Executive Summary - Draft Pre-Feasibility Report

Mongla Economic Zone, Bangladesh

Bangladesh Economic Zones Authority (BEZA)
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1. Executive Summary

1.1. Introduction

The Government of Bangladesh has launched an effort to develop a new Economic Zone (EZ) paradigm for the country, with the objective of inclusive economic growth and job creation through development of industries.

As part of the Private Sector Development Support Project (PSDSP), supported by the World Bank, Mongla is the first site amongst the four sites identified under PSDSP to be developed on PPP basis. Mongla Economic Zone at Khulna Division is located in the south western part of Bangladesh. The site is spread over a land parcel of 205 acres and is 40 km from Khulna city, 105 km from Jessore airport and 230 km from the capital Dhaka.

1.1.1. Key objectives of this study are -

- Prioritize and specify the required physical investments;
- Undertake feasibility assessments including complete financial modelling
- Undertake environment and social impact assessment, incorporate environmental and social management considerations to manage safeguards and risks, and
- Provide technical engineering designs, master plan for the economic zone;

1.1.2. Overall Approach

To achieve the objectives of this study, a modular approach is proposed that relies on a comprehensive assessment of all relevant factors necessary for an informed decision about the feasibility of an economic zone at Mongla. The study starts by undertaking a commercial assessment to identify industrial sectors that may be set up at Mongla Economic zone. This assessment is further supported using environment & social impact assessment along with demand assessment for identified sectors. This demand assessment exercise resulted in identification of land requirement which is further used for master planning the area. Master planning exercise has provided the data used to generate CAPEX & OPEX that form the key inputs for the financial feasibility analysis for the proposed site.
EXECUTIVE SUMMARY

Overall Approach

- Survey respondents ranking
- Sectors identified by respondents
- Incentives sort by industry
- Bangladesh trend & Mongla/Khairlanji Region

Industry Identification for Mongla EZ

- Supply/Industry Analysis
- Export/Import Data
- M&A Transactions
- FDI Trends

Best Practice Master Plan
- State of the art infrastructure
  - Industrial, General, commercial, social, Connectivity
- Sustainability
  - Green cover, Rain water harvesting
- Development Rules & Regulations

Social Review
- Impacts & Mitigation Measures

Environment Review
- Impact & Mitigation

Demand Assessment
- Expected Land requirement/demand for Mongla EZ
- Industry Estimated Growth Rate
- Review of cost of FoPs, Policies – Bangladesh
- Probability of occurrence by experts

Industry experts ranking as obtained in survey

Bangladesh trend & Mongla/Khairlanji Region
1.2. Understanding Bangladesh’s Economic Landscape

1.2.1. Economic overview of Bangladesh

The Economy of Bangladesh was ranked as the 37th largest economy in the world by IMF in 2013. The GDP of Bangladesh has shown a consistent growth, registering a CAGR of around 6% since 1994.

The Bangladesh Perspective Plan 2021 sets forth the target of transforming Bangladesh into a middle-income economy. In order to achieve this target, the GDP is projected to follow a steep trajectory so as to achieve a growth rate of 10% by 2021.

However, trends indicate that investment has remained stagnant at around 25%–26% of GDP over the past several years. To meet the targets of the Sixth Five Year Plan (FY11-15), the rate needs to be raised to a 32%–33% range. The high growth agenda therefore makes greater fund mobilization through private sector participation imperative that can also facilitate employment generation and promote human resource development.

Trade and FDI Trends
Analysis of current foreign investment trends presents the attractiveness of various sectors for investment. Data shows manufacturing, trade and commerce have been the most lucrative sectors for foreign investment in the country. Manufacturing especially has been the highest grossing sector with an average share of more than 33% in past 5 years.

1.2.2. Factors driving Industrial Growth

Domestic Consumption Pattern- The volume of consumption in Bangladesh has steadily increased over the last decade. Higher domestic consumption indicates larger domestic markets.
for industrial growth. Final Consumption expenditure (% of GDP) was last measured at 82.4% in 2012, according to World Bank Final Consumption Expenditure Report.

Growing foreign Trade- Government has been pursuing an export led economic development strategy to stimulate export earnings. With initiation of economic reforms, the foreign trade of Bangladesh has registered sustainable growth over the past few years. In 2001-02, the total volume of foreign trade was US$ 14.53 billion which increased to US$ 67.17 billion in 2014, reflecting a 12 year CAGR of 14%.

Thrust on industrialization and increased responsiveness of institutional framework- Four corporations under the Ministry of Industries (MoI) have been tasked with implementing industrial development in key sectors of the country, viz.

1) Bangladesh Chemical Industries Corporation (BCIC),
2) Bangladesh Sugar and Food Industries Corporation (BSFIC),
3) Bangladesh Steel and Engineering Corporation (BSEC) and Bangladesh Small and Cottage Industries Corporation (BSCIC),

To drive private sector investment, the Board of Investment (BOI) has been established as the primary agency to assist and develop private sector industrial investment in the country.

Economic zone development has been identified by the Government as a key ingredient for driving industrialization in the country. The Industrial Policy 2010 has announced a large number of incentives to encourage investment including:

- Economic Zones can be set up by local or foreign entrepreneur, organization or institution on a PPP basis
- Economic Zones are entitled to avail special tax holiday, financial assistance and incentives
- Exemption of Double Tax on royalties, technical know-how fees
- Incentives to private sector power generation companies (IPP, ISP) according to the private sector power generation policy of Bangladesh
- Special facilities and venture capital support will be provided to EO industries under 32 thrust sectors identified by Government
- Special incentives for using biomass, solar and windmill based power
- Implementation of One District One Product (ODOP) policy will be taken into account in setting up industrial parks

Increasing domestic consumption pattern, rapid expansion of foreign trade, thrust on industrialization and increased responsiveness of institutional framework - Strategic shift from EPZ to EZ regime are factors driving Industrial Growth in Bangladesh

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1 Foreign Exchange Policy Department, Bangladesh Bank, CCI&E and EPB
Strategic shift from EPZ to EZ regime- Due to the new Economic Zone (EZ) regime, the Government expects more spill-overs to be harnessed by local firms from foreign direct investment, additional investments to be encouraged within value chains, more local produce to be procured and better linkages established between manufacturing firms and educational institutions.

1.3. Industry Assessment & Global Benchmarking

1.3.1. Industries Assessment

The identification of industrial sectors that may be set up at Mongla Economic Zone requires a multipronged approach that relies on existing strengths of the region, Bangladesh’s vision for development as well as performance of industrial sectors globally.

The methodology for industry identification for Mongla EZ is based on filtering mechanism as described in the figure below:

Global analysis includes an overview of top and emerging economic sectors world over and an Asia Pacific view that benchmarks Bangladesh with relevant Asian economies. The parameters that are evaluated for global sector analysis are –EXIM trade, FDI and M&A. This is followed by a parametric analysis of Bangladesh’s key industrial sectors /sub-sectors to identify target areas for focus. Parameters here include those pertaining to performance of the particular sector – Gross Value Added, Employment etc. As a next step, understanding of Mongla region, is mapped and used to identify particular sub-sectors for implementation at Mongla Economic Zone. The objective till these steps was to get an indication of which type of industries may be attracted to Mongla region. However, in order to reasonably understand and quantify the proposed industry for the Mongla site, a detailed bottom up approach has been undertaken that include conducting extensive primary interactions with potential tenants across the country.

1.3.2. Global Economic Review

To assess the performance of merchandise/manufacturing sectors, world over and understand the suitability of industries for Mongla EZ, three key parameters have been used –
Export/Import trends, FDI trends & M&A trends. The parameters selected are based on the strategic initiatives taken by Government of Bangladesh².

**Trade scenario**

Globally 20 economies dominate ~70% share of total trade in 2013. Over the past 10 years, Asia and the Pacific have gained a significantly larger share of world merchandise trade and are driven by the large economies in East and North-East Asia. In 2012, this region surpassed Europe to become world’s largest trading region with share of 37% in global exports and 36% in global imports. However Bangladesh’s rank in total trade dropped 14 positions from 21 in 2004 to 35 in 2013.

In terms of sectoral share within global merchandise trade, Fuels & mining products, Machinery and Auto & Auto equipment formed 50% of total exports’ share in 2013. In terms of growth potential, Fuels & mining products, Food processing, Pharma, Agriculture products, Chemicals and Textile industries have been observed to witness higher growth trends over the decade.

**FDI trends**

The sectorial composition of FDI in Greenfield projects and the share of sectors has remained consistent over the past 10 years, with automobile & transport equipment, chemical & petrochemical, electrical machinery, electronics, metallurgical industry, food processing, beverages & tobacco receiving the highest shares of FDI. Further the manufacturing sectorial break-up at Asia Pacific level indicates that Chemical and Chemical products, Metals and metal products, Electrical and electronics and Auto sectors are the highest contributors of Greenfield FDI in manufacturing sector.

On the other hand, FDI inflow in Bangladesh is majorly into Textiles and Pharma sector. It may however be noted that Bangladesh at 22% appears 7th among top 20 destinations with highest inward FDI rates of return in 2011. However, in terms of sectors, the FDI inflow is limited to Textiles and Pharma sectors only.

**Mergers and Acquisitions (M & A)**

Inorganic growth is one of the most widely used strategic tools for business expansions today. Since last two decades, liberalization and consequent globalization and privatization have

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² Trade and investment are essential components of economic growth of nations and this has been considered as the first parameter. Increase growth rate of GDP based on improved FDI Inflow has been one of the key investment source identified in Vision Plan 2021 for Bangladesh.
resulted into tough competition not only in Indian business but globally as well. Corporate restructuring has facilitated thousands of companies to re-establish their competitive advantage and respond more quickly and effectively to new opportunities and unexpected challenges. Accordingly, Merger & acquisition trends can provide insights on attractiveness of a sector for Bangladesh.

Services sector has been a key area of M&A activity historically as well as currently, with close to 49% of the deals happening in this sector in 2013. Manufacturing sector constituted 44% share of the M&A deals in 2013.

Non-metallic mineral products, Textiles, clothing & leather and Food, beverages & tobacco industry have shown tremendous CAGR among other sectors in M&A deals from 2003 to 2013.

The discussions above can be summarized to determine industrial sectors that need to be explored for implementation in the planned Mongla economic zone in line with the objective of successful industrial development of the region and Bangladesh’s overall vision and strengths.

**Parametric Analysis of Bangladesh’s Key Industrial sectors**

In terms of sectorial composition Textiles, Wearing Apparels, Leather, Food processing, Tobacco products, Basic metals, non-metallic mineral products are dominant in country. Each of these sectors hold more than 75% share in terms of GVA, Gross outlook, Exports and Investments in the manufacturing sector in the country in 2012.

<table>
<thead>
<tr>
<th>sector</th>
<th>No. of establishment</th>
<th>No. of people employed</th>
<th>Gross output( in Mil Tk)</th>
<th>GVA (in mil Tk)</th>
<th>Investments (In Mil Tk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>23562</td>
<td>42792</td>
<td>5,015,936</td>
<td>5,394,902</td>
<td>1562944</td>
</tr>
<tr>
<td>Food Processing</td>
<td>2%</td>
<td>21%</td>
<td>5%</td>
<td>12%</td>
<td>12%</td>
</tr>
</tbody>
</table>

At present five sectors viz. Textiles, Wearing Apparels, Food processing, Tobacco products, Basic metals, and non-metallic mineral products together constitute more than 75% of share of output, Gross Value Added (GVA) and Investment respectively.
1.3.3. Bangladesh Industry Vision - Strategic Initiatives

Global review of industrial sectors along with a review of Bangladesh’s strengths provides the base for prospective industries that can benefit Bangladesh; if suitably developed and given an impetus to. However, this leaves a scope for development of those industries which might not be Bangladesh’s traditional strengths but could be globally emerging with strong future potential. Besides, ensuring diversification of Bangladesh’s exports and manufacturing sector requires that the country’s overall vision of the country for its development is kept into perspective while shortlisting sectors for exploration at new economic zone developments. Accordingly, country’s
Perspective Plan 2021 that sets out Bangladesh’s overall vision along with targets in the industrial development space has been assessed.

The key emphasis of Bangladesh perspective plan 2021 hovers around increasing the share of manufacturing sector and in turn increasing the share of Industrial sector in terms of contribution to GDP from the current level of 29 % to 37% in the next 5-6 years.

Focus sectors for future industrial development include:

1. Thrust on sectors – such as toys, agro-processing, auto parts, electronics and light engineering beyond the traditional sectors such as Textiles, RMG and Leather etc.
2. Focus on SME based industrialization
3. As per industrial policy 2010, emerging sectors like ICT -based sectors, food, beverages, light engineering, high-end ready made garments, pharmaceuticals, ship-building and others will be given an extra impetus in terms of policy support and incentives
4. Liberalization of capital market
5. Added focus on Jute industry
6. Building a global market for some important non-traditional exports like footwear and leather products, light engineering products (bicycle and electronics), pharmaceuticals, ceramics, jute goods, ocean-going ships etc.
7. Increasing exports to China especially for labor intensive commodities like ready made garments, shoes, electrical goods, car parts, toys, kitchenware etc.
8. Development of ICT sector

Manufacturing sectors of food processing, leather and footwear, textile and clothing, pharmaceutical, ship building are likely to be the main growth generators. And production of auto parts, electronics and light engineering will be the emerging sectors and will play a significant role in exports.
1.3.4. **Shortlist of sectors for local level assessment**

The outcome based on Global and Bangladesh Country level analysis can be summarized to determine industrial sectors that need to be explored for implementation in the planned Mongla economic zone in line with the objective of successful industrial development of the region and Bangladesh’s overall vision and strengths.

<table>
<thead>
<tr>
<th>Exports</th>
<th>FDI</th>
<th>M&amp;A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels</td>
<td>Textiles, clothing and leather</td>
<td>Food Processing</td>
</tr>
<tr>
<td>Machinery</td>
<td>Motor vehicles and other transport equipment</td>
<td>Chemicals and chemical products</td>
</tr>
<tr>
<td>Chemicals</td>
<td>Chemicals and chemical products</td>
<td>Electrical and electronic equipment</td>
</tr>
<tr>
<td>Food Processing</td>
<td>Electrical and electronic equipment</td>
<td>Non-metallic mineral products</td>
</tr>
<tr>
<td>Transport equipment</td>
<td>Food Processing</td>
<td>Textiles, clothing and leather</td>
</tr>
<tr>
<td>Telecommunications equipment</td>
<td>Rubber and plastic products</td>
<td>Metals and metal products</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>Non-metallic mineral products</td>
<td>Pharmaceuticals</td>
</tr>
<tr>
<td>Manufactures</td>
<td>Machinery</td>
<td>Machinery</td>
</tr>
</tbody>
</table>

1.3.5. **Broad location assessment for Mongla /Khulna region**

This section assesses the Mongla Khulna region in terms of existing and proposed infrastructure, presence of strategic assets like Mongla port and other constraints at the site. The objective been to undertake a SWOT analysis of the location/region and assess the type of industries that may come to the location.

**Regional assessment of Khulna Division**

The average daily wage rate for industrial workers (both skilled and unskilled) in Khulna division is less than that at Chittagong and Dhaka division. The availability of cheap labour acts as a promoter of industrial growth primarily for the industries

Khulna has favourable demographics for establishing labour intensive industries. In terms of existing industry sectors, fish processing and jute industries are current strengths of Khulna region.
that are more labour intensive. In terms of industry sectors, food processing (fish processing) and jute industries are current strengths of Khulna region.

**Breakup of Industries at Mongla EPZ**

In order to boost up economic development, the government of Bangladesh has taken up many initiatives. Mongla EPZ is one such initiative by Bangladesh Export Processing Zones Authority (BEPZA) to attract foreign direct investments and facilitate industrialization in Mongla region. The major investment in Mongla EPZ comprises of Food Processing (44%), Textile (28%) and Leather contributing to more than 70% of the total investment share. Other industries such as Light Engineering Industry, IT & Hardware Industry contribute to 12% share each.

**Strategic advantage of Mongla Port**

The proposed site for Mongla economic zone shares close proximity (within 200 meters) with Mongla port, providing strategic advantage in terms of accessibility to various international markets for trade. The major export commodities, handled at Mongla port include jute, jute products, frozen food/shrimps, clay tiles and betel nuts. The frozen economic goods exports have been increased since 2002 and is estimated that majority of the entire shrimp exports has been conducted through Mongla, about 70% of which destined to Europe and the rest to the US.

Clinker is one of the major components of general imports at Mongla. For use by the local cement plants mostly, Clinker import has increased in last few years due to regional infrastructural development projects. Food grains, fertilizer, slag, fertilizer, Gas, Machineries and Motor Vehicles etc, are other major commodities handled at Mongla Port which together account for around 90% of total imports.

