

श्यामा प्रसाद मुखर्जी पत्तन, कोलकाता
हल्दिया गोदी परिसर

फ्लैग -ए

सं.- आईएंडसीएफ/एसडीएम/डॉक/टी/1158/180

दिनांक- 10.06.2022

[एनआईटी-1]
लघु निविदा सूचना

हल्दिया गोदी परिसर में निम्नलिखित कार्य हेतु निविदा में दिए गए योग्यता मापदंड के अनुसार दो साथ दो भाग प्रक्रिया के तहत (तकनीकी-वाणिज्यिक बिड एवं लागत बिड) ई-निविदा आमंत्रित की जाती है।

➤ कार्य का नाम	:	REPAIR & RENOVATION OF VARIOUS BUILDINGS LOCATED IN THE LOCK AREA, INSIDE DOCK ZONE, HDC, HALDI DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE.
➤ प्री-बिड मीटिंग और साइट विजिट के लिए तिथि और समय	:	प्री-बिड मीटिंग 29.06.2022 को दोपहर 12.00 बजे महाप्रबंधक (इंजीनियरिंग), एचडीसी के कार्यालय, चिरंजीबपुर ऑपरेशनल बिल्डिंग में साइट का दौरा करने के बाद.
➤ ई-निविदा संख्या	:	आईएंडसीएफ/एसडीएम/डॉक/टी/1158
➤ अनुमानित लागत	:	Rs. 11,80,97,076.50 (Rupees Eleven Crore Eighty Lakh Ninety Seven Thousand seventy Six and paise Five Zero only).
➤ ई-निविदा जमा करने की अंतिम तिथि	:	12.07.2022 अपराह्न 15:00 बजे तक जमा की जाएगी

निविदा और निविदा दस्तावेज की विस्तृत जानकारी वेबसाइट (www.kolkataporttrust.gov.in) पर उपलब्ध है। इच्छुक ठेकेदार इस वेबसाइट <https://kopt.enivida.in> के माध्यम से बोली प्रक्रिया में भाग ले सकते हैं। अन्य जानकारी हेतु ईमेल abose.hdc@kolkataporttrust.gov.in पर सम्पर्क कर सकते हैं।

No. I&CF/SDM/DOCK/T/1158/180

Date : 21.06.2022

[NIT-1]

SHORT TENDER NOTICE

E-Tender under two stage two part system (Techno-Commercial Bid and Price Bid) are invited as per Prequalification criteria stipulated in Tender Document for the following work at Haldia Dock Complex.

Name of work	:	DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE.
E-Tender No	:	I&CF/SDM/DOCK/T/1158
Estimated Cost	:	Rs. 11,80,97,076.50 (Rupees Eleven Crore Eighty Lakh Ninety Seven Thousand seventy Six and paise Five Zero only).
Earnest Money Deposit	:	The intending bidders should submit Earnest Money of INR Rs. 23,61,942.00 (Rupees Twenty Three Lakh Sixty One Thousand Nine Hundred Forty Two only).
Date and Time for pre- bid meeting & site visit.	:	Pre-bid Meeting on 29.06.2022 at 12.00 PM at the office of General Manager (Engineering), HDC, at Chiranjibpur Operational Building followed by site visit.
Last date of submission of e-tender	:	12.07.2022 Submission Up to 15:00 hrs.

Details of the Tender & Tender Documents are available in website (www.kolkataporttrust.gov.in) and have to participate in bidding process through their website <https://kopt.enivida.in> only. Interested bidders may contact at abose.hdc@kolkataporttrust.gov.in

No. I&CF/SDM/DOCK/T/1158/180

Date : 21.06.2022

3. NOTICE INVITING TENDER

WORK TITLE: - **DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXISTING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE.**

3.1 E -TENDER NO: I&CF/SDM/DOCK/T/1158

E-Tender under two stage two part system (Techno-Commercial Bid and Price Bid) are invited from resourceful, experienced and bonafide agencies with sound technical and financial capabilities on fulfilling the following Pre-qualification Criteria;

3.2 PRE-QUALIFICATION CRITERIA FOR BIDDERS: -

- i) Average Annual Financial Turnover during the last three years, ending on **31-03-2021**, should be at least 30% of the estimated cost.
- ii) Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following: -
 - a. Three similar completed works costing not less than the amount equal to 40 % of the estimated cost.
Or
 - b. Two similar completed works costing not less than the amount equal to 50 % of the estimated cost.
Or
 - c. One similar completed works costing not less than the amount equal to 80 % of the estimated cost.
- iii) Similar works means:

Successful completion of Construction of Jetty / Berth at Port Sector / Central Government/ PSU / State Government and other reputed organization.

Or

Successful completion of marine structural work like gangway, walkway, bridges etc. in offshore condition at Port Sector / Central Government / PSU / State Government and other reputed organization.

Or

Successful completion of any structural steel fabrication / erection work at Port Sector /Central Government / PSU / State Government and other reputed organization.

The bidder should have executed any marine based work by using barge crane (Only for experience purpose).

TENDER AUTHORITY:-

Sr. Dy. Manager (I&CF), Haldia Dock Complex, Chiranjibpur Operational Building [2nd Floor], P.O.- Haldia, Dist. Purba Medinipur – 721 604, Tele-Fax:- [03224]-252110.

Due Date	12.07.2022	Time	UPTO 15:00 hrs.	Date of Opening of Tender (Techno Commercial Part)	12.07.2022	Time	15:30 hrs. onwards.
Bid document will be available on website (www.kolkataporttrust.gov.in) Bidders will have to participate in bidding process through website https://kopt.enivida.in only.							
Date and Time for pre-bid meeting & site visit.		Pre-bid Meeting on 29.06.2022 at 12.00 PM at the office of General Manager (Engineering), HDC, at Chiranjibpur Operational Building followed by site visit.					

Cost of Tender document (Non-refundable)	Rs. 2,950.00 (Rupees Two Thousand Nine Hundred Fifty only)
Time Of Completion	12 (Twelve) months.
Estimated Cost Of Work	Rs. 11,80,97,076.50 (Rupees Eleven Crore Eighty Lakh Ninety Seven Thousand seventy Six and paise Five Zero only).
Earnest Money Deposit	The intending bidders should submit Earnest Money of INR Rs. 23,61,942.00 (Rupees Twenty Three Lakh Sixty One Thousand Nine Hundred Forty Two only).
Transaction Fee for bidding in RailTel	Rs. 8,850.00 (Rupees Eight Thousand Eight Hundred Fifty only).

3.4 OTHER INSTRUCTIONS:-

3.4.1 E-Tenderers are invited on two Cover basis (Techno Commercial Part & Price Part) from resourceful, experienced and bonafide bidders with sound technical and financial capabilities for the above mentioned work at Haldia Dock Complex.

3.4.2 Details of the Tender Documents and Notification of any Addendum / Corrigendum to the tender documents are available in web site from website (www.kolkataporttrust.gov.in) and have to participate in bidding process through website <https://kopt.enivida.in> only.

3.4.3 E-Tender Document shall neither be issued by post nor sold.

3.4.4 E-Tenderers are not permitted to alter/change/delete/modify any clause of the tender document down loaded from the website. If any deviation / discrepancy is found after submission of tender, the submitted offer will be summarily rejected.

3.4.5 Bidders shall submit the Bid Document as stipulated in the "Instructions To Bidders" of the e-tender document. Trustees reserve the right to verify the submitted copies of documents / credentials with the original documents.

3.4.6 The successful tenderer will be required to comply with the relevant provisions of BOCW (RECS) Act, 1996, West Bengal BOCW (RECS) Act, 2004 and BOCW Welfare Cess Act, 1996 and the rules framed there under. An amount of cess as per prevalent rate (presently @ 1% of the billed amount) shall be progressively recovered from all the bills of the contractor for onward transmission of the same to the appropriate authority.

3.4.7 E-Tenderers will be received through <https://kopt.enivida.in> up to 15:00 hrs. on the last date of submission and opening of tender specified above.

3.4.8 The E-Tender (Techno-Commercial Part) will be opened shortly after 3.30 p.m. on the stipulated date.

3.4.9 In case of unscheduled Holiday / Bandh on the date of opening of E-Tender, the same will be opened on the next working day.

3.4.10 It is stated here that the subject tender may not be extended further.

3.4.11 SMP, Kolkata reserves the right to reject any or all offers or to accept the offer in whole or in part without assigning any reason whatsoever thereof.

