

Environmental Assessment (EA)

Sylhet Hi-Tech Park



Support to Development of Kaliakoir Hi-Tech Park Project

**Bangladesh Hi-Tech Park Authority
Information and Communication Technology Division
Ministry of Posts, Telecommunications and IT**

**Government of the People's Republic of Bangladesh
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Bangladesh**

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Report For	Sylhet Hi-Tech Park (Sylhet Electronics City)

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Abbreviations

BECA	Bangladesh Environmental Conservation Act
BPO	Business Process Outsourcing
BHTPA	Bangladesh Hi-Tech Park Authority
DBFOOT	Design, Build, Finance, Own, Operate and Transfer
DoE	Department of Environment
DPP	Development Project Proposal/Proforma
EA	Environmental Assessment
ECA	Environmental Conservation Act
ECC	Environmental Clearance Certificates
ECR	Environmental Conservation Rules
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMF	Environmental Management framework
ESDO	Environment and Social Development Organization
GoB	Government of Bangladesh
HTP	Hi-Tech Park
ICT	Information and Communication Technology
IEE	Initial Environmental Examination
IIFC	Infrastructure Investment Facilitation Company
IT	Information Technology
ITES	Information Technology Enabled Services
JSTP	Jessore Software Technology Park
MFL	Mean Flood Level
MoEF	Ministry of Environment and Forest
MoICT	Ministry of Information and Communication Technology
NEMAP	National Environmental Management Action Plan
NOC	No Objection Certificate
NTTN	National Communication Transmission Network
OP	Operation Policy
POPs	Point Of Presence
PSDSP	Private Sector Development Support Project
SCC	Site Clearance Certificate
SDKHTP	Support to Development of Kaliakoir Hi-Tech Park
SEC	Sylhet Electronics City
SFYP	Sixth Five Year Plan
STP	Software Technology Park
UNO	Upazila Nirbahi Officer
WB	World Bank

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Executive Summary

The government has its vision 2021 with a target to make Bangladesh a middle income country through the use of ICT in all strata of life. Accordingly the government in its Sixth Five Year Plan (2011 -2015) targeted to make Bangladesh the most preferred destination for ICT and ICT- enabled services through the combined efforts of all stakeholders in both the public and private sectors. The objective during the Sixth Five Year Plan will be to make an effective and maximum utilization of ICT to improve the quality of life of the citizens and promote inclusive growth through human resource development, so that Bangladesh can find its proper place in the field of national and global community.

The Major Targets of the ICT sector in the Sixth Five Year Plan broadly as follows:

- Encouragement of IT enabled services and establishment of ICT incubator, Software Technology Park and IT Villages in suitable locations of the country.
- Expansion of infrastructure facilities for development of ICT sector for transforming the country into Digital Bangladesh.
- Development of ICT skills in public and private sectors for ensuring productivity and efficiency of the economy and using ICT for good governance.
- Ensure women's participation in all professional trainings.
- Development of a national network for establishing connectivity in all government offices and public key infrastructure for electronic transactions.

To achieve the targets, one of the major initiatives will be on hand to establish modern IT parks, Hi-tech parks, incubation clusters in order to attract national and, above all, foreign investment in such knowledge- dense, environmentally-friendly industries as information technology/IT Enabled Services, biotechnology, nanotechnology, and thus to spur the development of a world-class atmosphere for business.

Therefore, in order to implement the target government has been working sincerely in a planned 'IT ecosystem'. The final destination of the 'ecosystem' is to create employment opportunities through the establishment of knowledge-based industries in general and IT / ITES & advanced Hi-Tech industries in particular as well as expanding the business arena of IT entrepreneurs both locally and globally.

To accomplish these objectives the government has an optimistic plan of establishing Hi-Tech Park (HTP) or Software Technology Park (STP) in the divisional and district level. The HTP or STP will work as a hub of IT/ITES and advanced Hi-Tech industries as well as a BPO (Business Process Outsourcing) centre of the country. These will function as a knowledge and innovation sharing centres by integrating both local and international experience through the opportunity of accommodating both national and foreign investors.

To fulfill this idea government is in the process of building Hi-Tech Park in each divisional level and subject to getting adequate amount of land government is also trying to establish HTP/STP in the district level. As part of this process, government started to build HTP at Kaliakoir under Gazipur district and JSTP at Jessore district. Both the cases, substantial work has already been completed. Now the government has initiated of establishing HTP at Sylhet in the name of Sylhet Electronics City (SEC). This will be at Companiganj Upazila under Sylhet district within 162.83 acres of land.

Hi-Tech Park (HTP) or Software Technology Park (STP) is a place, suitable for investment for the Software and IT Enabled Services and industries; where all the physical/logical infrastructure, like, Ready Office Accommodation, Transportation, Telecommunications, High Speed Broadband Internet Access, Data Center, Data Recovery Center, Uninterrupted Power supply, Water supply, Gas supply, Residential and Dormitory facilities, indoor/outdoor entertainment facilities, Cafeteria, Banking etc. services/facilities and securities are to be ensured for the workers and investors.

Initially a Site Clearance Certificate (SCC) is required from the Department of Environment to start the development of the infrastructure of the project and thereafter an Environmental Clearance Certificate (ECC) is required for implementation of the whole work and operation of the project. In case of World Bank supported project at the same time in accordance with World Bank Policy guideline (OP 4.01) an Environmental Assessment (EA) is also required for a project to help ensure that they are environmentally sound and sustainable, thus to improve decision making.

The proposed project site is situated on the eastern side of Sylhet – Salatikor – Companiganj - Bholaganj road, about 25 km away from Sylhet Town and almost 5 km away from Companiganj Upazila Headquarter. The site is 20 km away from the Osmani International Airport and about 28 km from the Sylhet new Railway station and Bus Terminal. The land area of the proposed site for the development of Sylhet ICT Village is 162.83 acres. The land is located in the Khalitazuri Beelerpar Mouza, under the Dhakkin Ronikhai Union in the Companiganj Upazila. It has a J.L number 188, Khatian number 01 and Plot (Dag) number 25. It is a Khash Land and The Ministry of Land gave their concurrence to handover these 162.83 acres of land to Bangladesh Hi-Tech Park Authority for establishing the proposed Sylhet Electronics City (SEC). The transferring process has been made under section 10 of “Non-Agricultural Khas Land Settlement Policy, 1995”. There is no dispute over the land and no legal impediments to use the land for developing the proposed SEC. The mutation process of the land to transfer the Right and Title of the land in favour of BHTPA already completed.

The site is a non-arable flat land with some small sizes shallow ditches on the north side. A borrow-pit which is almost 60 feet width is situated along the highway and passes on the west side of the land. The borrow pit can be used as a water body and can be used also for any recreational purposes to make the view of the site scenic and attractive for the visitors. Over this borrow pit a bridge can be built to enter the project from the highway. The site is almost 15 feet lower than the Sylhet – Bholaganj road. It usually remains under water for 3 to 4 months during the rainy season but also have the possibility of happening flash flood during rainy season.

There should be no chemical process during the construction and operation phases of the project and hence will not generate any liquid effluent and there will be no impact of effluent on the environment. Only domestic waste water is to be generated from the MTB, dormitory, staff quarter and other facilities which need to be properly treated through the water treatment process using septic tank connected with soaking pit.

As the project would have to deal mainly with electronic devices like, computers, mobile phones, electronic equipment, data centre, software, hardware etc., certainly after a certain period of time these will generate e-Wastes from the processes. E-waste is one of the most harmful by-products of ICT industries. Incorrect disposal and dumping of old equipment such as computer parts and other peripheral devices can be detrimental to the environment and cause serious health hazards. Studies have shown that incorrect disposal of old equipment can lead to highly toxic substances like Lead (Pb), Cadmium (Cd) and Mercury (Hg) being released into the environment. These toxic chemicals can contaminate soil and groundwater, creating and spreading further toxicity.

Reducing the amount of computer waste relies heavily upon the reuse of systems that may be out of date, but fully functional. Reusing old computers can manifest itself in two main ways; by the selling or donation of old systems, or by up-grading existing systems (Williams and Sasaki, 2003). The key concept with respect to reuse is to meet the user's needs with existing machines, while extending that machine's lifespan.

In case of WB funded project, the World Bank Operational Policy (OP) 4.01 classifies projects into three major categories (category A, B and C), depending on the type, location, sensitivity and scale of the project, and nature and magnitude of potential impacts. The proposed SEC project under BHTPA will be a category 'B' project according to the World Bank classification. The environmental impacts of the project are expected to be mostly construction related and limited within the project boundaries.

As the IT/ITES/Hi-Tech Park is a recent issue in Bangladesh so under the existing Environmental Conservation Rules (ECR), 1997 IT and Software related type of project/industries was not listed in any category. So during the promulgation of ECR in 1997 it did not come into consideration to include these industries on the categorization list. But Department of Environment during issuance of Site Clearance for the Kaliakoir Hi-Tech Park and Jessore Software Technology Park categorized them 'Red'. So, naturally this project should be "Category Red" project, requiring preparation of an IEE and EIA, and issuance of an Environmental Site Clearance (SCC), and an Environmental Clearance certificate by the DoE.

Environmental Management Plan (EMP) is an integral part of category "Red" project for the Department of Environment and category "A and B" project for the World Bank. A project's EMP consists of the set of mitigation measures for minimizing or removing negative impacts, enhancement measures for further improvement of positive impacts, environmental monitoring arrangements for observing the changes induced by the project interventions and institutional arrangements to be taken during implementation and

operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable level.

As the land is relatively low and below the level of an adjacent highway, hence there should be required to elevate the area up to a certain level. This will require huge land filling causing the site development cost excessively high. At the same time certain area of wetland habitat will be disturbed, resulting in adverse impact on the environment. But if it is implemented keeping the plan of vegetation clearing very minimal only where necessary and mitigation measures are properly executed the impacts will be negligible. Proper facilities of water drainage in case of flash flood or submerging situation will also help to keep the situation better.

One full time environmental specialist for supervision and monitoring of environmental quality and smooth implementation of the project already been appointed in the Project Implementation Unit (PMU).

The findings of this EA suggest that the only negative impacts during pre-construction stage will be vegetation clearing. As there are some local species of herbs and shrubs and for land preparation some of the species needs to be cut. During construction stage, land elevation to a certain level certainly will disrupt the natural surface of the ground, which will obstruct the natural drainage system of the area, if proper mitigation measures are not taken. The proposed project, changes the local landscape of the area to some extent by covering a grass and weed based green area in a built-up area. This will change the natural and visual equilibrium for the local people. Impact on water and soil is not expected to occur as the project does not use any toxic or any chemical for its process and operation. Intervention of flora and fauna and habitats is expected to be negligible due to setting up the facility and its operation. The effect of noise in the operation phase on ambient condition will be insignificant.

The overall finding of the IEE/EA is that the proposed project will not cause any significant adverse environmental impacts if it is implemented keeping the adequate facilities for drainage of water during flash floods and monsoon period , provided that adequate mitigation measures are executed. The proposed mitigation measures are prescribed conceptually in the EA, as an outline EMP. This will be implemented by the contractors/investors in the construction phase and monitored by Implementing Agency as well as investors and developers. The Sylhet HTP will be built as an environment-friendly business atmosphere with a pleasant living environment.

There are no uncertainties in the analysis, and no additional work is required to comply with National Law. Thus, there is no need for further study or Environmental Assessment for obtaining Site Clearance from Department of Environment.

Overall feedback for the project from preliminary consultation with government level stakeholders and local people of different profession has been consistently positive. General

support for the project and useful information was provided from all levels of government officials and local community along with a general consensus that the project would be a nation's best interest.

This EA report was prepared with consideration of available primary and secondary sources of information, stakeholder consultation and site visits. It applies standardized methods of impact prediction and impact management.

The results of this EA suggest that the proposed project is likely to be able to proceed without resulting in any significant impacts to physical, biological, or socio-economic environments, if appropriate management measures are implemented. However, it is recommended that a comprehensive EIA to be conducted to identify environmental and social sensitive features relating to this Project and propose appropriate mitigation measures prior to obtain the Environmental Clearance Certificate from the Department of Environment.

1. Introduction

1.1. Background

1. The demand of IT and IT enabled services are increasing throughout the world and the investors around the world want to have a competitive cost of production. Bangladesh has a sizeable unemployed and educated young population with low labour cost of production, which can be utilized in this sector with proper training and guidance. Bangladesh needs to create skilled manpower and favourable environment conducive for IT/ITeS industries to attract potential foreign and local entrepreneurs for investing in the country.

2. Bangladesh has one of the most attractive population demography in the world. Relatively high young population base as over 34% are in the age group of 15-34 years; which is favourable for IT-BPO industry. State of World Population Report recently published by the United Nations Population Fund (UNFPA) revealed that, the young population across the globe has reached a remarkable 1.8 billion out of 7.3 billion, and most of them live in developing countries like Bangladesh. Some 47.6 million or 30 percent of the total 158.5 million people in Bangladesh are young (10-24 years). This means that Bangladesh needs to invest right now in the human capital of its young people if it wants to reap the benefits of a large demographic dividend," said the report.

3. Sylhet Division has a total literacy rate on an average is 45.0% (out of which 47.0% are male and 43.1% are female). Out of the four districts under Sylhet Division literacy rate of Sylhet district is the highest and Moulvibazar district is the second highest. The total literacy rate of Sylhet District is 51.2% of which male is 53.5% and female is 48.9%, while the total literacy rate of Moulvibazar district is 51.1% of which male is 52.7% and female is 49.5%. In Companiganj upazila has a total literacy rate on an average is 28.8% (out of which 30.9% are male and 26.5% are female) (BBS, 2011). These figures are shown in Table 01.

Table 01: District wise Statistical Information (Courtesy: IIFC, Bangladesh, 2014)

Division	Zilla	Adjusted Population as per census 2011			Population Density per sq KM	% of Population in Age group 15-29	Literacy Rate in Percentage		
		Total Pop	Male	Female			Total	Male	Female
1	2	3	4	5	6	7	8	9	10
Sylhet Division	-	10,296,995	5,126,069	5,170,926	784	26.3	45.0	47.0	43.1
	Sylhet	3,567,138	1,793,858	1,773,280	995	28.3	51.2	53.5	48.9
	Sunamganj	2,564,541	1,284,520	1,280,021	659	24.2	35.0	36.9	33.1
	Moulvi Bazar	1,994,252	981,783	1,012,469	686	27.0	51.1	52.7	49.5
	Hobiganj	2,171,064	1,065,908	1,105,156	792	25.6	40.5	42.2	38.9

4. For creating employment opportunity in the IT/ITES sector, it was felt necessary to develop infrastructures which will create an environment for innovative companies and increase foreign & local investment. To foster the vision 2021 with a target to make Bangladesh a middle income country through the use of ICT in all strata of life will eventually fulfill the demand of the country as well. The key objective of this goal is to make an Information Technology (IT) based country with the promotion of capacity building, development of IT infrastructure facilities and growing of high quality IT/ITES professionals to render services from anywhere and anytime to the doorstep of the people. Therefore, to fulfill this vision government has been working hard in a planned 'IT ecosystem'. The final destination of the 'ecosystem' is to create employment opportunities through the establishment of knowledge-based industries in general and IT / ITES & advanced Hi-Tech industries in particular as well as expanding the business arena of IT entrepreneurs both nationally and globally.

5. To accomplish these objectives the government has an optimistic plan of establishing Hi-Tech Park (HTP) or Software Technology Park (STP) in the divisional and district level. The HTP or STP will work as a hub of IT/ITES and advanced Hi-Tech industries as well as a BPO (Business Process Outsourcing) centre of the country. This HTP/STP will function as a Center of Excellence for knowledge and innovation sharing forum by integrating both local and international experience through the opportunity of accommodating foreign investors also.

6. To establish these resource centres' government is in the process of building Hi-Tech Park in divisional level and subject to getting adequate amount of land government is also trying to establish HTP/STP in district level in phases. As part of this process Kaliakoir Hi-Tech Park under Gazipur district and Jessore Software Technology Park under Jessore district is under implementation and a substantive amount of construction work has already been completed.

7. To build a HTP in Sylhet the Government of Bangladesh has allocated 162.83 acres of land for its development. This land will be used to develop a world-class business environment, conducive for IT/ITeS industry, attracting both from local entrepreneurs or investors and international also.

8. In recent years, there have been significant developments in the ICT sector in Bangladesh. The vision of the government "envisages that by 2021, Bangladesh will reach a trajectory of high-performing growth supported by advanced and innovative technology" and that "Information and communication technology will, by that time, take the society to new heights of excellence giving the country a new identity to be branded as Digital Bangladesh".

9. In conformity with the objectives of "Digital Bangladesh" and ICT Policy 2009, the government has pursued specific strategies within the Sixth Five Year Plan (2011-2015). The plan has put particular emphasis on the development of ICT and set strategic objectives to implement the Government's commitment. In this plan, the government and private industries are expected to implement ICT systems and thus, re-engineer their business processes and become better integrated.

10. The objective of the HTP project is to establish knowledge based industries throughout the country, particularly related to Software and IT Enabled Services, and thus contributes to the national economy and achieve the goals of Vision 2021: Digital Bangladesh. The Government of Bangladesh has the plan of creating basic infrastructure for establishing an HTP in Sylhet. Government has allocated 162.83 acres of land for developing the HTP in Sylhet under Companiganj Upazila. This land will be used to develop a world-class business environment, conducive for IT/ITeS industry. This HTP (ICT village) will attract investments from both foreign and local entrepreneurs.

The specific objectives of the project are:

- To promote balanced development of ICT Industries in North-west region of the country;
- To create basic infrastructure for the establishment of Hi-Tech Park in Sylhet;
- To construct two Multi Tenant Buildings (MTB) and other utility services at the allocated land for creating ready infrastructure for the local and foreign investor;
- To create a conducive environment to attract foreign companies in establishing and operating Software and ITeS industry in Bangladesh;
- To create employment opportunities for the ICT professionals;
- To promote knowledge based industry to realize the Vision 2021: Digital Bangladesh.

The proposed HTP in Sylhet when implemented will ensure the following facilities:

- Single window service
- Strong customer base
- 24/7 technical support
- Qualified manpower
- Competitive pricing
- Tie up with major telecom partners
- Service of International standards
- Inclusion of service for new entrepreneurs including the freelance workers.
- Strong and low cost internet connectivity
- Office space for Software development, call centres, Training centres, along with all recreational facilities for the user of the ICT Centre
- Low rent office space and
- Creation of Green zone or Green area
- Other physical facilities like nonstop/ stable power supply, water, gas, telephone facilities and road development etc.

1.2. Objectives of EA

11. Environmental Assessment (EA) is a formal process to be used to examine the environmental consequences of proposed project and policies and suggest relevant management actions. Contrary to the belief, EA is not meant for examining adverse consequence only; it should also look into the possible positive effects of a development

activity and identify ways of enhancing them further by carrying out modification in the project. A comprehensive process of EA, hence, involves study of the probable changes, physical and biological as well as socio-economic environment which may result from the proposed development activity or project, and formulating a suitable environment management plan to minimize adverse effects and to enhance positive effects.

12. The objective of an EIA is to ensure that potential problems are foreseen and addressed at an early stage in the project's planning and design. To achieve this assessment findings are communicated through an EIA report to all the groups who will make decisions about the proposed project, that is, the project developers, their investors, as well as regulating authorities, planners. Design, execution and operation of the project can be planned in light of the findings of EA / EIA, so that the expected benefits can be sustained with a minimum and acceptable adverse environmental impacts, Thus essentially, an EA/EIA should :

- Review the proposed site of the Sylhet Electronics City (SEC) and identify potential environmental impacts to be considered in the planning and design and implementation stage of the project
- Identify sources of impacts of the project activities, during pre-construction, construction and operational stages, on the various environmental components and recognizes those which are critical to the change resulting from the project its development or construction phase.
- Recommend an Environmental Management Plan(EMP)to avoid or mitigate adverse environmental impacts and enhance positive contributions of the project
- Prepare implementable Environmental Management Plan (EMP) integrating the measures the identified impacts with suggested mitigation measures and an appropriate monitoring and supervision mechanism to ensure EMP implementation.
- Recommend suitable institutional mechanisms to monitor and supervise effective implementation of the EMP.

1.3. Categorization

13. As the Hi-Tech Park or Software Technology Park is a recent issue in Bangladesh, as a result, under the existing Environmental Conservation Rules (ECR), 1997 these types of projects/industries were not listed any category on DoE list. So during the issuance of ECR in 1997 by DoE did not come into consideration to include these industries on the categorization list. But recently the Department of Environment during issuing the site clearance for the Kaliakoir Hi-Tech Park and Jessore Software Technology Park categorized those projects as 'Red.' Therefore, Hi-Tech Park at Sylhet would be same, "Category Red" project, requiring preparation of an IEE and EIA, and issuance of a Site Clearance Certificate (SCC), and thereafter an Environmental Clearance certificate by the DoE.

14. On the other hand, World Bank categorizes all projects according to the magnitude or scale of their anticipated environmental impact. Projects classified as 'A' with significant adverse environmental impacts that are sensitive, diverse and unprecedented. Whereas the project classified as 'B' if potential adverse environmental impacts are less adverse than 'A' classified projects. As the HTP in Sylhet has no possibility of polluting any physical, physico-chemical, biological and socio-economic environment in the area and if the construction and operation of the project adopt an environmentally sustainable manner, the impacts would be minor and insignificant. Therefore, in accordance with WB policy the HTP at Sylhet will fall in category 'B' project must require an Environmental Assessment (EA). In compliance with the above requirements, an environmental assessment and review procedures were prepared and included.

2.0. Legal Framework

2.1. Legal Requirements

15. This section identifies the relevant legislative, regulatory and policy requirements of the government of Bangladesh for the project. The environmental legislations in Bangladesh provide the context within which the regulatory compliance of Private Sector Development Support Project (PSDSP) for WB is ensured. Similarly, the operational policies of the World Bank provide the context for environmental management in the project. It is, hence, imperative that PSDSP shall comply with the legal requirements of the GoB and the operational policies of the Bank for the proposed Sylhet Electronics City project.

16. As part of its legal compliance, Bangladesh Hi-Tech Park Authority will conduct its processes in compliance with relevant local, national and international legislation. This requires the project to be delivered in accordance with Environment related acts, rules, guidelines developed by the GoB, World Bank policy guidelines (if funded by WB) and international agreements to which Bangladesh is a signatory.

