

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, E-16 Agargaon
Dhaka-1207
www.doe.gov.bd

Memo No: 22.02.0000.018.72.109.17, 665

Date: 31/12/2017

Subject: Remedy from IEE and Approval of Terms of Reference for EIA of the Proposed Matarbari Port Development Project under Chittagong Port Authority at Matarbari, Moheshkhali, Cox's Bazar.

Ref: Your Application dated 10/12/2017.

With reference to your letter dated 10/12/2017 for the subject mentioned above, the Department of Environment hereby gives Remedy from IEE and Approval of Terms of Reference for EIA of the Proposed Matarbari Port Development Project under Chittagong Port Authority at Matarbari, Moheshkhali, Cox's Bazar subject to fulfilling the following terms and conditions.

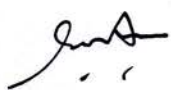
- I. The project authority shall submit a comprehensive Environmental Impact Assessment (EIA) Report considering the overall activity of the proposed Project in accordance with the TOR and time schedule submitted to the Department of Environment (DOE).
- II. The EIA report should be prepared in accordance with following indicative outlines:

Executive Summary

- 1.0 Introduction
 - 1.1 Background
 - 1.2 Rationale of the Project
 - 1.3 Importance of the Project
 - 1.4 Objective of the Study
 - 1.5 Scope of EIA Study
 - 1.6 Approach and Methodology
 - 1.7 The EIA Team
- 2.0 Legal and Legislative Framework, Regulations and Policy Considerations Legislative, regulation and policy consideration (covering the potential legal, administrative, planning and policy framework within which the EIA will be prepared)
- 3.0 Project Data Sheet
 - 3.1 Project Proponent
 - 3.2 Project location and area
 - 3.3 Nature and Size of the Project
 - 3.4 Project Components
 - 3.5 Project Activities
 - 3.6 Project schedule
 - 3.7 Resources and utilities demand
- 4.0 Project Description
 - 4.1 Project Objective
 - 4.2 Project Site
 - 4.3 Project Layout
 - 4.4 Land Requirement
 - 4.5 Project Options

- 5.0 Analysis of Suitability for Different Alternatives (this analysis shall be performed, among other approaches, in a GIS based Spatial Decision Support System (SDSS) presenting the suitability of different options for both the interventions)
- 6.0 Detail description of the land cover/land use (with all the existing resource classes along with area coverages shall be shown in the respective maps derived from updated image of proper spatial and spectral resolution. Basic information (name of satellite, date and time of acquisition with atmospheric condition, spatial resolution, color composite etc.) of the image data to be used for making landuse/landcover maps shall be mentioned)
- 7.0 Analysis of Suitability for Different Alternatives (this analysis shall be performed, among other approaches, in a GIS based Spatial Decision Support System (SDSS) presenting the suitability of different options for both the interventions)
- 8.0 Environmental and Social Baseline : Study Area (10 Km. radius), Period, Component and methodology (Seasonal Variation should be covered)
 - 8.1 Meteorology
 - 8.1.1 Temperature
 - 8.1.2 Humidity
 - 8.1.3 Rainfall
 - 8.1.4 Evaporation
 - 8.1.5 Wind Speed
 - 8.1.6 Sun Shine Hours
 - 8.2 Water Resources
 - 8.2.1 Surface Water System
 - 8.2.2 Tropical Cyclones and Tidal Flooding
 - 8.2.3 Salinity
 - 8.2.4 Drainage Congestion and Water Logging
 - 8.2.5 Erosion and Sedimentation
 - 8.2.6 River Morphology
 - 8.2.7 Navigation
 - 8.2.8 Ground Water System
 - 8.3 Land Resources
 - 8.3.1 Agroecological Regions
 - 8.3.2 Land Types
 - 8.3.3 Soil Texture
 - 8.3.4 Land Use
 - 8.4 Agriculture Resources
 - 8.4.1 Farming Practice
 - 8.4.2 Cropping Pattern and Intensity
 - 8.4.3 Cropped Area
 - 8.4.4 Crop Production
 - 8.4.5 Crop Damage
 - 8.4.6 Main Constraints of Crop Production
 - 8.5 Livestock and Poultry
 - 8.5.1 Feed and Fodder Shortage
 - 8.5.2 Livestock/Poultry Diseases
 - 8.6 Fisheries
 - 8.6.1 Introduction
 - 8.6.2 Problem and Issues
 - 8.6.3 Habitat Description
 - 8.6.4 Fish Production and Effort
 - 8.6.5 Brakish Water and Pond Aquaculture
 - 8.6.6 Fish Migration