SD/-

General Manager (Engg.)
Haldia Dock Complex
महाप्रबंधक (इंजीनियरिंग)
हल्दिया डॉक कॉम्प्लेक्स

श्यामा प्रसाद मुखर्जी पत्तन, कोलकाता
Syama Prasad Mookerjee Port, Kolkata

हल्दिया गोदी परिसर
HALDIA DOCK COMPLEX
I&CF DIVISION

BIDDING DOCUMENTS

(e-Tender)

[Tender No.: I&CF/SDM/DOCK/T/1158]

FOR

"DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

JUNE - 2022

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1. SCHEDULE OF TENDER (SOT)

E-Tender under two stages two-part system (Techno-Commercial Bid and Price Bid) are invited from reliable, bonafide & experienced agency with required experience as per Prequalification criteria stipulated in Tender Document for **"DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXISTING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."** as per Bill Of Quantities to Haldia Dock Complex. Bid Document may be seen from the RailTel Portal (<https://kopt.enivida.in>). Corrigenda or clarifications, if any, shall be hoisted on the above-mentioned website only. The tender is also published on SMP, Kolkata website (www.kolkataporttrust.gov.in).

a. E-TENDER NO.	I&CF/SDM/DOCK/T/1158
b. MODE OF TENDER	e-Procurement System (Online through RailTel Portal (https://kopt.enivida.in)). The intending bidders are required to submit their offers electronically through e-tendering portal. No physical tender is acceptable by Haldia Dock Complex, Haldia.
c. i) Date of NIT available to parties to download.	21.06.2022 to 12.07.2022
ii) Date and Time for pre-bid meeting & site visit.	Pre-bid Meeting on 29.06.2022 at 12.00 PM at the office of General Manager (Engineering), HDC, at Chiranjibpur Operational Building followed by site visit.
d. i) Estimated Cost Of Work.	Rs. 11,80,97,076.50 (Rupees Eleven Crore Eighty Lakh Ninety Seven Thousand seventy Six and paise Five Zero only).
ii) Earnest Money Deposit	The intending bidders should submit Earnest Money of INR Rs. 23,61,942.00 (Rupees Twenty Three Lakh Sixty One Thousand Nine Hundred Forty Two only).
iii) Bid Document fee.	The intending bidders should submit Bid Document Fee of INR Rs. 2,950.00 (Rupees Two Thousand Nine Hundred Fifty only) including 18% GST.
e. Transaction Fee for bidding in RailTel Portal.	Rs. 8,850.00 (Rupees Eight Thousand Eight Hundred Fifty only).
f. Last date of submission of Bid Document fee.	12.07.2022 upto 15.00 Hrs.
g. Date of starting of online e-tender for submission of Techno-Commercial Bid & Price Bid.	21.06.2022
h. Date of closing of online e-tender for submission of Techno-Commercial Bid & Price Bid.	12.07.2022 (Up to 3:00 P.M.).
i. Date & time of opening of the subject tender.	12.07.2022 (After 3:30 P.M.).

2. SHORT TENDER NOTICE

E-Tender under two stage two part system (Techno-Commercial Bid and Price Bid) are invited as per Prequalification criteria stipulated in Tender Document for the following work at Haldia Dock Complex.

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Date and Time for pre- bid meeting & site visit.	:	Pre-bid Meeting on 29.06.2022 at 12.00 PM at the office of General Manager (Engineering), HDC, at Chiranjibpur Operational Building followed by site visit.
Last date of submission of e-tender	:	12.07.2022 Submission Up to 15:00 hrs.

Details of the Tender & Tender Documents are available in website (www.kolkataporttrust.gov.in) and have to participate in bidding process through their website <https://kopt.enivida.in> only. Interested bidders may contact at **abose.hdc@kolkataporttrust.gov.in**

3. NOTICE INVITING TENDER

WORK TITLE: - **DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE.**

3.1 E -TENDER NO: I&CF/SDM/DOCK/T/1158

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3.2 PRE-QUALIFICATION CRITERIA FOR BIDDERS: -

- i) Average Annual Financial Turnover during the last three years, ending on **31-03-2021**, should be at least 30% of the estimated cost.
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Or

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The bidder should have executed any marine based work by using barge crane (Only for experience purpose).

TENDER AUTHORITY:-

Sr. Dy. Manager (I&CF), Haldia Dock Complex, Chiranjibpur Operational Building [2nd Floor], P.O.- Haldia, Dist. Purba Medinipur – 721 604, Tele-Fax:- [03224]-252110.

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3.4.5 Bidders shall submit the Bid Document as stipulated in the "Instructions To Bidders" of the e-tender document. Trustees reserve the right to verify the submitted copies of documents / credentials with the original documents.

3.4.6 The successful tenderer will be required to comply with the relevant provisions of BOCW (RECS) Act, 1996, West Bengal BOCW (RECS) Act, 2004 and BOCW Welfare Cess Act, 1996 and the rules framed there under. An amount of cess as per prevalent rate (presently @ 1% of the billed amount) shall be progressively recovered from all the bills of the contractor for onward transmission of the same to the appropriate authority.

3.4.7 E-Tenderers will be received through <https://kopt.enivida.in> up to 15:00 hrs. on the last date of submission and opening of tender specified above.

3.4.8 The E-Tender (Techno-Commercial Part) will be opened shortly after 3.30 p.m. on the stipulated date.

3.4.9 In case of unscheduled Holiday / Bandh on the date of opening of E-Tender, the same will be opened on the next working day.

3.4.10 It is stated here that the subject tender may not be extended further.

3.4.11 SMP, Kolkata reserves the right to reject any or all offers or to accept the offer in whole or in part without assigning any reason whatsoever thereof.

**General Manager (Engg.)
Haldia Dock Complex**

4. Important instructions for E-procurement

Bidders are requested to use internet Browsers Firefox version below 50 / Internet Explorer version 8 or above, and Java 8 Update 151 or 161.

Further, bidders are requested to go through the following information and instructions available on the RailTel Portal (<https://kopt.enivida.in>) before responding to this e-tender:

- Bidders Manual Kit
- Help for Contractors
- FAQ

Contact Persons (Haldia Dock Complex , SMP, Kolkata):

A. K. Bose, Sr. Dy. Manager (I&CF), Mob: 9434744410, email :
abose.hdc@kolkataporttrust.gov.in

1	<p>Process of E-tender :</p> <p>THE TECHNICAL BID AND THE COMMERCIAL BID HAS TO BE SUBMITTED ON-LINE AT <u>https://kopt.enivida.in</u></p> <p>Vendors are required to register themselves online with <u>https://kopt.enivida.in</u></p> <p>Contact person (Haldia Dock Complex):</p> <p>1. Sri. A. K. Bose Sr. Dy. Manager (I&CF) Haldia Dock Complex Ph. No. 03224 252118 abose.hdc@kolkataporttrust.gov.in Mb. No. 9434744410</p> <p><u>Contact persons (RailTel Portal):</u></p> <p>1. Sri Siddharth Ghosh – Mob: 9355030604 email: <u>ewizardsiddharth@gmail.com</u> See CPP Portal for Contact details.</p>
2	<p>The Techno-commercial Bid and the Price Bid shall have to be submitted online at <u>https://kopt.enivida.in</u> Tenders will be opened electronically on specified date and time as given in the Tender.</p>
3	<p>All entries in the tender should be entered in online Technical & Commercial Formats without any ambiguity.</p>
4	<p>Information about tenders /corrigendum uploaded shall be sent by email only during the process till finalization of tender. Hence the vendors are required to ensure that their corporate email I.D. provided is valid and updated at the time of registration of vendor with <u>https://kopt.enivida.in</u>. Vendors are also requested to ensure validity of their DSC (Digital Signature Certificate).</p>
5	<p>E-tender cannot be accessed after the due date and time mentioned in NIT.</p>
6	<p>Bidding in e-tender :</p> <ol style="list-style-type: none">a) Vendor(s) need to submit necessary Tender fees to be eligible to bid online in the e-tender. Tender fees are non-refundable.b) The process involves Electronic Bidding for submission of Technical and Commercial Bid.c) In all cases, vendor should use their own ID and Password along with Digital Signature at the time of submission of their bid.d) During the entire e-tender process, the vendors will remain completely anonymous to one another and also to everybody else.e) The e-tender floor shall remain open from the pre-announced date & time and for as much duration as mentioned above.