The potential of Mongla port has not yet been utilized as in the case of the Chittagong port. Government of Bangladesh is actively considering revitalizing the port to make it a national level port with comparable capacity/activity to the Chittagong port. Industries drawing these raw materials or finished products may find Mongla an attractive site for investment and development.
Infrastructure connectivity at the site

The proposed “Mongla Economic Zone” will be spread on 205 acre (83 hectare) of land. It is located near Mongla EPZ, under Bagerhat district. Its geographical coordinates are 22° 28’ 0” north and 89° 37’ 0” east. It is 105 kms from Jessore airport, 397 kms from Dhaka city and 664 kms from Chittagong port.

It is bounded by Upazila Rampaul in the north, Mongla EPZ on the south, the Mongla River in the east and the Pashur & Gona river/Mongla Port Authority on the west.

Mongla EZ stands on the river Mongla. Mongla port is the second biggest seaport of the country. The proposed EZ is under Burir Danga union. Mongla Town is at a distance of 1.7 km in southeast from the site (no road connectivity from N7). Mongla EPZ is abutting the site.

Access of Proposed Mongla EZ site to major transport modes

- The proposed site is located 50 meters from the Jessore – Khulna – Mongla Road
- Located within 200 meters of the Port of Mongla
- An unfinished Rampal airport is 22 km from the proposed site
- Jessore airport is 105 km from the proposed site

Access to Urban Hubs from the Proposed site

- Dhaka -379 km
- Jessore – 105 km
- Mongla – 15 km
- Khulna – 50 km
- Border of India – 145 km
- Port of Chittagong – 664 km

Existing On-Site Infrastructure

- No onsite infrastructure available.
- Power lines are laid adjacent to the site but no power is available.
- A new substation is required for the site.

Existing Off-site Infrastructure

- **Roads** – The site has no access to any public road. The site may be accessed via the Mongla EPZ.
- **Water** – No water is available, water for the EPZ is piped from Rampal. The ground water present is saline.
Feasibility study for Mongla Economic Zone
EXECUTIVE SUMMARY

- **Wastewater** – No wastewater treatment plant exists on the site
- **Drainage** – No drainage system exists at the site
- **Telecom** – Mobile telecom towers are available, further investigation is required for land lines
- **Power** - Power line to the EPZ is crossing the site on the western side which needs to be rerouted

**The details of the proposed development of the offsite infrastructure are delved in detail in the Master-plan section.**

**Constraints at the site**

In addition to the connectivity discussed above in relation to the port and the Khulna area in general, the existing constraints in the site have been identified and due consideration has been given while planning the developmental activities and formulating the master plan. The identified constraints are:

a. **Approach road** - The site does not have a proper approach. At present, the site is connected by a temporary road adjacent to the existing EPZ. This road may be utilised for the preliminary activities at the site till a proper and permanent approach is made available for the site.

b. **Power Pole with line** - Power line to the EPZ is crossing the site on the western side which needs to be rerouted.

c. **Site filling** - The soil type (up to 50ft depth) as per soil investigation report is of clay in nature and hence increase in foundation cost. The proposed site is already filled up with dredged material; hence increase in the cost is envisaged for road sub base and foundations

d. **Transmission network** - Presently there is no water Transmission network and is to be planned from Rampal

e. **High water table** - As the site is surrounded by rivers, the water table is high. This will pose difficulty in construction and accordingly needs to be incorporated in cost and time parameters by the developer.

f. **Salinity** - Ground water is saline and may pose difficulty during construction

g. **Availability of gas** - There is no availability of gas in the nearby vicinity. This needs to be planned by developer

**SWOT Analysis**

To understand and clearly identify key areas of strength and the competitive advantage of the proposed economic zone, a SWOT framework assessment is presented below. The objective of this section is to assess the type of industries that may come at the site, given the existing

BEZA is considering proposal to develop an approach road to the site from the Mongla port- road off Mongla-Khulna highway crossing the Ghona River before entering the site. Further, BEZA has also proposed to construct a connecting bridge across the Ghona River.
advantages, issues and threats. The analysis and understanding in this section has been further used for identification of suitable industries for the Mongla Economic Zone.

<table>
<thead>
<tr>
<th>Strength</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strong production of cash crops such as Jute, Cotton, Rice etc.</td>
<td>• Agro based and marine culture industry can flourish due to strong backward linkages</td>
</tr>
<tr>
<td>• Fishing is major activity in the region, hence availability of raw material</td>
<td>• Cost competitiveness to other Asian countries and even division</td>
</tr>
<tr>
<td>• Well-developed Inland water transport</td>
<td>• Well connected via various mode of transport like road, rail, water and proximity to cities like Khulna</td>
</tr>
<tr>
<td>• Upcoming Mongla Airport and construction of Padma Bridge at Mawa</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weakness</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Salinity of water, water intensive industry cannot flourish</td>
<td>• Region prone to flooding due to rivers such as Pasur</td>
</tr>
<tr>
<td>• Shortage of skilled labour</td>
<td>• Other natural disasters like cyclone, excessive rainfall</td>
</tr>
<tr>
<td>• Shortage of Power availability from Authority</td>
<td>• Competition from major industrial areas like Dhaka, Chittagong etc.</td>
</tr>
</tbody>
</table>

1.3.7. Preliminary indicative shortlist of sectors

Bangladesh level analysis through an assessment of its current strengths and vision for future highlights indicative sectors that include Food processing, Textiles and Garments, Light Engineering, Non-metallic products and Pharmaceuticals.

Collectively potential sectors for exploration at Mongla Economic Zone based on global analysis, Bangladesh analysis and Mongla locational strength are:

- Textiles
- Food Processing
- Pharma
- Electronics*
- Auto & Auto Components*
- Chemical and Petrochemicals
- Machinery*
- Non-metallic products

(* are classified under light engineering as per Bangladesh Standard Industrial Classification (BSIC code))

1.3.8. Assessment of Demand of land for industrial development in Mongla (2015 to 2035) – Top down approach based on historical trends

With the shortlisted sectors in place, next step in our assessment involved estimation of demand for land for industrial development in Mongla.
As a whole, Bangladesh and Khulna division has witnessed substantial increase in number of Industrial establishments, especially with the advent of increasing private sector participation in the region. Number of industrial establishments in Bangladesh increased from around 24000 in 2000 to around 35000 in 2006 and further to around 43000 in 2012. This indicates a CAGR of 4.7% over the twelve year period. A similar analysis for Khulna indicated a CAGR of 8.8% over the same period.

The number of establishments for next 20 years (2015-2035) was projected based on this past growth witnessed by Khulna (for the period 2015-20) and Bangladesh (period 2021-2035). Further these projected establishments were converted to land area demand based on the land area requirement for each of the establishments.

In order to arrive at land area per unit of industrial establishment three scenarios have been considered:

- **Scenario 1** – based upon Survey results analysis
- **Scenario 2** – based upon EPZ Land Utilization Trend
- **Scenario 3** – based upon Land Utilization at Mongla EPZ

Based upon the above mentioned scenarios three different cases were derived – pessimistic (Minimum land area/Unit.), Optimistic (Maximum land area/Unit) and base case to compare the manufacturing land demand scenario for Mongla with the proposed land for Mongla EZ:

<table>
<thead>
<tr>
<th>Pessimistic Case</th>
<th>Base Case</th>
<th>Optimistic Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.04</td>
<td>3.79</td>
<td>4.16</td>
</tr>
</tbody>
</table>

Demand for land is expected to be significantly higher than the current supply of land for organised industrial development in Mongla.

The number of establishment for Mongla has been derived in the proportion land area in Mongla as a percentage of land area in Khulna. The basic assumption has been that industrial development is expected to be uniform across Khulna division. This itself is a conservative assumption, given the fact, that industries (given a choice) would like to prefer Mongla relatively than any other region in Khulna, due to proximity of Mongla port and presence of an existing EPZ.

Demand for land is expected to be significantly higher than the current supply of land for organised industrial development in Mongla.

The above analysis gives the following land area demand under each of the scenarios:

<table>
<thead>
<tr>
<th>Period</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>49,068</td>
<td>61,640</td>
<td>77,433</td>
<td>97,273</td>
<td>1,22,195</td>
</tr>
<tr>
<td>Khulna</td>
<td>8320</td>
<td>12664</td>
<td>11700</td>
<td>14698</td>
<td>18464</td>
</tr>
<tr>
<td>Mongla</td>
<td>1577</td>
<td>2400</td>
<td>2218</td>
<td>2786</td>
<td>3500</td>
</tr>
</tbody>
</table>

**LAND DEMAND**

<table>
<thead>
<tr>
<th>Period</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongla EZ (Acre) Pessimistic</td>
<td>1,640</td>
<td>2,496</td>
<td>2,307</td>
<td>2,897</td>
<td>3,640</td>
</tr>
<tr>
<td>Mongla EZ (Acre) Base Case</td>
<td>5,977</td>
<td>9,098</td>
<td>8,405</td>
<td>10,559</td>
<td>13,264</td>
</tr>
</tbody>
</table>

3 The number of establishment for Mongla has been derived in the proportion land area in Mongla as a percentage of land area in Khulna. The basic assumption has been that industrial development is expected to be uniform across Khulna division. This itself is a conservative assumption, given the fact, that industries (given a choice) would like to prefer Mongla relatively than any other region in Khulna, due to proximity of Mongla port and presence of an existing EPZ.
In the pessimistic case, the land demand for industrial establishment is expected to increase from 1640 acres in 2015 to 3640 acres by 2035.

On the other hand, total supply of land for organised industrial development, after including around 128 acres of vacant land in Mongla EPZ and the proposed EZ aggregates to around 333 acres. Thus, the demand far exceeds the current supply in Mongla, thereby establishing a fundamental case for establishing the economic zone at Mongla.

The above outcome of the approach is further triangulated using primary research wherein a ground survey with 150 potential tenants was undertaken and inputs regarding their choice for Mongla, condition precedents for choosing Mongla, likelihood for a sector / sub sector that can come to Mongla, and area that these potential tenants may be willing to lease at Mongla has been assessed. Next section delves on the key findings of this primary bottom up analysis.

1.3.9. *Excerpts from the survey- Industry Identification*

In order to substantiate the analysis with the ground result, we conducted primary survey of various industry players in Bangladesh. The survey sample size was 150 respondents. The sample size was calculated based on a total population size of 43,077 (Industrial units in Bangladesh, SMIE 2012 data) and taking a 95% confidence level and 8% margin of error.
**Approach – Industry Identification & Land Demand Assessment**

**Steps**

1. Primary Interview (Through e-mails, telephonic & personal Interview)
   - Target sample size of 150 respondents
   - Collect information (through structured Questionnaire) on –
     - Respondent Profile
     - Interest in Mongla EZ
     - Survey: Respondents Ranking to rationale for As-Is interest
     - Industry Sub-sector ranking
     - Enablers/Incentives sort by investors
     - Target Investment size
   - Respondents Profile
   - As-Is interest of Respondent
   - Rankings to rationale for interest
   - Subsector Rankings
   - Incentives (policy push) sought by investors

2. Survey Analysis
   - Collate rankings given to subsectors (on scale of 1 to 10):
     - Determine Derived Ranking* (highest ranking given to any of subsector) of sectors
     - Determine probability of occurrence*
     - Identifying industries with PoO ≥ 65%
     - Listing of shortlisted industries
   - Ranking for Sectors
   - Probability of occurrence of Industry*
   - Shortlisted Industry
   - Finalization of product mix for Mongla EZ

*Probability of Occurrence (PoO) = \( \sum_{i=1}^{10} (\text{Ranking}_i \times \text{No. of Respondents}) / (\text{Total No. of Respondents})/10 \)
Approach – Industry Identification & Land Demand Assessment

Steps

3. Land Demand Assessment
   - Collating investment sizes proposed by investors (based upon interest shown for leasing land parcels)
     - Collating land demand sector-wise
     - Applying probability of occurrence of each sector to the proposed land size
     - Deriving land demand
   - Derived land demand for identified sectors
   - Proposed land demand for finalized industry mix for Mongla E2

4. Enablers/Incentives sought by investors, Analysis
   - Collate enablers/incentives sought by investors
     - Identify broad level of categories & subcategories for different incentives sought by investors
     - Capture incentives desired under those broad categories
     - Identifying gaps in current govt. initiatives vs desired
   - Highlight key incentives sought by investors
   - Facilitating in identifying immediate policy push required in order to maximize investor’s interest
   - Recommendation on enablers to optimize investors’ turnaround for Mongla

* Enablers/incentives sought by investors, whose As-Is status is either No/May-be
Survey Sample Overview

The participants in the survey belonged to diverse set of industries, as indicated in the figure below. Textiles, RMG and Leather sector form 40% of the total respondents. This breakup is also aligned with the industry breakup in the country, with Textile, RMG and Leather industry forming around 43% of the overall figure as per SMI 2012 data. The regional breakup indicated dominance from Dhaka region, followed by Khulna, Chittagong, and Narayanganj regions.

Interest in the Proposed Site at Mongla

One of the objectives of the survey was to assess the share of the respondents that are interested in Mongla EZ on an as-is condition and without any incentives. Only about 8% of respondents appear to be interested in the Mongla EZ (i.e. these respondents are not asking for any additional incentives or conditions to come to Mongla). Further, about 45% of the respondents were ambivalent about Mongla.

On the other hand, 47% of the respondents indicated their disinterest in Mongla under present conditions. In other words, respondents belonging to “May be” or “No” category have requested certain incentives for aligning with Mongla EZ and they might align with Mongla in case their demand are met. Given due competitiveness of Mongla with regions with Dhaka and Chittagong, this demand is understandable. It may be noted that BEZA has already started planning and implementing key development works in terms of offsite infrastructure that would further incentivise tenants to come to Mongla.
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As-Is interest of respondents to invest in Mongla EZ and breakup of the existing sectors of the respondents answering “Yes” or “may be”

Further we tried to understand the reasons for respondents for investing in region. We asked respondents to score the certain probable reasons from scale of 1-10. Proximity to Mongla port, low land price compared to regions of Dhaka and Chittagong, access to raw materials/local suppliers, availability of semi-skilled labour for labour intensive industries and proposed connectivity enhancement (Padma river bridge construction, up gradation of Mongla port) are few reasons that stand out for interests for respondents

Majority of the players with affirmative yes belonged to jute & jute products and fish processing sectors.

Key enablers included proximity to Mongla port, price of land, access to raw materials/suppliers and availability of cheap labour.

4 The most prevalent reason gets higher marks (maximum 10) and vice versa.
Reasons that are currently attractive to the industry players

At the same time, it is imperative to also understand, what had been the reasons concerns for Mongla site. The objective of this question was to understand the infrastructure related interventions that BEZA or the World Bank may need to undertake for the site to become attractive to majority of the players.

Non-availability of gas and electricity at lower rate, shipping services and lack of backward linkages are few concerns

Reasons that are leading to lack of interest among industry players

Target Incentives

The objective of this assessment is to provide recommendations for tailored incentives customized for Mongla EZ. This will facilitate immediate policy push required in order to optimally address the incentive requirement and maximize industry’s interest in the proposed economic zone.

In this, we tried to understand the desired incentives (from the perspective of policy changes) from the respondents who said either “No or May Be” (92% of total lot) primarily for investing in region. We asked the respondents about “the incentives that should be given to promote industrial development in Mongla and Khulna Region”. We captured their incentive requirements under categories of –

- Power (continuous source),
- Fiscal incentives,
- Infrastructure Development,
- Other Incentives
On analysis of survey results, it has been observed that ‘requirement of power (electricity and gas)’ is the most important rider to facilitate investment in Mongla EZ. The need of low-cost gas and electricity supply in the region is imperative for growth of industries. The need for better infrastructure facilities in the Mongla region is well emphasized in the survey results, with ‘infrastructure facility’ category ranking second and comprising of more than 25% of the total respondents. As a result of availability of quality infrastructure, industries get established with less capital investment and can function without obstacles. Under the category of ‘Fiscal Incentives’, a large number of respondents identified various sub-categories such as Tax Holiday, Provision of concession Loans and low lease rent as critical riders to promote industrial development in the EZ. Similarly, under ‘Other Incentives’, 46% of the respondents highlighted that the economic zone should develop one stop service solution centres to address multiple services under one roof. The category-wise split of responses as given by 150 respondents in the primary survey is provided below. It is seen that some of the sub-categories as highlighted under ‘Infrastructure Facility’, such as better road connectivity, better developed port facilities etc. have already been addressed by the government of Bangladesh.