- 8.6.7 Fish Biodiversity
 - 8.6.8 Fisheries Management
- 8.7 Ecological Resources
 - 8.7.1 Bio-ecological Zone
 - 8.7.2 Common Flora and Fauna
 - 8.7.3 Ecosystem Services and Function
- 8.8 Socio Economic Condition
 - 8.8.1 Socio Economic Condition
 - 8.8.2 Quality of Life Indicators
 - 8.8.3 Income and Poverty
 - 8.8.4 Gender and Women
 - 8.8.5 Common Property Resources
 - 8.8.6 Conflict of Interest and Law and Order Situation
 - 8.8.7 Historical, Cultural and Archaeological Sites
- 9.0 Identification and Analysis of Key Environmental Issues (Analysis shall be presented with Scenarios, Maps, Graphics, etc. for the Case of Anticipated Impacts on Baseline)
 - 9.1 Environmental Sensitivity Investigation
 - 9.2 Environmental Asset
 - 9.3 Environmental Hot Spots
 - 9.4 Likely Beneficial Impacts
 - 9.5 Community Recommendations
 - 9.6 Alternate Analysis
- 10.0 Environmental and Social Impacts
 - 10.1 Introduction
 - 10.2 Impact on Water Resources
 - 10.2.1 Pre-Construction Phase
 - 10.2.2 Construction Phase
 - 10.2.3 Post-Construction Phase
 - 10.3 Impact on Land Resources
 - 10.3.1 Pre-Construction Phase
 - 10.3.2 Construction Phase
 - 10.3.3 Post-Construction Phase
 - 10.4 Impact on Agriculture Resources
 - 10.4.1 Pre-Construction Phase
 - 10.4.2 Construction Phase
 - 10.4.3 Post-Construction Phase
 - 10.5 Impact on Fisheries
 - 10.5.1 Pre-Construction Phase
 - 10.5.2 Construction Phase
 - 10.5.3 Post-Construction Phase
 - 10.6 Impact on Eco System
 - 10.6.1 Pre-Construction Phase
 - 10.6.2 Construction Phase
 - 10.6.3 Post-Construction Phase
 - 10.7 Socio Economic Impact
 - 10.7.1 Pre-Construction Phase
 - 10.7.2 Construction Phase
 - 10.7.3 Post-Construction Phase



11.0 Evaluation of Impacts

The impacts should be evaluated in terms of their local, regional and national importance. The impact should be assessed in terms of the magnitude, significance, frequency of the occurrence, duration and probability. The confidence level in the prediction must be stated. The judgment of significance of impacts can be based on one or more of the following, depending on the environmental factor being evaluated. These are :

- i. comparison with laws, regulation or accepted national or international standards
- ii. reference to pre-set criteria such as conservation or protected status of a site, feature or species
- iii. consistency with pre-set policy objectives
- iv. consultation and acceptability with the relevant decision makers, civil society, local community or the general public.