	<p>f) All electronic bids submitted during the e-tender process shall be legally binding on the vendor. Any bid will be considered as the valid bid offered by that vendor and acceptance of the same by the Buyer will form a binding contract between Buyer and the Vendor for execution of supply.</p> <p>g) It is mandatory that all the bids are submitted with digital signature certificate otherwise the same will not be accepted by the system.</p> <p>h) Buyer reserves the right to cancel or reject or accept or withdraw or extend the tender in full or part as the case may be without assigning any reason thereof.</p> <p>i) No deviation of the terms and conditions of the tender document is acceptable. Submission of bid in the e-tender floor by any vendor confirms his acceptance of terms & conditions for the tender.</p>
7	Any order resulting from this tender shall be governed by the terms and conditions mentioned therein.
8	No deviation to the technical and commercial terms & conditions are allowed.
9	The tender inviting authority has the right to cancel this e-tender or extend the due date of receipt of bid(s) without assigning any reason thereof.
10	Vendors are requested to read the vendor guide and see the video in the page https://kopt.enivida.in to familiarize them with the system before bidding.
11	No deviation of the terms and conditions of the tender document is acceptable. Submission of bid in the e-tender floor by any bidder confirms his acceptance of terms & conditions for the tender.
12	The bidders must upload all the documents required as per terms of NIT. Any other document uploaded which is not required as per the terms of the NIT shall not be considered.
13	The bid will be evaluated based on the filled-in technical & commercial formats.
14	The documents uploaded by bidder(s) will be scrutinized. In case any of the information furnished by the bidder is found to be false during scrutiny, punitive action including suspension and banning of business can also be taken against defaulting bidders.
P	Necessary addendum/ corrigendum (if any) of tender would only be hosted in the e-tendering portal of CPP.
16	Due date of submission of tender will not be extended under any situation.

KOPT e-Nivida Special Instruction to Bidders

e-Procurement is the complete process of e-Tendering from publishing of tenders online, inviting online bids , evaluation and award of contract using the system. You may keep a watch of the tenders floated under <https://kopt.enivida.in>. The link of e-procurement portal is also given on our official portal i.e www.kolkataporttrust.gov.in/ under TENDER TAB.

These will invite for online Bids. Bidder Enrolment can be done using "**Online Bidder Enrolment**". The instructions given below are meant to assist the bidders in registering on the e-tender Portal, and submitting their bid online on the e-tendering portal as per uploaded bid.

More information useful for submitting online bids on the eNivida Portal may be obtained at: **<https://kopt.enivida.in>**

GUIDELINES FOR REGISTRATION:

1. Bidders are required to enroll on the e-Procurement Portal (**<https://kopt.enivida.in/bidderRegistration/newRegistration>**) or click on the link "**Bidder Enrolment**" available on the home page of e-tender Portal by paying the Registration fee of Rs.2000/- +Applicable GST.
2. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
3. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication with the bidders.
4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (**Only Class III Certificates with signing + encryption key usage**) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
5. Only valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
6. Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC / e-Token.
7. The scanned copies of all original documents should be uploaded in pdf format on e-tender portal.
8. After completion of registration payment, bidders need to send their acknowledgement copy on our help desk mail id **enividahelpdesk@gmail.com**/for activation of account.

SEARCHING FOR TENDER DOCUMENTS

1. There are various search options built in the e-tender Portal, to facilitate bidders to search active tenders by several parameters.
2. Once the bidders have selected the tenders they are interested in, you can pay the Tender fee and processing fee (NOT REFUNDABLE) by net-banking / Debit / Credit card then you may download the required documents / tender schedules, Bid documents etc. Once you pay both fee tenders will be moved to the respective 'requested' Tab. This would enable the e- tender Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

PREPARATION OF BIDS

1. Bidder should take into account any corrigendum published on the tender document before submitting their bids.

2. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid.
3. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF formats. Bid Original documents may be scanned with 100 dpi with Colour option which helps in reducing size of the scanned document.
4. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, GST, Annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Documents" available to them to upload such documents.
5. These documents may be directly submitted from the "My Documents" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process. Already uploaded documents in this section will be displayed. Click "New" to upload new documents.

SUBMISSION OF BIDS

1. Bidder should log into the website well in advance for the submission of the bid so that it gets uploaded well in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document as a token of acceptance of the terms and conditions laid down by SMP, Kolkata.
3. Bidder has to select the payment option as "e-payment" to pay the tender fee as applicable and enter details of the instrument.
4. In case of BG bidder should prepare the BG as per the instructions specified in the tender document. The BG in original should be posted/couriered/given in person to the concerned official before the Online Opening of Financial Bid. In case of non-receipt of BG amount in original by the said time, the uploaded bid will be summarily rejected.
5. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BOQ file, open it and complete the white Colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BOQ file is found to be modified by the bidder, the bid will be rejected.
6. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission
7. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
8. Upon the successful and timely submission of bid click "Complete" (i.e. after Clicking "Submit" in the portal), the portal will give a successful Tender submission acknowledgement & a bid summary will be displayed with the unique id and date & time of submission of the bid with all other relevant details.
9. The tender summary has to be printed and kept as an acknowledgement of the submission of the tender. This acknowledgement may be used as an entry pass for any bid opening meetings.

For any clarification in using eNivida Portal:

1. Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
2. Any queries relating to the process of online bid submission or queries relating to e-tender Portal in general may be directed to the Helpdesk Support.

Please feel free to contact eNivida Helpdesk (as given below) for any query related to e-tendering.

Phone No. 011-49606060/7278929467/8448288981

Mail id: - enividahelpdesk@gmail.com/ ewizardkumar@gmail.com/

5. INSTRUCTIONS TO BIDDER

E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

5.0 PREFACE:

The work as described in the tender shall be executed in Haldia and in accordance with the attached General Conditions of Contract, Special Conditions of Contract, Technical Specifications, Drawings (if any) & detailed Bill Of Quantities. Location Plan of the place of work might be inspected at the office of the SR. DY. MANAGER (DOCK), I&CF on any working day before quoting for the tender.

5.1 BID DOCUMENT FEE & EARNEST MONEY :

Cost of tender document and earnest money are to be physically deposited (both separately) at the office of Tendering Authority Sr. Dy. Manager [Dock], I&CF Division, 2nd floor Operational Building, Chiranjibpur, Haldia Dock Complex, Haldia, PIN 721604, separately in a single sealed envelope, mentioning Tender no. with proper marking.

Demand Draft /Banker's Cheque /Pay Order etc. against cost of tender document and earnest money (both separately), should be submitted/deposited on any scheduled/ nationalized Bank, by the bidder in favour of Syama Prasad Mookerjee Port, Kolkata payable at Haldia before opening of the tender, as specified in the Tender Document.

5.1.1 Details of cost of e-tender paper and earnest money (both separately) remitted should be entered by the participating bidder in the space provided in the e-tender as indicated hereunder:

- a) Name of remitting bidder :
- b) Tender No. :
- c) Amount remitted :
- d) Date of remittance :
- e) DD/BC No. :

Tender submitted without requisite Bid Document Fee and Earnest Money will be liable for rejection.

5.2 MODE OF SUBMISSION OF BID :

5.2.1 All bidders must submit their offers through e- tendering in accordance with the terms and conditions set out in the bid documents and no deviation will be accepted.

5.2.2 Techno commercial part shall contain the following which are to be uploaded: -

I. Essential Document:-

- a) Credentials in the form of copies of Letters of Award of Works along with corresponding Completion Certificates from owners to justify that the intending bidder satisfies the earlier mentioned pre-qualification criteria.
- b) Certified copies of audited balance sheet and Profit and Loss account / Trading account for the last 3 (three) financial years **(i.e. 2018-2019, 2019-2020, 2020-2021).**

II. Non-Essential Document:-

- a) That the Bidding Firm has Not been debarred / de-listed by any Govt / Quasi Govt. / Public Sector undertaking in India.

- b) The proprietor/partner(s)/authorized signatory of the bidding firm (in the case of proprietorship firm /partnership firm /limited company, as the case may be) is/are not associated with any other firm bidding for the same work.
- c) The un-priced "Abstract Form Of Tender" & "Form Of Tender" (without price quoted) shall not only be signed and stamped by the Bidder, but must also be duly witnessed and scan copy to be uploaded.
- d) A list of works which are in hand at the time of submitting the offer as per the enclosed proforma titled 'Concurrent Commitments of The Bidder' vide 'Annexure-II' in Volume-I of the tender document.
- e) A Declaration as per 'Annexure – IA' that no conditions / deviations have been added in the price part of the Bid.
- f) A Declaration as per 'Annexure – IC' that if I/We withdraw or modify our bid during period of validity etc., I/We will be suspended for three years.
- g) Scan copy of the following documents to be uploaded:-
 - i) GSTIN / Provisional GST registration certificate.
 - ii) Valid Trade Licence.
 - iii) Valid Professional Tax Clearance Certificate / Up to date tax payment.
 - iv) Proof of possessing valid Employees' Provident Fund (EPF) Account.
 - v) Proof of being registered with Employees' State Insurance Corporation (ESIC).
- h) Details of the firm as per "BIDDER'S PROFILE" of the tender document.
- i) Addendum/Corrigendum / Notice / Extension Notice issued and drawings (if any) duly signed by the Bidder under office seal.
- j) The design shall be done with STAAD software and shall be submitted during the submission of the Bid for Technical evaluation.**
- k) The methodology for dismantling, erection and painting shall be submitted during the submission of the Bid for Technical evaluation.**
- l) Baseline program for the work to be executed shall be submitted for during the submission of the Bid for Technical evaluation.**

The bidder will have to produce the original documents or any additional documents, if asked for, to satisfy the Authorities.

