16509.3	18098.6	19634.0
Closing Balance of Cash and Bank Balance	8675.3	9953.8	11190.0	12382.3	13807.0	15183.2	16509.3	18098.6	19634.0	21111.2
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash inflow										
PAT	1682.9	1620.1	1555.0	1892.3	1819.8	1743.8	2128.4	2043.3	1955.6	2389.9
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1775.7	1712.8	1647.7	1985.0	1912.6	1836.6	2221.1	2136.1	2048.3	2482.7

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	1775.7	1712.8	1647.7	1985.0	1912.6	1836.6	2221.1	2136.1	2048.3	2482.7
Opening Balance of Cash and Bank Balance	21111.2	22886.8	24599.6	26247.3	28232.4	30144.9	31981.5	34202.6	36338.7	38387.0
Closing Balance of Cash and Bank Balance	22886.8	24599.6	26247.3	28232.4	30144.9	31981.5	34202.6	36338.7	38387.0	40869.7
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Cash inflow										
PAT	2294.6	2191.5	2683.7	2571.9	2456.0	3011.8	2882.5	2746.7	3380.6	3228.4
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	2387.3	2284.3	2776.4	2664.6	2548.7	3104.6	2975.2	2839.4	3473.3	3321.2
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	2387.3	2284.3	2776.4	2664.6	2548.7	3104.6	2975.2	2839.4	3473.3	3321.2
Opening Balance of Cash and Bank Balance	40869.7	43257.0	45541.3	48317.7	50982.3	53531.0	56635.6	59610.8	62450.2	65923.5
Closing Balance of Cash and Bank Balance	43257.0	45541.3	48317.7	50982.3	53531.0	56635.6	59610.8	62450.2	65923.5	69244.7
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Base Scenario Cash Flow Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cash inflow										
PAT	-193.3	51.1	-40.2	-192.6	-252.4	-59.6	49.0	256.4	278.6	666.7
Depreciation	0.0	0.0	0.0	61.7	77.2	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	375.3	421.3	335.6	376.8	378.9	425.3	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	193.3	48.3	53.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	875.7	982.9	783.2	879.1	884.0	992.3	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1251.0	1503.6	1131.8	1125.0	1087.8	1450.7	141.8	349.1	371.3	759.4
Cash outflow										
Capital Expenditure	1251.0	1404.2	1118.8	1255.9	1262.9	1417.6	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	185.9	185.9	352.1	352.1	539.7	539.7	539.7
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	1251.0	1404.2	1118.8	1441.8	1448.8	1769.7	352.1	539.7	539.7	539.7
Net Cash generation	0.0	99.4	13.0	-316.8	-361.0	-319.0	-210.3	-190.6	-168.4	219.7
Opening Balance of Cash and Bank Balance	0.0	0.0	99.4	112.4	112.4	112.4	112.4	112.4	112.4	112.4
Closing Balance of Cash and Bank Balance	0.0	99.4	112.4	112.4	112.4	112.4	112.4	112.4	112.4	332.1

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Equity Infusion	0.0	0.0	0.0	316.8	361.0	319.0	210.3	190.6	168.4	0.0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Cash inflow										
PAT	856.5	874.5	1147.8	1037.7	875.4	932.4	910.3	880.3	1058.9	1021.1
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	949.3	967.3	1240.5	1130.5	968.1	1025.2	1003.0	973.0	1151.6	1113.8
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	539.7	539.7	539.7	353.9	353.9	187.6	187.6	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	539.7	539.7	539.7	353.9	353.9	187.6	187.6	0.0	0.0	0.0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Net Cash generation	409.6	427.5	700.8	776.6	614.3	837.5	815.4	973.0	1151.6	1113.8
<i>Opening Balance of Cash and Bank Balance</i>	332.1	741.6	1169.2	1870.0	2646.6	3260.9	4098.4	4913.8	5886.8	7038.5
<i>Closing Balance of Cash and Bank Balance</i>	741.6	1169.2	1870.0	2646.6	3260.9	4098.4	4913.8	5886.8	7038.5	8152.3
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash inflow										
PAT	982.5	1185.7	1143.5	1099.5	1332.1	1283.4	1233.4	1496.6	1442.6	1384.4
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1075.2	1278.4	1236.2	1192.3	1424.8	1376.1	1326.1	1589.3	1535.4	1477.2
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	1075.2	1278.4	1236.2	1192.3	1424.8	1376.1	1326.1	1589.3	1535.4	1477.2
Opening Balance of Cash and Bank Balance	8152.3	9227.5	10505.9	11742.2	12934.4	14359.2	15735.4	17061.5	18650.8	20186.2
Closing Balance of Cash and Bank Balance	9227.5	10505.9	11742.2	12934.4	14359.2	15735.4	17061.5	18650.8	20186.2	21663.3
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash inflow										
PAT	1682.9	1620.1	1555.0	1892.3	1819.8	1743.8	2128.4	2043.3	1955.6	2389.9
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1775.7	1712.8	1647.7	1985.0	1912.6	1836.6	2221.1	2136.1	2048.3	2482.7