**Power supply (electricity and gas both) and infrastructure facility (Dhaka connectivity and Mongla port facilities) are major enablers. Tax holidays, provision of concession loan, social infrastructure upgradation and skilled workforce being other enablers for investors. An immediate policy push is the need of the hour to optimally address the incentive requirement of the investors and maximize industry’s interest in the proposed economic zone.**
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As per the analysis, Energy intensive sectors like shipbuilding have emphasized on the need of power for establishment of such industries in the economic zone. Similarly, need for better infrastructure like better road-rail connectivity, improved inland water connectivity, need for...
availability of fresh water and better communication facilities is a rider for development of light engineering sector.

Industry identification and Proposed Product Mix

Respondents were asked to rate the potential sectors to be included in Mongla EZ based on the Factors of production (and their opinion) in the region on a scale of 1-10 (1 indicates low and 10 indicates high). These ratings were given for each of the sub-sector within the sectors. In other words, each participant was asked to assign a probability of likelihood of a particular sector aligning to Mongla EZ on a scale of 1 to 10. Based on the findings, the derived ranking for the sector was calculated. The derived ranking for the sector is the maximum for each of the sub-sector ranking given by respondents.

Finally, in order to shortlist the sectors for Mongla EZ, a sector with probability of occurrence ≥65% has been considered as a minimum threshold. It is imperative to note that majority of the respondents have demanded certain interventions in terms of physical infrastructure as well as policy based incentives as pre-conditions to assign the ranks. The probabilities calculated in this section should be looked in tandem with the demand for incentives by the industry.

Heat map on respondents ranking

<table>
<thead>
<tr>
<th>Sector</th>
<th>Respondents that (%) ranked &lt; 5</th>
<th>Respondents that (%) ranked 5-7</th>
<th>Respondents that (%) ranked 8-10</th>
<th>Weighted average (probability of occurrence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Processing</td>
<td>7%</td>
<td>23%</td>
<td>70%</td>
<td>81%</td>
</tr>
<tr>
<td>Light Engineering</td>
<td>14%</td>
<td>44%</td>
<td>42%</td>
<td>65%</td>
</tr>
<tr>
<td>Non-Metallic Minerals</td>
<td>19%</td>
<td>23%</td>
<td>58%</td>
<td>71%</td>
</tr>
<tr>
<td>Others</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>55%</td>
</tr>
<tr>
<td>Pharma</td>
<td>44%</td>
<td>32%</td>
<td>23%</td>
<td>50%</td>
</tr>
<tr>
<td>Ship Building</td>
<td>16%</td>
<td>20%</td>
<td>64%</td>
<td>73%</td>
</tr>
<tr>
<td>Textile &amp; RMG</td>
<td>11%</td>
<td>24%</td>
<td>65%</td>
<td>77%</td>
</tr>
</tbody>
</table>

Food processing, Textiles & RMG, Light Engineering, Shipbuilding and Non-metallic minerals emerges potential industries for the Mongla EZ

Arriving at Land Area Demand through bottom up analysis

As discussed above, most of the respondent had demanded certain incentives or infrastructure development at Mongla for them to align with the Mongla EZ. Accordingly, respondents were asked to choose a sector to invest considering all the incentives are
provided to industries and bottlenecks as highlighted by them are addressed. Under this condition, 102 respondents out of 150 reverted with affirmative along with the area that would like to lease in Mongla. The cumulative area for such tenants worked out to be 806 acres.

However, in order to estimate the land demand for Mongla, probability of each of these players aligning with Mongla was multiplied with these projections to arrive at the land area allocation of respective potential sectors in Mongla EZ. The result of this analysis is provided in the table below:

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Total Area as per respondents (Acre)</th>
<th>Area after incorporating the probability of the players coming to Mongla (Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Processing</td>
<td>141</td>
<td>113</td>
</tr>
<tr>
<td>Others</td>
<td>60</td>
<td>33</td>
</tr>
<tr>
<td>Pharma</td>
<td>107</td>
<td>53</td>
</tr>
<tr>
<td>Shipbuilding</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Textile</td>
<td>367</td>
<td>280</td>
</tr>
<tr>
<td>Light Engineering</td>
<td>96</td>
<td>63</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>806</strong></td>
<td><strong>568</strong></td>
</tr>
</tbody>
</table>

**Compatibility of industries in EZ**

Considering the positioning of the targeted sectors within the EZ area in a most optimum manner the following parameters shall be taken into consideration:

- The requirements of environmental considerations
- Micro climatic conditions
- Compatibility issues and Surrounding areas
- Buffer requirements
- Physical site features
- Accessibility
- Logistic requirements
- Functional requirements
- Safety

The pollution level in cement industry will vary depending upon the technology involved in the process. Cement dust is a potential phytotoxic pollutant in the vicinities of cement producing factories creating serious pollution problems. The discharge of cement factories generally consist of Particulate matter, Sulphur dioxide and Nitrogen oxides producing continuous visible clouds which ultimately settle on the surroundings as a result the whole ecosystem around the cement factory is subjected to extraordinary stress and abuse. The problem of environment with its impact is not only on the employees working in the plant but also the community in the neighbourhood of 5-10 km radius. Mainly the air pollution
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from cement industry will be disadvantageous to the food processing industries in the vicinity of 5-10 kms radius. Based on HACCP (Hazard Analysis Critical Control Point programme) positioning the food processing industries adjacent to cement factory is not practicable due to the presence of health hazard from cement industry. As food processing industry is already well established in region with concentration towards fish processing and hence cannot be neglected to be included in Mongla EZ. Hence considering the above parameters, cement industry in the Mongla EZ is not considered even though it is on higher probability of occurrence based on respondent replies.

On similar compatibility grounds, leather industries are also not included, as these are highly polluting industries with severe odour and these are not compatible with the food processing industry.

The land area distribution among the sectors stands as follows:

1.4. Suitability of selected sectors for Mongla EZ

Food Processing in Khulna and Mongla region

Food processing related industrial establishments at Khulna fall under six broad heads: Rice Mill, oil mills, sugar mills and fish processing units. Rice mills, oil mills and sugar mills are major categories within food processing sector forming 17%, 26% and 14% share of Bangladesh respectively in terms of number of manufacturing establishments. The raw supplies for these mills come from local production of rice, seeds and

Under the Frozen food segment, Shrimps are the most significant in terms of exports from Bangladesh which is largely from the Khulna region. Fish catching is a prominent source of employment in Khulna
sugarcane. In terms of geographic bifurcation of fish production by division, Dhaka leads with 28% share followed by Chittagong at 21% (2009-10 data). Khulna and Rajshahi have equal share of 15% each. Shrimps that form the major chunk of frozen food exports are dominant in Khulna division. It contributes 80% of total shrimp catch of Bangladesh. Fish catching is a prominent source of employment in Khulna division. As per 2010 data, there are 7 Government hatcheries (total 77) and 119 private sector hatcheries (total 854) in the division forming one-fourth of total hatcheries in Bangladesh.

Within Khulna division, Bagerhat district dominates fish and shrimp production with share of 26% and 39% respectively. Khulna and Satkhira districts are other two major contributors of shrimp production with 25% and 29% share respectively.

The Food-processing industry in Bangladesh mostly thrives on serving the domestic demand. Excess imports of produced food i.e. food grains, pulses, oil seeds and sugar indicate that these items cater to the domestic demand and/or are input to related industries. Also there are processed items like dairy products (Milk & cream) and Edible oil being imported indicating potential to develop these processing industries owing to local availability of raw supplies in Bangladesh. Moreover, higher share in output of fruits, vegetables and starch processing industries indicates sufficient availability of such raw material locally in Bangladesh and potential for development of processing industries of this kind in proposed Mongla EZ.

Source: Survey of Manufacturing Industries- SMI 2012

**Suitability of Mongla EZ for food processing sub-sectors**

Based on the understanding of Bangladesh and Mongla region for food processing industry as described above, following table summarises suitability of Mongla EZ for selected food processing sub-sectors.

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>Meat Processing</th>
<th>Fish Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatcheries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquaculture feed plants</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Fish production in 2012 in Khulna division and Bagerhat district*

**Suitability of Mongla EZ for food processing sub-sectors**

Based on the understanding of Bangladesh and Mongla region for food processing industry as described above, following table summarises suitability of Mongla EZ for selected food processing sub-sectors.
Feasibility study for Mongla Economic Zone

EXECUTIVE SUMMARY

Sub-sectors

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>Meat Processing</th>
<th>Fish Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Hatcheries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aquaculture feed plants</td>
</tr>
<tr>
<td>Raw material availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export oriented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative competitive position w.r.t Dhaka, Chittagong (mainly in terms of raw mat. &amp; labour availability and road connectivity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import substitution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

〇 Very Low 〇 Low 〇 Medium 〇 High 〇 Very High

Textile, RMG

The emergence of Readymade Garment Industry (RMG) with its export oriented set up has altered the manufacturing sector in Bangladesh in last 20 years. The major sub-sectors in this are: Manufacturing of wearing apparel, Manufacturing of knitted and crocheted apparel, Preparation and spinning of textile fibres, Jute textile and Finishing of textiles (dying, bleaching etc.). In terms of imports, Raw cotton, Yarn, Textile and related articles together constitute ~ 21% of total imports. These form the raw materials for Textiles and RMG industries. For exports under this sector, RMG today contributes to around 80% of the exports in Bangladesh and constitutes around 3% in the global market positioning Bangladesh as a Global Hub in RMG Manufacturing. Currently Bangladesh is the 2nd largest contributor in RMG exports globally. RMG manufacturers usually import fabric from different countries as locally produced raw material cannot compete with imported materials in terms of price or quality. These backward linkages sub-sector for RMG industry

As on date, RMG sector contributes to around 80% of the total exports in Bangladesh and around 3% in the global market thereby positioning Bangladesh as a Global Hub in RMG Manufacturing

5 Excludes imports and exports to/from EPZ, as sector wise data not available for EPZs
includes cotton production, spinning (Cotton & Synthetic yarn), weaving and knitting, dyeing and printing, and accessories (e. g. buttons).

At present 25-30% value addition to RMG products takes place as manufacturers import bulk of the raw materials. For jute products however, that get exported, value addition being done is almost to the extent of 70%.

**Khulna division/Bagerhat district:**
Textile related industrial establishments at Khulna division are broadly under six categories: Textile mills, garment factories, jute mills, leather tanning, Leather footwear and leather goods accessories. In terms of geographic distribution of industrial establishments, Textile mills and garment factories are concentrated in Dhaka division with ~95% share. Khulna division has less than 1% share of Textile mills and garment factories. This is mainly due to fact that raw materials for RMG are imported as mentioned above and Khulna’s connectivity to locations of Dhaka, Jessore airport is not established. This leads to investors preferring to invest in and around Dhaka so as to cut down the transportation cost. However factors like cotton farm production in Khulna, labour availability (unskilled to semi-skilled), development of Jessore airport and Mongla Port would help establish related industries with backward linkages at Mongla EZ and may even in the longer term encourage Readymade garment industries to come to Mongla.

For jute mills, Khulna division garners significant one-fifth share, second only after Dhaka division. The raw jute for mills in Khulna division is procured locally from farmers enabling supplies’ for jute mills.

**Suitability of Mongla EZ for Textile & RMG sub-sectors**

Based on the understanding of Bangladesh and Mongla region for Textile & RMG industry as described above, following table summarises suitability for selected Textile & RMG sub-sectors for Mongla EZ.

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>Weaving Mills -Woven fabrics</th>
<th>RMG</th>
<th>Jute &amp; Jute Based Industries</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Weaving Mills -Woven fabrics</th>
<th>RMG</th>
<th>Jute &amp; Jute Based Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value addition in RMG is limited to 25-30% due to majority of raw material being imported. On the other hand, textile industries with Jute as raw material see around 70% value addition in the country.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Khulna division garners majorly Jute and jute product industries and therefore provides an attractive base for establishing such industries in the Mongla EZ.
## EXECUTIVE SUMMARY

### Sub-sectors

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>Weaving Mills - Woven fabrics</th>
<th>RMG</th>
<th>Jute &amp; Jute Based Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material availability</td>
<td>🎫</td>
<td>🎫</td>
<td>🎫</td>
</tr>
<tr>
<td>Labour availability</td>
<td>🎫</td>
<td>🎫</td>
<td>🎫</td>
</tr>
<tr>
<td>Export oriented</td>
<td>Backward Linkage</td>
<td>🎫</td>
<td>🎫</td>
</tr>
<tr>
<td>Relative competitive position w.r.t Dhaka, Chittagong (mainly in terms of raw mat. &amp; labor availability and road connectivity)</td>
<td>🎫</td>
<td>🎫</td>
<td>🎫</td>
</tr>
<tr>
<td>Import substitution</td>
<td>🎫</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

- 🎫 Very Low
- 🎫 Low
- 🎫 Medium
- 🎫 High
- 🎫 Very High

---

**Light Engineering**

Light Engineering Industry is the most labor intensive industry in Bangladesh. It has been under the radar of the Government as it is identified as one of the thrust sectors in the Perspective Plan as well as by Bangladesh Board of Investment Promotion.

**Khulna division/Bagerhat district:** Khulna division has 406 no. of steel and engineering units (of which Kushtia and Jessore have 107 and 296 units respectively). This comprises 50% of total units in Bangladesh. LEI are a major element of the supply chain of most of the industries. Khulna division mostly comprises of spare parts of mills, factories and industries, maintenance, works, and bicycle manufacturing.

**Suitability of Mongla EZ for Light Engineering sub-sectors**

At present bicycle manufacturing is a major sub-sector in Bangladesh. Light engineering is an emerging industry which could play a significant role in exports of the country.
Based on the understanding of Bangladesh and Mongla region for light engineering industry as described above, following table summarises suitability for Light engineering sub-sectors for Mongla EZ.

### Table: Suitability of Mongla EZ for Light Engineering sub-sectors

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>Others-Spare parts of Mills (Textiles &amp; Jute)</th>
<th>Bicycle manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material availability</td>
<td>🌃</td>
<td>🌃</td>
</tr>
<tr>
<td>Labour availability</td>
<td>🌃</td>
<td>🌃</td>
</tr>
<tr>
<td>Export oriented</td>
<td>🌃</td>
<td>🌃</td>
</tr>
<tr>
<td>Relative competitive position w.r.t Dhaka, Chittagong (mainly in terms of raw mat. &amp; labour availability and road connectivity)</td>
<td>🌃</td>
<td>🌃</td>
</tr>
<tr>
<td>Import substitution</td>
<td>🌃</td>
<td>🌃</td>
</tr>
</tbody>
</table>

〇 Very Low  ◀ Low  ◁ Medium  ◁ High  ▶ Very High

### Ship Building- Domestic overview

Bangladesh is a maritime nation with 9,000 sq km of territorial waters and 720 km long coastline. At present 90% of total oil product, 70% of cargo and 35% of passengers move through the waterways in Bangladesh. There are more than fifty shipyards in Bangladesh. About 70% of the shipyards are located in and around Dhaka, 20% are in Chittagong and 10% are in Khulna and Barisal. These shipyards are concentrated to design and fabricate ship up to 3500 DWT to fulfil the demand of local market for use on its inland waterways and within the

Bangladesh has good prospects of capturing market for building ships less than 25,000 DWT with internationally large players in Korea, China and Japan concentrating on larger ship vessel building
coastal zones of Bangladesh (that do not require any International certification). There are eleven local shipyards of international standard capable of making ships up to 10,000 DWT.

Internationally large players in Korea, China and Japan have already announced that they will not go for building ships less than 25,000DWT (Dead Weight Tonnage). This generates opportunity for Bangladesh to venture into small ocean-faring vessels less than 25,000 DWT. The global market for the small ocean-faring vessels is now estimated to be $ 400 billion annually. Considering major shipyards of the world can meet 75% of total demand. If Bangladesh could achieve 4% market share of the surplus demand, which is $100 billion (25% of $ 400 billion), it could earn $4 billion annually.

**Suitability of Mongla EZ for Ship Building sub-sectors**

Based on the understanding of Bangladesh overview and Mongla region for ship building industry as described above, following table summarises suitability for selected ship building sub-sectors w.r.t. Mongla EZ.