5.2.3 All the bidders should submit the e-tender in accordance with the Mode of submission of Bid as aforesaid.

5.3 OPENING OF BIDS:

Techno Commercial Part as stated above will be opened on the date and time as fixed in the e-tender document on line. The Opening date of Price Part will be intimated to the eligible Bidders.

5.4 SECURITY DEPOSIT:

5.4.1 For the successful Bidder, the Security Deposit shall be recovered from party's bill @ 3% of the value of the contract as per latest guide lines.

5.4.2 Refund of S.D. and forfeiture S.D. shall be guided by Cl. 3.5 (i) & (ii) of the G.C.C.

5.5 VALIDITY OF OFFER:

The e-tender shall remain valid for a period of 120 [One Hundred Twenty] Days from the date of opening the same. If before expiry of this validity period, the Bidder amends his quoted rates or tender, making them unacceptable to the Trustees and / or withdraws his e-tender, preventive action will be taken by the Trustees/ Sanctioning Authority/Engineer.

5.6 DETAILED SCRUTINY OF E-TENDERERS:

5.6.1 During the course of examination of Techno Commercial Part of the bid, the bidders, if asked for, shall furnish any or additional document(s) for the purpose of evaluation of his / their bids. The price bids of those bidders who meet the qualifying criteria of NIT shall be opened.

5.6.2 During techno-Commercial Evaluation of tender, an offer shall be considered non-responsive in case :-

- (i) is not accompanied by requisite Bid Document Fee.
- (ii) is not accompanied by requisite Earnest Money,
- (iii) validity of the offer is less than tender stipulation,
- (iv) It does not meet the Qualification Criteria as stipulated in the NIT.
- (v) The bidder submits conditional offer / impose own terms and conditions / does not accept tender conditions completely.

In addition to above, a bidder may be disqualified if –

- a) The bidder provides misleading or false information in the statements and documents submitted.
- b) Record of unsatisfactory performance during the last seven years, such as abandoning of work or rescinding of contract for which the reasons are attributable to the non-performance of the contractor or inordinate delays in completion or financial bankruptcy etc.

c) Non submission of essential documents as stated above.

The decision of Syama Prasad Mookerjee Port, Kolkata in this regard shall be final and binding on the Bidder.

5.7 For Micro & Small Enterprises (MSEs) :-

5.7.1 Micro & Small Enterprises (MSEs) shall submit the following documents for availing themselves waiver of cost of tender documents :-

5.7.2 Micro and Small Enterprise registered with the authorities as mentioned in the Govt. of India gazette Notification dated 26.03.2012 shall be exempted from payment of Cost of Tender for which copies of valid MSE's Certificate along with the certificate of the authority as mentioned in the Govt. gazette with list of items registered must be submitted with tender.

5.8 EVALUATION CRITERIA:

5.8.1 During evaluation of Price Part, provided that the bidder submits his offer following e-tender stipulations & specifications, **the overall lowest offer received** shall be considered for acceptance by the Trustees.

5.9 ACCEPTANCE OF TENDER:

5.9.1 SMP, Kolkata reserves the right to accept / reject any / all offer(s) without assigning any reason thereof and also reserve the right to accept the tender in part or as a whole.

5.9.2 Any attempt to exercise undue influence in the matter of acceptance of Tender is strictly prohibited and any Tenderer who resorts to this will render his tender liable to rejection.

5.9.3 The successful Tenderer will be notified in writing of the acceptance of his tender. The "Tenderer" then becomes the "Contractor" and he shall forthwith take steps to execute the Contract Agreement within six weeks of issue of Letter Of acceptance and fulfill all his obligations as required by the Contract.

5.9.4 Work experience, as a sub-contractor or supply contractor shall not be considered as the requisite qualification.

5.10 GOOD CONDUCT:

If a bidder has had previous history of "defined misconduct" (such as banning from by any government sector, premature termination of a contract solely on bidder's fault, criminal case pending against the company or its owner / current director filed by a government entity etc.) his offer is liable to be ignored.

5.11 MISCELLANEOUS:

- (i) Bidder shall submit his offer for complete scope of work, strictly in accordance with the tender documents. Any deviation from the tender documents and / or any incomplete tender shall not be considered.
- (ii) The bidder shall not impose his own terms & conditions in his offer or quote his rates based on his own terms and conditions, such E-Tenderers are liable to rejection at the option of the Trustees without further reference to the bidder.
- (iii) All materials shall have to be procured by the successful Bidder and shall be of the best and approved quality conforming to relevant specifications. The successful Bidder shall also arrange for the supply of all labour, tools and plants as stipulated in the Special Conditions of Contract, required for efficient execution of the work.
- (iv) All measuring units are in Metric System and rates and sums in the tender are in Indian Currency. The language used throughout shall be in English.
- (v) The Tender Documents with all the enclosures, appendices, Abstract Form of Tender and Form of Tender shall be required to be complete, duly filled in and signed and uploaded.
- (vi) The Bidder shall give a declaration about the names of their relations employed in Syama Prasad Mookerjee Port, Kolkata. It is not the intention to debar the Contractors from working if their relatives are working in SMP, Kolkata but such a declaration is necessary in the interest of Trustees against any possible lapses.

6. SPECIAL CONDITIONS OF CONTRACT

E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

6.0 PREFACE:

These provisions though given in a separate section are part of the tender documents which must be read as a whole, the various sections being complementary to one another and are to be taken as mutually explanatory. These provisions shall be read in conjunction with the other parts of the tender documents viz. General Conditions of Contract, Notice Inviting E-Tenderers, Instructions to Bidder, Particular Specifications, Drawings, Bill of Quantities and other documents forming part of the Contract. In case of any discrepancy or ambiguity in the documents, the order of precedence of the documents as stated below will apply. In particular, these provisions will over ride those in the General Conditions provided there is discrepancy between them.

6.1 CORRELATION AND ORDER OF PRECEDENCE OF TENDER DOCUMENTS:

If the stipulations in the various tender documents be found to be at variance in any respect, one will override others (but only to the extent these are at variance) in the order of precedence as given in the list below, i.e. any particular item in the list will take precedence over all those placed lower down in the list.

- Order letter.
- Bill of Quantities.
- Drawings.
- Particular Specifications of work.
- Special Conditions of Contract.
- General Conditions of Contract.

In case of any dispute, question or difference either during the execution of the work or any other time as to any matter or thing connected with or arising out of this Contract, the decision of the Sr. Dy. Manager (I&CF), Haldia Dock Complex, thereon shall be final and binding upon all parties.

6.2 SCOPE OF WORK:

The work relates to:-

- Baseline program for the work to be executed shall be submitted.
- **Submission of Design** (including soft copy of STAAD file) with drawings of New Walkways & Platforms along with methodology for fabrication and erection.
- Submission of methodology for dismantling of existing damaged Walkways including Stairs & Railings.
- Submission of methodology for dismantling of damaged Platforms including Railings & Support Structures.
- Dismantling of existing damaged Walkways including Stairs & Railings including existing Electrical fittings and handing the retrieved materials over to the HDC store after weighment.
- Dismantling of damaged Platforms including Railings & Support Structures and handing the retrieved materials over to the HDC store after weighment.
- Fabrication of New Walkways including hand Railings and transport to site in good condition along with painting approved by HDC/PMC.
- Fabrication of Platforms including support structure and transport to site in good condition along with painting approved by HDC/PMC.
- Extra piles shall be casted if required.

- The nearest geotechnical data available in HDC is enclosed herewith as **Annex -S**. The geotechnical data is tentative and for information purposes only. The contractor may perform actual bore holes at the site for field data, if require.
- Erection & Placing in Position New Walkways including Railings.
- Supply and fixing of marine fixtures like eye hook, mooring ring, rubber ladder and tidal gauge etc.
- Final coat of painting of all steel structures of newly constructed walkways, railings, platforms, stairs etc.
- Handing Over the Site

The scope of work also includes all other works as described in the attached "Bill of Quantities" and ancillary and appurtenant works as may be required hereafter for successful completion of the work in accordance with the Trustee's General Conditions of Contract, attached Special Conditions of Contract, Particular Specifications, Bill of Quantities and in accordance with PWD (West Bengal's) Specifications for materials and workmanship.

6.3 LOCATION:

The location of HOJ-II is on the river Hooghly in the waterfront between the newly constructed OT-II Jetty and First Oil Jetty at the North side of the Lock entrance for the Haldia Dock Complex at Latitude: 21.20° N Longitude: 88° E.