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	1775.7	1712.8	1647.7	1985.0	1912.6	1836.6	2221.1	2136.1	2048.3	2482.7
Opening Balance of Cash and Bank Balance	21663.3	23439.0	25151.8	26799.5	28784.5	30697.1	32533.7	34754.8	36890.9	38939.2
Closing Balance of Cash and Bank Balance	23439.0	25151.8	26799.5	28784.5	30697.1	32533.7	34754.8	36890.9	38939.2	41421.9
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Cash inflow										
PAT	2294.6	2191.5	2683.7	2571.9	2456.0	3011.8	2882.5	2746.7	3380.6	3228.4
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	2387.3	2284.3	2776.4	2664.6	2548.7	3104.6	2975.2	2839.4	3473.3	3321.2
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	2387.3	2284.3	2776.4	2664.6	2548.7	3104.6	2975.2	2839.4	3473.3	3321.2
Opening Balance of Cash and Bank Balance	41421.9	43809.2	46093.5	48869.9	51534.5	54083.2	57187.8	60163.0	63002.4	66475.7
Closing Balance of Cash and Bank Balance	43809.2	46093.5	48869.9	51534.5	54083.2	57187.8	60163.0	63002.4	66475.7	69796.8
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Aggressive Scenario Cash Flow Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cash inflow										

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
PAT	-193.3	74.8	6.9	-53.1	-19.4	128.7	369.8	566.4	588.8	836.9
Depreciation	0.0	0.0	0.0	61.7	77.2	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	375.3	421.3	335.6	376.8	378.9	425.3	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	193.3	49.5	55.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	875.7	982.9	783.2	879.1	884.0	992.3	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1251.0	1528.5	1181.4	1264.5	1320.7	1639.0	462.5	659.2	681.6	929.6
Cash outflow										
Capital Expenditure	1251.0	1404.2	1118.8	1255.9	1262.9	1417.6	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	185.9	185.9	352.1	352.1	539.7	539.7	539.7
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	1251.0	1404.2	1118.8	1441.8	1448.8	1769.7	352.1	539.7	539.7	539.7
Net Cash generation	0.0	124.3	62.6	-177.3	-128.1	-130.7	110.4	119.5	141.8	389.9
Opening Balance of Cash and Bank Balance	0.0	0.0	124.3	186.9	186.9	186.9	186.9	297.3	416.8	558.6
Closing Balance of Cash and Bank Balance	0.0	124.3	186.9	186.9	186.9	186.9	297.3	416.8	558.6	948.5

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Equity Infusion	0.0	0.0	0.0	177.3	128.1	130.7	0.0	0.0	0.0	0.0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Cash inflow										
PAT	856.5	874.5	1147.8	1037.7	875.4	932.4	910.3	880.3	1058.9	1021.1
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	949.3	967.3	1240.5	1130.5	968.1	1025.2	1003.0	973.0	1151.6	1113.8
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	539.7	539.7	539.7	353.9	353.9	187.6	187.6	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	539.7	539.7	539.7	353.9	353.9	187.6	187.6	0.0	0.0	0.0
Net Cash generation	409.6	427.5	700.8	776.6	614.3	837.5	815.4	973.0	1151.6	1113.8