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>Manufacture of small vessels</th>
<th>Ship Repair</th>
<th>Ship Ancillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material availability</td>
<td>◆</td>
<td>◆</td>
<td>◆</td>
</tr>
<tr>
<td>Labour availability</td>
<td>◆</td>
<td>◆</td>
<td>◆</td>
</tr>
<tr>
<td>Export oriented</td>
<td>◆</td>
<td>◆</td>
<td>◆</td>
</tr>
<tr>
<td>Relative competitive position w.r.t. Dhaka, Chittagong (mainly in terms of raw mat. &amp; labour availability and road connectivity)</td>
<td>◆</td>
<td>◆</td>
<td>◆</td>
</tr>
<tr>
<td>Import substitution</td>
<td>◆</td>
<td>◆</td>
<td>◆</td>
</tr>
</tbody>
</table>

○ Very Low ◆ Low ◆ Medium ◆ High ◆ Very High

---

*“Emergence of Export-Oriented Shipbuilding Industry in Bangladesh: Current Position & Future Prospects”; although some estimates place this figure at only $200 billion*
### 1.4.1. Summary of target Industry Categories for Mongla Economic Zone

Based on the evaluation of industries at global and Bangladesh level and analysis of survey results, the summary of key industry categories for implementation at Mongla is presented below.

Target sectors selected for Mongla EZ

<table>
<thead>
<tr>
<th>Food processing</th>
<th>Attractiveness to Mongla EZ</th>
<th>Textiles, RMG &amp; Leather</th>
<th>Attractiveness to Mongla EZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing and preserving of meat</td>
<td>✓</td>
<td>Textiles and RMG</td>
<td>✓</td>
</tr>
<tr>
<td>Processing and preserving of fish, crustaceans and mollusces</td>
<td>✓</td>
<td>Manufacture of Jute and allied products, Jute Based geotextiles (technical textile – Jute based)</td>
<td>✓</td>
</tr>
<tr>
<td>Processing and preserving of fruit and vegetables</td>
<td>X</td>
<td>Weaving mills</td>
<td>✓</td>
</tr>
<tr>
<td>Manufacture of vegetable and animal oils and fats</td>
<td>X</td>
<td>Leather goods accessories</td>
<td>X</td>
</tr>
<tr>
<td>Manufacture of dairy products</td>
<td>X</td>
<td>Leather-Tanning</td>
<td>X</td>
</tr>
<tr>
<td>Manufacture of grain mill products, starches and starch Product</td>
<td>X</td>
<td>Leather Footwear</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shipbuilding</th>
<th>Attractiveness to Mongla EZ</th>
<th>Light Engineering</th>
<th>Attractiveness to Mongla EZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancillary industry</td>
<td>X</td>
<td>Electronics</td>
<td>X</td>
</tr>
<tr>
<td>Ship Equipment Ancillary</td>
<td>X</td>
<td>IT and Hardware</td>
<td>X</td>
</tr>
<tr>
<td>Ship fabrication</td>
<td>✓</td>
<td>Light Engineering</td>
<td>✓</td>
</tr>
</tbody>
</table>

---

7 Based on heat map created as per respondent ratings for each of the sectors/sub-sectors during the survey; a sector with probability of occurrence ≥65% has been shortlisted; sub-sectors within shortlisted sector with probability of occurrence ≥65% has been shortlisted further
### EXECUTIVE SUMMARY

#### Attractiveness to Mongla EZ

<table>
<thead>
<tr>
<th>Food processing</th>
<th>Attractiveness to Mongla EZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship Repair</td>
<td>√</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Textiles, Leather</th>
<th>RMG &amp; (bicycles)</th>
<th>Attractiveness to Mongla EZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Engineering</td>
<td>(others)</td>
<td>√</td>
</tr>
</tbody>
</table>

√ Sub-sectors shortlisted for Mongla EZ; X Sub-sectors not shortlisted for Mongla EZ

### 1.5. Proposed Master Plan & Infrastructure

#### 1.5.1. Technical Site Assessment

The proposed “Economic Zone” in Mongla will be developed on 205 acres (83 hectare) of land. It is under Kamardanga Mouza (JL # 20) in Mongla Upazila, Bagerhat district. Its geographical coordinates are 22° 28’ 0” north and 89° 37’ 0” east. It is 105 kms from Jessore airport, 397 kms from Dhaka city and 664 kms from Chittagong port. It is bounded by upazila Rampaul in the north, Mongla EPZ on the south, the Mongla River in the east and the Pushur & Gona river/Mongla Port Authority on the west.

The total area for the Mongla site is now a barren land. There is no vegetation, plantation and flora/fauna in this area. Through dredging from the adjacent Pashur River, the site has been raised by almost 1.50 to 2.0 meter. The GL (ground level) is now around 1.50 to 2.0 m above the highest flood level (HFL). The river Mongla is flowing by the side of the proposed EZ. Another river Ghona also flows on the other side of the EZ, which has narrowed down to a canal now. The width of this river is around 10. m. There is almost no current in Ghona river. Wide road is available around 300.00 m from the site.

**There is no vegetation, plantation, flora or fauna at the site. Further, the site is devoid of mangroves and corals.**

**The northeast boundary of Sundarbans, National Heritage Center of Bangladesh, is at a distance of 4.7 km in southwest from the Site.**
The site is devoid of mangroves and corals. The northeast boundary of Sundarbans, National Heritage Center of Bangladesh, is 4.7 km in southwest from the Site. Other than Sundarbans, there are no eco sensitive areas within 10 km area. The site is surrounded by a mix of agricultural lands and industrial facilities. Existing Cement and Refinery industrial cluster is in close proximity along Jessore-Khulna-Mongla road.

Mongla Town is at a distance of 1.7 km in southeast from the site (no road connectivity from N7). Mongla EPZ is abutting the site.

1.5.1.1. Topography

The area is generally flat and poorly drained. Soil consists of peat and gray floodplain soils. It is subjected to seasonal flooding. The ground level of the EZ is around 1.50 to 2.0 m above the HFL (highest flood level). The ground has been raised by dredged material (fine sand) from the adjacent Pashur River. Now the total area is full of fine sand.

Gopalganj-Khulna peat basin occupies a number of low-lying areas between the Ganges river Floodplain and the Ganges tidal floodplain. The major two beels of the area are Baghia Beel and Chanda Beel. Thick deposits of peat occupy perennially wet basins, but they are covered by clay around the edges and by calcareous silty sediments alongside the Ganges distributaries crossing the area. This is the largest peat stock basin of Bangladesh. The basins are deeply flooded by clear rainwater during the monsoon.

Land use / Land cover

Major portion of the proposed site is plain land covered with dredged material. Presently cultivation is being carried out in some of the areas. The site is free of any habitations.

Soil type

Soil Investigation has been carried out by BEZA through Consultancy Research & Testing Services, Department of Civil Engineering, Khulna University of Engineering & Technology, Khulna during August 2014 for Boundary wall & Access Bridge and the same is considered
for study of geotechnical characteristics. Six boreholes up to the depth of 50 ft from the existing ground level were drilled. Based on the information obtained from subsoil investigation both in the field and laboratory, it is observed that the sub soil dominantly consists of clay soils all through the depth of the boring.

1.5.1.2. Hydrography

Pussur River is the main water communication system in the Region. Mongla Port is located in the eastern banks of Pussur River. The river is deep and navigable throughout the year for the large marine ships to enter the Mongla Port from Bay of Bengal from Akram Point. As per recorded water level data, the long term maximum high water level at Mongla station is 2.56 m and minimum is 0.51 m. Presently, vessel of maximum 5 m – 6 m draught can proceed up to port jetty utilizing tidal advantage.

1.5.1.3. Meteorological status

The area lies in the South-central climate zone of Bangladesh and shows tropical monsoon climate with three prominent seasons - Summer/Pre-monsoon (March to May), Rainy/monsoon season (June to October) and Winter season (November to February). The rainy season is hot and humid, and characterized by heavy rainfall, tropical depression and cyclone. The winter is predominately cool and dry. The summer is hot and dry interrupted by occasional heavy rainfall.

Gentle north/north-westerly winds with occasional violent thunderstorms called northwester during summer and southerly wind with occasional cyclonic storm during monsoon are prominent wind characteristics of the region.

Monthly maximum temperature varies from 23.3 °C to 36.5 °C and the monthly minimum temperature varies in the range of 12.2 °C to 27.8 °C. While April is the warmest month, January is the coldest month. Monthly average relative humidity in the area varies seasonally from 70% to 90%. June, July and August are the most humid months (80 % to 90 %) while during January to March it remains lowest (20% to 30%).

The region is characterized by Southerly winds from the Bay of Bengal during monsoon and Northwesterly winds from Himalaya during winter. Wind speed has been measured at 10 meter height and the mean wind velocity of Mongla is 1.7 m/s (6.1 km/hr). The yearly mean wind rose shows that wind prevails flowing from south to north direction in most of the time in a year.

Mongla is located in highly rainfall prone areas and the annual rainfall ranges from 1232 mm to 2786 mm with an average 1946 mm per annum. Almost 80% rainfall occurs in monsoon and a negligible amount in winter.
1.5.1.4. Seismicity

Mongla area occurs in the Seismic Zone I. Seismically it is in the quiet zone and the only historic high magnitude earthquake occurred in this zone was centered in the Sundarbans. The possible maximum earthquake magnitude in Richter’s scale is 7.0

As per tectonic classification, the area falls under Faridpur trough of Western platform flank which is adjacent to the hinge line. Tectonically this area is inactive and no apparent major structure like fault or fold exists in the region that might be geologically significant.

1.5.1.5. Ambient air quality

Monitoring of ambient air quality in the Cement Plants area near Mongla is periodically carried out by the Department of Environment, Khulna Division. The rural areas of Mongla were also monitored. The maximum concentration of pollutants monitored is given in the following table with the Air Quality Standards.

<table>
<thead>
<tr>
<th>Location</th>
<th>Maximum Pollutant Concentration Range, ug/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PM2.5</td>
</tr>
<tr>
<td>Mongla Rural Area</td>
<td>-</td>
</tr>
<tr>
<td>AQ Standards*</td>
<td>65(24-hly)</td>
</tr>
</tbody>
</table>

The monitored values (existing baseline status) were found to be well within the Ambient Air Quality Standards stipulated by DoE.
1.5.1.6. Noise levels

The area is completely rural and no major point source of noise exists within the vicinity. The monitored equivalent noise levels (Leq) were found to be <50 dB(A) during day times (6 am to 9 pm) and <40 dB(A) during night times (9 pm to 6 am) and were found to be well within the Ambient Noise Standards.

| Noise Quality Standards (Leq) * for Mixed Zone, dBA | 60   | 50   |

1.5.1.7. Water

The minimum monthly discharge (occurs during February) of the Passur River is 6000 m³/sec where the highest flow is 22,500 cubic meter per sec during wet season (BWDB, 2005). The approximate range of the tide observed at Mongla station is between 1.2 m to 3.5 m and the tidal amplitude is around 3.25 m (Data : MPA). The mean water level (Chart Datum) at Mongla is 0.87 m.

Surface water

Mongla is located at the confluence of the Mongla river with the Pashur river, which flows south from Khulna passed Mongla for an additional 70 km before reaching Bay of Bengal. In wet season the amount of Chloride in the river water is 101 mg/L, whereas the allowable limit (Bangladesh standard) is 150-600 mg/L.

The surface temperature ranges between 22.9° - 33.0°C throughout the year. The salinity concentration is 27 parts per thousand (ppt) at the mouth of the Poshur River. The surface salinity levels between 10 - 29 ppt throughout the year. The dissolved oxygen (DO) content in Poshur River near the Sundarbans is about 6 mg/l. While most of the monitored parameters are found to be within the standards of ECR 1997 Norms for fisheries, drinking and industrial use but BOD is higher than the standard level.

Ground water

Ground water in Mongla is saline. NGOs active in this area report that following the cyclone “AILA” in 2009 as much as 99% of shallow wells in some areas became saline and few fresh water ponds remaining after a year were typically out-stripped by demand. Now the Chloride level in impounding reservoir has noted as 727 mg/L, where the acceptable limit is 1000 mg/L, in the coastal belt. The Chloride level in the adjacent river water was noted as 101 mg/L.

For drinking, water is supplied from “Foilar Hat” under Rampal Upazila, about 20 Km from the proposed Mongla EZ. This water is extracted from a depth of 274.39 m from GL. A twin PVC transmission line of 200 mm carries the water.
1.5.1.8. Infrastructure

**Power Grid network**

---

**Power**

Bangladesh has small reserves of oil and coal, but potentially very large natural gas resources. Commercial energy consumption is around 75% natural gas, with the remainder almost entirely oil (plus limited amounts of hydropower and coal). Presently about 60% of the total population has access to electricity including renewable energy. Per capita power generation of 292 Kwh through 8537 MW installed capacity.
Power Grid Company of Bangladesh Ltd. (PGCB) is responsible for operation, maintenance and development of transmission system all over the country. Presently power generated in various power plants in Bangladesh is transmitted to the national grid through 230 kV and 132 kV transmission lines.

Electricity distribution system is controlled by national grid. Total electric power, generated from the power plants is first supplied to the national grid then to the whole country through national grid. The Padma-Jamuna-Meghna River divides power distribution system into two zones, East and West. The East contains nearly all of the country’s electric generating capacity, while the West, with almost no natural resources, must import power from the East.

Presently there are no feeder lines available near by the proposed site. Separate dedicated 33KV line to be planned from the nearest substation. Mongla 132/33 kv substation is available within 3 km from the proposed Mongla EZ. The available surplus capacity to be confirmed by the respective authority.

**Water**

Presently Mongla EPZ is served by a dedicated water supply network from Rampal. Groundwater source at Mongla is of saline in nature. It is proposed to provide a dedicated water supply network from the existing pumping station at Rampal.

**1.5.1.9. Site assessment – compliance matrix**

For the assessment of suitability of land for the proposed Economic zone, a structured approach has been adopted. The key parameters for each critical success factor influencing the selection and suitability of land are identified and each parameter has been assigned a weightage for conducting a rationale evaluation to finalize the land for the development. The critical success factors influencing the land selection criteria are:

- Status
- Connectivity
- Physical features
- Infrastructure availability
- Environment and social considerations
- Business considerations

The site evaluation matrix with details on the critical success factors, evaluation parameters and corresponding weightage is shown in the following table.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Critical Success Factor (CSF)</th>
<th>CSF Weight (%)</th>
<th>Parameters to evaluate the CSF</th>
<th>Weight age (%)</th>
<th>Score</th>
</tr>
</thead>
</table>

PwC
## EXECUTIVE SUMMARY

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Critical Success Factor (CSF)</th>
<th>CSF Weight (%)</th>
<th>Parameters to evaluate the CSF</th>
<th>Weight age (%)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Status</td>
<td>30%</td>
<td>Land identification</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tenure</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land acquisition</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land price</td>
<td>15%</td>
<td>12%</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>25%</td>
<td>Resource availability with specific reference to target industries</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nearest rail head and its distance from the identified site</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distance from nearest National expressway / state highway</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nearest airport and its distance from the identified site</td>
<td>2%</td>
<td>0.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nearest sea port and its distance from the identified site</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nearest urban settlement and its distance from the identified site</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>3</td>
<td>Physical features</td>
<td>20%</td>
<td>Size &amp; shape</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Topography</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil conditions</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accessibility</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>4</td>
<td>Infrastructure availability</td>
<td>10%</td>
<td>Industrial power &amp; network</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water for industrial use</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sewerage disposal &amp; storm water disposal point</td>
<td>1%</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Environment and social considerations</td>
<td>13%</td>
<td>Environment regulations</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Building regulations</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Surrounding areas</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>6</td>
<td>Business considerations</td>
<td>2%</td>
<td>Presence of competing facilities</td>
<td>1%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supporting business environment</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100%</strong></td>
<td></td>
<td></td>
<td>73.50%</td>
</tr>
</tbody>
</table>

As can be seen from the above, the identified site qualifies for undertaking the proposed development activity by scoring a decent score of 73.50%.
1.6. Zone Definition

1.6.1. Need for zone demarcation

Further to the completion of land identification exercise, it would be imperative to prepare an indicative 'thematic' map showing the areas and features which could influence the development of Economic Zone. The method of planning the physical layout of the EZ is fundamental to sustainability. This would entail proliferation of land use practices that create and maintain efficient infrastructure, well - planned neighbourhoods and preservation of natural systems. Hence the need for demarcation of EZ assumes greater significance. The relationship between uses such as agricultural, industrial, residential, commercial, institutional, educational and recreational, and the expanse and intensity of each use, directly impacts the characteristics of the proposed development.