6.4 ACCESS TO THE SITE:

(a) By Road:

All-weather hard top road approachable from N.H. 41 and State Highway exist right up to the area of work.

(b) By Rail:

S. E. Railway Branch Line connects Haldia with the Panskura Railway Station.

6.5 INSPECTION OF SITE:

The Bidder shall inspect the site of work and thoroughly familiarise himself with the nature of work, site conditions, and access to the site and location before submission of the tender. He should contact the Sr. Dy. Manager (I&CF), Haldia Dock Complex at his office at 2nd Floor, Operational Building, Chiranjibpur, for collecting information about the site before submission of the tender. No excuse will be entertained afterwards on the above ground. In case any part of the site cannot be handed over to the successful Bidder in time, no compensation for loss of labour or any other cause nor any claim will be entertained by the Trustees. Suitable extension of time shall, however, be granted to the successful Bidder on that ground if applied for.

6.6 SITE CONDITIONS & METHOD OF WORK:

The work shall have to be executed at inside dock area, Haldia, H.D.C.

The sequence of work shall have to be programmed by the successful Bidder without hampering the existing operational activities in the surrounding areas. The working hours may have to be adjusted as the situation demands. No claim for idle labour on this account shall be entertained.

Proper care should be taken to provide adequate protection to the existing structures, cables (high voltage, telephone, computer etc.), underground pipes and ducts, water lines and all such installations against any damage at the Contractor's risk and expense. Any damage caused to the existing structures / facilities or defect arising during construction shall have to be rectified forthwith as directed to the satisfaction of the Engineer, without charging extra.

The working hours may have to be adjusted as the situation demands but no claim for idle labour on this account shall be entertained. The work may be carried out in Sunday(s) or Holiday(s) or beyond Normal working hour(s), if the situation so demands without any extra cost.

Further, if so required by the Engineer in the interests of Normal working of the Port, it is found necessary to shift / suspend some construction activity for some duration, this shall be done in compliance with the instructions of the Engineer and as per relevant clause of the G.C.C.

Due to urgency/importance of the work and to complete the work within available shutdown of the jetty the fabrication work of walkway, platform accessories, handrails, stairs etc. have to be done onshore at nearby suitable places as approved by HDC. The contractor shall pay the charges against land allotted by HDC as fabrication yard as per HDC norms.

After Completion of fabrication yard the walkway has to be carried and fixed in position by Floating Crane/Barge of suitable loading capacity. The cost of hiring Floating Crane/Barge and other ancillary equipment, tools, etc. should be inclusive of quoted rate.

6.7 PARTICULARS OF EXISTING WORKS:

Such information as maybe given in the specification as to the existing features and works other than those now under construction as part of the present Haldia Dock Complex given without warranty of accuracy and neither the Trustees nor the Engineer will be liable for any discrepancies therein.

6.8 DRAWINGS:

Tender drawings are for providing an indication of the nature and extent of the work and are tentative. The actual work will have to be executed without any reservations at accepted rates as per final detailed drawings which shall be **submitted by the contractor within 45 days of award of work** and shall be approved by HDC/ PMC. The final HDC/ PMC approved drawings shall be considered for the execution of work.

The Engineer can modify the drawings at any time during of the contract for successful completion of the work. Working drawings as and when necessary, shall be provided by the Contractor and got approved by the Engineer.

6.9 SETTING OUT WORKS AND INITIAL MEASUREMENTS:

The Engineer shall provide the initial references and a benchmark for the setting out of the work. It will be the Contractor's responsibility to set out the works accurately and get them checked by the Engineer.

The Contractor shall provide at his own expense all necessary instruments, staff and labourers for the checking of the survey.

The Contractor shall be responsible for the true setting out of the Works, and for the correctness of all dimensions, levels, lines, positions and alignment. Any error in any of the dimensions, levels, lines, positions and alignment found in any part of the Works shall be rectified by the Contractor at his own cost. Checking by the Engineer at any stage shall not absolve the Contractor from any responsibility for proper setting out and construction of the Works to correct levels, lines, positions and alignment.

Before commencement of the work, the Contractor shall take initial measurements and spot levels at intervals as ordered by the Engineer and after verification by the Engineer, these records shall be signed by the Contractor. The Contractor shall give the Engineer or his representative at least 24 hours prior notice in writing of the time when any part of the setting out of the works will be ready for checking.

6.10 TIME OF COMPLETION

The work is urgent in nature and must be commenced immediately on receipt of the work order and to be completed in all respects within **12 (Twelve) months** including preliminary time from the date of placement of work order subject to the condition that Procurement of materials and fabrication of Steel structures on shore has to be started immediately after issuance of work order after approval of designs & drawings by HDC so that the erection and placing of walkways including dismantling works at offshore can be carried out/completed within **shutdown period** of the jetty for a **maximum period of 1 (One) month** as per availability/permission by HDC.

6.11 MAINTENANCE PERIOD:

The Contractor shall maintain the works allotted to him as per Clause 9.0 of the General Conditions of Contract for a period **of 2 (Two) years** from the date of completion as certified by the Engineer or his representative in Form GCC-1.

6.12 PERFORMANCE GUARANTEE:

As an alternative to the deduction of Security Deposit from progressive bills, the Contractor, if he so desires, can submit to the Engineer, a Performance Bond as per Cl. 3.6 of General Conditions of Contract in the form of an irrevocable guarantee from Kolkata / Haldia Branch of any Nationalised Bank or Scheduled Bank of India in the proforma attached to the General Conditions of Contract and for a sum computed according to Cl. 3.4(g) of the

General Conditions of Contract. The Bank Guarantee for the Performance Bond shall remain valid till 30 (thirty) days after completion of maintenance period specified in the tender or any extension thereto as would be informed by the Engineer. On acceptance of Performance Bond, the Earnest Money deposit will be refunded to the successful bidder.

The submission of the Performance Guarantee shall be at the expense of the contractor in all respects.

In case Bank Guarantee is issued for a branch outside Haldia/ Kolkata, the same should be counter-guaranteed and payable by the Branch of the same bank situated at Haldia/ Kolkata.

Performance Guarantee will be discharged and released to the Contractor after the elapse of thirty days after the issue of certificate of final completion in terms of General Conditions of Contract. Provided always that if the Contractor has still to execute any works as provided in the GCC, and/or if some dues are recoverable from the Contractor, the Employer reserves the right to withhold discharge of the performance guarantee until thirty days after the completion of all these.

6.13 TEMPORARY OR ENABLING WORK:

The Contractor shall submit to the Engineer for his approval not less than 28 days before commencement or erection of any part of Temporary Works, drawings and detailed proposals for the method of construction of temporary works such as office, store, and temporary platforms, pre-casting yard, workshop etc. which he intends to construct for the execution of the contract and no such work shall be constructed before obtaining the written approval of the Engineer. The Contractor shall also submit his calculations relating to the design of temporary works, strength etc., if required by the Engineer and shall carry out the modifications that the Engineer may require of such temporary works at Contractor's own cost. As with the permanent works, the Contractor shall take all precautions while carrying out the temporary works and shall abide by regulations of all statutory authorities. Notwithstanding approval by the Engineer, the Contractor shall be solely responsible for the safety and proper execution of the temporary work and all related permanent work. The Contractor at his own cost shall repair any damage occurring to part or whole of the permanent work due to any failure of the temporary works. These provisions will apply to all enabling works also. The contractor shall obtain permission for any Temporary Works and would ensure that during execution of works the statutory requirements of the concerned authorities such as Syama Prasad Mookerjee Port, Kolkata, Police, Customs, etc. would be complied with.

6.14 CONTRACTOR'S SITE OFFICE, STORE SHEDS ETC:

On an application from the Contractor, land near to the site of work will be allotted by the Trustees for the construction of Site Office, Store etc. For such allotment a rent will be recovered from Contractor's bill at prevailing rates of HDC plus applicable GST. The Contractor shall hand over vacant possession of the land free from all encumbrances within two months from actual date of completion of work (as stated in G.C.-I). In case the contractor does not remove the site offices, store etc. within two months from the actual date of completion, the contractor will have to pay compensation equivalent to **three times** the applicable licence fee for the plot of land allotted to him temporarily for site offices, store etc. as per Schedule of Rent of SMP's land and buildings at Haldia and to be recovered from his final bill / Security Deposit. The Contractor shall

build office, sheds etc. on the land allotted to him as approved by the Engineer or his representative and shall maintain a clean hygienic condition throughout the period of their use.

The Contractor shall maintain a Site Order Book at his site office and all orders and instructions issued to him from time to time by the Engineer or his representative will be recorded in the Site Order Book. The Contractor shall promptly sign each entry as a token of having received such orders.