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Opening Balance of Cash and Bank Balance	948.5	1358.0	1785.6	2486.4	3263.0	3877.2	4714.8	5530.2	6503.2	7654.9
Closing Balance of Cash and Bank Balance	1358.0	1785.6	2486.4	3263.0	3877.2	4714.8	5530.2	6503.2	7654.9	8768.7
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash inflow										
PAT	982.5	1185.7	1143.5	1099.5	1332.1	1283.4	1233.4	1496.6	1442.6	1384.4
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1075.2	1278.4	1236.2	1192.3	1424.8	1376.1	1326.1	1589.3	1535.4	1477.2
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	1075.2	1278.4	1236.2	1192.3	1424.8	1376.1	1326.1	1589.3	1535.4	1477.2
Opening Balance of Cash and Bank Balance	8768.7	9843.9	11122.3	12358.6	13550.8	14975.6	16351.7	17677.9	19267.2	20802.6
Closing Balance of Cash and Bank Balance	9843.9	11122.3	12358.6	13550.8	14975.6	16351.7	17677.9	19267.2	20802.6	22279.7
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash inflow										
PAT	1682.9	1620.1	1555.0	1892.3	1819.8	1743.8	2128.4	2043.3	1955.6	2389.9
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	1775.7	1712.8	1647.7	1985.0	1912.6	1836.6	2221.1	2136.1	2048.3	2482.7
Cash outflow										

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	1775.7	1712.8	1647.7	1985.0	1912.6	1836.6	2221.1	2136.1	2048.3	2482.7
Opening Balance of Cash and Bank Balance	22279.7	24055.4	25768.2	27415.9	29400.9	31313.5	33150.1	35371.2	37507.3	39555.6
Closing Balance of Cash and Bank Balance	24055.4	25768.2	27415.9	29400.9	31313.5	33150.1	35371.2	37507.3	39555.6	42038.3
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Cash inflow										
PAT	2294.6	2191.5	2683.7	2571.9	2456.0	3011.8	2882.5	2746.7	3380.6	3228.4
Depreciation	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
Grant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equity infused to meet pre-operating expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Working Capital Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	2387.3	2284.3	2776.4	2664.6	2548.7	3104.6	2975.2	2839.4	3473.3	3321.2
Cash outflow										
Capital Expenditure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash generation	2387.3	2284.3	2776.4	2664.6	2548.7	3104.6	2975.2	2839.4	3473.3	3321.2
Opening Balance of Cash and Bank Balance	42038.3	44425.6	46709.8	49486.3	52150.9	54699.6	57804.2	60779.4	63618.8	67092.1
Closing Balance of Cash and Bank Balance	44425.6	46709.8	49486.3	52150.9	54699.6	57804.2	60779.4	63618.8	67092.1	70413.2
Equity Infusion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

15.20. Annexure 20 – BOQ and Rationale for Project Cost

Cost Abstract					
Roads					
Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Earth work excavation / by mechanical means (Hydraulic Excavator)/ manual means in trenches and over areas for foundations of columns, walls, rafts, beams, steps etc., in all types of soil except hard rock requiring chiseling, blasting but including Existing building foundation dismantling, shoring, strutting, de-watering, refilling in foundations, plinth etc., wherever necessary in layers not exceeding 15cm with approved excavated soil, including watering and compaction etc., Surplus / rejected excavated material shall be disposed off to the contractor's own dump yard outside the work site or as per the requirements of local authorities or as directed by the Engineer-in-charge. - All kinds of soil	Cum	77393	279.00	21,592,775.30	21.59
Supplying and filling in basement with good quality earth and compacting in layers including all materials and labours as required for satisfactory completion of work and as directed.	Cum	6593.79	1768.00	11,657,820.70	11.66
Construction of granular sub-base by providing close graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401 of MORT & H For Grading-11 Material	Cum	24440	6738.00	164,676,989.50	164.68
Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density, Material [Table 400-11] Clause: 406 of MORT & H	Cum	40733	5715.00	232,791,381.00	232.79
Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base of low porosity such as WBM and WMM including including clearing of road surface and spraying primer at the rate of 1.05 kg/sqm using mechanical means. (Bitumen Emulsion = 1.05 kgsqmt.)	Sqm	162934	82.00	13,360,555.20	13.36
Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.4 kg per sqm on the prepared on granular surface cleaned with mechanical broom such as WBM and WMM surfaces treated with primer and dry and bituminous surface as per MORT&H specification clause No.503 complete in all respects.	Sqm	162934	31.00	5,050,941.60	5.05
Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.25 kg per sqm on the prepared on normal bituminous surface cleaned with mechanical broom. (Bitumen Emulsion = 0.25 kg/sqmt.)	Sqm	157762	20.00	3,155,240.00	3.16
Providing and laying bituminous macadam 50mm thick with 40-60 TPH hot mix plant using cum crushed aggregates of specified grading premixed with bituminous binder, transported to site, laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction (Bitumen Emulsion = 0.0724 ton/cum, Metal = 1.415).	Cum	0	11629.00	-	0.00
Providing and laying dense graded bituminous macadam 60-75mm thick with 40-60 TPH HMPusing crushed aggregates of specified grading, premixed with bituminous binder @ 4.25 percent by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRTH specification clause No.507 complete in all respects. (Bitumen = 0.0981 Metal = 1.401).	Cum	7888	13848.00	109,234,408.80	109.23
Providing and laying Semi dense bituminous concrete using crushed aggregates of specified grading, premixed with bituminous binder @ 5.00 per cent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MDRT & H specification clause No.509 complete in all respects (Bitumen = 0.109 Metal = 1.36, Cement 0.0469)	Cum	3944	11113.50	43,832,199.70	43.83
Providing and fixing Pre cast solid concrete kerb stones made out of CC 1 :1.5:3 of size 450 x 200 x 400 mm and finished with CM 1 :3 plastering and finishing cutting etc., complete.	Rm	51716	692.00	35,787,472.00	35.79
Total Cost in Million Taka					641.14