12.0 Mitigation Of Impacts

Mitigation measures which may be of the following categories and coverages:

- i. changing project layout, transport routes, disposal routes or locations, timing or engineering design
- ii. introducing pollution controls, waste treatment, phased implementation and construction, engineering measures, monitoring, landscaping, social services or public education;
- iii. rehabilitation, compensation to restore, relocate or provision of concession for damage

13.0 Environmental Management Plan

- 13.1 EMP during Preparation Phase
- 13.2 EMP during Construction Phase
- 13.3 EMP during Operation Phase
- 13.4 Greenbelt Development
- 13.5 Rehabilitation and Resettlement Plan
- 13.6 Budget for EMP
- 13.7 Contingency Plans

14.0 Risk Assessment

- 14.1 Consequence Analysis
- 14.2 Emergency Response Plan
- 14.3 Risk Mitigation Measures

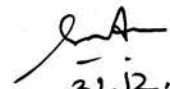
15.0 Environment Monitoring Plan

- 15.1 Monitoring Plan
 - 15.1.1 Ambient Air Monitoring
 - 15.1.2 Meteorological Monitoring
 - 15.1.3 Ambient Noise Monitoring
 - 15.1.4 Surface Water & Waste Water Monitoring
 - 15.1.5 Ground Water Monitoring
 - 15.1.6 Solid & Hazardous Waste Monitoring
 - 15.1.7 Flora and Fauna Monitoring
 - 15.1.8 Workers Health and Safety Monitoring
 - 15.1.9 Monitoring of Disaster Management Plan (DMP)
- 15.2 Action During Abnormal Operating conditions
- 15.3 Budgets for Monitoring
- 15.4 Reporting



- 16.0 Public Consultation and Disclosure
 - 16.1 Introduction
 - 16.2 Objectives of Public Consultation and Disclosure Meeting
 - 16.3 Approach and Methodology of Public Consultation and Disclosure Meeting
 - 16.4 Public Consultation Meetings (PCMs)
 - 16.5 Public Disclosure Meetings (PDMs)
- 17.0 Emergency Response Plan and Disaster Impact Assessment
- 18.0 Conclusion and Recommendation

- III. Without obtaining approval of EIA report by the Department of Environment, the project authority shall not be able to start the physical activity of the project and also not be able to open L/C in favor of importable machineries.
- IV. Rehabilitation of human settlement or compensation for any sort of activity which will incur damage or loss of public or private property shall be addressed as per Government of Bangladesh rules and regulations.
- V. The project authority shall submit the EIA report along with the filled-in application for Environmental Clearance in prescribed form, the feasibility study report, the applicable Environmental Clearance fee in a treasury chalan, the applicable VAT on clearance fee in a separate treasury chalan, the No Objection Certificate (NOC) from local authority, NOC from Forest Department (if it is required in case of cutting any forested plant, private or public), NOC in favor of Cutting/Dressing (if it is required) of Hill/Hillock from the concerned authority and NOC from other relevant agencies for operational activity etc. to the Cox's Bazar District Office of DoE in Cox's Bazar with a copy to the Head Office of DoE in Dhaka.
- VI. A soft copy of the image data as well as the maps to be generated from the image shall be submitted to DOE Head Office along with the EIA.


31.12.2017

(Syed Nazmul Ahsan)

Director (Environmental Clearance)

Phone # 8181673

Project Director (IPIU, Matarbari Port)

Chittagong Port Authority

Bandar Bhaban, Bandar

Chittagong-4100.

Copy Forwarded to :

1. PS to Secretary, Ministry of Environment and Forests, Bangladesh Secretariat, Dhaka.
2. Director, Department of Environment, Chittagong Regional Office, Chittagong.
3. Deputy Director/ Office-In charge, Department of Environment, Cox's Bazar District Office, Cox's Bazar.
4. Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.



ATOMIC ENERGY CENTRE

4, KAZI NAZRUL ISLAM AVENUE, P.O. BOX NO. 164,
DHAKA-1000, BANGLADESH

FAX : 880-2-8613051,
E-MAIL: aecd@citechco.net
Tel. No. : 880-2-8617946

Ref No: Request letter dated 10/02/18,

DATE: 22/02/2018

TEST RESULTS OF AMBIENT AIR QUALITY MONITORING

Project Name: Environmental Impact Assessment (EIA) under JICA Preparatory Survey for the
Matarbari Port Development in Bangladesh

Sampling Site Description

1. Sampling location : Matarbari Port;
Latitude: 21°41'27.33"N; Longitude: 91°52'1.86"E

2. Date of sampling : 16 February, 2018

ANALYSIS

The respirable particulate matter (RSPM) concentrations, PM₁₀ and PM_{2.5} were measured by collecting sample on Teflon filter using AirMetric portable samplers and subsequent gravimetric analysis using microbalance. The ambient SO₂, NO₂ and CO was monitored sequentially at project site using Gas Badge Pro monitor. The results are also presented below.