2.2. Environmental Legislative Framework

17. Under the Bangladesh Environmental Conservation Rules, 1997 this type of project was not classified under any category as the HTP or STP and IT related industries is a very recent issue in Bangladesh. So during the preparation of ECR in 1997 it did not come into consideration to include these industries on the DoE categorization list. But recently the Department of Environment during awarding site clearance for the Kaliakoir Hi-Tech Park and Jessore Software Technology Park categorized the project as 'Red.' Therefore, Hi-Tech Park at Sylhet would be same "Category Red" project, requiring preparation of an IEE and EIA, and issuance of a Site Clearance Certificate (SCC), and thereafter an Environmental Clearance certificate by the DoE.

2.3. Compliance with Environmental Related Policies in Bangladesh

18. The environmental legislations in Bangladesh provide the context within which the regulatory compliance of PSDSP for project is ensured. Similarly, the operational policies of the World Bank provide the context for environmental management in the project. It is, hence, imperative that PSDSP shall comply with the legal requirements of the GOB and the operational policies of the Bank of the proposed Sylhet Electronics City project. The major relevant policies, acts, rules, plans and strategies of GoB are:

- a) National Environment Policy, 1992
- b) National Environmental Management Action Plan (NEMAP), 1995
- c) Bangladesh Environmental Conservation Act (BECA), 1995(amended 2000, 2002, 2010)
- d) Environmental Conservation Rules (ECR), 1997(amended 2002, 2003, 2010)
- e) Bangladesh Environmental Court Act, 2010

2.3.1. National Environmental Policy, 1992

19. The concept of environmental protection through national efforts was first recognized and declared with the adoption of the Environment Policy, 1992. The policy sets out the basic framework for environmental action together with a set of broad sectoral action guidelines. Key elements of the policy are:

- Maintenance of the ecological balance and overall development of the country through protection and improvement of the environment;
- Protection of the country against natural disaster;
- Identification and regulation of all activities, which pollute and degrade the environment;
- Ensuring environmentally sound development in all sectors;
- Ensuring sustainable, long term and environmentally sound base of natural resources; and
- Promoting active association with all environmental international initiatives

20. Environmental Policy, 1992 highlights specific actions with respect to the Industrial sector and workers health and safety at working place. The policy details the following requirements:

- To phase in corrective measures in polluting industries(Sec: 3.2.1);
- To conduct Environmental Impact Assessment (EIAs) for all new public and private industrial developments(Sec: 3.2.2);
- To ban, or find environmentally sound alternatives for, the production of goods that cause environmental pollution(Sec: 3.2.3); and
- To minimize waste and ensure sustainable use of resources by industry (Sec: 3.2.4);

Therefore, Under the National Environmental Policy, Department of Environment is mandated to review and approve all Environmental Impact Assessments.

2.3.2. National Environmental Management Action Plan (NEMAP), 1995

21. NEMAP is a wide-ranging and multi-faceted plan, which builds on and extends the statements set out in the National Environmental Policy. NEMAP was developed to address issues and management requirements and set out the framework within which the recommendations of the National Conservation Strategy are to be implemented. NEMAP has the following broad objectives:

- Identification of key environmental issues affecting Bangladesh;
- Identification of actions to halt or reduce rate of environment degradation;
- Improvement of the natural environment;
- Conservation of habitats and bio-diversity;
- Promotion of sustainable development; and
- Improvement of the quality of life of the people.

2.3.3. Bangladesh Environmental Conservation Act (BECA), 1995

22. The Bangladesh Environmental Conservation Act (BECA) of 1995(amended 2000, 2002 and 2010) is the main legislative framework document relating to environmental protection in Bangladesh. This umbrella act includes laws for conservation of the environment, declaration of ecologically critical area, restrictions regarding vehicles emitting smoke injurious to the environment, remedial measures for injury to the ecosystem, improvement of environmental standards, control and mitigation of environmental pollution etc. This act

established the Department of Environment (DOE), and empowers its Director General to take measures as he/she considers necessary which includes conducting inquiries, preventing probable accidents, realizing compensation from the polluter, coordinating with other authorities or agencies, and collecting & publishing information about environmental pollution.

The main objectives of the act are:

- Declaration of ecologically critical areas and specify the activities or processes that cannot be initiated or continued in an ecologically critical area
- Restrictions regarding vehicles emitting smoke injurious to environment
- Remedial measures for injury to ecosystem
- Provision for Environmental Clearance Certificate to start a project or industry
- Restriction on hill cutting
- Restriction on production, importation, transportation and storage of hazardous wastes
- Restriction on ship breaking activities that creates pollution
- Restriction to changing classification of wetlands
- Specification of standards for quality of air, water, noise and soil for different locations and activities
- Specification of standard limits for discharging and emitting waste; and
- Formulation and declaration of environmental guidelines whenever necessary

23. According to this act (Section 12), no industrial unit or project shall be established or undertaken without obtaining, in a manner prescribed by the accompanying Rules, an Environmental Clearance Certificate (ECC) from the Director General of DoE.

2.3.4. Environmental Conservation Rules (ECR), 1997

24. The Environment Conservation Rules, 1997 was issued by the Government of Bangladesh in exercise of the power conferred under the Environment Conservation Act, 1995. Under these Rules, the following aspects, among others, are covered:

- Declaration of ecologically critical areas;
- Classification of industries and projects into 4 categories;
- Requirement of Environmental Clearance Certificate for various categories of projects or industries;
- Requirement for IEE/EIA according to the category of the project;
- Procedures for issuing the Environmental Clearance Certificate;
- Renewal of SCC or ECC;
- Provision of standards for quality of air, water and sound and acceptable limits for emission discharges from vehicles and other sources.

25. Rule 7 of ECR'97 classifies industrial units and projects into four categories depending on environmental impact and location for the purpose of issuance of ECC. These categories are:

- Green
- Orange A
- Orange B, and
- Red

26. Industrial units and projects that are considered to be low polluting are categorized under "Green" and shall be granted Environmental Clearance directly. For industrial units and projects falling in the Orange- A, Orange- B and Red Categories, firstly a site clearance certificate and thereafter an environmental clearance certificate is required from DoE. A detailed description of those four categories of industries has been listed in Schedule-1 of ECR'97. Apart from the general requirements, for every Orange B and Red category proposed industrial unit or project, the application must be accompanied by feasibility report, an Initial Environmental Examination (IEE), Environmental Impact Assessment (EIA) based on approved TOR by DOE, Environmental Management Plan (EMP) etc.

27. Though HTP related type of project was not categorized under the current legislative documents of DoE, but according to the recent DoE decision and the instance of categorizing KHTP and JSTP under category 'Red' the HTP in Sylhet might be labeled as 'Red' category. Accordingly the project is categorized as Category 'B' as per the World Bank Operational Policies. Hence, the project requires an IEE for site clearance/environmental clearance. In this respect, potential environmental, social and cultural impacts of the proposed project need to be identified in IEE report where adverse effects and mitigation measures as well as benefits would be addressed. For the Environmental Clearance Certificate from DoE a comprehensive Environmental Impact Assessment needs to be implemented in accordance with the TOR of SCC.

2.3.5. Environment Court Act, 2010

28. The government of Bangladesh has given highest priority to environmental pollution and passed the Environment Court ACT, 2010 for the trial of offences relating to environmental pollution and matters incidental thereto changing the previous Environment Court Act, 2000.

2.4. Implications of Policies and Environmental Clearance Procedure

29. Basic legislative tools for EIA in Bangladesh are the Bangladesh Environmental Conservation Act, 1995 and the Environmental Conservation Rules 1997. Department of Environment (DOE), under the Ministry of Environment and Forest (MOEF), is the regulatory body responsible for enforcing the BECA'95 and ECR'97. The ECR'97 includes categories of projects, but this type of HTP/STP project was not categorized under the legislative documents of DoE. However, HTP at Sylhet might be categorized as Red, will require initial

environmental examination with EMP and DoE Site Clearance and thereafter, Environmental Clearance.

30. It is the responsibility of the project proponent to implement an IEE and EIA of the development proposal. The responsibility to review EIAs for the purpose of issuing an Environmental Clearance Certificate (ECC) rests on DoE. The procedures for “Red” Category include submission of:

- An Initial Environmental Examination (IEE)
- Environmental Impact assessment (EIA)
- An Environmental Management Plan (EMP)

31. Environment clearance has to be obtained by the respective implementing agency / project proponent from Department of Environment (DOE). The environmental clearance procedure for “Red” Category projects can be summarized as follows:

Application to DOE → Obtaining Site Clearance → Submission of EIA study report with EMP → Applying for Environmental Clearance → Obtaining Environmental Clearance → Environmental Clearance Subject to annual renewal

32. It is to be mentioned here that, site preparation and some preliminary works, including some initial construction activities will be performed by HTPA through government financing or donor agency financing. In that case Site Clearance needs to be taken by HTPA as a proponent. But government has a plan to run the park by private developers /investors. The appointed developer/investor will carry out the next job by setting the IT based industries in the park in accordance with a contractual agreement with the government. In this phase the developer or investor will set up industries on the basis of his/her plan subject to conformity with the contractual agreement with the government , so it will be the developers/investor responsibility to perform EIA and apply for Environmental Clearance Certificate from the Department of Environment.

2.4.1. Steps to be followed for Environmental Clearance Certificate

33. The following are the steps needed to be followed getting an environmental clearance certificate from the Department of Environment (DOE).

- (a) Feasibility Study Report of the Project (for proposed industries or projects);
- (b) Initial Environmental Examination (IEE) Report/ EIA, layout plan (indicating the site), design and time-schedule to construct the HTP and the process-flow diagram;
- (c) Environment Management Plan (EMP);
- (d) No-objection-certificate (NOC) from the local authority;
- (e) Mitigation measure with respect of adverse environmental impacts together with a plan to reduce pollution load;

- (f) Outlines of relocation, rehabilitation plan (where applicable); and
- (g) Other relevant information.

2.5. World Bank Safeguard Policies (In case of WB funded project)

34. The objective of safeguarding policies of the World Bank is to prevent and mitigate undue harm due to environmental impacts to the people and nature associated with project activities supported by the Bank. Safeguard policies provide a platform for the participation of stakeholders in project design, and act as an important instrument for building ownership among local populations. Safeguard policies of the WB are aimed at avoiding and/ mitigating environmental impacts associated with projects supported by the Bank. Safeguard policies of the WB that could be triggered for PSDSP are summarized in Table 02.

S.No.	World Bank Policy	Reasons of Applicability	Addressed by
1	Environmental Assessment OP 4.01	Project is likely to have impact on natural environment. Particularly, air, water land, human safety, natural habitats, forestry.	Carrying out an Environmental Assessment and preparing an environmental management plan to avoid/mitigate environmental impacts
2	Natural Habitats OP 4.04	Project passes through / impacts sensitive natural habitats	Preparation of environmental management plan to address impacts, on Natural Habitats
3	Forestry OP 4.36	Project passes through or is adjacent to major forest areas	Preparation of the environmental management plan to address impacts, if any, on forest areas

Table02: The safeguard Policies of World Bank on Environmental Issues

35. In addition to the above mentioned safeguard policies; BP 17.5 exists as the Bank Disclosure Policy, which also relates to safeguards. Bank disclosure Policy supports decision

making by the Borrower and Bank by allowing the public access to information on environmental and social aspects of projects. The policy requires disclosure in both English and Local language before project appraisal and must meet the World Bank standards.

2.5.1. Environmental Policy OP 4.01(Environmental Assessment)

36. The Bank requires Environmental Assessment (EA) of projects proposed for Bank support to ensure that they are environmentally sound and sustainable, and thus to improve decision making.

37. EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout the project implementation.

38. EA takes into account the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples and physical cultural resources); and trans-boundary and global environmental aspects.

39. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.

40. The borrower/proponent is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements. The Bank reviews the findings and recommendations of the EA to determine whether they provide an adequate basis for processing the project for Bank financing. When the borrower has completed or partially completed EA work prior to the Bank's involvement in a project, the Bank reviews the EA to ensure its consistency with this policy. The Bank may, if appropriate, require additional EA work, including public consultation and disclosure.

2.5.2. Environmental Screening

41. The World Bank classifies the proposed project into three major categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

42. Category A: A proposed project is classified as Category 'A' if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For Category 'A' project, the borrower is responsible for preparing an EIA.

43. Category B: The proposed project's potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats- are less adverse than those of Category 'A' projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than Category A projects.

44. Category C: A proposed project is classified as Category 'C' if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category 'C' project.

2.5.3. Applicability of DoE and WB Policy 4.01

45. The Department of Environment (DoE) has issued EIA Guidelines for Industries (this document was released in December 1997) and addresses the IEE and EIA for several industrial sectors, project and activities. Each Project Proponent shall have to conduct an EIA, and is expected to consult and follow the DoE guidelines.

46. According to WB Operational Policy (OP 4.01), the nature of environmental assessment to be carried out for a particular sub-project would largely depend on the category of the project.

47. As already mentioned before, the World Bank Operational Policy (OP 4.01) classifies projects into three major categories (category A, B and C), depending on the type, location, sensitivity and scale of the project, and nature and magnitude of potential impacts. The proposed project under HTPA will be a category B project according to the World Bank classification, since potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats- are less adverse and impacts are site specific. The environmental impacts of the project are expected to be mostly construction related and limited within the project boundaries.

48. As summarized in section 2.0 on legal framework, any new zone development would be required to perform an EIA and obtain an ECC from the GoB. Similarly, all 'Category A and B' projects would need to perform an EA to comply with the safeguard policies of The World Bank.

49. In line with both these requirements, all 'Category A' and 'B' sub-projects will be subjected to an environmental assessment process, and will ensure that all key environmental issues are addressed in the project. This shall comprise the following steps.

- i) a screening exercise that identifies the project category and establishes the need for conducting an EA;
- ii) an IEE that defines the scope of EA (for category A and B Projects)
- iii) Securing site clearance certificate from the DoE and commencement of EA;
- iv) Prepare EA and EMP and secure clearances (DoE and World Bank);
- v) Implement EMP and monitor its effectiveness.

50. All relevant acts, policies and regulations with this project will be followed by the borrower (proponent/developers/ project authority).

3.0. Detail Environmental Features

3.1. EIA Procedures

51. In Bangladesh the EIA procedure passes through three tiers in order to optimize the resources required for conducting EIA studies. These three tiers are:

- Screening
- Initial Environmental Examination(IEE); and
- Detailed EIA (EIA)

- Screening decides whether the EIA process should be applied to a development project, and if it is required, that is, IEE or EIA.

52. In case of Sylhet HTP as it is 'red' category it requires crossing the above mentioned tiers in phases.

53. Initial Environmental Examination (IEE) helps in understanding the potential extent of environmental changes and in finding ways to mitigate or enhance them by considering the available information, or the past experience or standard operating practices. The EIA procedure carries out, a detailed examination of impact, by conducting relevant surveys and monitoring studies, applying more rigorous impact prediction tools where necessary and ensuring effectiveness of the mitigation and enhancement measures.

54. In the above mentioned tiered process, EIA can be carried out only up to a tier at which environmental aspects of a project become clear, or otherwise for proceeding to the next tier. Conducting EIA in tiers helps in optimizing the resources as well as to increase efficacy of the exercise by maintaining a better focus. Another advantage of a tiered approach is that the extent of enquiry or examination expands with the advancing development of the project plans. Thus the tiered process becomes a “concurrent” EIA process; and ensures that impacts are examined at a very early stage in project planning and not later when sites or designs are already decided by other factors. The EIA process, thus, gets truly integrated with the development process.

3.1.1. Criteria for locating industrial plants

55. According to EIA guideline of the DoE proper location of an industrial plant is often crucial for an effective environmental management. Though for plants with significant potential for environmental impacts only EIA will indicate suitability of a location, selection of candidate sites in different categories of industries should be done keeping in view the following criteria.

a) The location of an industry should be the area which is designated or likely to be designated as an industrial zone, under the town and country planning regulations.

b) While selecting sites for industries the following features should be taken into due consideration:

- Environmentally or otherwise sensitive areas
- High tide line in coastal areas, or natural or modified flood plain boundary
- Boundary of the nearest human settlement
- Highway/Railway boundary

c) ‘Forest land’ or prime agricultural land should be avoided as far as practicable

d) The industrial premises should adequately provide for:

- Storage of solid wastes
- Treatment of waste water
- Reuse of treated wastewater
- Green belt of reasonable width around the site perimeter, depending upon the size and pollution potential of the industry

e) Industrial plants with high pollution should avoid the vicinity of:

- Catchment area of public water supply reservoir
- Recharge area of aquifer of present or possible water supply use
- Areas known to suffer from frequent invasions
- Areas prone to flooding and earthquake

Other factors which need to be taken into consideration from the point of view of potential impacts include:

- Assimilative capacity of receiving body of water
- Effect on availability of existing infrastructural facilities to the local population like water supply, housing, power
- Likely induced growth around the industrial site
- Views of the local people likely to be affected

3.1.2. Baseline studies

56. Existing background, i.e., baseline condition of environment states the present status of different components of environment in absence of the project. The main objective of examining the present environment is to provide an environmental baseline against which potential impacts from construction and operational phases of the project can be compared.

57. A second important function of establishing a baseline for parameters such as air and water quality is to ensure that any problems arising from existing sources are not erroneously attributed to the project under study. In the present study the different environmental components, examined for setting baseline conditions of the project area, are physico-chemical, biological and socio-economical.

58. The task is generally achieved by reviewing all available material on the project and environmental setting, and by performing reconnaissance of the site. If the available data is insufficient, to make a reliable assessment of likely environmental impacts, additional data, as required, should be obtained through field monitoring and studies. It would be desirable to seek advice of the environment related agencies concerned in order to save efforts and minimize cost.

59. Site visits would help identify many of the important resources likely to be affected, such as soils, vegetation condition, water regime, relationship to the nearest communities and public opinion. These visits will uncover many unforeseen factors that cannot be otherwise anticipated.

60. It is desirable that informal interviews are held with local residents and communities likely to be affected, to assess the local situation. This will make it possible to gauge public reaction, possible support or opposition to the project and the reasons for such opinions. They may also be asked how the proposal should be revised to render it acceptable or supportable.

61. Baseline studies are generally divided into two sections,

- Those related to the project and
- Those related to the background environmental features of the project site. (This should cover not only the project site in proper, but generally an area of 5 km. radius

around the site and also the surface water systems neighbouring the site) (DoE Guidelines, 1997).

3.1.3. Setting the Boundaries of an IEE by identifying significant issues

62. This is the most important step of the IEE/EIA exercise. The baseline information collected in step provides the basis for deciding on the boundaries of the required environmental examination.

63. The elements of scoping include geographical boundary, time horizon for alternative actions to be considered, affected groups, institutions, agencies and significant environmental issues to be investigated.

64. The scoping should cover all phases of an industry or project that is siting, construction, operation and closure. The important question, however, is how far into the future the impact examination should be taken. Perhaps, where possible, the public affected by the activity and other interested parties as well. For this purpose scoping session may be organized.

65. It is to be mentioned here that, to set the scoping, a session was organized at the Companiganj Upazila Parishad office on 09th November 2014, officials from different government agencies, local bodies and local people were present at the session. The detail environmental features within 5 km. of the project are shown in Table 03.

Sl. No.	Location	Environmental Features
1	North side of the project up to 5 km. distance	Katakhal river → Telikhal village → Choto Rauti – Boro Rauti Jalmahal → Khalitajuri beel (North-East) → Lama Deksibari village and Fethar village(North – East)
2	West side of the project up to 5 km. distance	About 60 feet width burrow pit → Sylhet-Companiganj Highway → West Barni village and East Barni village → Companiganj village → Bilajore village
3	South side of the project up to 5 km. distance	Barni Haor → Gourinagar village
9	East side of the project up to 5 km. distance	Furarapar village → Akhaikuri group Jalmahal

Table 03: Detail Features up to 5 km. distance from the project site

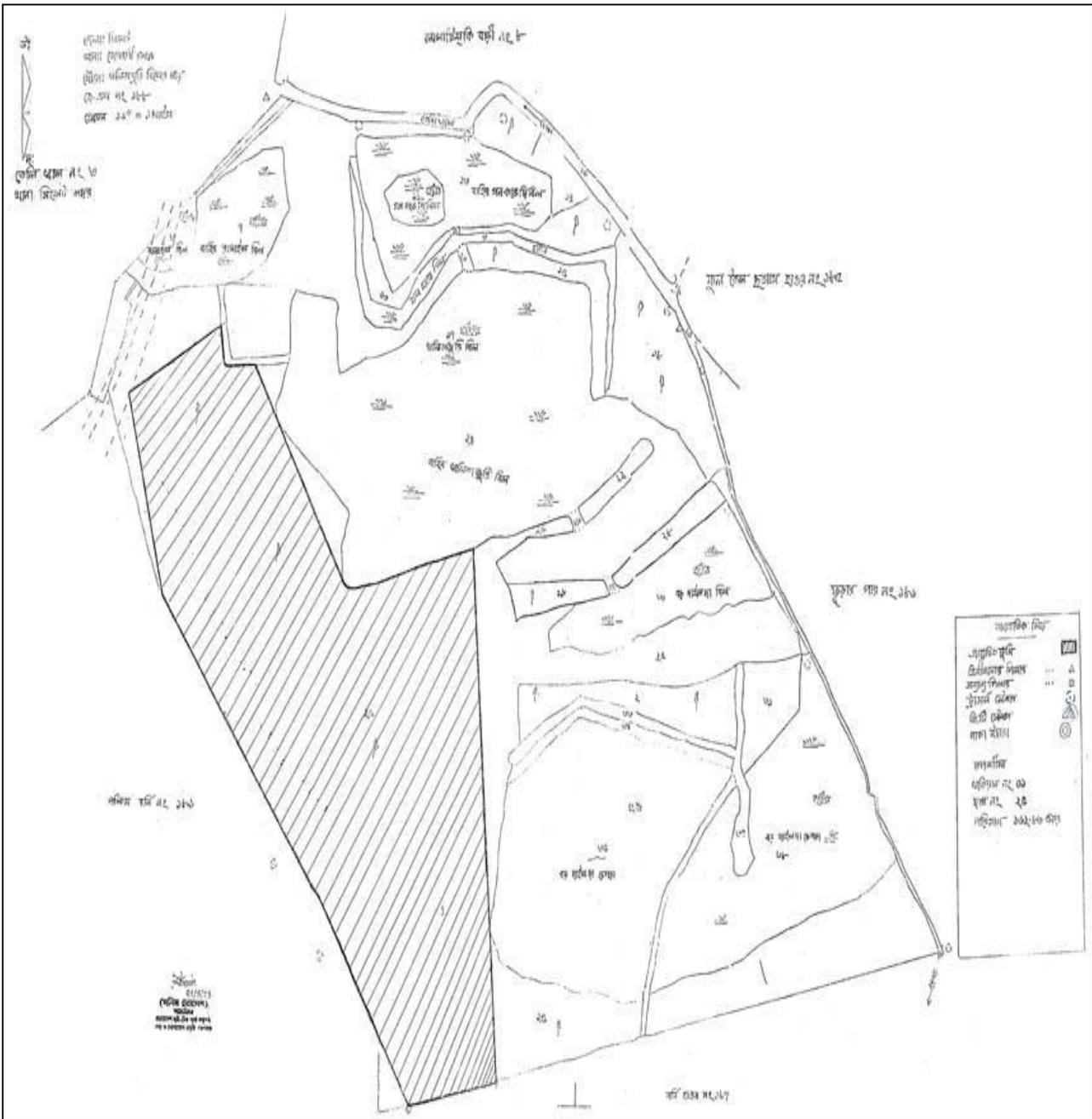


Fig 01: Mouza map of the site

4.0. Methodology

67. The various activities required for carrying out EA study have to be undertaken by several individuals and organizations, each being responsible for a specific activity.