Cost Abstract

Foot Path & Road culvert

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Earth work excavation / by mechanical means (Hydraulic Excavator)/ manual means in trenches and over areas for foundations of columns, walls, rafts, beams, steps etc., in all types of soil except hard rock requiring chiseling, blasting but including Existing building foundation dismantling, shoring, strutting, de-watering, refilling in foundations, plinth etc., wherever necessary in layers not exceeding 15cm with approved excavated soil, including watering and compaction etc., Surplus / rejected excavated material shall be disposed off to the contractor's own dump yard outside the work site or as per the requirements of local authorities or as directed by the Engineer-in-charge. - All kinds of soil	Cum	3682	279.00	1,027,145.48	1.03
Supplying and filling in basement with good quality earth and compacting in layers including all materials and labours as required for satisfactory completion of work and and as directed.	Cum	3681.53	1768.00	6,508,936.20	6.51
Providing and laying in position plain cement concrete of mix 1:4:8 using 40mm and down size graded granite metal, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation and plinth, including cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	1477	8092.00	11,954,898.27	11.95
Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centring, shuttering, finishing and reinforcement - All work upto plinth level : 1:1.5:3 (1 cement: 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	Cum	9159	7982.00	73,106,938.45	73.11
Providing H.Y.S.D steel (Cold, Twisted) /TMT reinforcement for RCC work including straightening, cutting, bending, hooking, placing in position, lapping and /or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) including cost of materials, binding wire, labour, HOM of machinery complete as per specifications. - upto floor VIII level. Grade Fe500	MT	1078	77000.00	82,990,369.00	82.99
Providing and fixing at site precast cement concrete M15 grade kerb, 450mm wide and 10 cms thick using 20mm and down granite metal including cost of materials, labour, curing complete as per specifications.	Sqm	24544	1607.00	39,441,404.50	39.44
Providing and laying heavy duty cobble stones 60mm thick interlock pavers, using cement and course sand for manufacture of blocks of approved size, shape and colour with a minimum compressive strength of 281 kg per sqm over 50mm thick sand bed (average thickness) and compacting with plate vibrator having 3 tons compaction force thereby forcing part of sand underneath to come up in between joints, final compaction of paver surface joints into its final level, including cost of materials, labour and HOM of machineries complete as per specifications.	Sqm	24544	1252.00	30,728,462.00	30.73
Total Cost in Million Taka					245.76