6.15 KEEPING THE SITE AND WORKING AREA CLEAR:

The Contractor shall at all times keep the site and working areas free from all surplus materials, rubbish and offensive matter all of which shall be disposed off in a manner to be approved by the Engineer's Representative. As the works will be carried out mainly inside of operational buildings of HDC, the Contractor has to make necessary arrangement to clear the rubbishes etc. from the buildings, at the end of day's work at his own cost & risk.

6.16 SUPPLY OF MATERIALS BY THE CONTRACTOR:

It will be the responsibility of the contractor to make timely procurement of all materials for both temporary and permanent works required in accordance with the Bill of Quantities or for any extra/additional work required as per the directions of the Engineer. The contractor shall procure Structural Steel and other materials from manufacturers approved by the Engineer.

The contractor will be allowed to take away surplus materials on completion of the work, subject to Engineer's verification of contractor's records of entry and consumption of materials in the works.

6.17 TESTING OF MATERIALS & EQUIPMENT:

The contractor shall provide at his own cost all necessary equipment and all necessary facilities for such testing which by the nature of work will have to be done at site.

Equipment will be in the nature of sufficient number of slump cones, standard metal moulds for concrete test cubes / beams, sets of standard IS sieves, weighing balance, graduated measuring cylinders, etc.

These are only indicative and it may be noted that equipment are to be provided and testing carried out as per direction of Engineer without any reservation and at the cost and expense of the contractor.

Any other testing of materials or workmanship desired by the Engineer shall be carried out by the contractor at his cost from Government registered laboratory as approved by the Engineer. The testing charges and all other incidental charges like packaging and transporting the test samples etc. shall have to be borne by the contractor and must be included in the rates.

6.18 INSPECTION, TESTING AND PROJECT MONITORING:

The Employer may appoint a PMC, at the cost of the Employer, for stage-wise close project monitoring, technical inspection and certification of materials & workmanship, including fabrication, erection, placing in position, etc. in connection with the instant work.

The stage-wise project evaluation, technical inspection will be carried out by the based on the approved Project Bar chart, Quality Assurance Plan (QAP).

The Contractor shall have to submit a Phase wise project evaluation criteria, Bar chart, Quality Assurance Plan (QAP), based on the approved Technical Specification and other terms & conditions stipulated in the bidding documents. The QAP shall be approved by the "Engineer". The Project monitoring, Technical Inspection & Certification, payment recommendations will be carried out by the PMC, in accordance with approved Project evaluation criteria, QAP.

6.19 PROGRAMME OF WORK AND PROGRESS REPORT:

The contractor shall suitably schedule various activities required for completion of the work and shall submit detailed programme of work in writing in the form of a Bar / PERT Chart before commencement of the work. The contractor shall submit the weekly and monthly progress report to HDC.

The contractor shall present the progress of work in a format approved by HDC weekly/monthly for follow up of work to HDC for review meeting and submit a copy to HDC.

If desired by the Engineer, the contractor, during execution of the work, shall submit on the first day of each month the progress report of the work in a manner as directed, showing therein corrective measures to be taken to make up the backlog, if there be any.

6.20 SAFETY MEASURES:

The contractor shall adhere to safe construction practice, guard against hazardous and unsafe working conditions and follow all safety precautions for prevention of injury or accidents and safeguarding life and property. The contractor shall comply with relevant provisions of Dock Workers (Safety, Health and Welfare) Act – 1986 and Dock Workers (Safety, Health and Welfare) Regulation – 1990 and Safety Officer of the Trustees or Safety Inspectors shall be afforded all facilities for inspection of the works, tools, plant, machineries, equipments etc. wherever so required. The contractor shall further comply with any instruction issued by the Engineer, Trustees' Safety Officer, Safety Inspector in regards to safety which may relate to temporary, enabling or permanent works, working of tools, plants, machineries, equipments, means of access or any other aspect.

The contractor shall provide all necessary first aid measures, rescue and lifesaving equipment to be available in proper condition.

The contractor shall provide PPE's (Personal Protective Equipments) such as, helmet, safety shoe etc. to all workers and shall also provide job specific PPE's e.g. safety belts for working at heights, protective face and eye shield, goggles, hand gloves for welding / gas cutting works; protective foot wear and gloves for hot works, facemasks, gloves and overalls for painting works, mixing and handling materials etc , as directed by the Engineer.

All safety rules shall be strictly followed while working on live electrical systems or installations as stipulated in the relevant safety codes.

Use of hoisting machines and tackles including their attachments, construction tools, machineries and equipments shall comply with the relevant safety codes.

Before allowing workers in sewers, manholes, any duct or covered channel etc, the manhole covers shall have to be kept open and ventilated at least one hour in advance and necessary safety torches / lamps should be inserted first before allowing entry to the worker. Suitable hand gloves and other safety gear will be provided to the worker during handling / removing of slushes / sludge etc. without any extra cost. The contractor shall adopt all the above safety measures at his own cost.

The successful bidder shall also ensure that –

- (i) No damage is caused to plants and vegetation unless the same is required for execution of the project proper.
- (ii) The work shall not pollute any source of water / land / air surrounding the work site so as to affect adversely the quality or appearance thereof or cause injury or death to animal and plant life.
- (iii) His office & labour hutment etc. shall be maintained in a clean and hygienic condition throughout the period of their use and different effluents of the labour hutment shall have to be disposed off suitably.
- (iv) Proper safety measure including insurance coverage of workmen during execution of work will be ensured by the Contractor. In case of any untoward incident happened during execution of work, Contractor will be solely responsible for such incidence.

6.21 INSURANCE OF WORKS :

The Contractor shall insure in the joint names of the Employer and the Contractor against all loss or damage from whatever cause the whole of the works for which the Contractor is responsible under the terms of the contract and in such manner that the Employer and Contractor are covered for the period from the

commencement of the works until the date stipulated in the Certificate of Completion for the whole of the works and are also covered during the period of maintenance for loss or damage arising from a cause occurring prior to the commencement of the period of maintenance for loss or damage occasioned by the Contractor in the course of any operations carried out by him.

6.22 THIRD PARTY INSURANCE

Before commencing the execution of the works the Contractor, but without limiting his obligations and responsibilities under Clause 4.16 of GCC, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the Employer, or to any person, including any employee of the Employer, by or arising out of the execution of the works or in the carrying out of the Contract.

6.23 MINIMUM AMOUNT OF THIRD PARTY INSURANCE

Such insurance shall be effected with an insurer and in terms approved by the Employer, which approval shall not be unreasonably withheld and for at least Rs 15,00,000/- per insurance with number of occurrences unlimited. The Contractor shall, whenever required, produce to the Engineer or the Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premium.

Without limiting his responsibilities under clause no 4.16 and 4.13 of the "General Conditions of Contract ", the contractor shall insure in the joint name of the Employer and the contractor against all losses.

6.24 PROVISION TO INDEMNIFY EMPLOYER

The terms shall include a provision whereby, in the event of any claim in respect of which the contractor would be entitled to receive indemnity under the policy being brought or made against the Employer, the insurer will indemnify the Employer against such claims and any costs, charges and expenses in respect thereof.

6.25 ACCIDENTS OR INJURY TO WORKMEN

The Employer shall not be liable for any damages or compensation payable at law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or any sub-contractor. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

6.26 INSURANCE AGAINST ACCIDENT ETC. TO WORKMEN

The Contractor shall insure against such liability with an insurer approved by the Employer, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any person is employed by him on the works and shall, when required, produce to the Engineer or the Engineer's Representative such policy of insurance and the receipts for payment of the current premium. Provided always that, in respect of any person employed by any sub-contractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall required such sub-contractor to produce to the Engineer or the Engineer's Representative, when required, such policy of insurance and the receipt for the payment of the current premium.

6.27 NOTIFICATION TO INSURERS

It shall be the duty of the Contractor to notify the insurers under any of the by the terms of such insurance are required to be notified and the Contractor shall indemnify and keep indemnified the Employer against all losses, claims, demands, proceedings, costs, charges and expenses whatsoever arising out of or resulting

from any default by the Contractor in complying with the requirements of this sub-clause whether as a result of the avoidance of such insurance or otherwise.

6.28 ALL INSURANCES AT CONTRACTOR'S COST

The insurance referred to in clauses 22.0 to 22.6 hereof shall be entirely at the cost and expenses of the Contractor.

6.29 REMEDY ON CONTRACTOR'S FAILURE TO INSURE

If the Contractor shall fail to effect and keep in force the insurance referred to in clauses 22.1 to 22.6 hereof, the work shall not be commenced.