1.6.2. Methodology

The methodology has been outlined as below:

- GIS data of the influence area up to 30 km radius of the identified site was collected from the following sources:
  
  - Shuttle radar topographic mission data for contour delineation
  - Landsat 7 global imagery mosaic (natural colour, pan - sharpened) and interpretation with Google earth

- The collected GIS data was studied in detail to generate information on the existing land use pattern of the influence area covering the following features:
  
  - Administrative boundaries
  - Major cities, towns/villages
  - Settlements in the influence zone
  - Industries
  - National Highway, major roads and minor roads, railway lines, airport, sea port etc.
  - General topography
  - Hydrology - rivers, streams and water bodies
  - Land use – agriculture, wet lands, barren, savanna land etc
  - Mixed vegetation, scattered shrubs
- Forest area
- Areas with striking features such as hills/cliffs (greater than 100m)
- Institutes
- Location of power source (substation)
- Location of water source

1.6.3. **Land use, transportation network and topography**

Study of land use in the adjoining areas includes Water body, streams, Forests, Agriculture and Aquaculture land and settlements. Based on the GIS data, transport pattern was studied to identify national highway, major and minor roads traversing the influence area. This information was used in preparing spider diagram depicting network of motorable roads of lengths for 200 km for assessing the cost of transportation and transaction cost of raw materials to the occupant unit of the EZ. In addition, information on existing railway lines, airport, major settlements, and infrastructure linkages is also provided.
EXECUTIVE SUMMARY

Transportation network and spider diagram - 30 km radius

Contour Map at 1 m interval
1.7. Master Planning of Economic Zone

1.7.1. Principles of Planning

The aim is to develop EZ for Food processing, Apparel and Readymade garments, Light engineering, Shipyard industries in Mongla, Khulna district with an excellent state-of-the art infrastructure facilities and professional management to attract and support investments in industrial sectors.

Hence, EZ in the form of prepared land is proposed with general and specialized infrastructure facilities. It focuses on development of large, medium and small scale industries, as also trading and services.

Given the industrial base and the concept of EZ for taking cluster advantage, the proposed project will further strengthen Khulna District’s position in the industrial sectors map of Bangladesh and will contribute to the economy.

It is important to develop the master plan to accommodate both the user industries area requirements and requirements of the various identified development 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.

- Propose a set of planning standards to be adopted
- Designate broad land use distribution of the whole site
- Evolve land use mix – industrial plots for the identified sectors, social amenities, general infrastructure, specialized & specific infrastructure, road, open & green space etc.
- Position the zone to accommodate various types of target industries and to ensure compatibility
- Provide an integrated infrastructure system network to support the development
- Develop requirements of various public utilities
- Evolve phasing of the project
- Compliance to various planning norms & guidelines of Bangladesh government
1.7.2. Economic Zone Planning Concept

- Create a vibrant integrated industrial region with an inclusive growth concept
- Create a dynamic, vibrant and bustling investment region to attract investors
- Design shall be based upon modern planning concepts
- Establish world class work environment targeting essentially the domestic and foreign target companies at an affordable cost structure
- The guiding principle for the design is to create a conducive place for attracting reputed domestic and foreign companies/institutions/research centres
- Create a holistic package by integrating with multi formatted development with excellent infrastructure facilities
- A place for achieving
  - Work - live - learn - play
  - Dynamic, vibrant & sustainable community
  - Industry – institution interaction and networking
- Create excellent brand image in the master planning to attract major corporate & MNC communities for conducting business
- Promote variety and diversified inbuilt environment through flexible mix of uses
- Enhance physical connectivity to adjoining districts & states
- Create green environment

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.

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
EXECUTIVE SUMMARY

- Constraints and core offering of the site
- Services and amenities
- Addressing shortage of housing for the workforce
- Lack of enforcement / control on land use and growth of unapproved housing / layouts
- Non uniform distribution / concentration of industrial growth pockets
- Shortage of skilled / trained manpower
- Conservation of ground water & surface water resources
- Transportation
- Poor quality of roads & unplanned road junctions leading to traffic congestions
- Environmental management

Zone Spotting

The whole area is divided into various zones. The zoning design is done in order to have a smooth pedestrian circulation by simplifying the movement patterns and allow the inter-zone movement. Parking is planned at strategic locations catering to the visitor's vehicles.

Following site parameters are 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

Description of EZ zones, product mix and facility configuration are as follows:

- **Industrial Zone:** Anchor units, ancillary units of Food processing, Apparel and RMG, Light engineering and shipping sectors, QA / QC labs, R & D centre, value addition centres, etc.

- **Logistics Zone:** Loading and unloading yards, transportation hubs, cargo handling centers, raw material collection and storage halls, finished goods storage, etc.

- **Institutional and amenities zone:** Play school for toddlers, crèche, knowledge cell, marketing intelligence, retail, poly clinic, recreational areas, parks, play grounds, administrative buildings, etc.

- **Multi facility complex, utilities:** ETP, STP, WTP, SWM, sewer network, communication network, street lighting, wastewater network, electrical substation, etc.

- **Residential Zone:** Multi formatted housing, guest houses, etc.

- **Greenery and Walkways:** Green belt along the boundary, lawns and parks, tree plantation along the proposed roads, internal walkways etc.
## 1.7.3. Economic Zone Land Use Pattern

<table>
<thead>
<tr>
<th>Land use pattern</th>
<th>in Acres</th>
<th>In %</th>
<th>Saleable area</th>
<th>Non saleable area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acres</td>
<td>In %</td>
</tr>
<tr>
<td><strong>Processing area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Industrial area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food processing</td>
<td>31.77</td>
<td>15.49%</td>
<td>31.77</td>
<td>15.49%</td>
</tr>
<tr>
<td>Shipyard</td>
<td>5.27</td>
<td>2.57%</td>
<td>5.27</td>
<td>2.57%</td>
</tr>
<tr>
<td>Apparel /RMG</td>
<td>70.27</td>
<td>34.26%</td>
<td>70.27</td>
<td>34.26%</td>
</tr>
<tr>
<td>Light engineering</td>
<td>12.34</td>
<td>6.02%</td>
<td>12.34</td>
<td>6.02%</td>
</tr>
<tr>
<td>Total industrial area</td>
<td>119.66</td>
<td>58.34%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specialized infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warehouse</td>
<td>2.32</td>
<td>1.13%</td>
<td>2.32</td>
<td>1.13%</td>
</tr>
<tr>
<td>Truck lay bay</td>
<td>3.78</td>
<td>1.84%</td>
<td>3.78</td>
<td>1.84%</td>
</tr>
<tr>
<td>Q.A &amp; Q.C lab</td>
<td>2.82</td>
<td>1.37%</td>
<td>2.82</td>
<td>1.37%</td>
</tr>
<tr>
<td>R&amp;D facility</td>
<td>3.15</td>
<td>1.54%</td>
<td>3.15</td>
<td>1.54%</td>
</tr>
<tr>
<td>Training center</td>
<td>2.57</td>
<td>1.25%</td>
<td>2.57</td>
<td>1.25%</td>
</tr>
<tr>
<td>Total specialized infrastructure</td>
<td>14.64</td>
<td>7.14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Public amenities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility</td>
<td>4.96</td>
<td>2.42%</td>
<td>2.48</td>
<td>1.21%</td>
</tr>
<tr>
<td>Road</td>
<td>26.77</td>
<td>13.05%</td>
<td></td>
<td>26.77</td>
</tr>
<tr>
<td>Green &amp; open space</td>
<td>24.10</td>
<td>11.75%</td>
<td></td>
<td>24.10</td>
</tr>
<tr>
<td>Total processing area</td>
<td>193.91</td>
<td>94.54%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non processing area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance plaza</td>
<td>1.53</td>
<td>0.75%</td>
<td></td>
<td>1.53</td>
</tr>
<tr>
<td>Admin block</td>
<td>2.38</td>
<td>1.16%</td>
<td></td>
<td>2.38</td>
</tr>
<tr>
<td>Guest house</td>
<td>0.79</td>
<td>0.39%</td>
<td>0.79</td>
<td>0.39%</td>
</tr>
<tr>
<td>Investors club</td>
<td>1.11</td>
<td>0.54%</td>
<td>1.11</td>
<td>0.54%</td>
</tr>
<tr>
<td>Crèche</td>
<td>0.44</td>
<td>0.21%</td>
<td></td>
<td>0.44</td>
</tr>
<tr>
<td>Residential</td>
<td>1.35</td>
<td>0.66%</td>
<td>1.35</td>
<td>0.66%</td>
</tr>
<tr>
<td>Retail</td>
<td>0.29</td>
<td>0.14%</td>
<td>0.29</td>
<td>0.14%</td>
</tr>
<tr>
<td>Place of worship</td>
<td>0.39</td>
<td>0.19%</td>
<td></td>
<td>0.39</td>
</tr>
<tr>
<td>Road</td>
<td>0.89</td>
<td>0.44%</td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>Green &amp; open space</td>
<td>2.02</td>
<td>0.99%</td>
<td></td>
<td>2.02</td>
</tr>
<tr>
<td>Total non-processing area</td>
<td>11.19</td>
<td>5.46%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grand Total area</strong></td>
<td>205.10</td>
<td>100.00%</td>
<td>142.21</td>
<td>69.34%</td>
</tr>
</tbody>
</table>
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.

1.7.4. **Phasing, Sustainability initiatives and Master Plan**

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.

**Implementation of sustainability ideas**

- Rain water harvesting
- Zero discharge
- Waste recycling
- 3-R concepts
- Scientific management of waste disposal
- Energy efficiency
- Waste minimization

**Sustainability Initiatives**

Detailed master planning is done cluster wise covering the following components:

- Micro level zoning
EXECUTIVE SUMMARY

- Land use plan
  - Detailing the locations and sizes of various land uses
- Land parcel plan
  - Showing the subdivision of industrial land
- Phasing
- Utilities mapping
- Greenery and open space plan
- Road category

Master Plan of Economic Zone
1.8. **Infrastructure and Facilities**

### 1.8.1. Coverage area, objectives and detailing

The infrastructure is the key requirement for sustainable operation of the EZ. Infrastructure requirements are categorized as follows:

- Infrastructure within EZ
- Specialized infrastructure
- External connectivity and offsite infrastructure for EZ.

The table below elaborately details the infrastructure planned within EZ.

<table>
<thead>
<tr>
<th><strong>Site grading</strong></th>
<th>65% of the site is already filled with dredged sand upto 1.8 m from the natural ground level and remaining area filling is considered in the offsite infrastructure.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The existing topography of the site is generally sloping with minor undulations, gently sloping towards the east direction with variation of about +6 m to +4 m</td>
</tr>
<tr>
<td><strong>Boundary wall</strong></td>
<td>A compound wall all along the EZ boundary to a height of 2.1 m above NGL is proposed to be constructed and provided with 0.9 m height barbed wire fencing on top.</td>
</tr>
<tr>
<td></td>
<td>The total length of the compound wall is estimated to be 4000 m.</td>
</tr>
<tr>
<td><strong>Roads – General considerations</strong></td>
<td>Arterial, primary &amp; secondary roads are planned to give access to the industries within EZ apart from catering to residential and commercial zones and shall be looped with inter connecting roads</td>
</tr>
<tr>
<td></td>
<td>In order to maximize lead values and minimize land taken by major and minor roads, a proper hierarchy of roads is proposed to ensure smooth traffic movement inside EZ</td>
</tr>
<tr>
<td><strong>Roads – categories</strong></td>
<td>Different categories of roads are proposed for the internal road transportation network</td>
</tr>
<tr>
<td><strong>Roads – pedestrian walkways</strong></td>
<td>Routes and paths are provided for easy movement of visitors with sufficient care so that no transport system comes in the way of pedestrians.</td>
</tr>
<tr>
<td></td>
<td>Aesthetically designed walkways are provided along with lush green environment on either side of road.</td>
</tr>
<tr>
<td></td>
<td>Pedestrian walkways are provided for all categories of roads.</td>
</tr>
<tr>
<td></td>
<td>All services for drains, sewers, water, power and telecom are contained within the road right of way.</td>
</tr>
</tbody>
</table>
Feasibility study for Mongla Economic Zone

EXECUTIVE SUMMARY

- Necessary signage, street name boards, zone guiding maps and visitors 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.

- **Roads - pavement structure**
  - In the proposed EZ, flexible pavement structure is recommended for the following reasons:
    - Ease of rehabilitation in consideration for anticipated long-term settlement.
    - Lower reinstatement cost to accommodate future laying of utility services
      - 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 2%. If the CBR value of the sub grade is less than 5%, a capping layer of 150 mm thickness of material with a minimum CBR of 5% shall be provided in addition to the sub-base.
      - A single layer of dense bituminous base course (DBM) and bituminous-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.

- **Surface drainage – general considerations**
  - Based on the topography of the EZ, the drainage pattern has been decided.
  - 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 and connected to existing river / discharge points.

- **Surface drainage – Peak runoff**
  - The peak runoff and discharge capacities are computed based on the following design parameters.
    - The peak runoff is planned to be computed based on rational formula:-
    \[
    Q = \frac{C \times I \times A}{360}
    \]
    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:

- 0.9 - for built-up area
- 0.5 - for road and other paved area
- 0.2 - for greenery and open areas

Maximum annual rainfall intensity of 1947 mm for Mongla for the year 1991 to 2008 is considered for storm drain design.

**Surface drainage – sizing**

The sizing of the drains are designed based on the discharge capacity of $Q_c$ to cater adequately the estimated peak runoff using Manning's formula:

$$Q_c = \frac{1}{n} A \cdot R^{2/3} \cdot S^{1/2} \text{ (m}^3/\text{sec)}$$

Where
A = Area of cross-section of drain (m²)
R = Hydraulic mean radius (m)
S = Hydraulic gradient
n = roughness coefficient

**Surface drainage – design & scheme**

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.
Feasibility study for Mongla Economic Zone
EXECUTIVE SUMMARY

- **Water demand**
  - The water demand estimation norms considered for arriving the water demand.

- **Water losses**
  - 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.

- **Fire protection demand - non potable**
  - Fire demand in litres per minute has been calculated based on the following formula:
    \[ Q_{FD} = 4000 \times (P)^{0.5} \times (1-0.01 \times (P)^{0.5}) \]
  - Where \( P \) = Population in thousands per hectare
  - \( Q_{FD} = 1006.90 \text{ lpm} \)
    \[ = 60.41 \text{ cum/hr} \]
  - Considering two hours fire demand requirement, the total quantity of water required for fire protection is 120.93 cum.
  - Demand for firefighting has not been considered under daily demand as one time storage of 120.93 cum i.e. 2 hours of fire demand will be created and maintained.

- **Average water demand**
  - Based on the computation and analysis, the total average water demand is estimated.

- **Water storage**
  - Based on the above estimates, the following infrastructure for the EZ is proposed.
  - **Underground storage tank**
    - The total storage capacity of the underground storage tank based on 24 hrs storage requirement is proposed.
    - Totally there will be 4 underground storage tanks for storing portable and non-portable water including fire demand for processing and non-processing area respectively.
  - **Elevated level service reservoir (ELSR)**
Feasibility study for Mongla Economic Zone

EXECUTIVE SUMMARY

- The total storage capacity of the overhead storage tank is based on 2 hrs. Storage requirement.
- Totally there will be 4 ELSR for storing portable and non-portable 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.

Water pumping station

- 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.

Water distribution network

- 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.
  - Demand computed based on the analysis.
  - Working hours per day - 24
  - Pipe material
    - 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

Sewage quantity estimation

- 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.

- 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).

- Treated sewage water available @ 90% = 1973.46 cum/day

- Non potable water demand = 355.71 cum/day

- Balance treated sewage water to be discharged as non-potable water = 1617.75 cum/day

- Following design criteria is proposed for sewerage, treated effluent collection system
  - 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

- 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
Quality of sewage

- 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.

Sewage treatment plant (STP) considerations

- 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.

Sewage treatment plant technology selection

- Factors considered for selection of appropriate treatment system:
  - Reliability
  - Vector nuisance
  - Area availability
  - Power requirement
  - Capital cost
  - Operation & maintenance cost
- The above process technologies are analysed 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
  - 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
  - Nutrient removal without chemicals - nitrification and de-nitrification, phosphate removal
  - The system can also work with sewage in flow of 20 to 30 percentage of designed capacity due to presence
EXECUTIVE SUMMARY

- 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.

- 2 numbers of sewage treatment plant of capacity 1.90 MLD & 0.29 MLD for processing area and non-processing area respectively are proposed.

**Solid waste management (SWM)**

- 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.

- 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:

  - 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 and also household appliances
  - Hospital and biomedical waste

- The role of integrated SWM is to reduce the quantity of SW disposed of to land by recovering materials and energy from SW.

- The generation rates of industries, logistics, commercial & residential areas vary to such an extent that exact quantification of SW generation is not feasible.

- However, an attempt has been made to quantify the
municipal solid waste (MSW) that may be generated from various zones of EZ.

- Industries – 370 Kg / hectare / day
- Utilities – 100 gms / per person / day
- Residential area – 400 gms / person / day has been considered
- Road – 10 kg / hectare / day is considered as street sweeping.
- Greenery – 30 kg / hectare / day is considered.
- Commercial – 125 gms / per person / day is considered

- Total estimated MSW quantity – 21.14 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 colour coded bins.
  - Industrial non-hazardous waste
  - Industrial hazardous waste
  - Bio-degradable waste
  - Non-biodegradable waste
  - E-waste like parts of computer, floppies, monitor, cartridges, ribbons 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.