68. The primary responsibility for carrying out an EA study of any project lies with the project proponent. For this project (SEC) primary responsibility lies to BHTPA as this agency will start some physical and construction work for the project and thereafter responsibility will be borne by the developer/investors as they will implement next segment of the project. As stated earlier the EIA/EA should be carried out in tiers. An EIA procedure should be initiated simultaneously with the project planning and that the level of efforts required for various tiers of EIA should be commensurate with the project development, throughout the stages of its identification to implementation.

69. The task of preparing the EA report consisted of the following sequential components:

- Familiarization with and review of various project actions of the PSDSP projects;
- Identification and screening of the environmental parameters relevant to the proposed project actions in the HTP area through a scoping process;
- Avoidance/ mitigation measures to address the potential negative impacts, and preparation of a monitoring program during the period of project implementation;

70. Environmental assessment (EA) is an integral part of development planning. It is essential that environmental issues are properly evaluated in terms of impacts and relevance, and are integrated into each stage of the project cycle. The proposed actions under the SEC involve interventions in the implementation of various infrastructures in the project area. In conforming to the requirements of preparing an EA report, a methodology was developed in accordance with the WB's environmental assessment guidelines. The period of preparing the EA was from 8th November 2014 to 23rd December 2014, and field visits for data collection was done on 8th – 9th November 2014 and 23rd December 2014.

5.0. Description of the Project

5.1. General

71. The design and site development strategy of the project not yet finalized. A feasibility study was done by the Infrastructure Investment Facilitation Company (IIFC), Bangladesh and in accordance with the feasibility study multiple options (three) suggested for site development. This EA study made largely based on the Master Plan described in the feasibility study.

72. As the project area falls in the earthquake region of Bangladesh and the project area is sufficiently large, high-rise buildings avoided in the feasibility study. Buildings up-to 5 storied are suggested for Multi-Tenant Building (MTB) and Hotel buildings. Other buildings are of

double or single storied. Steel frame structure has been proposed for the 5-storied MTBs. Alternatively, the study also proposed to construct the buildings on RCC frame-structure. Other buildings are proposed for traditional RCC and brick structures. The study also suggests, the steel frame structure will be costlier than traditional construction, but it will take less time for construction. With this possibility of design and structure that proposed in the feasibility study, it can also think other alternatives. In fact, there are many earthquake prone countries in the world. Japan is one of them as the country sits on the “Pacific Ring of Fire”. The Ring of Fire is an area in the Pacific Ocean where the movement of the earth’s plates causes frequent earthquakes and volcanic activity. Japanese people experience the shaking of earthquake very often. But in Japan they have been built most of their multi-storied buildings resistant to earthquake. From the seismic point of view Sylhet region is less vulnerable than Japan. So, in the Sylhet HTP if buildings are built with earthquake resistant, high rise buildings beyond 5-storied can be built.

73. On the basis of IIFC feasibility study, Site development is proposed by a) raising the entire land with dredge spoils, after making a periphery earthen embankment around the project area, and keeping some water body, such as ponds and lakes in between b) alternately, the buildings may be constructed on scattered raised islands and c) buildings is to be built on pillars, keeping the ground at original low level and allowing the water to pass freely under the buildings.

74. The proposed project site is situated on the eastern side of Sylhet – Bholaganj Road (via Companiganj), about 25 km away from Sylhet Town and almost 5 km away from Companiganj Upazila Headquarter. The site is 20 km away from the Osmani International Airport and about 28 km from the Sylhet new Railway Station and Bus Terminal. The land area of the proposed site for the development of Sylhet HTP is 162.83 acres. The land is located in the Khalitazuri Beelerpar Mouza, under the Dhakkin Ronikhai Union in the Companigonj Upazila. It has a J.L number of 188, Khatian number 01 and Plot (Dag) number 25. It is a government khash land and The Ministry of Land gave their concurrence to handover these 162.83 acres of land to Bangladesh Hi-Tech Park Authority for establishing the proposed Sylhet Hi-Tech Park (SHTP). The transferring process was carried out under section 10 of “Non-Agricultural Khas Land Settlement Policy, 1995”. There is no dispute over the land and no legal impediments to use the land for developing the proposed SEC on the site.



Photograph 01: View of the proposed project site

75. The site is a non-arable flat, low land with some small sizes shallow ditches on the north side. A borrow pit which is almost 60 feet width is situated along the highway and passes on the west side of the land. The land is almost 15 feet lower than the Sylhet -Companiganj road. It remains under water for 3 to 4 months during monsoon season.

5.2. Options for site Development

76. On the basis of a feasibility study done by IIFC Bangladesh, they proposed three options for site development.

A. The development of Sylhet Electronics City site is proposed by dredge spoil within earthen embankments, keeping some water body – ponds and lakes. This is traditional land-filling for large areas. And this can also be undertaken in parts, making small compartments with earthen embankments.

B. Instead of raising the entire project site, smaller islands may be developed by raising the area where the buildings planned. The individual buildings are constructed on raising islands, keeping other areas low at the original ground level. These islands are connected by road constructed on embankments.

C. Another method is to construct all the buildings on pillars, higher than the flood level and keeping the ground at original low level. Later the buildings are interconnected by elevated concrete roads built on pillars. This will allow water to pass under the buildings and the roads.



Photograph 02: Katakhal Bridge over Katakhal River near to the site

77. It is stated earlier that, the land is quite below the existing level of Sylhet- Companiganj highway. To prepare the site up to highway level will require to raise the land at least 15' and to bring it in a desirable level; it will also require more 10' height of the entire proposed area. In addition, during the rainy season the land goes under the water for a period of time. In case of any flash flood which happens sometime in rainy season prolonged the staying of water.

78. It is also suggested to developed land in phases, part by part. This is to be developed by constructing embankment all around the site, taking earth from the project land. This will create a polder and sub-polders. Later, these polders are to be filled by pumping dredge spoil in the polders, with proper care and drainage facilities. The dredge spoils may be procured locally. Or, this may also be done by bringing dredge sand from far places in river barges. The land filling by river sand will be more stable and economical.

6.0. Master Plan

79. The Master plan for the Sylhet Electronics City has been prepared by IIFC incorporating various required buildings and installations in different zones, as per programme design and requirement of the industry.

80. For development of the Sylhet Electronics City, the project area is divided into five different Blocks. Each block is attributed to different types of business. The details of the developments are provided below.

Figure 03: Master Plan Layout of Project Site (showing different Zones/Blocks, source: IIFC)

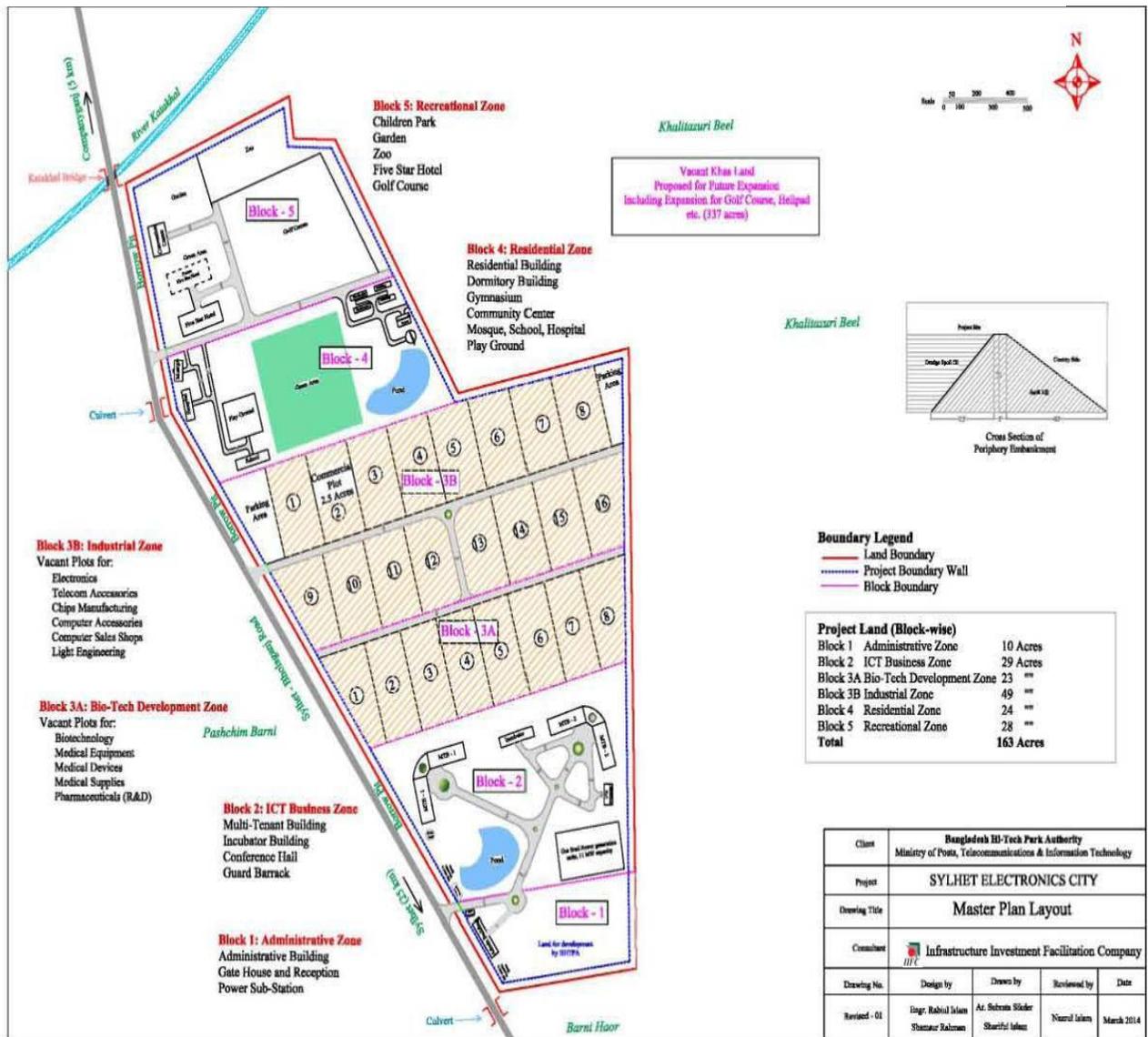


Table04: Total 163 acre land is distributed in five Blocks/ zones, as follows

Block	Type of Development	Approximate area in acres
Block-1	Administrative zone	10
Block 2	ICT business zone	29
Block -3	Industrial and Bio-Tech zone	72
Block 4	Residential zone	24
Block -5	Recreational zone	28
Total		163

Total 163 acre land is distributed in five Blocks/ zones, as follows

Table05: Block wise Development of the project

Sl.	Installation	Type	Length	Width	Description			Total Area
			ft	ft	Size (sft)	Floors	Units	(sft)
General Site development								
1	Earthwork, Internal roads and BW							
2	Off-site Infrastructure							
BLOCK-1: Administrative Zone								
1	Administrative Building	Building	200	50	10,000	2	1	20,000
2	Gate House & Reception	Building	50	25	1,250	1	1	1,250
3	Power Sub-station	Building	40	25	1,000	1	1	1,000
BLOCK-2: ICT Business Zone								
1	Multi Tenant Building 1	Building			43,000	5	1	215,000
2	Multi Tenant Building 2	Building			43,000	5	1	215,000
3	Incubator	Building	200	50	10,000	2	1	20,000

Sl.	Installation	Type	Length	Width	Description			Total Area
			ft	ft	Size (sft)	Floors	Units	(sft)
4	Conference Hall	Building	100	100	10,000	1	1	10,000
BLOCK-3: Industrial and Bio-tech Zone								
A	ICT Industrial Plots	Vacant Plot	16 Plots		(2.5 acre)			(40 acre)
B	Bio-tech dev. Plots	Vacant Plot	8 Plots		(2.5 acre)			(20 acre)
BLOCK-4: Residential Zone								
1	Residential Buildings	Building	100	25	2,500	5	4	50,000
2	Dormitory Buildings	Building			3,000	5	1	15,000
3	Community Center	Building	100	50	5,000	1	1	5,000
4	School	Building	100	50	5,000	2	1	10,000
5	Hospital	Building	150	50	7,500	1	1	7,500
6	Mosque	Building	100	50	5,000	1	1	5,000
BLOCK-5: Recreational Zone								
1	5-star Hotel Buildings	Building	250	100	25,000	5	1	125,000
2	Convention Center	Building	150	100	15,000	2	1	30,000
3	Garden	Plot						
4	Zoo	Plot						
5	Golf Course	Plot						

6.1. Project Development Process

81. Since the land is quite large in area, it is proposed that the site development should be done by dredge spoils. It is to be done by making a number of compartments and filling block by block. The total 163 acres of land of the project site are to be developed in the beginning of project initiation.

82. After land-filling the external boundary wall, along with necessary entry/ gates, is to be constructed along the periphery of project land. It may be mentioned here that by raising the land by 25 ft. the outer slope of the embankment will take up about 40 ft. wide. The boundary wall of the project will be constructed on the raised ground. After that, the project blocks will be demarcated as per Master plan and the network of internal main road will be demarcated.

83. Initially BHTPA will construct the Administrative Building in Block-1. It will also arrange providing the common utility facilities and all the off-site infrastructures. This will make rest of the project site ready for delivery to private investors or developers. In the initial stage, BHTPA may allow the selected private investor to use the space in Administrative building, till they complete the MTB and start using their own space.

84. After agreement with the private sector investors or developers, the selected private investor in consultation with BHTPA will develop the entire project in phases, in different Blocks and zones.

6.1.1. Land Development Plan by Dredge Soil

85. The land at the project site is a flat low land. It is quite lower than the Sylhet- Bholaganj road. The land remains under water for 3 to 4 months during the rainy season and in case of any flash-flood during that time prolongs the situation.

86. The Land is to be developed at least 25 feet height, if it is to be brought to a desirable level. The land-filling at the project site will be of quite substantial quantity and the cost of land development will also be high. Detailed digital topographic surveys, to be carried out before project implementation, will provide more accurate details.

87. It is suggested that the land is developed in phases, part by part. This is to be developed by constructing embankment all around the site, taking earth from the project land. This will create a polder and sub-polders. Later, these polders are to be filled by pumping dredge spoil in the polders, with proper care and drainage facilities. The dredge spoil may be procured locally. Or, this may also be done by bringing dredge sand from far places in river barges. The land filling by river sand will be more stable and economical.

6.1.2. Building Design and Brief Specification

Some salient features of the design of the project buildings are mentioned below.

6.1.2.1. Structural Steel Building

88. The main Multi Tenant Buildings (MTB proposed to be constructed as Smart Building with steel structures for quick implementation as well with e-glass (solar radiation limited glass for energy conservation).

89. The soil conditions on the site are to be tested before construction work starts, by undertaking a detailed sub-soil investigation by a reliable firm. The recommendations of the soil test results are to be used for foundation design.

90. As per discussions with BHTPA Project office the MTB Building has been designed with Structural Steel Frame and flooring system. This means that the whole building frame and structure will be built with structural columns and beams. The floors are to be made of metal deck on Open Web Steel Joists (OWSJ). This topped with 3" of poured concrete deck with a wire mesh system. Under this system, the erection of the building, particularly the

building structure can be done in less than a third of the time as it takes for conventional RCC structure building.

91. As the Sylhet region falls under Seismic Zone – 1 so it is necessary to make the columns and beams with steel structure as it is good at resisting earthquakes. The columns and beams will be of prefabricated structural steels. This will aid in quick erection and implantation of the building. In fact the erection of the steel structure can be made in a matter of four to six months as against fifteen to eighteen months for an RCC (Reinforced Cement Concrete) structures.

6.1.2.2. RCC Service Core

92. To give structural stability and particularly against earthquakes, the MTB and other buildings are designed with a RCC core. The MTB has been provided with fire escape provision to its users, having two fire rated RCC stairs as insulators for the users of the building. Service Core provides two sets of washrooms (male and female) for its users. The service core will provide vertical shafts (Risers) for fire water lines, electrical risers and bus ways for Fibre Optics cables.

6.1.2.3. RCC Frame Structure Buildings

93. The Hotel building and other low height buildings are designed as traditional RCC and brick masonry structures. These traditional constructions will be cheaper than that of steel structures.

6.1.2.4. Energy Efficiency with E-Glass cladding

94. The main buildings will be clad mostly with thermal e-Glass, which cuts down heat gains by 50% as against normal curtain wall glass. Further, to minimize the heat gain and to reduce the cooling load and thus energy requirements further, double sunscreens at 9' and 12' levels will be incorporated. It is estimated that multiple design elements will reduce the heat gain load, thus energy requirements by 40% to 50% of normal glass clad office buildings.

6.1.2.5. Solar Panels and Green Technology for buildings

95. Wherever possible, green technology for the building and environment will be used. Solar panels will be used over each building as per roof capacity and building locations. These will be investigated in detail during project implementation.

Sufficient open space, green space and water body like pond, lake, etc. will be provided in the project area during landscaping.

6.1.2.6. Ceilings and Floors

96. The ceilings and floors will have provisions for cooling ducts and electrical and power services. The ceilings should be equipped with sprinkler systems for localized fire

suppression, before it will have opportunity for spreading. The Floors will have an elevated system, capable of carrying all the cables and fibre optics and future requirement of any part of the floor.

6.1.2.7. Mechanical and Service space

97. Behind the Service Core, across a corridor, there will be a designated space for mechanical equipments, including compressors for cooling of each floor.

6.1.2.8. Air Conditioning

98. For economy and easy maintenance, instead of a centralized cooling system with cooling towers and chilling system, the system proposed is one with a localized A/C. For the MTB and other high rise buildings, the Variable Refrigerant Flow (VRF) system for air-conditioning has been recommended, where floor – wise flow is controlled.

6.1.3. Buildings and Installation of Electronic City

99. Brief descriptions of different buildings and other installations, provided in the Master plan of the Sylhet Electronics City described briefly, in the following paragraphs.

6.1.3.1. Administrative Building (BHTPA)

100. A two-storied Administrative building is to be constructed near the entrance of the Electronic City. This is meant for accommodation of BHTPA officials and other concerned officials of the Electronic City. This building is of 10,000 sft footprint, having total area of 20,000 sft. In the early stage of the project construction, the selected private sector investor will use part of this building as their office accommodation.

6.1.3.2. Multi Tenant Building (MTB)

101. Two 5-storied MTBs are provided in the project. These are 5-storied steel structure commercial building of 43,000 sq.ft. Each MTB has 3 Blocks, - Blocks A and B are office spaces, connected by a third Block-C, which contains utility installations, such as reception, foyer, lobby, lift, stairs, escalator, washrooms and toilets, large open area for display and exhibition, etc.

It may be noted here that the size of the building provided in the design is suggestive only. The selected private sector investors/developers may change the design, with government approval, to suit latest requirements of the industry.

6.1.3.2.1. The MTBs will accommodate the following facilities:

- Reception, Lobby Foyer areas
- Administrative area
- Commercial Banks

- Food Courts and Food Vender stalls
- Software Development area
- Research & Development (R&D) area
- Call Centers (BPO)
- Training area
- Meeting rooms
- Conference and seminar hall
- Mechanical Services Area
- Core Service Areas (including 2 Lifts, one escalator, 2 stair halls, washrooms, 2 additional lifts for fire escapes, etc.).

6.1.3.4. The Incubator Building

102. A two-storied building of 1000 sft. per floor, is provided for accommodating some of the ICT business incubators.

6.1.3.5. Conference Hall

103. A Conference Hall of total 10,000 sft is provided in the ICT Business Zone, for multi-purpose use in the development of ICT business.

6.1.3.6. The Residential Buildings

104. There is provision of 5 storied residential buildings. Four (4) separate buildings of 100' x 25' plinth area are provided. Each building will give a floor area of 12,500 sft. in 5 floors. The 4 buildings will give a total floor area of 50,000 sft. These buildings will provide family accommodation for officials of the Sylhet Electronics City.

6.1.3.7. The Dormitory Building

105. This is a 5 storied dormitory building in the residential zone, of 3-star standard. This will have a total floor area of 15,000 sq.ft. in 5 floors and will provide suitable accommodation for the workforce of ICT City.

The dormitory building will accommodate the following facilities:

- Reception, Foyer, lounge, lobby
- Administration etc
- Bedroom or Hostel suits
- Kitchen
- Dinning
- Gymnasium
- Laundry
- Other Utilities

6.1.3.8. Social and Utility Buildings

106. Some social and utility buildings, along with open spaces, are also provided in Block-4, the Residential zone. The buildings and spaces include:

- Community centre
- School building
- Hospital building
- Mosque
- Playgrounds
- Small Parks

6.1.3.9. Hotel Building

107. One 5-star standard hotel building is provided in Block-5. This has an area of 25,000 sft per floor. The hotel building is designed as 5 storied buildings, and will have total 125,000 sft. The hotel will run on a commercial basis. It will cater for need of national and international guests. Details of this 5-star Hotel building will be prepared by the selected investor, or their agents, as per the demand of the time and norm of the industry.

6.1.3.10. Convention Centre

108. One two-storied Convention Centre, of total 30,000 sft, is provided in Block- 5. This centre will cater for training and meeting needs of national and international institutions.

Details of this zone will be prepared by the selected investor, as per the demand of time and the norm of the industry.