Cost Abstract
Drains, Culverts

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Earth work excavation / by mechanical means (Hydraulic Excavator)/ manual means in trenches and over areas for foundations of columns, walls, rafts, beams, steps etc., in all types of soil except hard rock requiring chiseling, blasting but including Existing building foundation dismantling, shoring, strutting, de-watering, refilling in foundations, plinth etc., wherever necessary in layers not exceeding 15cm with approved excavated soil, including watering and compaction etc., Surplus / rejected excavated material shall be disposed off to the contractor's own dump yard outside the work site or as per the requirements of local authorities or as directed by the Engineer-in-charge. - All kinds of soil	Cum	17412.26	279.00	4858021.91	4.86
Providing and laying in position plain cement concrete of mix 1:4:8 using 40mm and down size graded granite metal, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation and plinth, including cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	3048.50	8092.00	24668492.21	24.67
Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centring, shuttering, finishing and reinforcement - All work upto plinth level : 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	763.92	11868.00	9066197.81	9.07
Providing H.Y.S.D steel (Cold, Twisted) /TMT reinforcement for RCC work including straightening, cutting, bending, hooking, placing in position, lapping and /or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) including cost of materials, binding wire, labour, HOM of machinery complete as per specifications. - upto floor VIII level. Grade Fe500	MT	13.84	77000.00	1065660.75	1.07
Brick work with common burnt clay bricks of class designation 35 conforming IS : 2222 in exposed brick work including making horizontal and vertical grooves 10mm wide 12 mm deep complete in cement mortar 1:6 (1 cement : 6 coarse sand).	Cum	5024.91	6636.00	33345286.30	33.35
Providing and laying coping and Screed concrete with 1 :2:4 cement concrete, 40 mm thick Sqm 150.09 using broken granite metal of 20mm and down size laid to line and level in one layer and finish with a floating coat of neat cement, including cost of materials, labour, curing, complete as per specifications.	Sqm	11759.90	296.00	3480930.40	3.48
Providing 12mm thick cement plaster in single coat with cement mortar 1 :4, to brick masonry including rounding off corners wherever required smooth rendering, : Providing and removing scaffolding, including cost of materials, labour, curing complete as per specifications.	Sqm	28959.44	109.00	3156578.81	3.16
Providing Weep holes using 75mm dia PVC pipes for abutments, wing walls, return walls and drain as per drawings and specification including cost of material, labour, complete as per specifications.	Nos	7086.00	187.00	1325082.00	1.33
Providing and laying non pressure NP 2 class (light duty) RCC pipes with collars jointed with stiff mixture of the cement mortar..etc					
300mm dia RCC pipe	Rm	80.00	495.00	39600.00	0.04
500mm dia RCC pipe	Rm	280.00	880.00	246400.00	0.25
Providing, stone pitching on slopes using stone of approved size and packing with quarry spalls as per drawings including cost of materials, labour, complete as per specifications.	Sqm	7889.61	743.00	5861978.35	5.86
Total Cost in Million Taka					87.11