- Power supply &
- The system parameters are as follows:
distribution

- 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 40 - 70% 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.
- Total estimated power demand is 19.80 MVA.
- Distribution substation is proposed in a strategic location. Individual facilitation and all power reticulation are to be carried out at 11 kV.
- 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.

- Street lighting has been conceived in 2 different forms.
  - 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.
EXECUTIVE SUMMARY

- **Telecommunication**
  - All telecommunication services are expected to be provided through the concerned MDAs and other private operators.
  - Value added telecom services are covered in infrastructure and internal communications for the users are not covered under the general infrastructure.

- **Landscaping**
  - This includes works associated with the landscaping within the EZ covering tree strips along the boundary, roads, public greenery etc.

- **Specialized infrastructure**
  - It is also envisaged to provide the specialized infrastructure within EZ catering to the specific requirements of the occupant units. This would include:
    - R&D hub
    - Innovation centre and knowledge hub
    - Warehouses
    - Training centre
    - QA & QC lab
    - Administrative building etc.

- **Environmental sustainability**
  - The aspects of environmental sustainability considered while carrying out the designing activities are enunciated.

### 1.8.2. Detailing of Offsite Infrastructure

For sustained business operation of EZ, it is pertinent that off-site infrastructure and EZ connectivity to the proposed sectors are adequately addressed.

- Already 65% of site is filled with dredged sand upto 1.8 m height. Remaining area of about 70 acres filling upto 1.8 m height from NGL is proposed to be developed through separate contractor.
- It is planned to widen and augment the existing approach road from Mongla port road to proposed EZ for a length of 350 m and 36m length 15m wide bridge to cross the Ghona river in order to provide easy access to the proposed EZ.
- It is planned to build a new 33 kV dedicated power transmission line from Mongla substation to EZ site for catering to the needs of industries occupying the EZ along with 33/11 KV substation with in EZ.
- It is planned to build three new borewells cum pumping stations at village Foyla to draw the ground water along with pumping main length of 22km to the proposed EZ. It is also planned to construct an underground service reservoir to store the water within EZ.
Offsite Infrastructure Details

- It is planned to construct a boundary wall as indicated earlier for a length of 4000 m. The detailing and tender for the same has been prepared and bid process is in progress.

- It is planned to construct an administrative building consisting of 1680 sqm of built-up area, G+ 2 structures within the EZ.
1.9. Social Impact Assessment

1.9.1. Background

The Mongla EZ is located in Burirdanga Union Parishad (UP) of Mongla Upazilla under Bagerhat district of Khulna Division. Bagerhat district is a poverty ridden geographical area with 66.8 percent of the population below the poverty line. The development of Mongla EZ would affect only a small number of residents (less than 200). This is due to the fact that the land selected for the establishment of EZ is government land and the entire area is currently barren with no human habitation, vegetation, and plantation.

Though, the site selected for the establishment of EZ does not involve any social safeguard issues, the widening of the approach road will have impacts on the eight small business/dwelling units staying near the approach road. The approach road and the nearby areas belong to Mongla Port Authority and the Port Authority has given permission to these eight families to use the land for business purpose by paying an annual rent of BTk. 4.05/sq. gauge with a clause to vacate them within a month’s notice. The widening of the approach road to 50 ft. will lead to the displacement of the eight business/dwelling units. Hence, it is required to prepare an Abbreviated Resettlement Action Plan (ARAP) in compliance with World Bank’s Social Safeguard Policy and the Land Acquisition, Resettlement & Rehabilitation Policy, 1084 of GoB.

1.9.2. Socio economic characteristics of the EZ area

1.9.2.1. Demographic profile

The TAS team has carried out a SIA study to capture the existing as well as the future impacts of EZ in the region and accordingly analyzed the magnitude of social impacts of the various activities of the EZ on the local community during construction, operation and commissioning phases. The primary study area for SIA consists of Burirdanga Union Parishad (UP), where the EZ is located. However, keeping in view of the direct/indirect impacts of EZ on the nearby areas, the study area has been extended to Mongla Port Pourashava, which is the nearest urban centre.

The total population in Burirdanga UP is 12097, which is 0.81% of the total district population. While the figure in Mongla Port Pourashava is 39837, which is 2.69% of the total district population. Population density per Km is low in Burirdanga UP (428), while it is very high in Mongla Port Porashava. The development of Mongla EZ is expected to have relatively minor social impact on the livelihood of the local population and possibly affect a small proportion of people.

In Burirdanga UP and Mongla Port Pourashava, majority of the population are in the age group of 16-49 resulting in higher proportion of younger population viz-a-viz dependent population.

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8 Zila level povmap estimates, 2010, The World Bank & World Food Program
9 Updated Social Screening Report of Mongla EZ, BEZA
Feasibility study for Mongla Economic Zone
EXECUTIVE SUMMARY

The 2011 Census data revealed a negative growth rate in Burirdanga UP and Mongla Port Pourashava when compared to 2001 census data. In Burirdanga UP, the growth rate is -10.1%, while in Mongla it is -29.79%.

The majority of the population in Burirdanga UP is constituted of Hindu (55.3%), followed by Muslim (43.4%), Christian (1.2%) and Buddhist (0.006%). In Mongla, Muslim population is the majority (88.57%) followed by Hindu (7.03%), Christian (4.35%) and Buddhist (0.4%). The floating population in Mongla Port Pourashava is 3.96% of the total households while there is no floating population in Burirdanga UP. There are no indigenous people (tribal or ethnic minority) within these areas.

In Burirdanga UP and Mongla Port Pourashava, majority of the population belongs to employable age group, which is also vital for fuelling the economic growth of the local area.

The Housing patterns show that 85% people in Burirdanga UP and 56.9% people in Mongla Port Pourashava have kutcha houses which indicate their low social and economic status. The kutcha houses are vulnerable and increase the risk to life in the event of climatic hazards such as floods or cyclones.

The female literacy rate (62.3%) in Mongla Port Pourashava is almost equal to male literacy rate (65.5%), while the difference in Burirdanga UP is very high (Male literacy: 72.8% and female literacy: 58.7%). The higher literacy rate indicates that employable resources are available in the region which would be vital for implementing and operationalizing the EZ. The occupation pattern at district level reveals that 23% of the total households are comprised of nonagricultural day labourers followed by self-employed in non-agricultural sector at 22.61%. Day labour in agriculture and self-employed in agriculture accounts for 3rd and 4th positions. The trend in Burirdanga UP and Mongla Port Porashava, however, is different from the district pattern. The majority derive income in these areas from the service sector and the percentage of people employed is 43.39% (493 people) and 79.50% (2703 people) respectively. Agriculture sector stands in the second position where 32.96% (329 people) in Burirdanga UP and 6.40% (218 people) in Mongla Port Pourashava are engaged.

The percentage of people engaged in the industrial sector is very low in Burirdanga UP (0.20%) and Mongla Port Pourashava (1.55%). This implies that the local people are not able to access employment opportunities in the Mongla Port and Bangladesh Export procession Zone Mongla (BEPZA), which are the two major industries in the area.

The literacy rate in Burirdanga UP (65.8%) and Mongla Port Pourashava (64.1%) is higher than the district level (59%) and the national level (51.8%). The higher literacy rate indicates that employable resources are available in the region which would be vital for implementing and operationalizing the EZ.

Regarding the sex wise employment status, it was observed that in Burirdanga UP and Mongla Port Pourashava, the percentage of men employed is higher (29.55% of men and 6.24% of women in Burirdanga UP and 41.49% men & 5.94% women in Mongla Port Pourashava) than women. At the same time, women are engaged in household works (44.94% in Burirdanga UP and 32.09% in Mongla Port Pourashava). The commissioning of Mongla EZ will be able to...
provide better job opportunities for both men and women in Burirdanga UP and Mongla Port Pourashava.

On the infrastructure front, in terms of basic services, scarcity of safe drinking water is an acute problem, with tap water available to only 24.4% population in Burirdanga UP and 23.1% population in Mongla Port Pourashava. Percentage of population using tube well is almost close to that using tap water. Majority of the population (75.5% in Burirdanga UP & 76.5% in Mongla Port Pourashava) use other sources for drinking water such as ponds.

Transport is a major problem in the project area. Public transport is almost non-existent in Burirdanga UP & Mongla Port Pourashava. Rickshaws, vans, easy bikes and auto-rickshaws are used for local transport. There is no road access to the Mongla main city from the EZ area and people depend on boat services. Planning and implementation of public transport system will be a major challenge for Burirdanga UP & Mongla Port Pourashava when the EZ is operational.

With respect to gender related aspects, women in Burirdanga UP and Mongla Port Pourashva constitute 48.99 percentage & 45.76 percentage of the total population respectively. Households are overwhelmingly male headed with only 7.2 percentage being headed by the women. The sex ratio (104 & 109) and literacy rate (62.3% & 58.7%) in Burirdanga UP and Mongla Port Porashava are below satisfactory level. At national level, the female participation in the labour market is low (57.2%) in comparison with the men (84.3%) (HDR, 2013). The trend shows almost similar pattern in Burirdanga UP and Mongla Port Porashva. Women in Burirdanga UP and Mongla Port Porashva are mainly engaged in household work (72.60% & 65.85 %). Women’s participation in other sectors including industry and agriculture employment is negligible.

### Potential Social Impacts

#### 1.9.3. Potential Social Impacts

<table>
<thead>
<tr>
<th>Potential Negative Impacts</th>
<th>Potential Positive Impacts</th>
<th>Mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There will be negative impacts on the livelihoods of the eight small business/dwelling units staying on the side of the approach road.</td>
<td>• The investment through the commissioning of Mongla EZ will directly enhance the local economy of the area by increasing cash flow which in turn will increase the purchasing power of the local population.</td>
<td>• To rehabilitate the eight small business/dwelling units 30 feet backwards from their current location or to the vacant land on the right side of the approach road.</td>
</tr>
<tr>
<td>• Possibilities of demographic changes due to large scale inwards migration</td>
<td>• The 65.2% of workable population in Burirdanga UP and Mongla Port Pourashava will have access to better employment opportunities during the construction and commissioning phases of Mongla EZ.</td>
<td>• Need to develop a long term development plan for the areas to enhance the quality of basic services to the increased population in the coming years.</td>
</tr>
<tr>
<td>• The unskilled local community may feel unhappy if preferential treatment is given to the people outside Burirdanga UP and Mongla Porashava for skilled jobs.</td>
<td>• Enhanced employability for the women in the area</td>
<td>• Equal employment opportunities should be given to women, especially those who are now unemployed or are working in the service sector as daily wage workers.</td>
</tr>
<tr>
<td>• There will be an increase in the demand for temporary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
accommodation, housing and basic services including sanitation, health and emergency services in Burirdanga UP and Mongla Port Purashava areas.

- Increased pressure may occur in Mongla city as the workers and employees will tend to settle in the city due to the availability of infrastructure facilities.
- The high rate of poverty in the area may lead to children being inadvertently recruited at the construction sites.
- The inward migration of labour will also boost the tourism sector in Mongla area where Sunderban is a major attraction.
- Measure will have to be taken to prohibit child labour in the EZ as per the National Child Labour Elimination Policy 2010 of Ministry of Labour and employment.
- Care should be taken to promote women’s advancement and to ensure that women are not confined to low-skill, low-paid and low prospect jobs. The EZ enterprises should make special efforts to ensure that women workers are not discriminated against equal wages for work of equal value.

1.9.4. Stakeholders’ consultation

The main findings of the consultations are summarised below:

<table>
<thead>
<tr>
<th>Community</th>
<th>Government officials</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. The EZ will help to improve the socio-economic conditions of the local people.</td>
<td>i. The upcoming EZ will help in the economic upliftment of the local people, both in Burirdanga UP and Mongla Port Pourashva.</td>
</tr>
<tr>
<td>ii. It will give a boost to local tourism due to the inward migration/floating migration in the area.</td>
<td>ii. General reluctance towards working in the EZ due to poor connectivity, commuting and low wages. Currently, the only access to Mongla city, which is the nearest urban area, is by boat and the commuters from rural areas to the main land is a major issue.</td>
</tr>
<tr>
<td>iii. New livelihood opportunities will be available to the people during the construction and commissioning phases of the EZ;</td>
<td>iii. The majority of the workforce is unskilled; therefore, in order to provide employment opportunities in the skilled sector, there is a need to establish a “Vocational Training Institute” for skill enhancement of the local people, especially the youth and women in the area.</td>
</tr>
<tr>
<td>iv. Employment opportunities for the local people particularly construction workers and service providers are expected to increase;</td>
<td></td>
</tr>
<tr>
<td>v. The local residents expressed their concerns that the low literacy rates among the community may lead to exploitation of the labourers;</td>
<td></td>
</tr>
<tr>
<td>vi. The residents want for the local workforce in the EZ during the construction and commissioning phases; and</td>
<td></td>
</tr>
</tbody>
</table>
vii. The community felt that employment needs to be generated for them especially for the unskilled labours;

1.9.5. Institutional, Legal and Policy Framework

This section summarizes the relevant policy and legislation of GoB and WB for the resettlement of the PAPs of Mongla EZ. The main policies that address the resettlement of affected people are:

I. Government of Bangladesh (GOB) Law:

a. The Acquisition and Requisition of Immovable Property Ordinance 1982 and subsequent amendments in 1994, 1995, 2004 and 2011: The owners affected by the acquisition will be eligible to receive compensation for the following:
   i. Land permanently acquired (including standing crops, trees, houses); and
   ii. Any other impact and damages caused by such acquisition.

In accordance with the Ordinance, The DC of the concerned district is the sole authority to acquire land if it appears to him that the property is needed for a public purpose or the public interest. However, the Ordinance has made provisions for people to object to the decision. Compensation payments must be made before the authorities take possession of the property, and the payments should be made within a period of one year from the date of the decision of acquisition. The 1982 Ordinance, however, does not cover the Project Affected Persons (PAPs), such as informal settlers/squatters, persons without titles or ownership records. Further, the compensation paid does not consider the market or replacement cost of the property acquired.

II. Safeguard Policies of the World Bank (WB)

The Social Safeguard Policy of the WB on resettlement of PAPs is under OP 4.12-Requirements for Involuntary Resettlement. The policy states that all occupants of an area who need to be displaced are eligible for assistance that permits them to replace lost assets, recover their living standards and incomes to a level at least as per the pre-project state. This is irrespective of whether they are formal occupants (those with land titles) or otherwise. The policy does not cover occupants who would come to occupy after the “cut of date”. This means that the Bank policy (OP 4.12) does not cover those who would later come to a land or an area around the project area in order to take advantage of compensatory assistances being offered to those who have been living/using the place, up to the period of PAP census/survey.

The eligibility criteria set for the displaced persons to be entitled for compensation for loss of land or other assets taken for project purposes are:

I. Those who have formal legal rights to land or other assets (including customary and traditional rights recognized under the law of the country); and

II. Those who do not have formal legal rights to land or other assets at the time of Census but have a claim to such legal rights, provided that such claims are recognized by the laws of the country or are recognized through a process identified in the resettlement plan. The absence of legal title to land or other assets is not, in itself, a bar to compensation for lost assets or other resettlement assistance. Displaced persons in these two groups are also entitled to
compensation for loss of other assets such as structures and crops, and to other resettlement assistance.

**Gaps between Acquisition and Requisition of Immovable Property Ordinance 1982 and OP 4.12- Requirements for Involuntary Resettlement, the World Bank**

The provisions under the 1982 Ordinance are inadequate to cope up with the adverse effects on the land acquisition and involuntary resettlement and it does not fully match with the requirements of the WB’s Operational Policy: OP 4.12. The major gaps identified in the two polices are outlined below:

i. The Ordinance does not cover PAPs without titles or ownership record, such as informal settler/squatters, occupiers, and informal tenants and lease-holders (without document) and does not ensure replacement value of the property acquired.

ii. Under the ordinance, a person who appears in the land administration records as an owner or who has legal title is eligible for compensation. However, all affected parties, including squatters and illegal occupants are eligible for compensation under OP 4.12.

iii. The Ordinance has provisions for the compensation for lands and fixed assets, but there is no provision to assess loss of income and the livelihood of PAPs, and no mitigation measures to regain income and livelihood.

iv. Under the Ordinance, the compensation is calculated based on market values of the land over the previous 12 months; meanwhile the OP4.12 has made provisions to calculate the compensation at replacement cost at current market price.