6.1.3.11. Recreational Zone Vacant Spaces

109. In the Block-5 of Recreational zone, some vacant spaces are kept for development of Recreational garden, Amusement Zoo and Golf Course; etc. These are to be developed by the private investor in due course of time.

6.1.3.12. Vacant Industrial Plots

110. In Block 3 of the Sylhet Electronics City, there is provision of some Vacant Industrial Plots (Bare Land). There are 8 (eight) green-field industrial plots in Bio-Tech development zone and 16 (sixteen) plots in ICT Industrial zone. These plots are of size 2.5 acres each, which are to be developed and operated by individual leaseholder companies.

6.1.3.13. Internal Roads for Electronics City

111. For the Electronics City, three different types of internal roads are planned by the IIFC feasibility report. The major roads will be 40 ft wide; the secondary roads will be 30 ft. wide while the tertiary roads will be 20 ft. wide.

6.1.4. Off-site Infrastructure for Electronics City

112. For the Electronics City, three different types of off-site infrastructure will be required. These are:

- Optic Fibre Cable (24 core), connectivity from main backbone
- Electricity Connection (external main 33 kV power line)
- Gas Connections (4" pipeline)

6.1.4.1. Jetty Construction

113. Though this is not suggested in the IIFC report, in addition to above mentioned off-site infrastructures a small sized jetty construction is to be necessary adjacent to north-west side of the proposed project on the bank of the Katakali River/Gang. As the area is low lying area and has the possibility of flash flooding any time during the monsoon period so waterway will be the best solution to move to and fro the Electronic City. In such a case there should be wise to establish a Jetty at the bank of the adjacent river, so that tenants can easily use this route in case of any road traffic disruptions.

6.1.5. Remarks on the Design Aspect

114. On the basis of feasibility study, the Multi Tenant Building (MTB) and other buildings have been shown in the Master-plan as an indicative one, these are not firm designs. The Project will be implemented in PPP model and private sector investor/s will be selected for 'Design, Build, Finance, Own, Operate and Transfer (DBFOOT)' model.

115. The selected HTP Developer will use his own design and size of the MTB and other structures, as per most optimum and economical use of the facilities, at the time of implementation. However, the Park developer will obtain a consent node for such plans from the implementing agency, i.e. from BHTPA, and this will be mentioned in a clause in the contract agreement with the Developer.

116. It is to be mentioned here that, BHTPA already floated International Competitive Tender requesting for RFQ (Request for Qualification) from the reputed developers for developing a Hi-Tech Park in Sylhet on DBFOOT model.

6.1.6. Rationale of the Project

117. The mission of this project is to promote IT enabled knowledge based industry in the country. Bangladesh has a pool of ICT experts and professional and the global IT/ITES market is worth 500 billion dollars, which has good potential for local exporters to harness the opportunity from the ICT sector. HTP at the regional level like Sylhet would be an appropriate initiative to achieve the goal of Digital Bangladesh through the use of ICT in all spheres of life for the development of the country.

118. The plentiful availability of knowledge oriented manpower is a Prerequisite for the potential industries like IT/ITES. The HTP/ STP at the regional level will host ICT related industries. To attract such industries, infrastructure readiness such as telecom infrastructure, transportation infrastructure must be of high standards with good legal environment, like Cyber law and Intellectual Property Rights. Therefore the Government is committed to establishing Hi-Tech Park and Software Technology Park throughout the country.

119. The Shahjalal University of Science and Technology is the major centre of academic excellence in Sylhet, offering four-year degree programmes in IT. Universities in the surrounding areas of Sylhet, which include Mymensingh, Comilla, and Chittagong, also offer degrees in IT and other related disciplines, and are sources of potential talent for the Sylhet HTP. The educational institutes in Sylhet and its surrounding areas produce around 4,607 graduates in programmes relevant to the IT/ITeS industry. Sylhet also has six public and private polytechnic Institutes provide Diploma courses in Computer Science and Engineering (CSE), Electrical and Electronic Engineering (EEE), and Telecommunication Engineering. Annually, around 5,195 graduates come out with diplomas in the aforementioned programs from these institutes. Added together, the universities and polytechnic institutes produce 9,802 IT skilled graduates. With this large pool of talent, there appears to be significant scope for expanding the employment in the ICT sector in this region.

6.1.7. Location of the Project

120. Sylhet Division is one of the seven Divisions of Bangladesh. It is located in the north-eastern side of Bangladesh, bordered by the Meghalaya, Assam and Tripura states of India to the north, east and south, respectively and by Chittagong to the southwest and Dhaka to the west. The total area of Sylhet Division is 12,635.24 square kilometers.

121. Sylhet is well connected by highways and railway links to the capital Dhaka and the port city of Chittagong, as well as other parts of Sylhet. Sylhet has a direct road link to India and has 06(six) immigration check posts on the border. The Sylhet Railway Station is the main railway station connects trains on national routes operated by the state-run Bangladesh Railway.

122. The city of Sylhet is served by the Osmani International Airport, located at the north of the city. It is the third busiest airport in Bangladesh. The main frequent airlines of the airport are Biman Bangladesh Airlines, United Airways (BD) Ltd., Novoair and US-Bangla airlines. The area around Sylhet is a traditional tea growing area. The Surma Valley is covered with terraces of tea gardens and tropical forests. Srimangal is known as the tea capital of Bangladesh; for miles around, tea gardens are visible on the hill slopes. The area has over 150 tea gardens, including three of the largest tea plantations in the world, both in terms of area and production.

123. Nearly 300,000 workers, of which more than 75% are women, are employed on the tea estates. Employers prefer to engage women for plucking tea leaves since they do a better job than, but are paid less than, men. The plantations, or gardens, were mostly developed

during the British Raj. The plantations were started by the British, and the managers still live in the white timber houses built during the Raj. The bungalows stand on huge lawns. The service and the lifestyle of managers are nearly unchanged. Sylhet is also a centre of the Bangladeshi oil and gas sector, with the country's largest natural gas reserves.

6.1.7.1. The Project Site

124. The proposed project place is in Companiganj upazila under Sylhet district. The Companiganj Upazila occupies an area of 296.75 sq. km. including 100.22 sq. km. forest area. It is located between 24058' and 25011' north latitudes and between 91041' and 91053' east latitudes. The Upazila is bounded on the north by India, on the east by Gowainghat Upazila, on the south by Sylhet sadar and on the west by Dowarabazar and Chhatek Upazila of Sunamgonj Zila.

125. The proposed project site is situated on the eastern side of Sylhet – Bholaganj Road



(via Companiganj), about 25 km away from Sylhet Town and almost 5 km away from Companiganj Upazila Headquarter. The site is 20 km away from the Osmani International Airport and about 28 km from the Sylhet new Railway station and Bus Terminal. The land area of the proposed site for the development of Sylhet HTP is 162.83 acres. The land is located in the Khalitazuri

Photograph 03: Water in borrow pit early November 2014

Beelerpar Mouza, under the Dhakkin Ronikhai union of Companigonj Upazila, Sylhet. It has a J.L number of 188, Khatian number 01 and Plot (Dag) number 25. It is a Khash Land and The Ministry of Land gave their concurrence to handover these 162.83 acres of land to



Bangladesh Hi-Tech Park Authority for establishing the proposed Sylhet Electronics City (SEC). The transferring process was carried out under section 10 of "Non-Agricultural Khas Land Settlement Policy, 1995". There is no dispute over the land and no legal impediments to use the land for developing the proposed SEC on the site.

Photograph 04: Farmers washing cattle with Borrow Pit's water

126. The site is a non-arable flat, low land with some small sizes shallow ditches in the north-west side. A borrow pit which is almost 60 feet width is situated along the highway and passes on the west side of the land. The site land is almost 15 feet lower than the Sylhet – Companiganj road. It remains under water for 3 to 4 months during the rainy season.

127. Since the project site is situated just beside the Sylhet – Bholaganj (via Companiganj) main highway, access roads may be made at any point from the highway to enter the site. The Katakhal Bridge over Katakhal River/Gang in Sylhet – Companiganj road at Dhakkin Ronikhai Union is right beside the site.

128. For power supply, the nearest sub-station of the Pally Bidyut Samity (33/11 KV) is located at Companiganj almost 4 KM away from the site and the second nearest one (15 KM away from the site) is located at Badaghat, Sylhet Sadar that is currently under construction and expected to run by 2016. Additionally, in order to ensure continuous power supply, a sub-station with a combined capacity of 4,000 KVA needs to be set up exclusively for the SEC. A gas fired power plant of 11 MW needs to be established and considered as the main source of electricity in the proposed SEC. The power connectivity from the Sylhet PBS-2 will be considered as the secondary source of electricity.

129. It has been found that three NTTN operators (BTCL, Fiber @ Home and Summit Communications) have their POPs in the vicinity of the project site and capable of providing the expected level of services to the proposed SEC as far as high-speed optic fibre connectivity (data and voice) is concerned. Any operator with sufficient capability may provide network connectivity inside the SEC and maintain their clientele among tenants independently.

6.1.8. Ownership

130. The proposed site is a Government Khash Land. In the meantime the land has been handed over to Bangladesh Hi-Tech Park Authority and transferring process was carried out under section 10 of “Non-Agricultural Khas Land Settlement Policy, 1995”. A lease deed already been executed signing by the Deputy Commissioner, Sylhet and representative of Bangladesh Hi-Tech Park Authority.

6.1.9. NOC from Local Authority

131. No Objection Certificate (NOC) from the local authority is a pre-requisite document for submitting of application to the DoE for obtaining Site Clearance/Environmental clearance certificate for the project. BHTPA already received NOC from the local authority and application will be submitted to the DoE, Sylhet office, including other documents for awarding site clearance for the project.

6.1.10. Raw Materials

132. The followings will be used as the main raw materials of the project. Such as

- ❖ Cement
- ❖ Local and Sylhet sand
- ❖ Bricks
- ❖ Stone chips
- ❖ Mild steel rod/Bar
- ❖ Water
- ❖ Admixture
- ❖ G.I Pipe
- ❖ Wood
- ❖ Glass curtain
- ❖ Thai Aluminum
- ❖ Internal & external paints
- ❖ Varnishes
- ❖ PVC pipe

6.1.11. Outputs of the Project

The following outputs of the project:

133. In general the strengths of HTP industries depend on the (i) availability of skilled manpower (ii) Competitive cost of doing business (iii) Quality of Public infrastructure and (iv) appropriate business environment. Bangladesh has a good number of young educated unemployed populations, which can be the workforce of IT/ITeS Industries. In the education sector, Bangladesh has 84 universities, including 23 public universities, where IT related courses are offered in more than 60 universities. There are degree and intermediate colleges where IT related programs are offered in more than 40 institutes. In addition, there are many Polytechnic institutes where IT related programs are offered. From all of these institutions approximately 14,500 students (Source: BASIS) is graduated every year out of approximately 5000 software graduates. Initiatives are underway to introduce computer science at secondary school level. The numbers of IT graduates are small compared to demand in the market and therefore the government has to address the issue by increasing the course facilities as well as number students to meet the situation. The curriculum for the IT courses in the educational institutions should be synchronized with the requirement of the IT industries. In addition, very recently the government has taken the decision to establish a Digital University near Kaliakoir Hi-Tech Park under Gazipur district.

134. Bangladesh based companies- both domestic and multinationals, have built strong relationships with various universities in the country to tap and train talent at the sources. Finishing schools to bridge the skill gaps between academia and industry are also coming up, allowing ready resource availability.

135. Bangladesh has a much lower IT/ITeS labour cost compared to India, China and Pakistan. It is estimated that the IT/ITeS skilled labour cost is as much as 50% less in Bangladesh than its neighbouring countries (Bangladesh Beckons, KPMG Report 2012). This is an important advantage since labour is the largest cost component across most IT/ITeS segments. Thus, this labour cost advantage together with a sizable young population can attract investors and grow the HTP industry in Bangladesh.

136. Companies seeking to outsource primarily select the outsourcing agency factoring in the quality of service, language skills, cost of production, and the availability of skilled manpower in both the present and the future. In this aspect, Bangladesh has prepared quality workforce, train its manpower to comply with international standards and guidelines.

137. Some companies in Bangladesh have performed well in certain IT/ITeS segments. By replicating best practices, expanding on strengths and making use of low cost and abundant labour, Bangladesh can expand its market share of the IT/ITeS industry. In particular, Bangladesh has to increase awareness about the potential of the IT/ITeS industry, and the potential of Bangladesh's labour force. Bangladesh has to take advantage of talent across the country by expanding IT/ITeS businesses to cities, districts and divisions outside of the capital region of Dhaka (WB Report 2010). Moreover, Bangladesh needs to tap into its female labour force to facilitate growth in IT/ITeS. This can help Bangladesh increase its supply of talent, maintain its cost advantage and gain momentum in its pursuit of the IT/ITeS industry. The World Bank report also recommended developing IT parks in various places of the country.

138. Specifically the HTP at Sylhet will bring change like,

1. To promote the development and export of software and software services including Information Technology (IT) enabled services.
2. To provide promotional services to the exporters by implementing Software Technology Parks (STP)/ Electronics Schemes and other such schemes this will be formulated and entrusted by the Government from time to time.
3. To provide data communication services including value added services to IT/ IT enabled Services (ITES) related industries.
4. To promote micro, small and medium entrepreneurs by creating a conducive environment for entrepreneurship in the field of IT/ITES.
5. Development of IT sector as well as industrialization in Bangladesh.
6. Access to public business related processes available to firms within the HTP
7. Knowledge of and competitively priced products available to firms in the park zone
8. Firm level compliance, with social and environmental standards within the park zone

7.0. Environmental Baseline

7.1. General

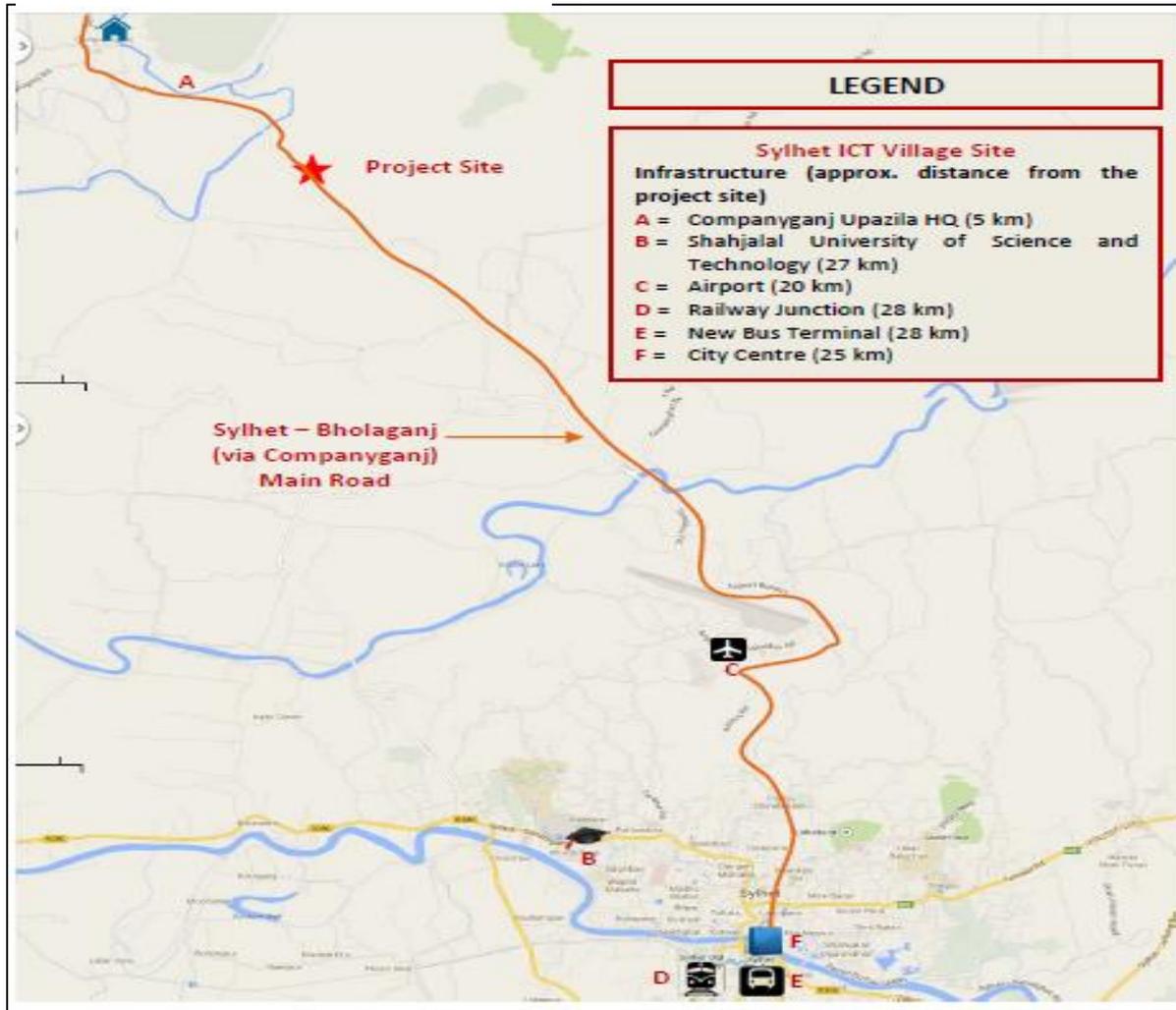
139. Sylhet Division is one of the seven Divisions of Bangladesh. The total area of this Division is 12,635.24 square kilometres. Sylhet Division consists of 4 districts, 38 Upazilas and 333 Unions. The Division has a total literacy rate on an average is 45.0% (out of which 47.0% are male and 43.1% are female). 25.3% of the total population of Sylhet Division are in the 15-29 age groups. This is around 2,708,110 individuals (Male 1,348,097 and Female 1,360,013). This represents a sizeable young population available for work in the IT/ITeS industry like HTP.

140. The Shahjalal University of Science and Technology is the major centre of academic excellence in Sylhet, offering four-year degree programmes in IT. Universities in the surrounding areas of Sylhet, which include Mymensingh, Comilla, and Chittagong, also offer degrees in IT and other related disciplines, and are sources of potential talent for the Sylhet HTP. The educational institutes in Sylhet and its surrounding areas produce around 4,607 graduates in programmes relevant to the IT/ITeS industry. Sylhet also has six public and private polytechnic Institutes provide Diploma courses in Computer Science and Engineering (CSE), Electrical and Electronic Engineering (EEE), and Telecommunication Engineering. Annually, around 5,195 graduates come out with diplomas in the aforementioned programs from these institutes. Added together, the universities and polytechnic institutes produce 9,802 IT skilled graduates. With this large pool of talent, there appears to be significant scope for expanding the employment in the ICT sector. However, the challenge identified is the need for professional training in key skills and for reducing the skills gap between the education system's output and industry requirements at an adequate scale.

7.2. The Project Site

141. The proposed project site is situated on the eastern side of Sylhet – Bholaganj Road (via Companiganj), about 25 km away from Sylhet Town and almost 5 km away from Companiganj Upazila Headquarter. The site is 20 km away from the Osmani International Airport and about 28 km from the Sylhet new Railway Station and Bus Terminal. The land area of the proposed site for the development of Sylhet HTP is 162.83 acres. The land is located in the Khalitazuri Beelerpar Mouza, under the Dhakkin Ronikhai Union in the Companiganj Upazila. The Important infrastructures like, Companigonj upazila head quarter, Shahjalal University of Science and Technology, Osmani International Airport, Sylhet new Railway Station and Bus Terminal and Sylhet City centre is shown in figure 04.

Fig 04: The location of proposed Sylhet HTP



142. The site is a non-arable flat, low land with some small sizes shallow ditches on the north side. A borrow pit which is almost 60 feet width is situated along the highway and passes on the west side of the land. The site is almost 15 feet lower than the Sylhet – Companiganj road. It remains under water for 3 to 4 months during monsoon season. Since the project site is situated just beside the Sylhet – Bholaganj (via Companyganj) main highway, access roads may be made at any point. The Katakhal Bridge on Sylhet – Companyganj road is right beside the site.

143. For power supply, the nearest sub-station of the Pally Bidyut Samity (33/11 KV) is located at Companiganj almost 4 KM away from the site and the second nearest one (15 KM away from the site) is located at Badaghat, Sylhet Sadar that is currently under construction and expected to run by 2016. Additionally, in order to ensure continuous power supply, a sub-station with a combined capacity of 4,000 KVA needs to be set up exclusively for the HTP. A gas fired power plant of 11 MW needs to be established and considered as the main source of electricity in the proposed HTP. The power connectivity from the Sylhet PBS-2 will be considered as the secondary source of electricity.

144. It has been found that three NTTN operators (BTCL, Fiber @ Home and Summit Communications) have their POPs (Point of Presence) in the vicinity of the project site and capable of providing expected level of services to the proposed HTP as far as high-speed

optic fibre connectivity (data and voice) is concerned. Any operator with sufficient capability may provide network connectivity inside the HTP and maintain their clientele among tenants independently (source: IIFC study 2014).

7.3. Environmental Background

145. Environmental base maps (covering minimum 05 km radius). Showing the features described in Figure 01 and 02.

7.3.1. Physical Environment

7.3.1.1. Topography

146. Topography is a field of Geosciences and planetary science comprising the study of surface shape and features of the Earth and other observable astronomical objects. It is also the description of such surface shapes and features (especially their depiction in maps). The topography of an area could also mean the surface shape and features.

In general, topography is concerned with local detail in general, including not only relief but also natural and artificial features, and even local history and culture.

147. Geologically, the Sylhet region is complex having diverse geomorphology; high topography of Plio-Miocene age, such as Khasi and Jaintia hills and small hillocks along the border. At the centre there is a vast low lying flood plain, locally called Haors. Available limestone deposits in different parts of the region suggest that the whole area was under the ocean in the Oligo-Miocene.

The proposed construction site and its vicinity are relatively plain in nature. It remains under water for 3 to 4 months during monsoon season. In case of any flash flood, which occasionally happens during rainy season, the road goes under water more for 3 to 4 days.

7.3.1.2. Location

148. Companiganj Upazila is located at 25°04'45"N 91°45'15"E- 25.0791°N 91.7542°E. It has total area 278.55 km², including 100.22 km² forest areas bounded by Meghalaya (a state of India) on the north, Sylhet sadar on the south, Gowainghat upazila on the east, Chatak upazila on the west. Main rivers are Surma, Piyain. Notable Haors: Baors, Pokohair. Notable Beels: Panichapara, Nagar, Rauti and Kalenga.