6.30 HOLIDAY OR SUNDAY WORK:

Subject to provisions in local Acts and any statutes of the State, the Contractor shall arrange for working on Holidays and Sundays whenever so desired by the Engineer to expedite progress and complete the works in time.

The Contractor shall not be entitled to any additional payment for taking up works on Holidays and Sundays. The Contractor should be prepared to resort to round-the-clock working by following shift timings for labour.

6.31 POWER SUPPLY:

If available and if required, suitable power supply may be arranged by the Trustees at the nearest existing supply point of the site of work on receipt of request letter from the Contractor to that effect. All necessary arrangements for the distribution at site will have to be made by the Contractor at his own cost as approved by the Trustees' Plant and Equipment Division.

Charges for consumption of power shall be periodically recovered from the Contractor's Bill at the rates of WBSEB as prevalent amended from time to time along with departmental overhead of 19.25% including installation and hire charges for meters. The Trustees do not guarantee uninterrupted power supply from the above sources and Contractor shall not be compensated for any delay in providing / irregularity of power supply. The Contractor shall have to arrange for the supply of power at his own cost during such periods.

6.32 WATER:

The Contractor will arrange for supply of water both for drinking and for construction purposes. However, on written request from the Contractor, fresh water for labourers & for construction purpose may be made available from the exiting water line of the Trustees at a point near the site of work on chargeable basis as per existing norm of HDC. The contractor will have to arrange for laying pipelines, as necessary, as per approval of the Engineer or his representative, for storing and distributing the same to the work point at his own cost.

The Contractor Will also arrange for Water meter for supply of fresh water from HDC. The bill /payment against supplied fresh water shall be assessed through water meter.

6.33 METHOD OF MEASUREMENT:

Unless otherwise specified in the Particular Specifications and Bill of Quantities, the work shall be measured according to the latest P.W.D.'s Schedule. For details of measurement not covered by the above the relevant parts of IS: 1200 (latest revision) shall be referred to. The method of measurement shall be actual measurement as per site and as directed by EIC.

6.34 PRICE BASIS:

The bidder will have to quote online as per **price schedule** of the tender. However, this price schedule is indicative only and not exhaustive. The price would include design, submission of drawings, supply, delivery, erection, Placing in position, handing over etc. considering all items related to the entire project. This price should include all taxes and duties except GST. GST would be reimbursed by HDC against compliance of prevailing GST norms. Quoted price should remain firm till end of the contract.

No Escalation will be considered for the instant Project.

6.35 PAYMENT SCHEDULE:

On account payment to the Contractor shall be arranged as per payment schedule attached as per **Annex-Y**.

The Bills should be submitted by the contractor in quadruplicate to the Sr. Dy. Manager (I&CF)'s Office with necessary documents in original.

Subject to the availability and feasibility of system, HDC may make payment directly to the contractor's designated bank account. For this purpose, the contractor will have to indicate (i) name of bank (ii) branch name (iii) branch code and (iv) designated account number in the "Abstract Form Of Tender ". In case payment is made directly through bank, the contractor may be required to submit a pre-receipt as per instruction of HDC.

6.36 WATCHING OF MATERIALS:

The successful Bidder will have to arrange for proper security of all materials and tools brought by him. Although the working area is under the jurisdiction of C.I.S.F., the Contractor shall be fully responsible for any theft or damage of the materials. He may be allowed to post his Watchmen round –the-clock at the work-site with valid permit and prior intimation to CISF. No extra amount will, however, be paid separately for watching. The Contractor should quote his rates keeping this in view.

6.37 PLANT & EQUIPMENT:

The successful bidder shall supply all necessary labour, tools, plants and equipments with fuel and operator required for successful execution of the work at his own cost.

6.38 ESCALATION / VARIATION ON PRICES:

No Escalation / Variation on the prices on any account will be considered for adjustment / payment.

6.38 A. CONTRACT LABOUR LAWS:

The Contractor must comply with the provisions of Contract labour (Regulation & Abolition) Act 1970 and Contract Labour (Regulation & Abolition) Central Rules 1971 and the rules framed there under with all modifications/amendments being enforced from time to time.

The Contractor shall indicate maximum number of workmen to be engaged on any day for execution of the work in the appropriate place in the ABSTRACT FORM OF TENDER & he shall have to obtain a regular /permanent license as per sec12(1) of the Contract Labour Act.

Further , whenever a contract work has commenced or completed , the contractor has to intimate the same to the Assistant Labour Commissioner(Central) /labour Enforcement Officer (Central) in Form IV-A , within 15 days of such commencement or completion.

The contractor has to obtain a certificate of registration under "Building & Other Construction Workers (Regulation Of Employment & Conditions Of Service) Act-1996 and Central Rule 1998 and his rate shall include a cess payable @ 1 % of the cost of construction as applicable under "Building & Other Construction Workers Welfare Cess Act -1996 & Welfare Cess Rules 1998.

The contractor has to arrange for displaying the name of the Regional Labour Commissioner (Central) , Asst. Labour Commissioner (Central) & Labour Enforcement Officer (Central) at his worksite(s).

The contractor shall inform the Principal Employer the date, time & venue of disbursement to be made by him to his workers.

The successful bidder shall also be required to put up a notice at the site of work mentioning the date, time & venue of disbursement to be made by him to his workers and he or his authorized representative shall have to be present during period of disbursement.

6.38 B. COMPLIANCE WITH E.P.F & M. P. ACT:

The successful contractor will have to comply with provision of EPF & MP Act –1952 (along with amendments, if any), issued from time to time.

If asked for by the Employer, the contractor will be required to submit photocopy of all payment challans and produce the original for verification to the representative of the principal employer, i.e. Sr. Dy. Manager (I&CF).

6.38 C. COMPLIANCE WITH ESI ACT:-

If applicable , the successful bidder will have to comply with provisions of “Employers State Insurance Act – 1948”, along with amendments (if any) issued from time to time. He shall obtain ESI registration and shall deduct employees’ contribution as applicable percentage of the wages of each of the employees’ and shall deposit the same together with employer’s contribution as applicable percentage of such total wages payable to the employees or at such rates as fixed by the competent authority from time to time.

In case, where an employee is not covered under ESIC Scheme (or contribution not paid for him regularly) and meet an accident during and arising out of his employment, the contractor being the immediate employer, shall be liable to pay him suitable compensation.

The contractor will be required to submit Photo copies of all payment challans and produce the original for verification to the representative of the principal employer, i.e. Sr. Dy. Manager (I&CF).

6.38 D. INDEMNIFICATION:

The successful bidder shall be deemed to indemnify and keep indemnified the Trustees from and against all actions, claims, demands and liabilities whatsoever under and in respect of the breach of any of the provisions of any law, rules or regulations having the force of law, including but not limited to –

- a) The Minimum Wages Act, 1948.
- b) The Dock Workers (Regulation Of Employment) Act, 1948
- c) The Building And Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996
- d) The Dock Workers’ Safety, Health & Welfare Act , 1986
- e) The Payment of Wages Act, 1936.
- f) The Workmen’s Compensation Act, 1923.
- g) The Employees Provident Fund Act, 1952.
- h) The Contract Labour (Regulation and Abolition) Act, 1970; Rules 1971.
- i) The Payment of Bonus Act, 1965.
- j) The Payment of Gratuity Act, 1972.
- k) The Equal Remuneration Act, 1976.
- l) The Employees State Insurance Act, 1948 & Employees State Insurance (Amendment) Act ,1989
- m) Child Labour (Prohibition and Regulation) Act, 1986.
- n) The Maternity Benefits Act 1961
- o) Interstate Migrant Workmen (Regulation Of Employment & Conditions Of Service) Act, 1979.
- p) Motor Vehicle Act, latest revision.

6.39 FORCE MAJEURE

In the event of either party rendered unable by Force Majeure to perform any obligation required to be performed by them under the Contract, relevant obligation of the party affected by such Force Majeure shall upon notification to the other party be suspended for the period which Force Majeure events lasts. The cost and loss sustained by the either party shall be borne by the respective parties.

The term “Force Majeure” as employed shall mean the events as below:

- (i) riot (unless solely restricted to or perpetuated by employees of the Contractor or his subcontractors / suppliers or occurring outside India) so far as it is uninsurable;
- (ii) War, hostilities (whether war be declared or not), invasion, directed to or by India or act of foreign enemies, directed to India;
- (iii) Rebellion, revolutions, insurrection, or military or usurped power, or civil war in India;
- (iv) Fire, flood, cyclone, hurricane and acts of God.

Time of performance shall be extended by the period of delay, which is directly caused by the Force Majeure. Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid shall notify the other party in writing immediately but not later than forty eight hours of the alleged beginning and ending thereof, giving full particulars and satisfactory evidence in support of his claim.