**1.9.6. Abbreviated Resettlement Action Plan (ARAP)**

The ARAP covers the socio economic details of the PAPs, steps to minimize impacts, valuation procedure, entitlement matrix, budget estimation, institutional arrangements & responsibilities, grievances redressal mechanism and monitoring & evaluation mechanism.

**1.9.6.1. Socio-economic details of the Project Affected People (PAP)**

The PAPs of Mongla EZ comprise of eight families having small business/dwelling units in a temporary (movable) structure on the side of the approach road of EZ. Though, the land has been given on lease to eight people to run small business units, their family members are also staying in the allotted areas. Out of the total eight temporary small business/dwelling units, seven are occupied and the remaining one is vacant. Three families are engaged in log selling and three are employed in service sector. The remaining two houses are rented out by the lessee to run a motor repairing shop and a tailoring shop. The tenant of the tailoring shop has vacated the house and is presently vacant. The total population in the eight small business units/dwelling units comprises 25 male, 20 females and eight children. The male and female members are engaged in the business and the children are all studying in the nearby Port School.
1.9.6.2. Minimisation of Impacts

In order to minimise the impacts of the EZ on the PAPs, it is suggested that the business/dwelling units of the PAPs may be moved 30 feet backwards from their current location. **However, moving backward of the eight business/dwelling units to 30 feet will result in the displacement of farmers who have been cultivating the land behind the eight business/dwelling units.**

The second option to minimise the impact is to shift the business/dwelling units to the vacant land available on the right side of the approach road, near the market, which is also belongs to the Port Authority. Shifting of eight business/dwelling units to this land does not involve displacement of any farmers or houses. Moreover, in the future, if the width of the approach road has to be further increased, then, there won’t be any social safeguard issues. **Hence, it is recommended that BEZA may implement the second option which is more sustainable.**

1.9.6.3. Valuation Procedure

The valuation for dismantling and construction of the eight business/dwelling units has been calculated based on the following method:

i. **Dismantling:** Labour cost of two labours (one main worker and one helper) for dismantling the business/dwelling units. Calculated 5 days for dismantling an area having more than 500 sq.ft and 4 days for an area having less than 500 sq.ft.

ii. **Reconstruction:**
   a. Cost for roof of thatched houses: Cost of material (gol pata) per Sq.ft,
   b. Cost for wall: Cost of material (bamboo sheet)) per Sq.ft,
   c. Cost for cement floor: As per PwD rates, and
   d. Cost of labour: As per item(i) above

1.9.6.4. Budget for the Implementation of ARAPP

A provisional budget estimate has been prepared for the resettlement of the eight PAPs. This includes the cost for dismantling the business/dwelling units and reconstructing the units. The total estimated budget for resettlement is BDT. 0.392 M.

1.9.6.5. Institutional Arrangement and Responsibilities

The roles and responsibilities of BEZA, World Bank and the related institutions for the preparation, implementation and monitoring of ARAP are outlined below:

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Stages</th>
<th>Activities</th>
<th>Institution responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preparation of ARAP</td>
<td>Preparation/Finalization of ARAP</td>
<td>TAS/BEZA/World Bank</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>Approval of ARAP budget</td>
<td>BEZA/World Bank</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>Disclosure and consultations with PAPs</td>
<td>BEZA</td>
</tr>
<tr>
<td>4.</td>
<td>ARAP Implementation</td>
<td>Constitution of GRC</td>
<td>BEZA/World Bank</td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td>Establishment of internal monitoring system</td>
<td>BEZA</td>
</tr>
</tbody>
</table>
1.9.6.6. Grievances Redressal Mechanism

The grievance mechanism suggested for the relocation of PAPs in Mongla EZ is as follows:

i. **Accessible Grievance Mechanism at Local Level**: At the local level, a group will be formed comprising the Chairman, Burirdanga UP, a representative from those relocated and a representative from BEZA, preferably, the Social Development Officer. If the PAPs have concerns about the relocation arrangements, the aggrieved person will first report his/her case to this group where it will initially addressed.

ii. **Grievance Redressal Committee (GRC) at BEZA Level**: If the grievance is not resolved at the local level, the PAPs can escalate their grievance to the Grievance Redressal Committee (GRC) set up by BEZA to deal with the grievances not only for Mongla EZ, but also for the other three EZs. The GRC can comprise of one representative from the concerned UPs, one representative from the concerned DC Office, two representatives from World Bank and three members from BEZA.

1.9.6.7. Monitoring of ARAP

The two types mechanism suggested for the monitoring of ARAP are:

i. **Internal monitoring** of the implementation of the ARAP by BEZA. The monitoring will be undertaken monthly by the Resettlement Specialist and the findings will be recorded in the monthly reports to be submitted to the Project Director & Chairman, BEZA and the World Bank. The monitoring report will cover the progress made, objectives attained and not attained during the period, challenges encountered, and the measures taken to address the challenges.

ii. **Compliance monitoring** of the implementation of compensation and entitlement to the PAPs, restoration of PAPs incomes, resolving grievances of the PAPs and provisions for adequate budgetary allocation for the resettlement of PAPs. Based on the monitoring, the Resettlement Specialist will prepare the monthly progress report and submit it for the approval of Project Director & Chairman, BEZA. The Project Director will forward the approved monthly progress report to World Bank for their concurrence and approval.
1.10. Environment Assessment

The impacts envisaged during the construction and operation phase of the project are enumerated below.

<table>
<thead>
<tr>
<th>During construction phase</th>
<th>During operation phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient air quality</strong>: Air quality in the vicinity of the project area is likely to be adversely affected, though temporarily due to dust and exhaust gases generated by earth moving machinery and transport vehicles. Also other operations like excavation, dredging, trenching and back filling etc. would cause dust to be blown around. The main sources of emission will be due to the transportation, movement and operation of construction equipment at site and fugitive dusts from handling of cement, sand and stone chips, etc.</td>
<td><strong>Air quality</strong>: During operational phase of the project, the visiting vehicles would cause emissions of SPM, SO2 and NOx thereby affecting air quality.</td>
</tr>
<tr>
<td><strong>Noise level</strong>: Noise will be produced during construction phase on account of building activity such as loading, unloading, erection and filling, concreting, piling, drilling etc., vehicular traffic plying in and out of the complex, use of construction machinery and equipment such as compressors and pumps.</td>
<td><strong>Noise level</strong>: Visiting vehicles may result in increased noise levels</td>
</tr>
<tr>
<td><strong>Surface water quality</strong>: During construction, loose soils may find its way into runoff, thus increasing suspended silt load in the runoff temporarily which in turn may increase the suspended solids content of the nearby water sources. Construction water generated from construction personnel may affect the quality of surface water.</td>
<td><strong>Water quality</strong>: The domestic wastewater if not treated properly can cause several health and safety impacts including spread of disease contamination of land/crops and drinking water. The uncontrolled disposal of sewage and other liquid wastes arising out of domestic and industrial sources constitutes main causes of water pollution.</td>
</tr>
<tr>
<td><strong>Biological environment</strong>: The increase in traffic and air pollution will have moderately adverse effect on the nearby floral composition. The project does not envisage any reserved forest land acquisition. However, indirect impacts on the Sunderbans shall be studied and mitigation measures provided.</td>
<td><strong>Biological environment</strong>: The implementation of the project will not have any major adverse effect on the existing eco system and the proposed development of green belt, solid waste management facility, water treatment facility will enhance the positive impacts on the biological environment. However, indirect impacts on the Sunderbans shall be studied and mitigation measures provided.</td>
</tr>
<tr>
<td><strong>Impact due to solid waste</strong>: Construction activities leads to generation of sand, gravel, concrete, stone, bricks, wood, metal, glass, polythene sheets, plastic, paper etc. as waste. Various operations during the construction</td>
<td><strong>Solid waste</strong>: Improper management of waste can become health and environmental hazards to the occupants and the surrounding areas.</td>
</tr>
</tbody>
</table>
During construction phase | During operation phase
--- | ---
activities lead to the varied compositions in the total solid waste stream and affect the site. |  

**Construction camp**: Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities may generate substandard living conditions and health hazards.

**Legislative Framework**

Regulatory requirements towards protection and conservation of environment and natural resources have been devised by GOB and the WB. These are enumerated below.

<table>
<thead>
<tr>
<th>GoB Environmental Policy, Regulations, and Guidelines</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National Environmental Policy, 1992</strong></td>
<td>The policy sets out the basic framework for environmental action together with a set of broad sectoral guidelines to ensure environmental sustainability during development.</td>
</tr>
<tr>
<td><strong>National Environment Management Action Plan, 1995</strong></td>
<td>The NEMAP has been developed with the objectives to: (i) identify key environmental issues affecting Bangladesh, (ii) identify actions to halt or reduce the rate of environmental degradation, (iii) improve management of the natural environment, (iv) conserve and protect habitats and bio-diversity, (v) to promote sustainable development and (vi) improve the quality of life.</td>
</tr>
<tr>
<td><strong>Environment Conservation Act, 1995</strong></td>
<td>This Act authorizes the DoE to undertake any activity to conserve and enhance the quality of environment and to control, prevent and mitigate pollution.</td>
</tr>
<tr>
<td><strong>Environment Conservation Rules, 1997</strong></td>
<td>The Environment Conservation Rules provide standards and guidelines for: (i) Categorization of industries and development projects on the basis of actual and anticipated pollution load, (ii) Requirements for undertaking Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA), as well as formulating an Environmental Management Plan (EMP) according to categories of industries/development projects/activities, (iii) Procedure for obtaining environmental clearance and (iv) Environmental quality standards for air, surface water, groundwater, drinking water, industrial effluents, emissions, noise and vehicular exhausts.</td>
</tr>
<tr>
<td><strong>The EIA Guidelines for</strong></td>
<td>The EIA Guidelines is a handbook for procedures for</td>
</tr>
</tbody>
</table>
# Executive Summary

## GoB Environmental Policy, Regulations, and Guidelines

<table>
<thead>
<tr>
<th><strong>Industry, 1997</strong></th>
<th>Preparing the EIA and for reviewing them for the benefit of the development partners, EIA Consultants, reviewers, and academics.</th>
</tr>
</thead>
</table>
| **Relevant Other National Policies:** | - National Legal Instruments: (i) Environment Court Act, 2000 and subsequent amendments  
(ii) Environment Court Act, 2000  
(iii) The National Water Policy, 1999  
(iv) Protection, restoration and enhancement of water resources,  
(v) Protection of water quality, including strengthening regulations concerning agrochemicals and industrial effluent,  
(vi) Sanitation and potable water,  
(vii) Fish and fisheries and Participation of local communities in all water sector development,  
(viii) The Brick Burning (Control) Act, 1989,  
(ix) The Brick Burning (Control) Amendment Act, 1992 and 2001 Ministry of Environment and Forest,  
(x) Ministry of Environment and Forest,  
(xi) Control of brick burning  
(xii) Water Supply and Sanitation Act, 1996 Ministry of Local Government, Rural Development and Cooperatives,  
(xiii) Management and Control of water supply and sanitation in urban areas,  
(xiv) Bangladesh Labour Law,  
(xv) National Land use Policy,  
(xvi) Bangladesh Labour Law,  
(xvii) National Land use Policy,  
(xviii) Bangladesh Labour Law. |
| **Environmental Health and Safety Guidelines** | The Environmental Health and Safety (EHS) Guidelines of IFC are safeguard guidelines for environment, health and safety for development of industrial projects. They contain performance levels and measures that are considered to be achievable in new facilities at reasonable costs using existing technologies. |

## World Bank Safeguard Policies

<table>
<thead>
<tr>
<th><strong>Environmental Assessment:</strong></th>
<th>The World Bank requires an Environmental Assessment (EA) for all projects proposed for Bank financing to ensure that these projects are environmentally sound and sustainable. The policy also requires that the EA should be made available to the public by disclosure at public libraries or other places accessible to project-affected groups, including a Summary EA in the local language.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural Habitats</strong></td>
<td>There are no designated conservation areas or nature reserves in the project area. The policy indicates the requirements for conserving the natural habitat.</td>
</tr>
<tr>
<td><strong>Physical and Cultural Resources</strong></td>
<td>The policy requires a proper management plan for unexpected chance finds during implementation of the project.</td>
</tr>
</tbody>
</table>
### World Bank Safeguard Policies

<table>
<thead>
<tr>
<th>Involuntary Resettlement</th>
<th>This policy aims to minimize resettlement while offering adequate compensation or settlement alternatives in conformity with World Bank policies and Bangladesh law.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous People</td>
<td>This policy aims to ensure that indigenous or tribal peoples are not adversely affected and are given opportunities to benefit from World Bank financed projects in a culturally appropriate way.</td>
</tr>
<tr>
<td>Environmental Health and Safety (EHS) Guidelines</td>
<td>The EHS Guidelines contain performance levels and measures for development of projects that are considered to be achievable in new facilities at reasonable costs by existing technology.</td>
</tr>
</tbody>
</table>

#### Environmental monitoring program

An environmental monitoring program shall be implemented to monitor the micrometeorological conditions, ambient air quality, noise level measurements, water quality, soil and sediment quality.

#### Environmental management plan

The project entails various impacts on the study area, some negative and some positive. Various impacts identified during the construction and operation phases will be provided with suitable monitoring and mitigation measures including the development of disaster management plan. In addition, an environmental monitoring program will also be implemented to monitor the realization of the environmental management plan to ensure minimization and mitigation of the adverse impacts.
1.11. Financial Viability Assessment - Key Findings

1.11.1. Financial Analysis

The financial analysis is based on the demand assessment for industrial land as set out in the section 3.6 “Demand Scenario for Bangladesh Manufacturing (2015 to 2035)” of this report. Assumptions on the project timeline, construction cost, operation and maintenance (O&M) costs and capital structure are appended below. The financial model developed analyses revenue generating sources and consequently the expected IRR & NPV for the developer. Further, this section attempts to assess the lease rentals and upfront payment that BEZA may realistically expect from the Developer. Later sections of this chapter undertake sensitivity analysis on various critical parameters and assumptions to assess the volatility of the results of the Base Case.

1.11.2. Methodology

The financial assessment along with the financial viability of the project will largely depend upon pricing, land offtake at the EZ and other timing scenarios which in turn will influence the overall profitability of the project. To have a robust model in place an exhaustive input sheet has been developed which broadly elucidates all the assumptions considered for development of the financial model. Further, with the help of these matrices/assumptions the financial model computes projected revenue streams, and capital and O&M costs. The model enables the testing of a number of parameters for their effects on the finances of the Mongla EZ. Some of these parameters include payments that the Developer would be willing to make to BEZA and in this aspect; this section also attempts to assess the returns to BEZA by developing Mongla EZ on PPP basis.

The overall structure is as presented in figure as below:

The financial viability of the Mongla Economic Zone is assessed through the following estimations:

1. Costs of public lands
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2. Capital Costs of acquiring the EZ inclusive of Relocation and Compensation Costs
3. Capital Costs of developing/constructing the zone
4. O&M costs of operating and maintaining the zone
5. Revenues accruing to the zone owner/operator

1.1.3. Assumptions

Overview of key characteristics of the proposed land for Mongla EZ is provided in the table below:  
(Source: Inputs from MACE)

<table>
<thead>
<tr>
<th>Heads</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td>acres</td>
<td>205</td>
</tr>
<tr>
<td>Total Area</td>
<td>(ha)</td>
<td>83</td>
</tr>
<tr>
<td>Total processing area</td>
<td>(ha)</td>
<td>78</td>
</tr>
<tr>
<td>Area Already Sold</td>
<td>(ha)</td>
<td>0</td>
</tr>
<tr>
<td>Total Unsold Area</td>
<td>(ha)</td>
<td>83</td>
</tr>
<tr>
<td>Total Developable Area</td>
<td>(ha)</td>
<td>83</td>
</tr>
</tbody>
</table>

Land Utilization (%)
- Processing area in EZ % 94.54%
- Open & Green Spaces % 12.74%
- Internal Infrastructure (Roads, Admin. Block, Entrance Plaza, worship place etc.) % 15.79%
- Industrial Use % 58.34%
- Utilities & Public Amenities % 4.26%
- Specialized Infrastructure (Truck lay bay, warehouse, QA/QC Lab, R&D facility etc.) % 7.14%
- Residential Area % 0.66%
- Commercial activity (Retail space, Guest house, Investors club) % 1.07%
- Total Saleable Area (%) % 67.21%
- Total Saleable Area (ha) 56

The projects timelines for proposed Mongla Economic Zone (EZ) are assumed based on the average time required as per past trend in Bangladesh infrastructure projects and are shown in table below:

<table>
<thead>
<tr>
<th>Project Timelines</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Development initiation by BEZA</td>
<td>1-Sep-14</td>
</tr>
<tr>
<td>EOI/RFQ / RFP</td>
<td>months</td>
</tr>
<tr>
<td>Letter of Award / Development Agreement</td>
<td>months</td>
</tr>
</tbody>
</table>
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Financial Closure months 6
Approvals months 6
Construction Start Date 1-Jun-16
Construction period (months) months 36
Construction End Date 31-May-19
Date of Commencement of Commercial Operations 1-Jun-19
Source: PwC Assessment

Three scenarios have been created for the land fill rate:

<table>
<thead>
<tr>
<th>Land Supply Scenario</th>
<th>Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pessimistic (%)</td>
<td></td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>Base (%)</td>
<td></td>
<td>50%</td>
<td>80%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Optimistic (%)</td>
<td></td>
<td>70%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Annual Lease rentals that Developer may charge from tenants

In order to arrive at annual land lease rent that the developer may charge from tenants, prevailing rentals of Mongla EPZ and other seven EPZ's under BEPZA were analysed:

<table>
<thead>
<tr>
<th>EPZ</th>
<th>Tariff\textsuperscript{10} (US$ /sq.mt./year)</th>
<th>Tariff\textsuperscript{11} (BT /sq.ft./year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chittagong, Dhaka, Comilla, Karnaphuli &amp; Adamjee</td>
<td>2.2</td>
<td>13.7</td>
</tr>
<tr>
<td>Ishwardi, Uttara and Mongla</td>
<td>1.25</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Source: Inputs from MACE/ IIFC and PwC Analysis

For the base case, given the world class facilities to be developed by BEZA and the Developer at the Mongla EZ, the developer is expected to command annual lease rental of BDT 13 / sq.ft/annum.