RESULTS

Sampling Date		PM ₁₀	PM _{2.5}	SO _x	NO _x	CO
		µg/m ³ (24h average)			mg/m ³ (1h average)	
16/02/18		43.2	32.1	<10	<0.012	<0.3
BNAAQS	24h average (µg/m ³)	150	65	365	-	40 mg/m ³
	Annual (µg/m ³)	50	15	-	100	-
WHO	24h average (µg/m ³)	50	25		200 (1h average)	10,000
	Annual (µg/m ³)	20	10		40	-

22/02/18

(Dr. Bilkis Ara Begum)
Director
Atomic Energy Centre, Dhaka



ATOMIC ENERGY CENTRE

4, KAZI NAZRUL ISLAM AVENUE, P.O. BOX NO. 164,
DHAKA-1000, BANGLADESH

FAX : 880-2-8613051,
E-MAIL: aecd@citechco.net
Tel. No. : 880-2-8617946

Ref No: Request letter dated 10/02/18,

DATE:22/02/2018

NOISE LEVEL AT PLANT SITE

Project Name: Environmental Impact Assessment (EIA) under JICA Preparatory Survey for the
Matarbari Port Development in Bangladesh

Date of sampling : 16 February, 2018

Noise Level Monitoring

The noise level is monitored using Sound Level Meter (Model No SL 4012) which is calibrated using Tenma 72-945 (NEDA-1604 IEC-6F22). The noise levels at project sites are presented below. The noise levels of project site are lower than the ECR 1997.

Monitoring Point	Bangladesh Standard	Test Time	Result
Southeast	Day Time 60 dBa	Day	49.3±2.0dBa
	Night Time 50 dBa	Night	42.1±1.9 dBa
Northeast	Day Time 60 dBa	Day	47.8±2.7dBa
	Night Time 50 dBa	Night	38.7±0.2 dBa
Southwest	Day Time 60dBa	Day	57.8±1.1 dBa
	Night Time 50 dBa	Night	44.5±2.1 dBa
Northwest	Day Time 60 dBa	Day	52.7±3.7 dBa
	Night Time 50 dBa	Night	45.1±2.1dBa

OBSERVATIONS

- Noise level monitoring data is compliant with the National Noise Level Standards (ECR 1997) of Industrial area.

22/02/18

(Dr. Bilkis Ara Begum)

Director

Atomic Energy Centre, Dhaka



BRTC No. : 1101-56922 /17-18/CE; Dt: 19/3/2018

Ref. No. : letter; Dt: 19/3/2018

Sent by : Dr. Abdus Shabur, Managing Director, BETS Consulting Services Ltd.

Project : EIA Study of Port and Road Development Project in Maheshkhali

Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-1: Depth (-0.5m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
1	pH	---	7	USEPA 150.1; SM 4500-H+ B	---
2	Arsenic (As)	mg/kg	5.43	USEPA 206.2; SM 3113 B	---
3	Copper (Cu)	mg/kg	9.1	0	---
4	Zinc (Zn)	mg/kg	41.2	USEPA 200.9 ; SM 3111 B	---
5	Mercury (Hg)	mg/kg	0	---	---
6	Chromium (Cr)	mg/kg	25.3	USEPA 200.9 Rev 2.2; SM 3111 B	---
7	Lead (Pb)	mg/kg	17.2	USEPA 200.9 Rev 2.2; SM 3111 B	---
8	Nickel (Ni)	mg/kg	16.2	USEPA 200.9 ; SM 3111 B	---
9	Cadmium (Cd)	mg/kg	0.1	USEPA 213.2 ; SM 3113 B	---
10	Iron (Fe)	mg/kg	18400	USEPA 200.9 ; SM 3111 B	---

Comments : 1. Sample was supplied by CLIENT
2. Sample was received in unsealed condition.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Signature

Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Test Performed by:

Signature
04.04.18

Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering



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Project : EIA Study of Port and Road Development Project in Maheshkhali

Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-1: Depth (-0.5m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
11	Organic Matter (Wet Combustion Method)	%	2.4735*	---	---
12	Moisture Content**	%	22.39(28.86)	---	---
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Comments : 1. Sample was supplied by CLIENT
2. Sample was received in unsealed condition.