149. The proposed project site is situated on the eastern side of Sylhet – Bholganj highway (via Companiganj), about 25 km away from Sylhet district town and is almost 5 km away from Companiganj upazila head quarter.

150. Companiganj is one of the resourceful upazila of Sylhet district and renowned for its hard rock. Hard rock, one of the main geo-resources of Bangladesh after gas and coal, is very useful in the construction sector and cement industry. The source of this rock is near Meghalaya of India. This part of India is relatively in higher than the ground level of

Bangladesh. That's why the rock comes down by gravity, especially in the rainy season. The water is the main transportation media which bring these rocks. People normally use manual hand tools for rock extraction and use crusher to crush these rocks (American Journal of Mining and Metallurgy (2014, 2(2), 23-26).

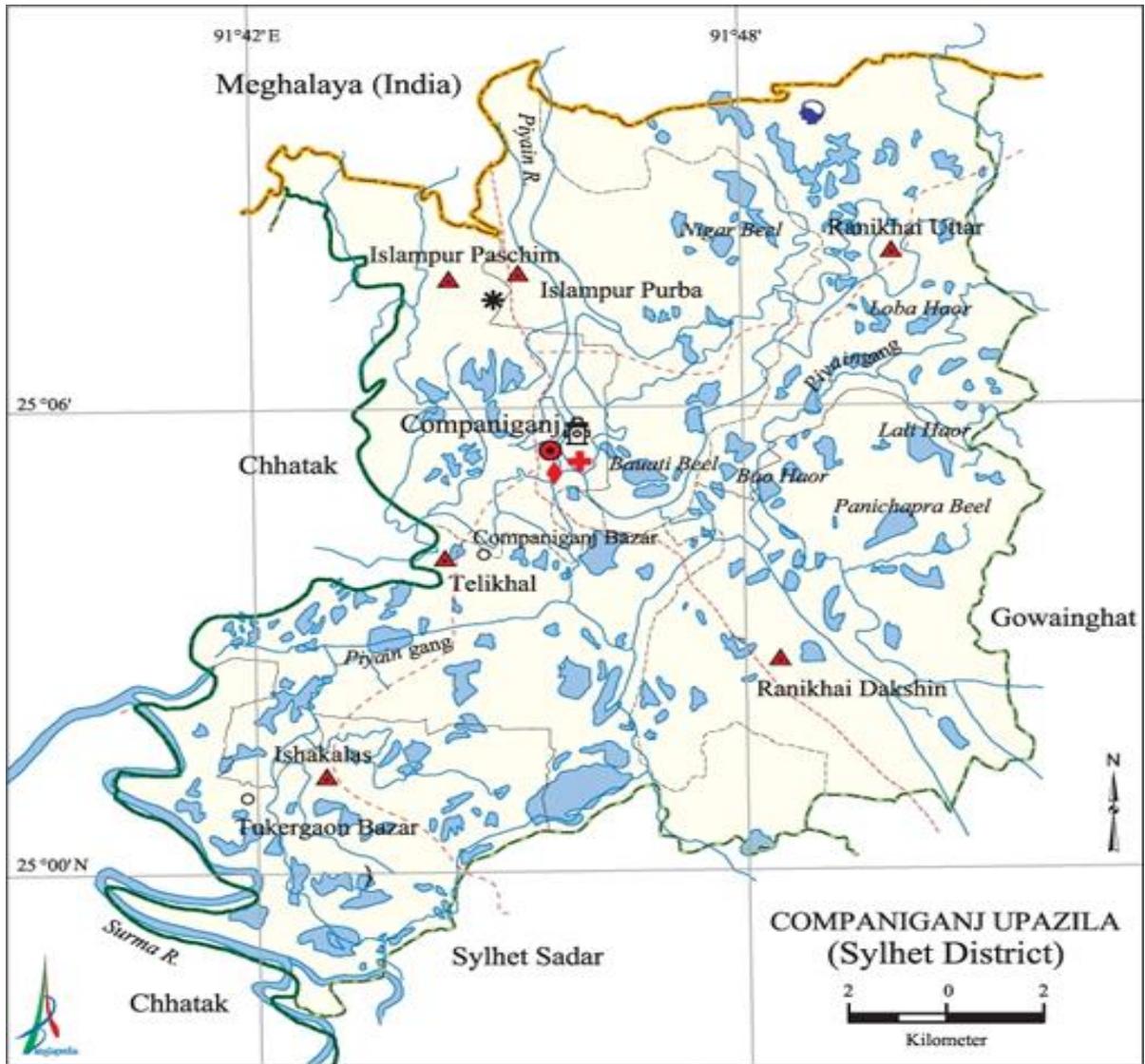


Fig 05: Companiganj upazila and adjoining areas (Source: Banglapedia)

7.3.1.3. Access roads

151. Since the project site is situated just beside the highway, required access roads to the proposed project site is very convenient and may be made at any point.

7.3.1.4. Waterway through Katakhal River

152. The Katakhal River (Dholai River) situated just to the north of the proposed site, passing west to east. The length of the river is about 17 – 18 km. Towards West the river is connected with the Surma River near Chatak. So it will be a good way of alternate

communication facilities through the waterway from project site to Chatak in case of any highway traffic disruption. From Chatak can move by train or by bus to the Sylhet city and anywhere in the country.

7.3.1.5. Shape of site

153. The site of 162.83 acres is irregular in size and oblong in shape, stretching in the north – south direction.

7.3.1.6. Earthquake data

154. The Sylhet region is in the high seismic zone of the country. It falls under Zone I with high seismic coefficient as per Bangladesh National Building Code, (BNBC). But there has been no evidence of a major earthquake in this region since last 100 years.

7.3.1.7. Roads

155. By road the site is about 28 km away from the Sylhet town and inter district Bus Terminal.

7.3.1.8. Railway

156. The site is about 28 km away from the Sylhet new railway station.

7.3.1.9. Airport

157. The project site is about 20 km away from Sylhet Osmani International Airport and the airport is on the way to Sylhet town. Currently 04 airlines operating Sylhet – Dhaka – Sylhet domestic route and Bangladesh Biman also operate an international route Sylhet – London – Sylhet.

7.3.1.10. Land use

158. The proposed site and land of adjacent areas is mostly government khas land. But yet there are privately owned lands also. The government khas lands remains mostly vacant throughout the year. But some people use the land without permission from the authority and they use this land, mostly for grazing purposes and in some cases, they use this for growing of *Rabi* crops during *Rabi* season and for *Jala* production. In the adjacent privately owned lands they grow mostly rice, vegetables and *Rabi* crops.

7.3.1.11. Climate

159. The project area is under 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. Typical parameters of

the weather elements, as recorded for the period of the last ten years of observations (2003-2012) at the Bangladesh Metrological Department, are presented in Table 06.

7.3.1.12. Temperature

160. The seasonal changes in temperature are noticeable throughout the year, with the warmest months being from April to September and the coolest months being December, January and February. In the year 2012, the maximum temperature was 38°C recorded in the month of April and the minimum temperature was 9.5°C recorded in the month of January. The year wise temperature range for the last decade is shown in the table 06.

Table 06: Annual Temperature Data

Year	Minimum Temperature		Maximum Temperature	
	Degree (°C)	Month	Degree (°C)	Month
2003	8.7	January	37.0	July
2004	8.8	February	36.4	May
2005	10.7	January	37.7	September
2006	11.5	January	38.0	May
2007	8.2	January	37.0	May
2008	9.8	February	36.8	August
2009	11.1	December	36.8	July
2010	10	January	37.1	March
2011	7.7	January	37.0	August
2012	9.5	January	38.0	April

The above table shows the minimum recorded temperature throughout the last decade was 7.7°C in the month January 2011, while the maximum temperature recorded 38°C in the month April 2012.

7.3.1.13. Relative Humidity

161. As would be expected, relative humidity during the wet season is significantly higher than those occurring in another period of the year. The relative humidity, at Sylhet during the period 2003-2012 is well depicted by the data in the table 07.

Table07: Relative Humidity in Sylhet

Monthly Mean Humidity (in Percentage)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2003	76	67	68	74	78	87	84	83	86	85	76	73	78
2004	75	62	65	80	77	83	87	82	87	82	73	70	76
2005	74	70	75	72	81	83	85	87	81	82	75	69	77
2006	73	70	60	73	77	86	82	80	83	78	76	72	75
2007	72	69	59	76	79	86	87	84	83	80	78	77	77
2008	77	68	73	71	77	86	87	88	82	81	71	79	78
2009	74	64	59	74	78	84	83	87	82	80	76	76	76
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2010	73	59	61	79	82	89	85	86	87	79	75	74	77
2011	77	64	64	69	80	85	86	85	82	77	72	75	76
2012	76	60	63	77	77	88	84	84	84	81	77	82	77
Average	75	65	65	75	79	86	85	85	84	81	75	75	77

High air temperature is observed throughout the summer season; daily air temperature variations are insignificant; air humidity is high with abounding rains. The average relative humidity recorded during the last decade is 77%.

7.3.1.14. Rainfall

162. Sylhet is located in highly rainfall prone areas and the annual rainfall ranges from 3,000 mm to more than 5,000 mm with an average 3,914 mm per annum. Almost 80% rainfall occurs in the monsoon season and a negligible amount in winter season. During the last decade the highest and the lowest annual rainfalls recorded were 4,939 mm in the year 2010 and 3,101 mm in the year 2011. The monthly rainfall during the last decade is depicted in the table 08.

Table08: Monthly Total Rainfall in Sylhet (in mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2003	0	0	170	311	359	1,038	497	438	499	237	0	7	3,556
2004	1	8	40	622	371	553	1,394	545	478	235	5	12	4,264
2005	0	48	388	296	895	354	978	626	319	259	0	0	4,163
2006	0	62	16	353	572	1,288	436	424	288	72	12	3	3,526
2007	0	34	41	481	669	869	786	578	594	142	144	0	4,338
2008	19	35	165	162	501	648	604	761	264	192	0	0	3,351
2009	0	20	63	427	576	469	599	674	323	136	0	0	3,287
2010	0	1	147	804	728	946	528	767	732	231	10	45	4,939
2011	0	3	99	78	403	578	673	722	490	55	0	0	3,101
2012	10	0	101	659	406	1,185	700	738	261	502	48	0	4,610
Average	3	21	123	419	548	793	720	627	425	206	22	7	3,914

The rainfall follows the general climate pattern with the highest rainfall in the summer months (June to September) and minimum rainfall in the cooler and drier months (November to March).

7.3.1.15. Cyclone

163. Bangladesh is subject to devastating cyclones, originating over the Bay of Bengal, in the periods of April to May and September to November. Often accompanied by surging waves, these storms can cause great damage and loss of life. The cyclone may create winds with speed of 100-150 miles per hour piling up the waters of the Bay of Bengal to crest as high as 20 feet that crash with tremendous force onto the coastal areas and offshore islands. As depicted in the figure below, Sylhet is far away from the cyclone affected area. The alignment of cyclonic events is given in Figure 07.

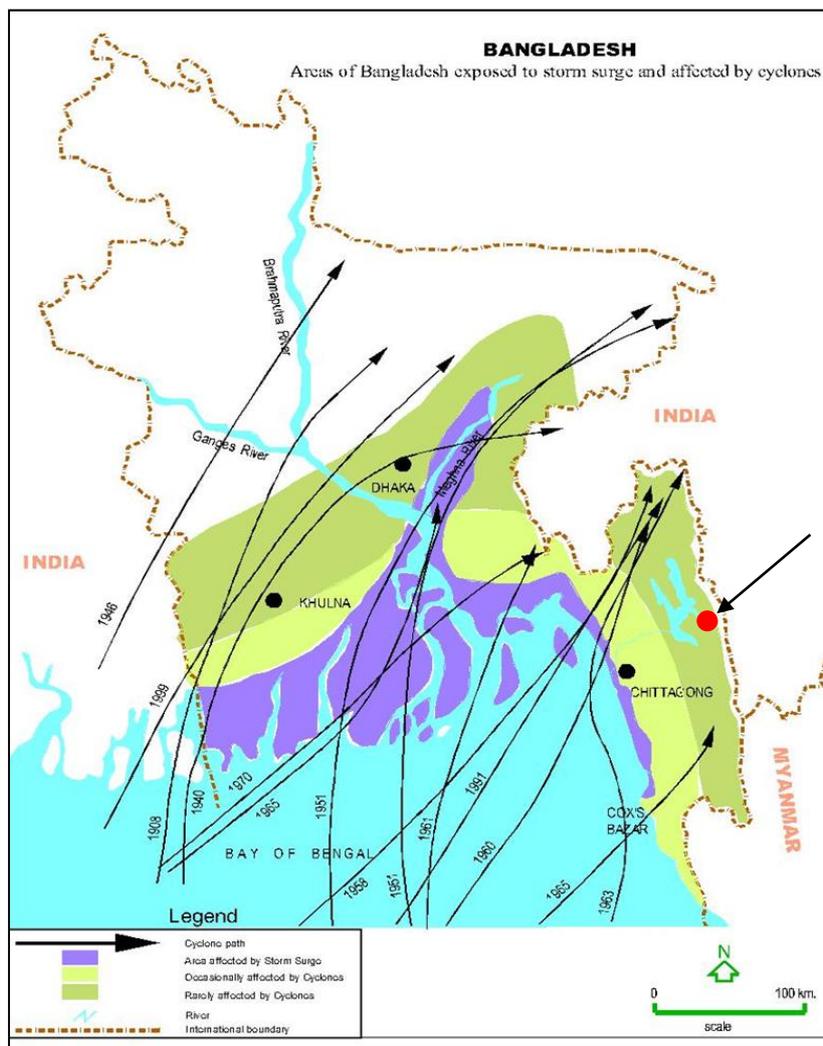


Figure 06: Alignment of cyclonic events

7.3.1.16. Earthquake

164. Status of earthquakes in Bangladesh is surrounded by the regions of high seismicity which include the Himalayan Arc and Shillong plateau in the north, the Burmese Arc, Arakan Yoma anticlinorium in the east and complex Naga-Disang-Jaflong thrust zones in the northeast. It is also the site of the Dauki Fault system along with numerous subsurface active faults and a flexure zone called Hinge Zone. These weak regions are believed to provide the necessary zones for movements within the basin area. Earthquake zone and seismicity with magnitude of scale are depicted in the following figure.

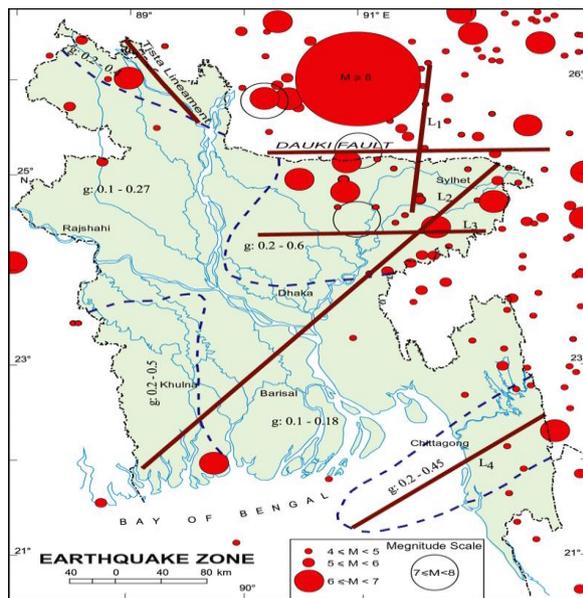


Fig 07: Seismic co-efficient at different places of Bangladesh

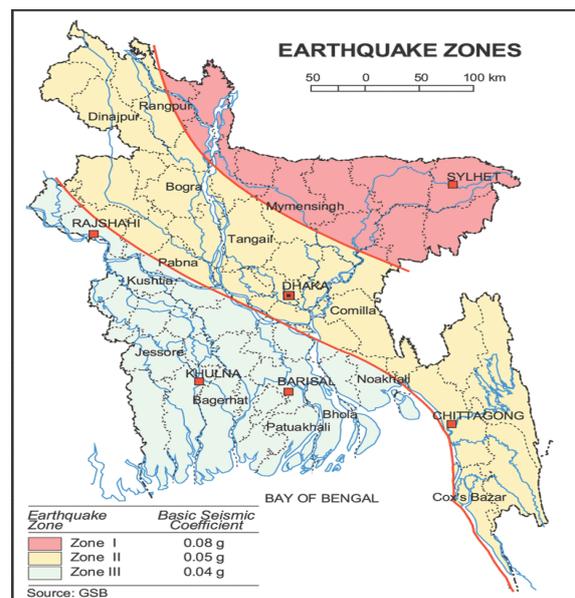


Fig 08: Earthquake zones of Bangladesh

Sylhet falls under Zone I with high seismic coefficient and near seismic sources. As such, Sylhet is in an earthquake prone area.

7.3.2. Biological Environment

7.3.2.1. General

165. A preliminary assessment (review) of floral and faunal diversity was carried out around the project site through site visit and consulting with the officials of the different departments working in Companiganj upazila. The main purpose of this survey was (i) to explore the plant and wildlife species (ii) to investigate the distribution and abundance of flora and fauna including fish species, and (iii) to make the preliminary assessment of the impacts of the proposed project activities on the ecological environment.

7.3.2.1.1. Flora and Fauna

166. Companiganj Upazila contains the best reed swamp remaining in the region and also has some floodplain grassland. The area has also been identified as a mother fishery, especially during the rainy season.

167. Two types of ecosystem exist in the project site and adjacent area viz. terrestrial and aquatic ecosystem. The project site comparatively has low floral and faunal density. The project site has some natural vegetation (Herbs and Shrubs). The site is predominantly covered by weeds and grasses, with traces of shrubs but no tree. *Binna son*, *Ara*, *Ekor*, *Murta*, *Ghagara* and *Bish katali* are the common native species in the area. The soil is generally covered with green grass and weeds.

168. The KataKhal River situated adjacent to the project site is the habitat of a number of small fish. The site is devoid of any significant animal presence. Some of the local people, however, graze their livestock, mainly goats and cattle in the site area. Insects and a few small birds were found at the project site. During the site visit on 23 December 2014, observed some 'Snail Mound' inside the area. The terrestrial and aquatic flora and fauna at the project site are shown in photographs (06 - 11).

169. A borrow pit which is almost 60 feet width is situated along the highway and passes on the west side of the land. The borrow pit can retain water even after the rainy season and continues till October to November. When there is water some small fishes grow in the borrow-pit and local people usually clean their cattle with this water. This Borrow-Pit can be used as a water body during project life, making retaining wall both sides to avoid possibility of any erosion and borrow pit also can be used for any recreational purposes to make the view of the project scenic and attractive for the visitors. Over this borrow pit a bailey bridge can be built to enter the project from the highway.

Photograph 05: Image of borrow pit along the highway





Photograph 06: weeds inside the project



Photograph 07: Murta plant inside the project



Photograph 08: *Binason* plant at the site



Photograph09: *Snail mounds* at the project site

Photograph10: Ghagra plant at the site



Photograph11: cattle's are grazing on the site



7.3.2.1.2. Surface Water Quality

170. Adjacent to the proposed project site there is a narrow river, some small sizes shallow ditches at the north side and a beel called Khalitajuri beel at the east side. There is no remarkable source of water pollution in and around the project site. A surface water sample collected from adjacent Khalitajuri Beel and Katakhal River on 23rd December 2014 and analysed in DoE laboratory, Sylhet. Physically we found that the river water is turbid and brown in colour and beel water is clear but many weeds grew there. The Detailed of surface water quality test results of parameter like pH, EC, DO, TS, TDS, SS, BOD, COD, Fe, NH₃ and CL₂ are shown in Table 09 and 10.

Table 09: Surface water quality of Khalitajuri beel (Source: DoE lab, Sylhet)

SN	Parameter	Unit	Concentration of Surface Water	Bangladesh (DoE) Standard for Surface Water
01	pH		7.9	6.5 – 8.5
02	DO	mg/l	5.4	4.5 – 8.0
03	BOD ₅	mg/l	39	50
04	COD	mg/l	31	200
05	TDS	mg/l	15.7	2100
06	EC	μS/cm	31.4	1200
07	TS	mg/l	21.98	2250
08	SS	mg/l	6.28	10
09	Fe	mg/l	2.04	2.0
10	NH ₃	mg/l	0.16	5.0
11	CL ₂	mg/l	10	600

Table10: Surface water quality of Katakhal River (Source: DoE lab, Sylhet)

SN	Parameter	Unit	Concentration of Surface Water	Bangladesh (DoE) Standard for Surface Water
01	pH		7.3	6.5 – 8.5
02	DO	mg/l	5.2	4.5 – 8.0
03	BOD ₅	mg/l	46	50
04	COD	mg/l	78	200
05	TDS	mg/l	49.5	1000
06	EC	μS/cm	98.3	1200
07	TS	mg/l	68.81	2250
08	SS	mg/l	19.31	10
09	Fe	mg/l	1.68	2.0
10	NH ₃	mg/l	0.15	5.0
11	CL ₂	mg/l	12	600

171. From the above reading the different parameter of surface water of the site is within Bangladesh standard except Fe in the Khalitajuri Beel and Suspended Solids (SS) in the Katakhal River. Fe content in the Khalitajuri Beel is little higher than Bangladesh standard,



Photograph12: DoE sample collector taking surface water sample from Khalitajuri beel

whereas, SS in Katakhal river is higher than Bangladesh standard. As the sample was taken in the month of late December there was not enough water in the river. Having very less amount of water still there was plying many barges carrying stones from Katakhal Bridge to other places of the country. Because of frequent moving of barges on the shallow river, it makes the water turbid and disturbed. Hence, it is quite natural to increase the SS of the river. But the SS may come down during

monsoon time when water will be enough in the river. This could be cross checked taking another sample from the same spot during rainy season.

7.3.2.1.3. Ground Water Quality

172. The project site is located in a low lying area, underground is water is available at a depth of 550 ft. The underground water samples were collected near the project site for analysis of chemical parameters in order to get the primary idea regarding the quality of ground water on 23rd December, 2014. Table 11 shows the groundwater chemical parameters. From the test result, it is found that the Iron (Fe) concentration is higher than standard.