Cost Abstract						
Water supply						
Sl.No	Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
1	Excavating trenches of required width for pipes, cables, etc including excavation for sockets and dressing of sides, ramming of bottoms, depth upto 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating etc : Pipes,cables etc.exceeding 80mm dia but not exceeding 300mm dia	Cum	24117.72	325.00	7838259.07	7.84
2	Supplying and filling with river sand including watering,ramming consolidating and dressing complete.	Cum	2013.48	1715.00	3453111.34	3.45
e)	PN - 10 110mm dia pipe	Rm	16161	1230.00	19878030.00	19.88
g)	PN - 10 160mm dia pipe	Rm	1293	1314.00	1699002.00	1.70
h)	PN - 10 200mm dia pipe	Rm	1293	1700.40	2198617.20	2.20
i)	Providing and laying SS Scentrifugally cast (spun) / Ductile iron 250mm dia pipes (classK7)	0	1293	5304.00	6858072.00	6.86
j)	Providing and laying SS Scentrifugally cast (spun)/ Ductile iron 300mm dia pipes (classK7)	Rm	1293	10123.00	13089039.00	13.09
k)	Providing and laying SS Scentrifugally cast (spun)/ Ductile iron 350mm dia pipes (classK7)	Rm	646	11736.00	7581456.00	7.58
l)	Providing and laying SS Scentrifugally (spun) / Ductile iron 400mm dia pipes (classK7)	Rm	646	13818.00	8926428.00	8.93
m)	Providing and laying SS Scentrifugally Ductile (spun) iron 450mm dia pipes (Class k7)	Rm	646	16037.00	10359902.00	10.36
n)	Providing and laying SS Scentrifugally Ductile (spun) iron 500mm dia pipes (Class k7)	Rm	646	17233.00	11132518.00	11.13
o)	Providing and laying SS Scentrifugally Ductile (spun) iron 600mm dia pipes (Class k7)	Rm	646	20101.00	12985246.00	12.99
	PN - 16 110mm Butterfly valve	Each	7.00	17074.80	119523.60	0.12
	PN - 16 160mm Butterfly valve	Each	1.00	21513.60	21513.60	0.02
	PN - 16 200mm Butterfly valve	Each	1.00	44820.00	44820.00	0.04
	250mm dia Butterfly valve - Ductile iron	Each	1.00	57967.20	57967.20	0.06
	300mm dia Butterfly valve - Ductile iron	Each	1.00	79480.80	79480.80	0.08
	350mm dia Butterfly valve - Ductile iron	Each	1.00	122508.00	122508.00	0.12
	400mm dia Butterfly valve - Ductile iron	Each	1.00	236052.00	236052.00	0.24
	450mm dia Butterfly valve - Ductile iron	Each	1.00	246840.00	246840.00	0.25
	500mm dia Butterfly valve - Ductile iron	Each	1.00	264000.00	264000.00	0.26
	PN - 16 110mm Air valve	Each	28	40338.00	1129464.00	1.13
	PN - 16 160mm Air valve	Each	1.00	40836.00	40836.00	0.04
	PN - 16 200mm Air valve	Each	1.00	41035.20	41035.20	0.04
	250mm dia Air valve - Ductile iron	Each	1	42240.00	42240.00	0.04
	300mm dia Air valve - Ductile iron	Each	1	42480.00	42480.00	0.04
	350mm dia Air valve - Ductile iron	Each	1.00	43320.00	43320.00	0.04
	400mm dia Air valve - Ductile iron	Each	1.00	45240.00	45240.00	0.05
	450mm dia Air valve - Ductile iron	Each	1.00	46068.00	46068.00	0.05
	500mm dia Air valve - Ductile iron	Each	1	47160.00	47160.00	0.05
	PN - 16 110mm Gate valve	Each	17.00	8605.20	146288.40	0.15
	PN - 16 160mm Gate valve	Each	2.00	9852.00	19704.00	0.02
	PN - 16 200mm Gate valve	Each	2.00	10806.00	21612.00	0.02
	250mm dia Gate valve - Ductile iron	Each	2	14760.00	29520.00	0.03
	300mm dia Gate valve - Ductile iron	Each	2.00	17400.00	34800.00	0.03
	350mm dia Gate valve - Ductile iron	Each	1	18000.00	18000.00	0.02
	400mm dia Gate valve - Ductile iron	Each	1.00	24000.00	24000.00	0.02
	450mm dia Gate valve - Ductile iron	Each	1.00	28800.00	28800.00	0.03
	500mm dia Gate valve - Ductile iron	Each	1.00	32400.00	32400.00	0.03
7	Constructing masonry chamber 120x120x100cm inside,in brickwork in cement mortar 1:4 for sluice valve with CI surface box 100mm top diameter, 160mm bottom diameter and 180mm deep inside with chain lid and RCC top slab 1:2:4 mix including necessary excavation, foundation .. etc	Each	17.00	2000.00	34000.00	0.03
8	Constructing masonry chamber 90x90x100cm inside,in brickwork in cement mortar 1:4 for sluice valve with CI surface box 100mm top diameter, 160mm bottom diameter and 180mm deep inside with chain lid and RCC top slab 1:2:4 mix including necessary excavation, foundation .. etc	Each	32.00	1800.00	57600.00	0.06
9	Constructing masonry chamber 60x60x75cm inside,in brickwork in cement mortar 1:4 for sluice valve with CI surface box 100mm top diameter, 160mm bottom diameter and 180mm deep inside with chain lid and RCC top slab 1:2:4 mix including necessary excavation, foundation .. etc	Each	38.00	1600.00	60800.00	0.06
	Total Cost in Million Taka					110.82

Cost Abstract for OHT, Sump and Pumps

Cost Abstract	Unit	Qty.	Rate in Taka	Amount in Taka	Amount in Million Taka
Sump - Potable - Processing	Lit	1.2E+07	15.00	175,755,000.00	175.76
OHT - Potable - Processing	Lit	976000	19.00	18,544,000.00	18.54
Potable water pump - Processing	nos	3.00	1218182.00	3,654,546.00	3.65
Pump house for potable water-Processing	Sqm	60	18182.00	1,090,920.00	1.09
Sump - Non Potable - Processing	Lit	851000	15.00	12,765,000.00	12.77
OHT - Non Potable - Processing	Lit	51000	19.00	969,000.00	0.97
Non Potable water pump - Processing	nos	3.00	54546.00	163,638.00	0.16
				212,942,104.00	212.94
Sump - Potable - Non Processing	Lit	4300000	15.00	64,500,000.00	64.50
OHT - Potable - Non Processing	Lit	358000	19.00	6,802,000.00	6.80
Potable water pump - Non processing	nos	3.00	436364.00	1,309,092.00	1.31
Pump house for potable water - Non processing	sqm	15	18182.00	272,730.00	0.27
Sump - Non Potable - Non Processing	Lit	1856000	15.00	27,840,000.00	27.84
OHT - Non Potable - Non Processing	Lit	154000	19.00	2,926,000.00	2.93
Non Potable water pump-Non Processing	nos	3.00	181819.00	545,457.00	0.55
				104,195,279.00	104.20
Water Treatment plant	MLD	16.02	9696970.00	155,316,312.17	155.32