* Note (1): Percentage of total dry mass at 100-105 deg.C.

**Note(2): 22.39 % when ratio of the weight of water to the total weight of the material is used. And 28.86% when expressed as a percentage of dry mass at 100-105 deg.C.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by :

Signature

Dr. Abu Siddique
Professor, Dept. of Civil Engg.



Test Performed by :

Signature
04.04.18

Dr. M. Habibur Rahman
Professor, Dept. of Civil Engineering

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Sent by : Dr. Abdus Shabur, Managing Director, BETS Consulting Services Ltd.

Project : EIA Study of Port and Road Development Project in Maheshkhali

Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-2: Depth (-1m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
1	pH	—	7.5	USEPA 150.1; SM 4500-H+ B	—
2	Arsenic (As)	mg/kg	3.94	USEPA 206.2; SM 3113 B	—
3	Copper (Cu)	mg/kg	4	0	—
4	Zinc (Zn)	mg/kg	23.5	USEPA 200.9 ; SM 3111 B	—
5	Mercury (Hg)	mg/kg	0	—	—
6	Chromium (Cr)	mg/kg	11.7	USEPA 200.9 Rev 2.2; SM 3111 B	—
7	Lead (Pb)	mg/kg	14.9	USEPA 200.9 Rev 2.2; SM 3111 B	—
8	Nickel (Ni)	mg/kg	8.8	USEPA 200.9 ; SM 3111 B	—
9	Cadmium (Cd)	mg/kg	0.1	USEPA 213.2 ; SM 3113 B	—
10	Iron (Fe)	mg/kg	15000	USEPA 200.9 ; SM 3111 B	—

Comments : 1. Sample was supplied by CLIENT
2. Sample was received in unsealed condition.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Test Performed by:

Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering

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BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

DEPARTMENT OF CIVIL ENGINEERING

Mobile: 01819 557 964; PABX: 966 5650-80 Ext. 7226; www.buet.ac.bd/ce/

ENVIRONMENTAL ENGINEERING LABORATORY



BRTC No. : 1101-56922 /17-18/CE; Dt: 19/3/2018

Ref. No. : letter; Dt: 19/3/2018

Sent by : Dr. Abdus Shabur, Managing Director, BETS Consulting Services Ltd.

Project : EIA Study of Port and Road Development Project in Maheshkhali

Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-4: Depth (-10m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
11	Organic Matter (Wet Combustion Method)	%	2.12*	---	---
12	Moisture Content**	%	21.38(27.19)	---	---
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Comments : 1. Sample was supplied by CLIENT

2. Sample was received in unsealed condition.

* Note (1): Percentage of total dry mass at 100-105 deg.C.

**Note(2): 21.38 % when ratio of the weight of water to the total weight of the material is used. And 27.19% when expressed as a percentage of dry mass at 100-105 deg.C.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Test Performed by:

Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering

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Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-3: Depth (-5m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
1	pH	—	7	USEPA 150.1; SM 4500-H+ B	—
2	Arsenic (As)	mg/kg	8.65	USEPA 206.2; SM 3113 B	—
3	Copper (Cu)	mg/kg	9.2	0	—
4	Zinc (Zn)	mg/kg	26.3	USEPA 200.9 ; SM 3111 B	—
5	Mercury (Hg)	mg/kg	0	—	—
6	Chromium (Cr)	mg/kg	13	USEPA 200.9 Rev 2.2; SM 3111 B	—
7	Lead (Pb)	mg/kg	17.8	USEPA 200.9 Rev 2.2; SM 3111 B	—
8	Nickel (Ni)	mg/kg	9.4	USEPA 200.9 ; SM 3111 B	—
9	Cadmium (Cd)	mg/kg	0	USEPA 213.2 ; SM 3113 B	—
10	Iron (Fe)	mg/kg	21000	USEPA 200.9 ; SM 3111 B	—

Comments : 1. Sample was supplied by CLIENT
2. Sample was received in unsealed condition.