Capital Expenditure

The capital cost breakup is as follows:

<table>
<thead>
<tr>
<th>Project Cost</th>
<th>Units</th>
<th>Cost</th>
<th>% of Total Hard Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Cost</td>
<td>BT Million/#</td>
<td>73.1</td>
<td>4.89%</td>
</tr>
<tr>
<td>Roads Culverts &amp; Drainage</td>
<td>BT Million/#</td>
<td></td>
<td>18.53%</td>
</tr>
</tbody>
</table>

\textsuperscript{10} for average 2000 m2 plot size
\textsuperscript{11} USD to BDT conversion= 80
EXECUTIVE SUMMARY

Decentralized water supply Treatment & Distribution  BT Million/# 163.8 10.96%
Electrical Street Lighting & fire fighting  BT Million/# 56.5 3.78%
Telecom & Communication systems  BT Million/# 39.7 2.66%
Buildings - Industrial/Business  BT Million/# 532.8 35.65%
Buildings - Commercial  BT Million/# 135.2 9.04%
Buildings - Residential  BT Million/# 228.9 15.31%
Buildings - MEP  BT Million/# 2.7 0.18%
Sustainable infrastructure elements, RWH, summer storage tank & greenery  BT Million/# 4.5 0.30%
Total Hard Cost  BT Million/# 1514.1
Interest during construction  BT Million/# 216.5
Total Project Cost  BT Million/# 1,730.6

Source: Inputs from MACE and PwC Analysis

O&M Expenses

In addition to this capital cost, Operation and Maintenance (O&M) costs during the operational phase of the project is presented below:

<table>
<thead>
<tr>
<th>Total Operation Cost</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Road works including drain culvert</td>
<td>BT Million/#</td>
<td>5.54</td>
</tr>
<tr>
<td>- Sewerage network including STP</td>
<td>BT Million/#</td>
<td>8.56</td>
</tr>
<tr>
<td>- Water supply including WTP</td>
<td>BT Million/#</td>
<td>4.1</td>
</tr>
<tr>
<td>- Electrical works including transformer &amp; street lighting</td>
<td>BT Million/#</td>
<td>1.13</td>
</tr>
<tr>
<td>- Buildings - Admin &amp; Social Amenities</td>
<td>BT Million/#</td>
<td>0</td>
</tr>
<tr>
<td>- Sustainable infrastructure elements, greenery, RWH, energy saving devices etc.</td>
<td>BT Million/#</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td><strong>BT Million/#</strong></td>
<td><strong>19.42</strong></td>
</tr>
</tbody>
</table>

Total Maintenance Cost

<table>
<thead>
<tr>
<th>Total Maintenance Cost</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Road works including drain culvert</td>
<td>BT Million/#</td>
<td>13.85</td>
</tr>
<tr>
<td>- Sewerage network including STP</td>
<td>BT Million/#</td>
<td>4.28</td>
</tr>
<tr>
<td>- Water supply including WTP</td>
<td>BT Million/#</td>
<td>3.28</td>
</tr>
<tr>
<td>- Electrical works including transformer &amp; street lighting</td>
<td>BT Million/#</td>
<td>2.82</td>
</tr>
<tr>
<td>- Buildings - Admin &amp; Social Amenities</td>
<td>BT Million/#</td>
<td>44.97</td>
</tr>
<tr>
<td>- Sustainable infrastructure elements, greenery, RWH, energy saving devices etc.</td>
<td>BT Million/#</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td><strong>BT Million/#</strong></td>
<td><strong>69.29</strong></td>
</tr>
</tbody>
</table>
Feasibility study for Mongla Economic Zone
EXECUTIVE SUMMARY

<table>
<thead>
<tr>
<th>Total Operation Cost</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Marketing Cost (% of sales)</td>
<td>%</td>
<td>2.00%</td>
</tr>
<tr>
<td>- Misc. Expenses</td>
<td>BT Million/#</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Inputs from MACE

**Salary Expenses**

The following table represents the salary and other expenses that the Developer is expected to incur:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Number of persons</th>
<th>Approx. salary BDT per month</th>
<th>Per annum cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO</td>
<td>1</td>
<td>300,000.00</td>
<td>3600000</td>
</tr>
<tr>
<td>General Managers-Finance &amp; Marketing</td>
<td>2</td>
<td>250,000.00</td>
<td>6000000</td>
</tr>
<tr>
<td>General Manager - Technical</td>
<td>2</td>
<td>250,000.00</td>
<td>6000000</td>
</tr>
<tr>
<td>Manager -Finance Administration &amp; Legal</td>
<td>5</td>
<td>200,000.00</td>
<td>12000000</td>
</tr>
<tr>
<td>Manager -Technical</td>
<td>5</td>
<td>200,000.00</td>
<td>12000000</td>
</tr>
<tr>
<td>Manager - Marketing</td>
<td>5</td>
<td>200,000.00</td>
<td>12000000</td>
</tr>
<tr>
<td>Assistant Manager -Finance &amp; Administration, Legal</td>
<td>5</td>
<td>125,000.00</td>
<td>7500000</td>
</tr>
<tr>
<td>Assistant Manager -Technical</td>
<td>5</td>
<td>125,000.00</td>
<td>7500000</td>
</tr>
<tr>
<td>Assistant Manager - Marketing</td>
<td>5</td>
<td>125,000.00</td>
<td>7500000</td>
</tr>
<tr>
<td>Engineers &amp; Supervisors</td>
<td>5</td>
<td>50,000.00</td>
<td>3000000</td>
</tr>
<tr>
<td>Support Staff</td>
<td>5</td>
<td>25,000.00</td>
<td>1500000</td>
</tr>
<tr>
<td>Security Staff</td>
<td>20</td>
<td>25,000.00</td>
<td>6000000</td>
</tr>
</tbody>
</table>

Total (Million BDT p.a.) 84.6

A summary of usages norms included as part of our financial analysis have been indicated in table below:

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Power Requirement (MW)</th>
<th>Water Requirement (KLD)</th>
<th>Employment per hectare (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textile</td>
<td>0.25</td>
<td>46.24</td>
<td>278</td>
</tr>
<tr>
<td>Food Processing</td>
<td>0.28</td>
<td>83.62</td>
<td>67</td>
</tr>
<tr>
<td>Light Engineering</td>
<td>0.32</td>
<td>46.24</td>
<td>167</td>
</tr>
<tr>
<td>Ship Building</td>
<td>0.28</td>
<td>46.24</td>
<td>99</td>
</tr>
</tbody>
</table>

Source: SMI Data 2012 and PwC Analysis

**Future Projections**
The annual escalation for lease rent is considered 7.7%. This is based on World Bank data for Bangladesh economy from 2005-13 that gives average inflation rate at 7.7%.

1.11.4. **Capital Structuring**

The development of Mongla EZ will be financed by equity as well as debt component for which the Debt equity ratio of 70:30 has been assumed. The debt component includes commercial loan (50%) and Government debt (20%).

The assumptions for the commercial loan are aligned with the borrowing terms of Commercial Banks lending for investment in Bangladesh. The overall tenure of the loan has been assumed to be 11 years including a 1 year moratorium period post Commercial Operation Date (COD). The interest rate has been assumed to be 12% per annum. A ballooning repayment of Principal has also been assumed:

```
Y1  Y2  Y3  Y4  Y5  Y6  Y7  Y8  Y9  Y10 Y11
0.00% 0.00% 0.00% 5.00% 10.00% 12.00% 14.00% 20.00% 20.00% 19.00%
```

Further, our financial model includes a Government debt of 20% from Bangladesh Bank (Investment Promotion and Financing Facility) which provides repayment period of 20 years at interest rate of 10.50% (considering BDT loan). The moratorium period for this loan has been assumed to be one year post COD.

PPP Investor 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 Finance Act 2009 (anuchched Kha), Income Tax rate for the companies, which are not publicly traded, is 27.5%. This rate has been used in the financial model for calculating the income tax payable to National Board of Revenue, Bangladesh.

1.11.5. **Returns from Project**

The project returns under all the three scenarios- Pessimistic, Base and Optimistic are as indicated in the table below:

<table>
<thead>
<tr>
<th>Project returns</th>
<th>Project IRR</th>
<th>Equity IRR</th>
<th>Average DSCR</th>
<th>Minimum DSCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pessimistic</td>
<td>13.9%</td>
<td>18.8%</td>
<td>3.1</td>
<td>0.52</td>
</tr>
<tr>
<td>Base case</td>
<td>14.6%</td>
<td>20.3%</td>
<td>3.15</td>
<td>1.08</td>
</tr>
<tr>
<td>Optimistic</td>
<td>14.9%</td>
<td>21.2%</td>
<td>3.18</td>
<td>1.20</td>
</tr>
</tbody>
</table>

In the base case scenario, project IRR of 14.4% is attainable with returns to developer (equity IRR) of 20%. Under Pessimistic and Optimistic scenarios, the IRR more or less remains in the same horizon.
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for Project IRR ~ 15% however equity IRR slips to 18.4% in pessimistic case and marginally improves to 20.8% in optimistic.

Mongla Economic Zone’s ability to repay its debt servicing obligations under each scenario is best shown by debt service coverage ratio (DSCR). Under base case scenario, the average DSCR is 3.12 with minimum DSCR of 1.02. This indicates that Mongla Economic Zone have an ability to repay its debt under the base scenario. Typically, a bank would feel comfortable lending to a developer whose debt service coverage ratio (DSCR) remains above 1 throughout debt repayment period. It may however be noted that the min DSCR in the pessimistic scenario may go below 1 thereby making the project unattractive to lenders.

Debt Servicing in Base Case

The Revenue, EBIDTA, PAT and Project clash flows and cash flows to shareholders under base case scenario are as indicated below:
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Sensitivity analysis parameters for evaluation

<table>
<thead>
<tr>
<th>Parameters for Evaluation</th>
<th>Conservative</th>
<th>Base</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.11.6. Results of Simulation of Different Scenarios and Sensitivity to Capital Costs and Prices

Sensitivity w.r.t. project hard cost component indicate that for every 5% change in construction cost as in base scenario (C) the EIRR changes on an average by 1.3%.

In addition, analysis of other critical parameters that could have effect on the EIRR was undertaken. The parameters with their respective conservative and bullish views that are analysed for sensitivity are as follows:
The three scenarios—Pessimistic, Base and Optimistic—are based on the variation in the land supply phasing. The sensitivity of above mentioned parameters were analysed under each of the three scenarios.
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Sensitivity of parameters w.r.t. EIRR under Base case scenario

Sensitivity of parameters w.r.t. EIRR under pessimistic case scenario
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Sensitivity of parameters w.r.t. EIRR under Optimistic case scenario
The following are the key observations from the above analysis may be summarized below:

- Mongla EZ development is more sensitive to change in the annual escalation rate for lease rentals.

- The power tariff as charged by developer is also crucial as it impacts the EIRR considerably. Hence, subsidised power to be provided by the Authority for EZ development is critical.

- Reduction in equity and increase in debt (financial institutional loan) also have considerable impact on EIRR.

- EZ Service Fees which is in addition to annual rentals charged by developer, water tariffs and construction period are having negligible or no impact on project financials.
1.11.7. Economic Internal Rate of Return (EIRR)

**Background**

The objective of the economic analysis is to quantify the impact of the development of Mongla Economic Zone (EZ) on the economy of Bangladesh. Financial analysis (Financial IRR) estimates the return accruing to the project operating entity (EZ developer), whereas EIRR estimates the return on the investment to the national economy.

**EIRR Framework**

EIRR calculation takes in consideration all the stakeholders of a project such as the project financers (whose return has been captured in 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 the rest of the society. Determination of EIRR is directly aligned with the objectives of the multilateral agencies i.e. eradication of poverty, employment generation and overall development of the nation.

A two-step process has been considered for calculation of EIRR\(^{12}\).

\[
EIRR = Private\ Returns + Cost\ Gains
\]

Where,

\[
Private\ Returns = Actual\ Revenues - Actual\ Costs
\]

\[
Cost\ Gains = Actual\ Cost - Opportunity\ Cost
\]

The calculation assumes the exclusion of taxes and subsidies.

**Assumptions**

The Economic model for the project is developed taking into account economic costs and benefits generating out of the project over a period of 20 years. The economic model is based on the financial model and all the assumptions applicable for the financial model holds for this model as well. Base case was considered for calculating the EIRR.

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Approach and Methodology

The approach & methodology adopted has been illustrated in the following diagram:

Details of Calculations

From the financial model, capital expenditure (Capex), operating expenditure (Opex) and revenue benefits have been considered in carrying out this analysis. Summation of the Capex and Opex results in the total economic cost of the project.

Standard Conversion Factor (SCF) is used to convert financial prices of largely non-tradable production goods and services. It indicates the ratio of the value of all exports and imports at border prices to their value at domestic prices. SCF illustrates the opportunity cost or the ground of willingness to pay by the customers. According to the research published by BIDS analysts Dr. Hossain and Ahmed (2009), the taka is overvalued by about 3%; hence, SCF has been calculated as 0.97.

Dynamic Efficiency (DE) is used to analyse capital accumulation and economic growth. An economy is dynamically efficient if it invests less than the return to capital and is inefficient if it invests more than the return to capital. Using the data in the research article Assessing Dynamic Efficiency: Theory and Evidence, DE for Bangladesh has been computed by benchmarking the DE of USA. The average of DE of USA for fifteen years has been considered, the same is multiplied by the escalation factor (this is calculated considering the relative change in GDP of Bangladesh with respect to that of USA) and the fractional value of GDP of Bangladesh with respect to GDP of USA. The DE value has been calculated as 0.03.

Multiplying the SCF and DE with revenue benefits provides the economic impact on the nation.

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14 “Assessing Dynamic Efficiency: Theory and Evidence” ABEL, MANKIW, SUMMERS
15 Table-1 of "Assessing Dynamic Efficiency: Theory and Evidence" ABEL, MANKIW, SUMMERS
From the financial model, the direct employment figure for the EZ was obtained. According to a report of PwC for analysis of SME park project in Bangladesh, Economic Multiplier Coefficient\textsuperscript{16} of 2.8 which is the International Labour Organisation (ILO) income multiplier. This co-efficient is the indication that for each direct employment created in Bangladesh, approximately 2.8 indirect employment will be generated. Average per capita income in Bangladesh is US$ 1,190. This figure is used to quantify employment generation to economic impact created.

Summation of the total employment (direct and indirect) generated to the dynamic efficiency provides second order economic benefits. This amount when added to the revenue benefits provides the Total Economic Benefits.

Net Economic Benefit is computed by deducting the Total Economic Cost from the Total Economic Benefits.

Internal Rate of Return (IRR) of the net economic benefits has been calculated for the project span of 20 years.

**Results and Discussions**

Base case Economic Internal Rate of Return (EIRR) has been calculated as 17.91\%, which indicates that the project is economically viable.

The project development will generate employment (both direct and indirect) of total economic value of 57.87 million BDT over a period of 20 years.

\textsuperscript{16} Draft Note on Economic Analysis of SME Park Project in Bangladesh prepared by PricewaterhouseCoopers and IIFC