Cost Abstract					
Sewer Network					
Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Excavating trenches of required width for pipes, cables, etc including excavation for sockets and dressing of sides, ramming of bottoms, depth upto 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating..etc : Pipes,cables etc.exceeding 80mm dia but not exceeding 300mm dia	Cum	42332.01	325.00	13757902.44	13.76
Constructing brickmasonry circular manhole 0.91m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 inside cement plaster 12mm thick in cement mortar 1:3 foundation concrete 1:3:6 mix and making ..etc	Each	142.00	2371.00	336682.00	0.34
Constructing brickmasonry circular manhole 1.22m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 inside cement plaster 12mm thick in cement mortar 1:3 foundation concrete 1:3:6 mix and making ..etc	Each	194.00	2534.00	491596.00	0.49
Constructing brickmasonry circular manhole 1.52m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 inside cement plaster 12mm thick in cement mortar 1:3 foundation concrete 1:3:6 mix and making ..etc	Each	96.00	2755.00	264480.00	0.26
Sewer pipe - RCC hume pipe 150mm dia	Rm	4267	795.60	3394825.20	3.39
Sewer pipe - RCC hume pipe 200mm dia	Rm	3232	1216.80	3932697.60	3.93
Sewer pipe - RCC hume pipe 250mm dia	Rm	2586	1456.00	3765216.00	3.77
Sewer pipe - RCC hume pipe 300mm dia	Rm	1293	1761.50	2277619.50	2.28
Sewer pipe - RCC hume pipe 450mm dia	Rm	646	2171.00	1402466.00	1.40
Sewer pipe - RCC hume pipe 500mm dia	Rm	388	2574.00	998712.00	1.00
Sewer pipe - RCC hume pipe 500mm dia	Each	309	3138.00	969642.00	0.97
					31.59

Cost Abstract					
Overhead Transmission Line					
Description	Unit	Qty	Rate in Rs.	Amount in Taka	Amount in Million Taka
Supply, Erection Testing, Commissioning of 33KV Single circuit transmission lines using ISMB200, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	1.24	1,364,097	1,691,480	1.69
Supply, Erection Testing, Commissioning of 33KV Double circuit transmission lines using ISMB200, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	2.48	2,346,261	5,818,726	5.82
Supply, Erection Testing, Commissioning of 11 KV Single circuit transmission lines using ISMB175, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	6.20	1,411,224	8,749,590	8.75
Supply, Erection Testing, Commissioning of 11 KV Double circuit transmission lines using ISMB175, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	4.65	2,230,198	10,370,419	10.37
Supply, Erection Testing, Commissioning of 415 V Single circuit transmission lines using ISMB175, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	3.10	1,427,473	4,425,165	4.43
Internal transmission line				31,055,380	31.06
Supply, Erection Testing, Commissioning of 11kV/415 V, 500kVA outdoor distribution Transformer along with earth pit, hardware accessories of adequate sizes including civil works along with necessary materials as required	Nos	54.00	1,333,333	72,000,000	72.00
Supply, Erection, Commissioning of four pole structure using ISMB 175, 'O' gauge copper conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	Nos	54.00	242,424	13,090,909	13.09
LT transmission transformer				85,090,909	85.09