Table 11: Underground water Chemical Parameters (Source: DoE lab, Sylhet)

SN	Parameter	Unit	Concentration of Ground Water	Bangladesh (DoE) Standard for Ground Water
01	pH		6.0	6.5 – 8.5
02	DO	mg/l	1.5	6
03	BOD	mg/l	0.1	0.2
04	TDS	mg/l	238	1000
05	EC	Mmho/cm	475	1200
06	Fe	mg/l	2.67	0.3-1.0
07	Ca	mg/l	8.8	75
08	Mg	mg/l	3.8	30-35
09	Cl	mg/l	8	150- 600
10	Total Coliform	n/100ml	0	0

7.3.2.1.4. Air Quality

173. Within 5 km of the project site there is no any industry or project that can cause of air pollution in and around the project. DoE, Sylhet office did not manage to take air quality data to High Volume Sampler machine as in and around the vicinity of the site there was no facility of providing electric connection to operate the machine. After visiting the site, DoE Sylhet office made their conclusion in the report, “as there is no industry or project within 05 km. of the project site, the standard of air quality of the site deemed to be within the limit”. There are no brick field and other industries hence the project area was found quite clean and rural in nature.

7.3.2.1.5. Noise Level

174. The intensity of noise can have a direct effect on biological and human communities. The intensity of a noise determines the distance over which it can be heard. The acceptability (and therefore the impact) of a new noise depends on existing noise levels.

175. The period over which a noise is likely occur is a factor which contributes to the impact of the noise. Noise during sleeping hours will have a major effect on the human community; noise during a mating season may have a major effect on wildlife. Short periods of noise may have less effect than persistent noise.

176. It is observed during the site visit that there is no remarkable noise source in the area. The noise level was measured at daytime in the project area at certain intervals and shown in Table 12.

SN	Location	Date	Time	Results in dBa (day)
01	South-West corner of the site (30 meter distance from highway)	23/12/2014	11.30 am	56
02	South-West corner of the site (200 meter distance from highway)	23/12/2014	11.45 am	49
03	Middle of the proposed site	23/12/2014	12.05 pm	44
04	Periphery of Khalitajuri beel	23/12/2014	1.00 pm	42
Noise Standard as per ECR,97				45 for silent place 60 for mixed area 70 for commercial are 75 for industrial place
Methods/Instruments				Sound Level Meter (SL-4033SD) Calibration at 94dB

Table12. Noise Level Data (Source: DoE Lab, Sylhet)

7.3.2.1.6. Fisheries

177. According to Fishery Department of Companiganj upazila, project area is comparatively higher than other parts of the Upazila. There was a large Beel (water body) at the north-east corner of the site, but gradually it was filled up with soil and currently a small area is existed as Beel. There is a river called Katagang (Katakhal) at the north side of the project, but it is not now exists as a real river. So if any Hi-Tech park is made at the site it will not hamper any fish cultivation in the area and will not disturb any environmental and ecological balance.

178. Fresh water fish habitat such as river, beel and ditches exist around the project site, which provide shelter, feeding, and spawning ground for different types of freshwater fish species. Small-scale human intervention for catching freshwater fishes from the borrow pit area has been observed. A small quantity of small size fish production will be hampered every year.

7.3.2.1.7. Heritage and Archaeology

179. Companiganj is one of the resourceful upazila of Sylhet district, though no gas or oil field has not been found yet, the area is renowned for its hard rock. Hard rock, one of the main geo-resources of Bangladesh after gas and coal, is very useful in the construction sector and cement industry. The source of this rock is near Meghalaya of India. This part of

India is relatively in higher than the ground level of Bangladesh. That's why the rock comes down by gravity, especially in the rainy season. The water is the main transportation media which bring these rocks. People normally use manual hand tools for rock extraction and use two types of crusher to crush these rocks. Apart from above mentioned Stone quarry, there is no Heritage and Archaeological place in this area. Many visitors come to this place to see the natural view and activities of rock extraction.

7.3.2.1.8. Flooding

180. The project site is over 15 feet lower than the maximum flood level (MFL) and remains submerged for 3 to 4 months during the monsoon and the post monsoon season. To bring the site above the MFL, a huge land filling will be required. However, this will reduce the natural catchment area that will consequently raise the flood level. Considering this, it would be necessary to elevate the approach road few feet above the flood level (Figure 11).

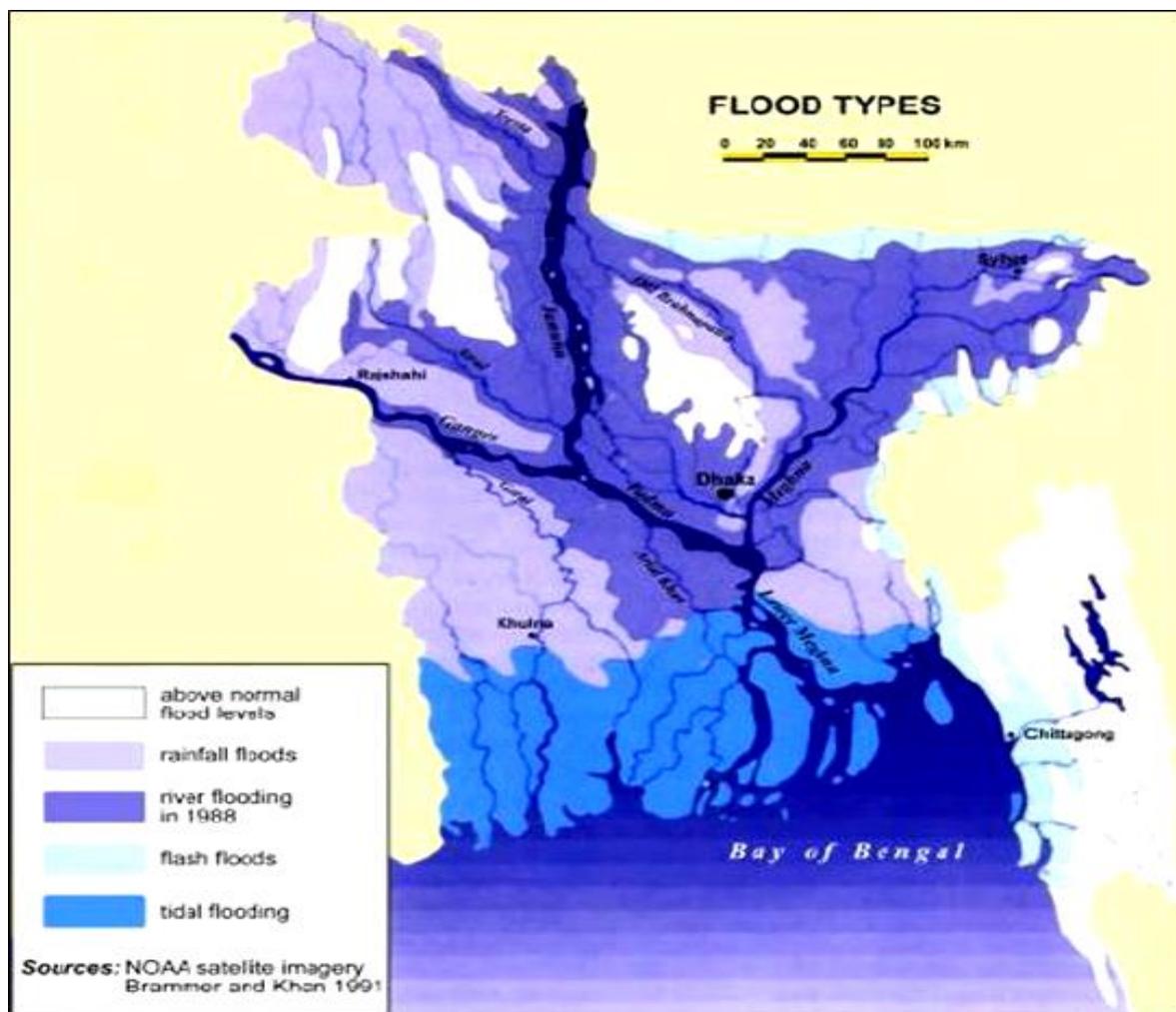


Fig 09: Flood types of Bangladesh

7.3.2.1.9. Transportation Facilities

181. There are a number of transport services carrying passengers to and from Companiganj - Sylhet. Transportation by railway is also available. The Sylhet Railway Station is the main railway station connecting trains on national routes operated by the state-run Bangladesh Railway. In addition to road and railway, air transportation is also available. On domestic routes there are currently four airlines out of which one state run Biman Bangladesh Airlines and three private airlines operate services Dhaka – Sylhet – Dhaka. One international flight operates Sylhet – London – Sylhet route.

182. With Sylhet district, there is a direct road link with India and has 06(six) immigration check posts, including a check post, under Companiganj upazila where site is located.

7.3.2.1.10. Seismicity

183. On the basis of distribution of earthquake epicenters and morpho tectonic behaviour of different tectonic blocks, Bangladesh has been divided into three generalised seismic zones. The north-eastern region of Bangladesh is seismically severe zone and represented by zone I with Basic seismic coefficient 0.05. So, considering the seismic zoning of Bangladesh the project area is vulnerable for earthquake.

184. According to the map Bangladesh has been classified into three seismic zones, with Zone-I the most severe, Zone-II severe and Zone-III the least severe. The project area falls in Zone-I, the tectonically most active zone and shown in Figure 08.

8.0. Identification and Evaluation of Potential Impacts

8.1. General Overview of Environmental Impacts

185. Identification of potential impacts and mitigation measures both are very important criteria of the EA study for any project. Since the project site is vacant hence the Important Environmental and Social Components will not be affected by the proposed HTP construction and there is no scope of compensation of any damages and resettlement issues.

186. But in some places on the proposed site a few local people use the land for grazing and growing of rice seedlings (*Jala*) purposes for a certain period of time of a year. During site visits, some *Jala* practices were observed on the site. During a consultation meeting at Companiganj upazila, the issue was discussed. UNO, Companiganj on behalf of local Khas land settlement authority ensured the meeting that, if anybody likes to use the government khas land for grazing and other purposes like *Jala* growing they would be able to use adjacent unused khas land for those purposes. The UNO also ensured the meeting to give

government Khas land if anybody falls under landless category and he requested to apply in his office securing for allotment of government Khas land.

187. Potential environmental impacts and mitigation associated with pre-construction, construction and operation of the ICT project and is based on 'superimposing' the project components onto the baseline compiled during the various studies. All activities related to the life-cycle of the project will include appropriate mitigation measures to ensure that negative impacts are properly mitigated and managed. Mitigation involves identifying the best options to be adopted to minimize or eliminate negative impacts, highlighting the benefits associated with the proposed project and the protection of public and individual rights. Practical measures are therefore sought to reduce adverse impacts or enhance beneficial impacts of the project.

8.1.1. Identification of Impacts

188. In reviewing impacts, this section addresses the following issues:

- Land Use
- Loss of Vegetation
- Earth Cutting
- Landscape views
- Disruption of Traffic
- Sanitation and drinking water facilities
- Noise and Vibration levels
- Changes in Air Quality
- Surface Water Quality
- Groundwater Quality
- Biodiversity
- Social and Cultural systems
- Employment levels

8.2. Pre-construction phase

8.2.1. Pre construction Phase Impacts

189. This stage involves the design, planning and pre-construction activities of the project. Key activities to be considered include:

- a) Vegetation clearing;
- b) Transportation of materials to project site;
- c) Public consultations;
- d) Storm water management;

- e) Visual intrusion;
- f) Landscape design;

8.2.1.1. Positive Impacts during the Pre- Construction

a) Public Consultation

190. Prior to any development, a proponent is required to conduct public consultations and obtain feedback from the community about their views concerning the proposed project. Through this activity the proponent gets to know more about the views of the community about the proposed development and therefore incorporates appropriate measures in order to be in line with the needs of the community before implementation of the project.

b) Environmental Sound Design

191. The incorporation of mitigation measures during construction and operation period and recycling of solid and liquid waste into the design of the Sylhet HTP ensure that environmental considerations have been taken into account in order to make it environmentally friendly.

8.2.1.2. Adverse impacts during the pre- construction

8.2.1.2.1. Impact on Physical Environment:

a) Vegetation clearing

192. During site preparation, vegetation consisting of weeds, grasses and shrubs will be cleared and the overburden removed so as to commence construction of the structures. Vegetation clearing is associated with loss of biodiversity, soil erosion, sedimentation and siltation, increased runoff and degradation of surface water quality of adjacent water bodies.

b) Earthquake vulnerability

193. The project area falls in zone I, i.e. Severe seismic zone ($Z= 0.25$) as per the Bangladesh National Building Code (BNBC). In the recent past, the most severe tremor that took place in Sylhet was of 5.6 Magnitude in Richter's Scale in May 1997 damaging some buildings (Source: Daily Star 17, 2009). Despite the low magnitude of this tremor, Sylhet still remains vulnerable to severe earthquake damage. In light of this, necessary seismic factors suggested by BNBC should be incorporated suitably while constructing the structures to safeguard against earthquake risks.

c) Land Acquisition and Requisition

194. The project will be established in a government khas land and there will be no land acquisition requirement and resettlement arrangement for the project.

8.2.1.2.2. Adverse Impact on Biological Environment

a) Loss of Biodiversity

195. There is no presence of any tree inside the area, but some vegetation like shrubs and weeds will be required to remove for the construction of the project site. Negligible amount of soil covering plants will be destroyed during pre-construction activities. These activities will not lead to soil erosion in the project area if construction works start immediately after clearing the area.

b) Terrestrial ecosystem and loss of trees

196. Though there are no trees in the project area, but some vegetation and shrubs within the proposed project site would be lost due to the development of the project. *Binna son, Ara, Ekor, Murta, Ghagara and Bishkatali* is the common species in the area. These species grew there sparsely and no uses of these plants by the people or for the animals except some grasses. In fact activities would not hamper any wildlife habitats. However, the area would be relatively less impacted due to this project.

c) Planning and Design

197. In the pre-construction phase potential impacts are considered that either occurs during project planning and design or which occur during subsequent phases, but are the direct consequences of activities which are carried out during the pre-construction phase.

8.3. Impact during construction phase

198. The components of the environment that may be affected by the proposed project during the construction period are stated below:

8.3.1. Impacts on Physical Environment

a. Loss of Vegetation

199. The project area is located in a plain area with different species of herbs, shrubs, weeds and grasses. The entire land of the proposed area is vacant and covered with these vegetations. Before starting construction activities some Vegetation needs to be cleared. Clearing is associated with loss of biodiversity, soil erosion, increased runoff and degradation of surface water quality.

b. Earth Cutting

200. The earth will have to cut during laying foundation for MTB and other facilities. This earth cutting will fill up the surrounding lowland to develop the project area.

c. Disruption of Traffic

201. The construction of the SEC in the proposed site will not create any traffic disruption and pedestrian movement if a diversion road is prepared to enter the project from the adjacent highway with a bridge over the borrow pit.

d. Sanitation and drinking water facilities

202. The health of the project personnel, construction workers and labourers, those who going to live at the base camp would be impacted if proper arrangements for sanitation and drinking water facilities are not ensured adequately and properly.

e. Housing facilities for workers

203. Inadequate housing facilities will be affected the health of the workers. If the temporary shed is not provided for construction workers and labourers for living at the base camp this will impact surrounding area as well as hamper construction activity. If the construction workers and labourers are engaged from locally, then housing and sanitation problem will be insignificant.

f. Air Quality

204. The impact of the project is related to generation of dust during transportation and filling up the low land by earth for proposed site construction. The construction equipment, diesel generator, concrete mixing, dust emission, cutting of earth will be transported to the project site and hence the surrounding area will busy with traffic and may impact on the air pollution and congestion of traffic movement.

g. Noise and Vibration

205. The noise and vibration that will produce during construction phase of the movement of vehicles, Lorries and construction equipment will impact the health of the workers, but this will not impact local people as the project site is quite far from the locality. This impact will be minor and of short duration at any particular location along the road.

h. Blockage of waterways

206. No blockage of waterways will be occurring due to site construction. Hence there will be no impact on adjacent canal or river water quality. A river called Katakhal River is situated just North-west side of the project. It is mentioned earlier that to keep multiple option for transportation "Waterway" through Katakhal River can be used. In that case navigability of the river should have to be improved.

i) Workers and public safety during construction

207. During construction period lack of any safety, protective equipment, emergency medical attention, and elements with proper administrative control, engineering control, and Emergency Response team may cause loss of property, life and disaster.

8.3.1.1. Water Quality

8.3.1.1.1. Surface and Ground Water

208. The nature of the project will not hamper any negative impact on the surface and ground water quality of the river and beel near the project.

8.3.1.1.2. Drainage System

209. Lack of adequate drainage facilities at the construction site often contributes to localized drainage congestion. During rainy season monsoon showers and pre-monsoon showers could lead to surface runoff. Liquid waste may generate from the earth cutting during site construction of. Drainage congestion may occur if the drainage system is not managed properly.

8.3.2. Impact on Biological Environment

8.3.2.1. Biodiversity (Floral and Faunal)

210. Since the project area there is no vegetation except any grass or weeds which will be destroyed for clearing the proposed project area. These types of activities will not create any soil erosion in the project area if construction works start immediately after the clearing of grass and weeds. After implementation of the project planting vegetation through establishing a green area or green zone will compensate the loss and this will also help to create the place a scenic view.

8.4. Operational Phase Impacts

211. Though the information technology and establishment of HTP will in general benefit the economy of the country, but adverse impact due to production and using of computers and other IT related equipment can't be ignored. Its environmental impacts are often not realized or considered sincerely in Bangladesh. These impacts are expressed throughout the manufacturing, use and disposal of computers, and thus require monitoring and an understanding of each stage of a computer's life-cycle. The impacts during operational phase can be briefed in the following sections.

8.4.1. Impact on Physical Environment

212. In rainy season or during flash flood water logging may occur due to drainage problems on surrounding areas. Potential environmental impacts from the operation of the road are limited to the loss of utility of land along the road alignment due to the

requirement for a right of way. There is no physical negative impact during the operation phase of the project instead there is positive impact. After establishment of the original land surface there may invasion of exotic plants plantation due to creation of ROW which may affect the environment like drawing more water from the ground. But it is suggested not planting any alien species that extract much water from the underground.

8.4.1.1. Impact on Air Pollution

213. Generator exhaust dust and gases will be impacted surrounding the project area. The impact of the project is related to generation of dust during transportation and filling up the low land by earth for the newly constructed road. The construction equipment, diesel generator will move to the site and hence the surrounding area will be busy with traffic and may impact on the air pollution and congestion of traffic movement.

8.4.1.2. Impact on Noise Pollution

214. The noise and vibration that are supposed to be produced during the construction phase of the movement of vehicles, lorries and construction equipment will impact on health of workers. Noise may be impacted when generator started due to load shedding and traffic congestion. This impact will be minor and of short duration at any particular location along the road.

8.4.1.3. Impact on Domestic Wastewater

215. Domestic wastewater is to be properly treated through septic tank connected with soak pit before disposal to avoid environmental pollution.

8.4.1.4. Impact on Effluent

216. There is no chemical process during the operation of HTP and hence will not generate any liquid effluent and there will no impact on effluent or liquid waste on the environment.

8.4.1.5. Impact on Geology

217. The greater Sylhet region is a most enriched area of Bangladesh in mineral resources. A large quantity of the total proven gas reserve and the only oil field of the country are located here. The area has also vast deposit of limestone, peat, glass-sand hard- rock grave. But the economic values of hydrocarbon reserves are overwhelmingly dominant. The region is geologically known as the Surma Basin and covers the north-eastern parts of the foredeep and Folded-Belt division of the Bengal Basin, which happens to be one of the most prominent tectonically-active sedimentary basins of the world. Parts of the Sylhet region, which are apparently flat having been within the foredeep division, while the hilly areas are called folded Belt. This huge sedimentary body is dominantly composed of sand and mud with subordinated limestone, which started depositing in a deep-basement (bottom of the basin being composed of igneous-metamorphic complex) basin about 50 million years ago with the gradual rise of the Himalayas due to collision between the Indian and Burmese

Plates and subsequent erosion. The sand-mud composition of the sedimentary body, along with technically-developed favourable structural set up (exposed and covered folds and faults mainly) have made the Sylhet region highly potential for the occurrence of natural resources. Muds act as sources, sands as reservoirs, while folds (anticlines) act as traps for hydrocarbons (gas and oil) (Bodrud-Doza Zion, 2013).

218. Whereas, Companiganj is one of the resourceful upazila of Sylhet district. The area is renowned for its hard rock, one of the main geo-resources of Bangladesh after gas and coal, is very useful in the construction sector and cement industry. The source of this rock is near Meghalaya of India. This part of India is relatively in higher than the ground level of Bangladesh. That's why the rock comes down by gravity, especially in the rainy season. The water is the main transportation media which bring these rocks. People normally use manual hand tools for rock extraction and use two types of crusher to crush these rocks. With the construction of HTP at the proposed site there would be no possibility of disturbing geology of the area

8.4.1.6. Impact on Surface and Ground Water

219. There is no possibility of surface and ground water level impact, since the proposed project will not use process water. During construction period a small quantity of water will be required for construction and domestic purposes only. During operation of the project surface water from the nearest river or beel may be used for general and domestic purposes. For drinking purposes a deep tube-well needs to be dug to extract water from the underground. Hence the ground water table will not affect much as water will be extracted from the underground only for drinking purposes not for other purposes.

8.4.1.7. Effects on Disposal of IT Equipment

220. In Bangladesh, there is a growing concern about the increasing amount of electronic or e-waste being consumed and disposed of. E-waste and the associated recycling processes can cause significant environmental and health hazards. At present, there is a lack of awareness about the hazards of electronic waste (or e-waste) in Bangladesh (ESDO, 2010).

221. In recent years, as a result of increasing access to technology and the rapid growth of the Bangladesh economy, a market has emerged for computers, consumer electrics and home appliances. This emerging market has seen an increase in the amount of local consumer electronics products in the market and as a result an increase in the level of equipment that is being disposed of. In Bangladesh, this electronic waste is reused, broken down for parts or thrown out completely. Currently this informal practice is not being carried out safely and has become a danger to human health and the surrounding environment. At present there is a lack of awareness about the issue in the general population, in the Government and also in private companies (ESDO, 2010).

Table13: List of heavy metals and toxic substances from e-Waste (Source: ESDO, 2010)

E-waste containing products	Heavy metals and toxic substances from e-Waste
Televisions and computer monitors, Computers and computer peripherals(e.g. monitors and key boards), Audio and stereo equipment VCRs and DVD players CFL bulbs Video cameras Telephones, cellular phones and other wireless devices Fax and copy machines Video game consoles Medical and dental equipment etc.	Mercury Lead Cadmium Zinc Chromium

Table14: Health hazard from e-waste containing mercury, lead, cadmium (Source: ESDO, 2010)

Mercury	Lead	Cadmium
Brain disorders, Kidney, renal and neurological damage, Leading to even death.	Learning disabilities, Mental retardation, Behavioral problems, Hearing impairment	Lung damage, Fragility of bones, High blood pressure, Nerve and brain damage, Kidney and liver disease.