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Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Test Performed by:

Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering



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Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-2: Depth (-1m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
11	Organic Matter (Wet Combustion Method)	%	1.35*	---	---
12	Moisture Content**	%	20.36(25.57)	---	---
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Comments : 1. Sample was supplied by CLIENT

2. Sample was received in unsealed condition.

* Note (1): Percentage of total dry mass at 100-105 deg.C.

**Note(2): 20.36 % when ratio of the weight of water to the total weight of the material is used. And 25.57% when expressed as a percentage of dry mass at 100-105 deg.C.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Signature

Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Test Performed by:

Signature
04.04.18

Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering



mfthLWDXH

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BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

DEPARTMENT OF CIVIL ENGINEERING

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ENVIRONMENTAL ENGINEERING LABORATORY



BRTC No. : 1101-56922 /17-18/CE; Dt: 19/3/2018

Ref. No. : letter; Dt: 19/3/2018

Sent by : Dr. Abdus Shabur, Managing Director, BETS Consulting Services Ltd.

Project : EIA Study of Port and Road Development Project in Maheshkhali

Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-4: Depth (-10m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
1	pH	—	7	USEPA 150.1; SM 4500-H+ B	—
2	Arsenic (As)	mg/kg	8.87	USEPA 206.2; SM 3113 B	—
3	Copper (Cu)	mg/kg	9.5	0	—
4	Zinc (Zn)	mg/kg	41.7	USEPA 200.9 ; SM 3111 B	—
5	Mercury (Hg)	mg/kg	0	—	—
6	Chromium (Cr)	mg/kg	21.1	USEPA 200.9 Rev 2.2; SM 3111 B	—
7	Lead (Pb)	mg/kg	18.3	USEPA 200.9 Rev 2.2; SM 3111 B	—
8	Nickel (Ni)	mg/kg	16.4	USEPA 200.9 ; SM 3111 B	—
9	Cadmium (Cd)	mg/kg	0	USEPA 213.2 ; SM 3113 B	—
10	Iron (Fe)	mg/kg	32800	USEPA 200.9 ; SM 3111 B	—

Comments : 1. Sample was supplied by CLIENT
2. Sample was received in unsealed condition.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Asadique

Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Test Performed by:

Muhammad
04.04.18

Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering



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Ref. No. : letter; Dt: 19/3/2018

Sent by : Dr. Abdus Shabur, Managing Director, BETS Consulting Services Ltd.

Project : EIA Study of Port and Road Development Project in Maheshkhali

Company : House No. 10, Road No. 135, Gulshan-1,

Address : Dhaka

Source : -

Sample Id : Soil Sample-3: Depth (-5m)

Location : Dhalghat union, Moheshkhali, Cox's Bazar

Date of Test : 19/3/2018 - 4/4/2018

TEST REPORT (ANALYSIS OF SOIL SAMPLE: TOTAL EXTRACTION BY AQUA-REGIA)

Sl. No.	Parameter	Unit	Concentration Present	Method of analysis	Minimum Detection Limit (MDL)
11	Organic Matter (Wet Combustion Method)	%	2.62*	---	---
12	Moisture Content**	%	25.47(34.18)	---	---
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Comments : 1. Sample was supplied by CLIENT

2. Sample was received in unsealed condition.

* Note (1): Percentage of total dry mass at 100-105 deg.C.

**Note(2): 25.47 % when ratio of the weight of water to the total weight of the material is used. And 34.18% when expressed as a percentage of dry mass at 100-105 deg.C.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Dr. Abu Siddique

Professor, Dept. of Civil Engg.



Test Performed by:

Dr. M. Habibur Rahman

Professor, Dept. of Civil Engineering



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