Cost Abstract					
Street Light					
Description	Unit	Qty	Rate	Amount in Taka	Amount in Million Taka
Design, manufacture, testing and inspection at places of manufacturer, painting, supplying delivery at site, installation, final painting, testing and commissioning of 415 v street lighting feeder pillar panel suitable for outdoor installation, made up of CRCA sheets steel of thickness not less than 2 mm with a weather proof canopy of top, double door construction, IP 55 production, anti corrosive chemical resistant paint with 300 A switch fuse unit with 100 A fuses and 63 A TP Contactor in the incoming and 8 nos. 100 A switch fuse unit with 63 A fuses and adequate plate to terminate 3.5 x 185 sq. mm. cable as incomer and 8 Nos. 3.5 c x 35 sq.mm. cable as outgoing. 24 Hrs. timer for automatic switching ON/OFF as per pre-sets time cycle including concrete pedestal and associated civil works.	Nos.	3.00	155,000	465,000	0.47
Design, manufacture, testing and inspection at places of manufacturer, painting, supplying, delivery at site, installation, final painting, testing and commissioning of 415V EB incoming metering panel suitable for outdoor installation, made up of CRCA sheets steel of thickness not less than 2 mm with a weather proof canopy of top, double door construction, IP 55 production, anti corrosive chemical resistant paint with 3 nos. of 300 A porcelain cut-out, neutral link, locking facility with necessary interconnection as per local Electricity Board.	Nos.	1.00	31,000	31,000	0.03
Design, manufacture, testing and inspection at places of manufacturer, painting, with anti corrosive chemical resistant paint as per IS:157 of approved brand and supplying, delivery at site, installation, final painting, testing and commissioning of street lighting poles suitable for mounting 2 nos. street light fixture with total height of 9.0 Mtr. along with base plate, cross arm bracket & GI pipe sleeves for cable protection, earthing terminals, complete with painting. All civil works required such as excavation, concrete foundation, coping, removal of surplus earth etc.,	Nos.	448.00	21,902	9,811,872	9.81
Design, manufacture, testing and inspection at places of manufacturer, painting and supplying, delivery at site, installation, final painting, testing and commissioning of outdoor weather proof junction boxes with 10 A DP MCB per fixture and terminals for terminating two cables. Junction box will be suitable for looping in and out one incoming and 2 out going cables on strategic locations wherever required.	Nos.	448.00	2,067	925,867	0.93
Design, manufacture, testing and inspection at places of manufacturer, and supplying, delivery at site, unloading, storing, transporting directly to site or through transit stores as the case may be, installation, final painting, testing and commissioning of street lighting fixtures suitable for 250 W SON-T along with control gear, capacitor and 250 W SON-T lamps	Nos.	896.00	11,367	10,184,533	10.18
3½ x 185 Sq.mm. AYFY	Mtr	750.00	827	620,000	0.62
			-	-	-
3½ x 35 Sq.mm. AYFY	Mtr	16,742.00	238	3,979,015	3.98
			-	-	-
Supply, installation. Testing & Commissioning of cable and termination along with Single compression type brass cable glands, aluminium / copper cable end sockets etc. of following sizes of cables			-	-	-
3½ x 300 Sq.mm. AYFY	Nos	-	806	-	-
			-	-	-
3½ x 185 Sq.mm. AYFY	Nos.	6.00	620	3,720	0.00
			-	-	-
3½ x 35 Sq.mm. AYFY	Nos.	950.00	258	245,417	0.25
Supply, erection, testing and commissioning of High Mast Light system conforming to IS 875, 30 Mtr height with the following:-	Nos	2.00	1,033,333	2,066,667	2.07
Supply, Installation, Testing and Commissioning of Earthing station consisting of GI Pipe earth electrode, with suitable chemical back filling compound, brick masonry work for chamber 300 x 300 mm. CI cover, watering pipe, funnel and earthing conductor as per IS:3043. All civil works required such as excavation in all types of soils, rocks, PCC Earthing Chamber foundation, reinstatement and making good the surface to match original, removal of surplus earth etc. are included.	Nos.	6.00	5,167	31,000	0.03
Supply, Installation, Testing & Commissioning of 25 x 6 mm. Size hot dip G.I. Earthing strip , for feeder pillar panel / metering panel earth stations and in between two lengths of strips are included. All civil works required such as excavation in all types of soils, rocks, reinstatement and making good the surface to match original, removal of surplus earth etc. are included.	Mtr	200.00	103	20,667	0.02
Supply, installation, testing & commissioning of 150 mm dia. hume pipe across the road wherever cables are crossing the roads. All civil works required such as excavation in all types of soils, rocks, bitumen road, WBM layers, reinstatement and making good the surface to match original, removal and disposal of surplus earth etc. are included.	Mtr	129.00	362	46,655	0.05
Supply, installation, Testing & Commissioning of Cable markers made of galvanised CI circular 100 mm. dia. with "LT CABLE" markers on same by 30 mm. size letter. The cable marked shall be firmly installed with 450 mm anchoring below ground level.	Nos.	335.00	362	121,158	0.12
Total				28,552,571	28.55

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