222. Every year Bangladesh generates roughly .17 million metric tons of e-Waste from television sets, 0.035 million metric tons from computers and .005 million metric tons from mobile phones. This electronic waste is disposed without understanding the harmful effects of dumping into open landfills, farming land and open bodies of water (ESDO, 2010).

223. Up until this point, there have been no effective steps made to stop the generation of e-waste in Bangladesh or to regulate the safe recycling and disposal. As a way forward, suggests the following recommendations (ESDO, 2010):

- To conduct a comprehensive inventory of the level of e-waste in large cities of Bangladesh.
- To develop an e-waste policy and guidelines in consultation with the relevant stakeholders.
- To establish an efficient collection system for selected types of electronic waste.
- To establish a registry of e-waste recyclers and to build their capacity development.
- To introduce an Environmental Management System in the e-waste sector.
- To establish an e-waste tracking mechanism in order to maintain this inventory.
- To raise awareness of the issue in the general population and within and private sectors.
- To monitor e-waste trafficking and shipment into and within Bangladesh.

8.4.1.8. Flooding

224. The project site is over 15 feet lower than the Maximum Flood Level (MFL) and remains submerged for 3 to 4 months during the monsoon period. To bring the site above the MFL, a huge land filling will be required. However, this will reduce the natural catchment area that will consequently raise the flood level. Considering this, it would be necessary to elevate the approach road few feet above the flood level.

8.5. Social related impacts

8.5.1. Employment Opportunity

225. During the construction period, temporary employment will be created. In the recruitment of workers and technicians for the project priority will be given to individuals who live near the project site including women. After completion of construction there will be creation of new permanent jobs, most of them related to operation and maintenance (O & M) of the project. It is envisaged that about two thousand ICT professionals would be employed in these jobs at HTP. Besides, a large number of supporting staff involving in ICT business will contribute in the development of the economy. The most significant positive impact of the proposed facility would bring economic benefits to the local people through employment in construction and operation phase of the facility.

8.5.2. Effects of e-waste Disposal

226. E-waste is one of the most harmful by-products of ICT. Incorrect disposal and dumping of old equipments such as computer parts and other peripheral devices can be detrimental to the environment and cause serious health hazards. Technological advancements have shortened the life span of IT equipments leading to more frequent creation of e-waste, which only exacerbates the negative environmental implications. Studies have shown that incorrect disposal of old equipments can lead to highly toxic substances like Lead (Pb), Mercury (Hg) and Cadmium (Cd) being released into the environment. These toxic chemicals can contaminate soil and groundwater, creating and spreading further toxicity.

227. The disposal of computers is a unique issue due to the fact that most computers are often disposed of before they truly become useless. In fact, the main reason for purchasing a new computer is not to replace a non-functioning system, but to keep up with rapidly changing technologies (Williams and Sasaki, 2003). One key term which is important for industry, the government, and the public, with respect to computer disposal, is “upstream management”; the various methods employed to reduce the amount of offing-coming computer wastes before they are disposed of for good (Williams and Sasaki, 2003). These methods embody the concept of Reduce, Reuse, Recycle, and have proven to yield many benefits, both environmental and socioeconomic.

228. Reducing the amount of computer waste relies heavily upon the reuse of systems that may be out of date, but fully functional. Reusing old computers can manifest itself in two main ways; by the selling or donation of old systems, or by up-grading existing systems

(Williams and Sasaki, 2003). The key concept with respect to reuse is to meet the user's needs with existing machines, while extending that machine's lifespan.

8.5.3. Fire fighting and first aid provision:

229. Fire fighting system will be maintained with adequate firefighting equipment against the fire hazards with first aid medical facilities and proper ventilation.

9.0. Public (Stakeholder) Consultation

9.1. Introduction

231. Stakeholder Consultation is a tool for managing two-way communication between the project proponent/developers and the project stakeholders. Its goal is to improve decision-making and build understanding by actively involving individuals, groups and organizations with a stake in the project. This involvement will increase a project's long-term viability and enhance its benefits to locally affected people and other stakeholders. As per the requirements of the study this consultation process was undertaken in the form of formal / informal consultative meetings to seek opinions and suggestions from various stakeholders with interest in the project.

9.2. Methodology

232. As part of the EA process, group discussions as well as individual stakeholder consultation were organized and conducted to record views and opinions of the stakeholders. Participants in these consultation meetings included elected representatives, local leaders, affected people, representatives of professional groups, mass media people, etc. Table: 15 indicate the date and place of the group discussion meetings including the number of participants present at each.

Table 15: Overview of Public consultation

Sl No.	Date	Consulted with Whom	Place	No. of Participant
1	8 th November, 2014	Public consultation meeting with government officials, affected people, local bodies, local press, teachers, students, business community and elites of the area	Upazila Parishad conference room, Companiganj, Sylhet and Proposed project site	24
2	9 th November, 2014	Public consultation meeting with affected people, local bodies, local press, teachers, students, business community and elites of the area	Upazila Parishad conference room, Companiganj, Sylhet	46
3	23 rd December, 2014	View exchange with local UNO, AC (Land) office, Engineers from Ernst and Young (EY) and some local beneficiaries of the site	Proposed project site	10

9.3. Disclosure of Public Consultation

233. Prior to public/stakeholder consultation relevant issues (discussing points) were sent to local UNO so that the people those who would come into the meeting can know the matters well before. Accordingly, all the important stakeholders and local people, including some beneficiaries (short term) from the site were present with full preparation with sufficient data and information. The highlights of the meetings were published in local newspapers. Also, the summary findings of the study will be published on the SDKHTP website to disclose for the national and international levels.

9.4. Summary of Public consultation

234. As part of the consultative process, consultants held three different meetings in collaboration with local UNO. About seventy participants attended the meetings held at the Upazila conference room on 08 and 09 November 2014. Apart from these two formal discussions, consultant also talked with the people at the project site on 8th November and 23rd December 2014 those who are now using the land for grazing purposes and *Jala* to produce rice seedlings.

Photograph 13: Environmental Specialist Taking information from the local beneficiaries





Photograph 14: Environmental Specialist talking with the local community

235. November 08, 2014 held a meeting in the presence of Upazila Chairman and other local body representatives in Upazila conference room of Companiganj Upazila. 24 Participants came from various government agencies, local public representatives, press media, teachers, etc. The meeting was conducted to know the relevant information about the area like, topography, surrounding land use, climate, temperature,

wind speed and direction, geology and geomorphology, surface and ground water resources, ecological resources, biodiversity, population and community characteristics, Soil types and distribution, flooding situation, seismicity, agricultural practices, irrigation practices, heritage and archaeology etc.

Participants from different government organizations were very open to deliver the data and information of respective issues and some of them also submitted written information during the consultative meeting.



Photograph 15: Public consultation at Companiganj

236. November 09, 2014 held a meeting in the presence of Upazila Chairman and other local body representatives in Upazila conference room of Companiganj Upazila with different stakeholders. 46 Participants came from different professionals, including local NGOs, business communities and other interested individuals or groups. The participants expressed their opinions regarding different issues, including their knowledge

about the project, possible impact of the proposed project on the environment and in their localities, and also suggested some mitigation tips to reduce/eliminate the adverse impacts.



Photograph 16: Environmental Specialist taking data from the local community

237. Most of the discussion was centered in favour of the establishment of HTP. No participants were against the project. The participants in general welcomed the project and expected that the project will contribute to the national economy in many ways. The important issues what participants raised were:

- The project is a pride for locals as well as for the government

- The project will enhance further development of the area
- Development of lifestyle of the local people
- They will assist to develop the park and industries
- No water body in the project area so no question of damaging any fish cultivation
- No possibilities of environmental impact as there is no structure or industries up to 05 km. from the project site.
- No landless people using the project land if any landless people use the land they will compensated providing Khas land as per government policy
- No forest near the site so no question of damaging any eco-system and bio-diversity
- Some people have grown vegetables and *Jala* (to produce rice seedlings) and it will be good if they can use the adjacent khas land for the same purposes
- Transfer of new technology
- Use of new scientific discoveries in practice
- Local worker should be employed in different activities of the project on a priority basis
- Female entrepreneur should be highly encouraged
- Many common people of the locality were present and they openly express their comment in favour of the project

238. BHTPA has designated only this site due to the fact that no other suitable site was found as an alternate option during the feasibility study. It may take further decision if any suitable site found in the future.

Photograph 17: Public Consultation at Companiganj Upazila Parishad Conference room



10.0. Environmental Management and Mitigation Plan

239. Environmental Management Plan (EMP) for the project outlines the management mechanisms (i.e. working arrangements) for how the environmental and social elements of the project will be managed from detailed design, pre-construction, construction and operation phases.

240. The purpose of the EMP is to ensure that any potentially negative environmental impacts during pre-construction, construction and operation are kept at an acceptable level. It sets out to ensure that all aspects of the works comply with the relevant legislation, license conditions and good practice and those measures to mitigate impacts identified are implemented.

241. The EMP contains environmental requirements which are required for the successful implementation of mitigation measures, environmental monitoring, emergency measures and environmental auditing to be carried out during the project implementation and execution process on the site. The implementation of mitigation measures and emergency measures shall be the responsibility of the project proponent/developers/contractors. The proponent shall ensure compliance with all environmental legislation, regulations and conventions. The responsibility for environmental monitoring lies with the Implementing Agency. The Implementing Agency must upgrade the capacity building appointing a full time Environmental Specialist (ES) so that the ES can monitor the compliance on a regular basis.

The contractors / investors will be contractually required to conform to the requirements specified in the EIA and EMP.

10.1. Principles of EMP and Detail Plan

10.1.1. Applicable Safeguard Policies of the World Bank

242. Safeguard policies of The World Bank are aimed at avoiding and / mitigating environmental impacts associated with projects supported by the Bank. Safeguard policies of the Bank that could be triggered for PSDSP are summarized below.

Table16: Safeguard policies of World Bank on Environmental Issues

S.No	World Bank Policy	Reasons of Applicability	Addressed by
1	Environmental Assessment OP 4.01	Project is likely to have impact on natural environment. Particularly, air, water land, human safety, natural habitats, forestry.	Carrying out an Environmental Assessment and preparing an environmental management plan to avoid/mitigate environmental impacts
2	Natural Habitats OP 4.04	Project passes through / impacts sensitive natural habitats	Preparation of environmental management plan to address impacts, on Natural Habitats
3	Forestry OP 4.36	Project passes through or is adjacent to major forest areas	Preparation of the environmental management plan to address impacts, if any, on forest areas

243. The project should be implemented taking into account the need to minimize potential negative impacts and maximize its potential positive impacts on the biophysical and socio-economic environment as well as health and safety of workers and the public. This commitment must be made at various levels, from the senior management level of the project company, to the levels of all parts involved in the implementation. EMP includes monitoring activities:

244. The potential impacts of such of the proposed site construction are considered in turn, by phase of implementation. The potential environmental impact of project is assessed by phase of development activity, namely: pre-construction, construction and operation phase.

10.2. Pre-construction Phase

245. The construction of the 162.83 acre project area is located at Khalitajuri Beelerpar Mouza of the Companiganj Upazila of Sylhet district will require no land acquired for the construction of the project.

246. But for the site preparation prior to start the earthwork some native vegetation (mostly weeds and some herbs and shrubs) needs to be cut to make the place in a position so that labourers can work easily. As a result of cutting the vegetation, soil will be uncovered and loss of habitat for some small insects.

247. To mitigate the impact, vegetations cutting should be need-based, that means where necessary the vegetation should be cut only from that place. At the same time this should keep in mind by the Implementing Agency/developer/investor to make a green area/green zone in the project or around the project so that whatever the loss of vegetation was, it should be re-vegetated more than the exact loss. The green area/zone will contribute not only to the bio-diversity or climate change affect; this will also create a scenic view of the area. Cleared / vegetation loss area should not be kept for a long time. It might cause soil erosion and surface runoff in case of heavy rainfall. So it is suggested to start the next step of work soon after clearing the area.

10.3. Construction Phase

248. During the preparatory phase some construction activities will be done. The potential impacts are those which results directly from the construction activity like earth cutting, soil erosion and soil contamination, loss of vegetation, noise, dust and gaseous emission, sanitation, drinking water supply, drainage problem, oil spillage, solid waste disposal, loss of bio-diversity. The mitigation measures are described below in detail of the above potential impact.

10.3.1. Effects on Water, Air and Soil Quality

249. Generally, any project site is required to raise its level from the existing ground level by earth filling. This land rising from its original level certainly disrupts the natural surface of the earth, which will obstruct the natural drainage system of the area, if proper mitigation measures are not taken.

250. However, in general, industrial building when not designed in considering the landscape, it creates visual intrusion to the people. The proposed project, changes the local landscape of the area to some extent by covering a green area into a built-up area. This will change the natural and visual equilibrium for the local people.

251. Built up of the project should be designed considering the key criteria of landscape like coherence, readability, hierarchy, harmony and stability. It is understood that the project

will have a modern architectural view which does not provide any significant visual intrusion.

Impact on soil is not expected to occur as the project does not use any toxic or any chemical for its process and operation.

10.3.2. Effects on Flora and Fauna, Ecosystem and Habitats

252. The whole area is a low lying area and kept unused or abandoned for a long time. As such, there will be no loss and displacement of agricultural land and encroachment into ecological resources. Intervention of flora and fauna and habitats is expected to be negligible due to setting up the facility and its operation.

10.3.3. Effects of noise and emission

253. The effect of noise in the operation phase on ambient conditions is insignificant. The facility may not emit any greenhouse gases if operates the process following under strict environmental guidelines.

10.4. Implementation of the EMP

254. Environmental Management Plan (EMP) includes a set of mitigation measures for minimizing or removing negative impacts, enhancement measures for further improvement of positive impacts, environmental monitoring arrangements for observing the changes induced by the project interventions and institutional arrangements for smooth implementation of environmental management plan.

255. It is to be noted here that, this EA document can be viewed as a draft EMP. On the basis of DoE Environmental guidelines, after securing the Site Clearance Certificate (SCC) from DoE thereafter Environment Clearance Certificate (ECC) will be awarded subject to fulfilling the terms and conditions of SCC. To obtain ECC a comprehensive EIA report needs to be developed in accordance with the TOR of SCC. As part of the detailed EIA, a more detailed EMP covering all significant environmental and socioeconomic issues, and tailored to the final design of the project, will be developed. This draft EMP will form the primary mechanism for management, accountability, monitoring and reporting of the project's social and environmental performance. The management measures given herein should not be considered final as further consideration will be given to the necessity and / or suitability of such measures during the EIA phase. EMP for the site construction is presented in the following matrix in Table 17.

Table 17: EMP for the site construction and operation phases

1	2	3	4	5
Issues	Potential Impacts	Mitigation Measures	Implementation Agency	Monitoring Arrangements
Ground clearing for construction activities	Vegetation Disruption, Soil erosion, Loss of Top soil	<ul style="list-style-type: none"> • Earthworks should be scheduled as far as possible within the dry season to minimize the potential for runoff • Clearing should be staged to minimize the area of soil exposed at any one time • Cutting earth should be kept bare minimum and earthwork cuts will be used where necessary • Adequate drainage system should be kept so that water can pass easily • Re-vegetation(where possible) and soil compaction can be minimized the effects • Removing of vegetation cover only from specific site construction is to be taken place • Disturbing the vegetation as little as possible in adjacent area 	Contractors/ Developers and Supervising Consultants	Project Implementation Unit (PIU)/Developers
Loss of soil fertility due to removal of top soil	The upper layer of the soil (Top soil- 6") contains essential soil Nutrients. If the cut of the top soil occurs for construction, soil fertility might be reduced	<ul style="list-style-type: none"> • To cut the top soil for construction facilities can't be avoided, but it will must reduce the fertility of the soil • Topsoil from all areas to be permanently covered shall be stripped, stored and used for re-vegetation works • Construction vehicles, machinery, and equipment shall move or be stationed in designated areas. • Access to adjacent agricultural land will be minimized 	Contractors/ Developers and Supervising Consultants	Project Implementation Unit (PIU)/ Developers
Soil erosion	Land slide/ battered slope, loss of soil fertility	<ul style="list-style-type: none"> • Ensure, layer to layer compaction, soil stabilization measures • Re-vegetate and Restore disturbed soil if development works for construction delayed • Vegetation according to design plan • Establishment of Green area or green zone inside or periphery of the project 	Contractors/ Developers and Supervising Consultants	Project Implementation Unit (PIU)/ Developers
Water pollution	Surface and ground water pollution due to	<ul style="list-style-type: none"> • Earthworks should be scheduled as far as possible within the dry season to minimize the potential 	Contractors/ Developers and	Project Implementation Unit (PIU)/

	soil erosion and construction activities	<p>for runoff</p> <ul style="list-style-type: none"> • Measures as per design or as directed by the Consultants to control soil erosion • Install waterway barriers around construction works to minimize the potential for transportation of sediment offset. • Earth materials and stone will be properly disposed off so as not to block adjacent rivers /canals, resulting in adverse impact on water quality • Measures will be taken to prevent the untreated wastewater produced during construction from entering into creeks and streams • Produced wastes should be disposed of properly • Septic tanks and soak wells should be with proper design; • Pollutant materials Such as fuels, lubricants, detergents, cement and others must be handled properly to avoid spills; • Minimizing disturbance of the groundwater • Washing of vehicles and equipment on the site shall be restricted; • the system for the Sludge/slurry/ backwash water production should ensure minimization of leakages to the ground water level. 	Supervising Consultants	Developers
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Air pollution	Health hazard to labours and Residents due to dust and fume emission	<ul style="list-style-type: none"> • Regular maintenance of vehicles, plant and machineries • Approved pollution control devices to be fitted to equipment and machinery • Vehicle speed restrictions should be enforced to minimize dust generation • Stockpiles of fine materials should be covered during periods of high winds • Water will be sprayed on construction sites, exposed sites and earth roads to minimize dust • Sprinkling and covering stockpiles; • Water will be sprayed to suppress dust on an as required basis in construction phase 	Contractors/ Developers and Supervising Consultants	Project Implementation Unit (PIU)/ Developers
Noise/ vibration pollution	Hearing hazards for the labours and residents from vehicles, plant and earth moving equipment	<ul style="list-style-type: none"> • Restrict noisy work activities to the day time • Scheduling of transportation not to disturb the community • Equipment should be used and operated within the noise standards set by the Government of Bangladesh • The vehicles and equipment should be inspected regularly to ensure its proper functioning and keeping the noise within acceptable level • The machineries should have silenced devises; • Ear muffs will be Supplied for workers to wear, when working close to machinery to protect noise • Vibrator insulator/ pad will be placed under electric pump/motor as well as diesel generator to protect / minimize vibration and false wall within/ besides the main wall of motor/generator room will be constructed to protect noise • Canopy built generator should be provided. 	Contractors/ Developers and Supervising Consultants	Project Implementation Unit (PIU)/ Developers
Waste/ sludge disposal Management	Contamination of biotic environment	<ul style="list-style-type: none"> • Wastes and debris should be disposed of properly • Construction debris must be stockpiled and should be disposed of to a safe site. • Don't drop or expose 	Contractors and Supervising Consultants	Project Implementation Unit (PIU)/ Developers

		<p>any debris while transporting.</p> <ul style="list-style-type: none"> • The retention/ settling basin, given its potential for environmental contamination should be designed so as to avoid any risk of either groundwater (through Infiltration) or surface water and soil (through leaks, cracks, overload, etc. contamination. • The retention/ settling basin be based on soil or rock, capable to support the maximum load of the basin • The width of the limits of the basin must also be sufficient to support a rapid level rise that can happen in the retention/settling basin as a result of heavy rainfall. • Finally, the transference of retention/ settling sludge to the landfill of inert material should be made to avoid any contamination of soil or water. 		
Destruction of vegetation coverage	Deforestation and desertification	<ul style="list-style-type: none"> • Enhance environment by tree plantation in proper place on the project premises and by the approach road side; • Re-vegetation on exposed surfaces be encouraged 	Contractors and Supervising Consultants	Project Implementation Unit (PIU))/ Developers
Additional burden on utilities	Stress on water supply, energy, sewerage and communication	<ul style="list-style-type: none"> • Ensure adequate provisions for facilities with concerned organizations; • Proper O&M for sustenance of the structures and approach roads; • Harvesting rainwater to reduce pressure on drinking water supplies. 	Contractors and Supervising Consultants	Project Implementation Unit (PIU)/ Developers)
Water supply and sanitation	Incidence of diseases	<ul style="list-style-type: none"> • Ensure adequate supply of pure drinking water to the labour & Ensure proper sanitation facilities for male and female workers separately; • All main pipes, and connections to be used in subsurface must be inspected; 	Contractors and Supervising Consultants	Project Implementation Unit (PIU))/ Developers
Health and safety	Health hazards and general safety of workers and people	<ul style="list-style-type: none"> • Arrange training for contractors & workers; • Workers involved with the operation should use personal protective equipment compatible with the work to be performed; • Make mandatory the use of 	Contractors and Supervising Consultants	Project Implementation Unit (PIU))/ Developers

		<p>Personal protective equipment (uniform, fluorescent vests, boots, hand-gloves, ear protection plugs, protective glasses, etc.);</p> <ul style="list-style-type: none"> • The water supply provided to the construction site must comply with the standards of potable water; • Ensure that adequate first aid equipment is available and that all workers are properly trained to use; • Permanent fencing will be established around the perimeter of the Facility; • Provision and inspections of fire fighting equipments and fire hydrant system in all sections. 		
E-Waste	Health hazards	<ul style="list-style-type: none"> • Provision to reduce, reuse, and recycle of disposing the equipment to maintain environmental and socioeconomic benefits. 	Contractors and Supervising Consultants	Project Implementation Unit (PIU)/ Developers

11.0. Organizational Management Aspects (Institutional Framework)

256. Executive responsibility for project management commonly involves a number of organizations/ persons, each with specific responsibilities for particular aspects during the preparatory works for site clearing, earth cutting on site execution and post-construction operation & maintenance phases.

257. An important aspect of environmental management is the accumulation of a database of environmental measurements. The management measures shall have to be taken with regard to controlling the potential impacts that could, in broader terms, occur during the pre-construction, construction and operation and maintenance phases of the project and indicates responsibilities for the various actions concerned. The environmental management team should, at an early stage of project planning, prepare a detail schedule of management actions required along with fixation of specific individual responsibilities for these actions.

- Policy and Leadership
- Continuous Improvement
- Safety and Health
- Incident reporting and investigation
- Emergency preparedness and response
- Environmental protection
- Training and orientation
- Community relation
- Regulatory requirement

258. In case of government funding component the overall management will be borne by the Implementing Agency, Bangladesh Hi-Tech Park Authority. During Pre-construction and Construction phase the overall compliance of the environmental issues largely lies on the contractors/developers. Whereas, supervision and monitoring lie with the IA and developer (if the project developed by developer funding). So contractor/Developer will be responsible for the overall compliance of the environmental issues.

259. In the case of World Bank supported component the overall management of PSDSP will be carried out by the Project Management Unit (PMU) set up for the purpose and the sub-projects will be managed and implemented by the respective implementing agencies.

260. in case PSDSP Institutional set up for Environment Management

1. The institutional arrangements for the implementation of various aspects of EMF and environment management of PSDSP comprise the following.
 - **Environment Management Cell (EMC) at PMU** to monitor all the aspects of

environmental management of the project

- **Project Environment Cell (PEC) at PIU** to ensure adequate integration of environment management measures in the design phase and supervise implementation of EMF and specific requirements of EMP
- **Environment Management Unit (EMU) at EPZ** to implement EMP and other regulatory requirements during construction & operation phase of EPZ.

261. To coordinate and ensure the implementation of the EMF, an Environment Management Cell (EMC) will be set up at the PMU. The EMC will be headed by an 'Environmental Specialist' and will be supported by 'Environmental Engineers'. The EMC will monitor the environment management aspects of PSDSP and will be responsible for the following.

- Ensure that all the sub-project proposed for implementation through PSDSP comply to the project categorization and other requirements of EMF;
- Identify regulatory requirements of sub-projects and monitor their compliance at all stages of the project;
- Identify and ensure integration of various aspects of environmental management in the respective contract documents / tenant lease agreements of Master Developer/ Operator /contractor and individual enterprises/ tenants;
- Co-ordinate with respective implementing agencies and contractors / operators and ensure that the environmental management measures are implemented as per the respective EMPs and ECC clearance conditions;
- Advise the environment staff at implementing agencies and the EPZ on various matters of environmental management;
- Prepare periodic progress reports on the implementation of the EMF and share with the Bank and other monitoring agencies.

262. It is to be mentioned here that, a full time Environmental Specialist (ES) already been appointed at the PMU (Support to Development of Kaliakoir Hi-Tech Park project). The ES will be responsible to supervise and monitor the environmental management issues of the SEC.

12.0. Environmental Monitoring Program for Performance Evaluation

12.1. Requirements for Management and Monitoring

263. The best implementation of EMP is largely depends on a suitable monitoring programme. Environmental monitoring during project implementation provides information to the regulatory agency on the environmental compliance and the efficacy of the various mitigation measures, particularly the environmental impacts of the project and the effectiveness of mitigation measures. Such information enables the implementing agencies and other supervising agencies to evaluate the success of mitigation as part of project supervision, and allows corrective action to be taken when needed. Therefore, the EMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the EA report and the mitigation measures described in the EMP.

264. The EMP contains environmental requirements which are required for the successful implementation of mitigation measures, environmental monitoring, emergency measures and environmental auditing to be carried out during the construction works on the site. The implementation of mitigation measures and emergency measures shall be the responsibility of the project proponent. The proponent shall ensure compliance with all environmental legislation, regulations and conventions. The responsibility for environmental monitoring lies with the Implementing Agency.

Specifically, the monitoring techniques of the EMP provide:

(a) a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

265. Likewise, all physical and biological environmental parameters, which have been identified as receptors of significant impacts and the pollution control measures should be covered under the monitoring programme. The monitoring should include monitoring of the health of all persons working in the plant, particularly the health aspects related to occupational hazards.

266. Monitoring of the performance of the facility is very important and sometimes vital. It should be mentioned here that the monitoring program should be such that it can ensure compliance with national environmental standards and legal requirements. The importance of this monitoring program is also for ensuring that the plant does not create adverse environmental changes in the area and providing a database of operations and maintenance which can be utilized if unwarranted complaints are made.

267. For surveillance of the performance of the equipment and the quality of the environment, monitoring of the environment of the work-zone and the general environment should be performed on a regular basis. The key objectives of monitoring are:

- a) Ensure that the ESMP is implemented;
- b) Evaluate the effectiveness of the mitigation measures;
- c) Verify of predicted impacts;
- d) To provide a means whereby impacts which were subjects to uncertainty at the time of preparation of EA, or which were unforeseen, can be identified, and steps to be taken to adopt appropriate control measures.
- e) Provide feedback to DOE/ licensing authorities.

There are two basic forms of monitoring:

- Visual observation or checking, coupled with inquiries
- Physical measurement of selected parameters

268. In the case of site construction projects in general, monitoring is done by physical measurement of some selected parameters like air, drinking water, wastewater, noise, solid waste, etc. It should be mentioned here that the monitoring program should be such so that it can ensure compliance with national environmental standards and WB guideline (in case of WB funding).

12.2. Monitoring and Reporting in case of WB funding project

269. The implementation of EMF and other agreed actions of environmental management during construction and operation phase of the sub-projects will be monitored by EMC, a combination of regular visits to the sub-project locations and periodic reports from the PEC. While the EMC will carry out monthly visit to the site and submit quarterly progress reports to the Bank, the PEC will conduct fortnightly visits and submit monthly reports to PEC.

	Field Visit	Reports
1.Environment Management Cell (EMC) at PMU	Monthly	Quarterly to Bank
2.Project Environment Cell (PEC) of PIU	Fortnightly	Monthly to EMC
3.Environment Management Unit (EMU) of EPZ	Daily	Monthly to PEC

Table 18: Monitoring and Reporting Requirements of WB funded project

12.3. Monitoring Parameters and Schedule

12.3.1. Monitoring Indicators

270. Environmental monitoring requires a set of indicators that could be conveniently measured, assessed and evaluated periodically to establish trends of change in baseline environment quality. A list of parameters to be tested, sample number and sampling frequency are given in Table 19. These indicators may be independent or may be functionally related. The physico-chemical, ecological, human interest and socio-economic indicators should be well defined and a mutual relationship among the indicators should be well understood. The monitoring program, in view of the possible impacts as assessed earlier, should consider the indicators for the impact assessment related to the following issues:

Table 19: Types, Parameters and Location and Frequency of Monitoring

Environmental component/Types of monitoring	Parameters	Location	Frequency of Monitoring or Sampling
Ground Water	pH, DO, TDS, Salinity, As, Fe and total coliform	Nearby ground water (two locations)	During construction period (Quarterly)
Surface water	pH, DO, BOD, COD, TDS and SS.	River and Beel water from (two locations)	During construction period(Quarterly)
Noise	dBA	Along the construction site (two locations)	During construction period (monthly)
Dust	Spraying of water	Construction site	Daily
Air quality	SPM, PM _{2.5} and PM ₁₀ , SO _x and NO ₂	Along the site& near busy area	During construction period (Quarterly)
Waste Management	Monitoring, collection, transportation, disposal of SW. Inspection of construction camp.	Construction site	Thrice in a week
Health and safety	Monitoring health and safety of worker	Construction site	Daily

12.3.1.1. Noise Monitoring

271. Generator and vehicle movement should be handled cautiously to check the noise and high noise making equipment should be avoided as far as possible. Sufficient cover or canopy should be used on the equipment or machines in case of high volume noise sources. Power generator units should be placed in the sound proof rooms and regulating the use of hydraulic horns should be monitored for compliance.

12.3.1.2. Water Quality Monitoring

272. Ground water quality monitoring shall be done during site construction period to check the change the parameters. Surface water quality at nearby river/beel site shall be performed. Routine monitoring on Environmental Performance of the project will be reported by the Project Management Unit (PMU) and a copy of the report will be made available to DoE.

12.3.1.3. Air Quality Monitoring

273. It was identified earlier that the negative impact on air quality, mainly dust and gaseous emissions generated from the movement of heavy vehicles during construction, operations and maintenance of the site. Dust load on the nearby areas and plants is an indicator of dust pollution in the air. Mitigation measures suggested earlier will successfully offset these negative impacts. Monitoring of suspended particle load in the atmosphere of the construction sites should be measured frequently to comply with the air quality standard.

12.3.1.4. Direct Construction Impacts Monitoring

274. Monitoring need to be done during direct construction work mainly on dust emission, noise generation. Three basic monitoring systems during construction stage will be followed and these are:

- Monitoring of air quality at selected point during construction at quarterly intervals
- Monitoring of noise close to working location at quarterly intervals
- Monitoring of restriction or obstruction to traffic movement at work places during construction period

275. The significant physical impact will be on air quality due to generation of dust during construction period. One point in the site will be monitored monthly during construction period for SPM. As the other issues related to air quality is of no concern.

276. The work camps are to be monitored regularly on the monthly basis if work camps are mainly a proper method of protecting soil from spill of oil.

277. The water quality of the adjacent river and beel may be monitored if there is any scope of dumping of debris into these places. Thus water quality monitoring will be specific on the identification of any scope of turbid water flowing from work sites.

278. Water supply and sanitation in the labour camps will be monitored to ensure that the contractor engaged actually follows the guidelines under contractual obligation.

279. Solid wastes are to be disposed at designated places, in bins. The grey waters are to be processed through septic tanks. If any hazardous waste produced should be properly collected and dispose through registered DoE vendor and make an inventory.

280. e-Waste: Provision to reduce, reuse, and recycle of disposing equipment to maintain environmental and socioeconomic benefits should be on the basis of strategies pointed out in the 'National 3R Strategy for Waste Management, 2010' issued by the Department of Environment.

12.4. Environmental Management and Monitoring Program

281. The environmental management of the SEC project should be based on the framework of the concerned project cell of STDKHTP and the project cell should be fully involved in the development and implementation of the project Environmental Management Plan (EMP). Detail baseline monitoring, pre-construction, construction and post construction should also be co-ordinated by concern project cell.

12.5. Environmental Management Budget

282. At this stage of the project, there are a number of environmental management issues which have been provided detail in EMP Table: 20 and included in the contractor's responsibility.

- The precise nature and extent of works involved.
- Details of their nature and scope any institutional strengthening and environmental training which is required.

283. Environmental management and monitoring cost will be around Tk. 5.75 Lac for monitoring and testing of various environmental parameters. At this stage of the project, there are a number of matters which have not yet been resolved, which have a bearing on environmental monitoring cost includes as follows in Table 20.

Items	Number	Per unit sample Cost in Tk.	Total cost in Tk.
Construction Phase			
1. Ambient air	6 Parameters	15000	90000
1. Drinking water & surface water	10 Parameters	2500	25000
3. Noise level	10	1000	10000
Cost for one time sample during construction phase			125000
A. For Cost during construction phase			250000
Operation Phase			
1. Ambient air	6 Parameters	15000	90000
2. Drinking water & surface water	10 Parameters	2500	25000
3. Noise level	10	1000	10000
4. Training			200000
B. Total cost for one time sample during operation phase			325000
Grand Total (A+B) in Tk. Five lac and Seventy five thousand only			575,000

Table 20: Estimated outsourcing cost for environmental monitoring during construction and operation phases.

284. Apart from above mentioned cost, the government fee for the Site Clearance Certificate (SCC) and Environmental Clearance Certificate will be borne by the project proponent.

13.0. Institutional Capacity

13.1. Key Aspects of the Study Including the no. of Competency Staff

285. The key aspect of the study is to assess environmental impacts for implementation of the project and is identified in Chapter 8. The mitigation measures of identifying impacts are described in Chapter 10 and will be implemented during site construction period. The respective implementing or responsible agencies and monitoring issues are also identified in Chapter 11 and 12.

286. The manpower requires for successful implementation of the project is 5 officers and 5 staffs. The positions are Project Director-1, Deputy Project Director- 1, Assistant Engineer-1 Sub-Assistant Engineer-1, and Assistant Director-1. The other 3 skilled and 3 unskilled staff will be engaged during the implementation of the project.

13.2. Availability of Appropriate Technology and Equipment

287. A monitoring program will be implemented during construction of the project site. Scientific environmental monitoring is required for implementation of the proposed project and environmental management plan. Specific monitoring parameters will help to achieve the monitoring objective and ensure environmental quality. Waste management, drinking water quality around the project sites will be regularly checked, tree plantation, quality of ambient air, noise, and health & safety of officers & labourers involved in the project and employment of labourers etc. should be monitored periodically to ensure a pollution free environment in the project site.

13.3. Monitoring Budget

288. A budget amounting Tk. 575,000 will be required for proper environmental monitoring and test analysis and training of the project implementation.

14.0 Responsibility of the Contractor

289. Contractors/developer shall carry out the project related activities as specified in contract agreement. HTPA shall ensure that contractors/developers take due responsibility to mitigate those negative impacts. Environmental awareness creation, particularly about the direct construction impacts and for the health, pollution and safety issues will be Contractor's/developer's responsibility. Consultants' supervisory/monitoring roles will be in conformity to clauses incorporated in tender documents, national legislation and donor's requirement. Clauses that may be incorporated with tender documents are:

- Contractor/developer shall take all steps to protect the environment and avoid causing damages of water bodies and public nuisances of all types during implementation and operations.
- Contractor/developer shall comply with the existing statutes and regulations concerning the execution of works as per requirements of DoE and donor's environmental guidelines.
- Contractor/developer shall use hollow brick for construction work where applicable, to mitigate the overall emission control. Contractor shall also procure bricks for construction work from modern auto brick field
- Contractor/developer shall use bulk cement container instead of 50 kg bags in order to reduce GHG emission
- Contractor/developer shall be responsible for familiarizing himself with the legislation relating to environmental protection that is relevant to his activities. Reference to rational environmental quality guidelines should be made.
- Contractor/developer shall be responsible for bearing the costs of cleaning up any environmental pollution resulting from his activities if methods for doing that are available and effective.
- Precautionary signboards /danger signals/ billboards shall be placed in appropriate places to notify people about the possible dangers.
- Contractor/developer in case of surface water pollution from his activities shall take adequate prevention measures not to pollute water and in case pollution of surface

water, he/she shall be liable to revert the original quality of water particularly so where surface water has potential use. Cost both for tests and purification shall be borne by Contractor/developer.

- Where water abstraction from bore-holes dug by the Contractor results in adverse effects on groundwater that at the time of commencement of contract was being used by local people Contractor/developer under the situation shall ensure supply of equivalent quantities of safe water to the users.
- Contractor/developer shall at all times maintain the camp and construction sites under his control in clean and tidy conditions and shall provide appropriate and adequate facilities for temporary dumping all types of wastes before disposed properly.
- Remove equipment, surplus material, rubbish and temporary works and leave the site in a clean condition to the satisfaction of the company's representatives after completion of construction activities.
- Be responsible to pay compensation upon the appropriate monetary evaluation applicable to the local market if any damage is incurred to agricultural land or surrounding homesteads outside project site.
- Contractor/developer shall be responsible for safe transportation and disposal of all type wastes generated out of his activities in a manner so that no environmental pollution or hazard to health is caused to the workers and local people. In case any third party is employed to dispose of wastes, Contractor shall, even in such case be considered as if he has discharged the responsibilities himself under this Clause until the wastes leave the site under his control. He remains legally bound to exercise due diligence to ascertain that the proposed transport and disposal mechanism do not cause pollution or public health hazards.
- Contractor/developer shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contact of such materials with soil or water course through discharge, run-off and seepage.
- Contractor/developer shall be responsible for provision of adequate sanitary facilities to the construction workers (including those employed under subcontract) for construction sites, office and campsites. He shall not knowingly allow discharge of any untreated sanitary waste to the ground or surface water. Before mobilization of construction workforce, Contractor shall provide details of sanitary and drainage arrangements to the Engineering Representative (ER) for approval. The detail should include maintenance and operation plans and sufficient other information to allow the ER to assess whether or not the proposed facilities are adequate.
- All vehicles and plant operated by the Contractor (including subcontractor) /developer shall be maintained according to manufacturers' specification and their original manual, particularly regarding control of noise and/or smoke emission. The ER shall reserve the right to ask the Contractor/developer for replacement or rectification of any vehicle or plant within 48 hours that he believes emits excessive noise and/or smoke by serving a notice in writing.
- Contractor/developer shall make every reasonable effort to reduce noise pollution caused by construction activities including relocation of crusher and ancillary plant at new site where the distance between these plants and residential sites is safer for attenuation of noise in the existing residential areas.

- Contractor/developer shall take all reasonable measures to minimize dust-blowing from sites under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions require dust suppression. If the ER considers dust suppression measures adopted by Contractor ineffective, Contractor shall in that case take further measure to minimize dust blowing at construction sites as per his direction.
- In case of any traffic disruption is caused due to construction activities of the Contractor (or subcontractors) /developer, Contractor/developer shall in that case be responsible to provide alternative access for operational use by vehicles. The facilities provided shall be such that neither of the party is disturbed by the arrangement.
- Contractor/developer shall be responsible to keep the construction materials in order so that it does not create any difficulty for the vehicular movement or pedestrian movement.
- In case of any damage by Contractor (or subcontractor)/developer, the Contractor/developer shall notify the ER of it and shall repair the road to its original condition at his own cost.
- In case of any damage caused to agriculture or water bodies outside the boundary of the project, either permanently or temporarily by the Contractor/developer or Subcontractor's activities, Contractor/developer shall in such case remain responsible to pay monetary compensation for the damage appropriate to the local market value.
- The Contractor/developer on completion of the Contract shall remove the equipment, surplus materials, and rubbish and temporary structures of all types and shall leave sites in clean condition to the satisfaction of local people and the ER.
- Officials of the concerned ministry, division and its superior authorities, officials/specialist of the implementing agency any time may visit the project to supervise and monitor the above mentioned responsibilities.

15.0. Conclusion

290. An Environment Assessment (EA) has been carried out for the project, according to the requirement of WB safeguard policy and DoE for necessary site clearance/environmental clearances as it is made mandatory in ECA' 95, and the subsequent ECR '97. An EA report has been prepared through identifying the potential impacts, assessing them and recommending possible mitigating and enhancing measure for negative and positive impacts, respectively. An outline of EMP has been given in the present report to mitigate/enhance the impacts, which are expected to occur during construction and operation phase of the project.

291. The implementation of the HTP at Companiganj, Sylhet is necessary to make an IT/ITES based country accommodating both national and international experts, researchers and investors. This HTP not only contributes to make a resource based country, but it will also largely boost to make a Digital Bangladesh.

292. Within this report the results of preliminary studies, baseline data collection, social impacts and stakeholder consultation are provided and analysed in relation to the proposed project. This EA demonstrates that there is the potential for impacts as a result of the project. However, the identified potential negative environmental and social impacts are likely to either be minor or insignificant if appropriate management and mitigation measures are implemented. The majority of negative potential impacts relate to the construction phase of the project. This EA also demonstrate that positive benefits of the project on the environment and the community are also likely to occur.

293. Most significant potential negative impacts identified as a result of the project include:

- A possible change in natural landscape and river/haor/beel dynamics which may cause floral and faunal disturbance
- Loading and unloading of stones near Katakhal bridge on Katakhal river may disturb the system
- Potential for pollution of waterways, particularly due to the extent of works to occur within Katakhal River and nearby beel. This presents the increased likelihood of river pollution should spills occur or the mismanagement of waste.
- Potential for general disturbance to the local community from increased road traffic to support the construction works.
- Possible temporary exclusion of fishing and other river activities within the area of the river required for construction the erosion control wall; and
- Potential for increased pressure on local resources such as health facilities and food supply to support the temporary construction personnel along with the potential for inflation of local prices.

294. Most of the potential negative impact relates directly to the construction phase of the Project and can be appropriately managed through the implementation of the mitigation and control measured identified in the Environmental Management Plan (EMP).

295. Potential positive impacts from the Project include employment of local people, better skilling of local people, increases in the incomes of local people and of transport facility.

296. The findings of this EA suggest that the project involves potential socioeconomic benefit, connecting with the Moulvibazar, Habiganj, Sunamganj, Brahmanbaria and Mymensingh. The social-economic development of the area will increase. The lifestyle of the area will also increase after the operation of the HTP project.

297. The project is to establish knowledge based industries in the Sylhet region, particularly related to Software and IT Enabled Services, in order to contribute to the national economy to achieve the goal of Vision 2021: Digital Bangladesh.

298. The limited environmental impacts to which further careful attention should be given during the construction and in the operation and maintenance of the project in order to minimize and offset the adverse effects. Dust emission should be mitigated through spraying water during construction period. Since the HTP construction and operation will follow an environmentally sustainable manner, the possible negative impacts are very minor and only during construction will occur and the adverse impacts if duly addressed could be minimized without much effort, though they would require attention and positive commitment from the project management.

299. There is no chemical process during the operation of the HTP and hence will not generate any liquid effluent and there will be no impact on effluent or liquid waste on the environment. Only domestic wastewater will be generated from the MTB, dormitory building and other facilities, which need to be properly treated through septic tank connected with soak pit. Particulate matter and gaseous emission will generate only when electricity will not available and power will be back up through diesel generator. The emission from the diesel generator will be discharged through a proper chimney with adequate height so that ambient air quality will be within limits.

300. E-waste will generate after certain period of time and need recycle and disposed after proper management. Solid waste mainly paper and cartoon etc will be collected properly and sale to the small traders otherwise these should be incinerated. In case of producing any e-Wastes, should be disposed off according to the strategies outlined in the 'National 3R Strategy for Waste Management, 2010' issued by Department of Environment.

301. Overall feedback for the project from preliminary consultation with government level stakeholders has been consistently positive. General support for the project and useful information was provided from all levels of Government officials, along with a general consensus that the Project was in the nation's best interest.

302. This EA report was prepared with consideration of available primary and secondary sources of information, stakeholder consultation outcomes and site visits. It applies standardized methods of impact prediction and impact management.

303. The results of this EA suggest that the proposed project is likely to be able to proceed without resulting in any significant impacts to physical, biological, or socioeconomic environments, if appropriate management measures are implemented. The proposed mitigation measures are prescribed conceptually in the EA, as an outline of EMP.

304. There are no uncertainties in the analysis, and no additional work is required to comply with National Law. There is thus no need for further study or Environmental Assessment for obtaining Site Clearance Certificate from DoE. However, according to DoE regulations a comprehensive EIA needs to be developed further for this project to obtain an Environmental Clearance Certificate from DoE on the basis of TOR that should be recommended in the Site Clearance Certificate.