Time of performance of the relative obligation suspended by the Force Majeure shall stand extended by the period for which such event lasts and affects the relative obligation directly. Such extension of time shall be without prejudice to the provision that time is essence of the Contract and any other terms and conditions related to time of completion as may provide elsewhere in the Contract

If the work is affected by Force Majeure lasting for more than 60 days at a stretch, the parties to the Contract shall settle the issue mutually.

6.40 CUSTOMS AND SECURITY REQUIREMENTS:

The Haldia Dock area is a custom bonded area and as such the Contractor shall comply with all regulations of the Port and Customs authorities extent and those that may be imposed from time to time in respect of the transit of all Contractor's plant, vehicles, materials and staff in the area.

The contractor shall fence the area that may be allotted to him inside the "Bonded area" of the Port for stores and other requirements with closely boarded C.G.I. sheets fixed to a suitable framework, to the full satisfaction of the Port and Security authorities.

The Contractor shall abide by all the regulations and rules of SMP, Kolkata applicable to the Haldia Dock Complex, as extant or as may be amended.

6.41 DOCK PERMIT:

Dock permits which may be necessary for any purpose related to the work shall be issued **against payment at the prevailing rate of HDC.**

6.42 TAXES:

The quoted rates should include all other Taxes excluding GST. GST as applicable shall be paid extra against proper invoice submitted by the successful contractor.

The contractor will be required to submit GST compliant invoice with all required details and also to be required to file timely and proper return so as to enable KoPT to get due input credit against GST paid of.

In case of any failure on the above account, GST amount even if paid by SMP, Kolkata shall be recoverable from the contractor, along with applicable interest if any.

6.43 SETTLEMENT OF DISPUTES:

If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with or arising out of the contract or the execution of the works, the same shall be dealt as per relevant provisions of the General Conditions of Contract and THE ARBITRATION AND CONCILITATION (AMENDMENT) ACT, 2015 and any statutory amendment thereof.

6.44 ROYALTY:

Royalty as applicable from time to time for various materials like sand, stone aggregates etc. obtained by the contractor, his agents/suppliers or sub-contractors from government or private quarry/land for the purpose of this contract work shall be paid by the contractor at prevailing rates. He shall indemnify the Trustees against any claim from the Government / other authorities for short or non-recovery of royalty charges and shall pay such short or non-recovered amount(s) on demand to the appropriate authorities at anytime.

6.45 INTIGRITY PACT:

The successful bidder must submit the Integrity Pact as per attached General Condition of Contract.

6.46 LIQUIDATED DAMAGES FOR DELAY:

If the Contractor fails to execute the contract partly or for the whole of the works, as applicable, within the stipulated dates or such extension thereof as communicated by Sr. Dy. Manager(I&CF) in writing, then the Contractor shall be required to pay to the Trustees' the @ ½ % of the Contract Value for every week or part thereof, provided always that the amount of such compensation under the provision of this clause does not exceed 10 % (TEN PERCENT) of the contract value of the goods. The Trustees 'may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract. In case the bidder fails to complete the supply, some other agency may be ordered to supply the remaining materials at the risk & expense of the Bidder after a minimum three days' notice in writing has been given to the bidder by the Sr. Dy. Manager (I&CF) or his representative. Deployment of separate agency shall be at the absolute discretion of the Sr. Dy. Manager (I&CF), who's decision will be final & binding.

6.47 PROVISIONS FOR SITE STAFF OF ENGINEER:-

After the issue of Engineer's notice to commence, the contractor shall as soon as possible make available of the following facilities for the staff of the Engineer at the Site of Work, all in accordance with the approval of the Engineer or his Representative and the Contract Price shall be deemed to be inclusive of the provision for all these facilities.

- (a) Office Facilities :- Throughout the period of Contract, office accommodation at site for two rooms with electricity and water supply and adequate ventilation for the sole use of Engineer's Representative and his staff. The room shall be provided and maintained with suitable furniture, peon facility as directed by the Engineer. An independent toilet facility shall have to be provided solely for the use of the client.
- (b) Equipment Facilities: - Provide and maintain all necessary equipments in working condition for use of Engineer's staff such survey, testing of materials and any other instruments, equipment and apparatus as they may require for carrying out the contractual obligations. Provide computer with printer connection of latest model (not more than six month old) at site office and maintain the same with the required software and consumables.
- (c) Transport facilities:- Shall make available, maintain and operate one good 4 wheeler vehicle with AC facilities having a minimum sitting capacity for 4 persons with driver, fuel, etc. for the use of the Engineer or his representative for survey, testing, inspection, measurement etc related to the work on working days from 8:00 A.M to 10:00 P.M during currency of contract including night shift if required. The vehicle shall not be more than 3 [Three] years old. Any failure in supply / sudden withdrawal / stoppage will attract deduction from bills @ HDC's similar operating transport contract. In case of exigency and work during night hours, the car shall be made available for the entire night. The supply of vehicle shall start on 15 th day from the date of work order and shall finish on the date of completion of work including extension of date of completion, if any.

7. TECHNICAL SPECIFICATIONS

E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

7.1 SITE PARTICULARS:

- Project Location and General**

Kolkata Port is one of the twelve major ports of India. It is the only major riverine port in India, situated in the Hooghly River, West Bengal. The latitude and longitude of the Haldia dock complex is given below:

Latitude: 21.20° N

Longitude: 88° E

HOJ-2 was commissioned in 1991. 150-200 vessels were catered every year by each oil jetty and the vessel size/capacity ranges from 20,000 DWT to 40,000 DWT. Oil handling capacity per jetty is around 3 Million ton per annum. Oil jetty is meant to handle various types of liquid cargoes as LPG, HSD, naphtha, butane, crude oil, furnace oil and motor spirit.

The location of the Haldia Dock Complex is furnished in Figure 2.1. The location of the HOJ - II is located between upcoming Outer Terminal – II and HOJ - I. The location of the HOJ - II is furnished in Figure 2.2.



Figure 2.1: Location of Haldia Dock Complex

7.2 METEOROLOGICAL & OCEANOGRAPHIC DATA

7.2.1 Meteorological data

- **Wind data**

1. For the purpose of design of the berth, wind loads have been considered with the following wind velocities.

Basic wind speed : 65m/sec

Wind speed in operating condition : 24m/sec

- **Rainfall Data**

- This region is mainly exposed to south-west monsoon from June to September and an average monthly rainfall of over 250 mm is experienced (July and August are the wettest months having monthly rainfall as high as 400 mm).
- During north-west monsoon from November to February monthly average rainfall of less than 50 mm is experienced.
- The average annual rainfall is around 1500 mm and the average number of rainy days in a year with rainfall of 25mm or more is about 20.

- **Temperature**

- In Haldia, there is a seasonal variation in the temperature. April and May are hotter month whereas December and January is colder months.
- The highest temperature so far recorded is 44.9°C during the month of May in 1975 and the lowest temperature is 6.9°C recorded during the month of December 1975. Design range of effective temperature is (+/-) 25°C.

- **Visibility**

2. It is learnt that visibility at Haldia is better compared to Kolkata as the area is free from industrial smoke. At times due to heavy rain poor visibility is reported during the south-west monsoon. On an average fog is reported on 5-7 days in each month from November to February during mornings.

7.2.2 Oceanographic data

- **Tidal data**

3. As per IPA report received on June 2016 details, the tidal data are tabulated in Table – 3.1

Table 3.1.Tidal Level

Description	Level(m)
Highest High Water (HHW)	(+) 7.26 m CD
Mean High Water Spring (MHWS)	(+) 5.70 m CD
Mean High Water (MHW)	(+) 5.01 m CD
Mean High Water Neaps (MHWN)	(+) 4.26 m CD
Local Mean Water Level (LMWL)	(+) 3.23 m CD
Mean Low Water Neap (MLWN)	(+) 2.10 m CD
Mean Low water (MLW)	(+) 1.34 m CD
Mean Low Water Springs (MLWS)	(+) 0.80 m CD
Lowest Low Water (LLW)	(+) 0.07 m CD

- **Current Data**

4. The maximum flow velocity may be considered as 3.00 m/s for both way water flows as per client's recommendation.

7.3 GENERAL ARRANGMENTS OF EXISTING WALKWAY

7.3.1 General for Steel Walkways:

1. The HOJ – II consists of six numbers of steel walkway connecting mooring dolphins/ piles.
2. All walkways are made of steel resting on steel platform above steel piles.
3. Walkway – I – Connects Mooring Dolphin – I to Mooring Dolphin – II.
4. Walkway – II – Connects Mooring Dolphin – II to Existing Tower Monitor – I pile (Tilted)
5. Walkway – III – Connects Existing Tower Monitor – I pile (Tilted) to Service Platform.
6. Walkway – IV – Connects Service Platform to Existing Tower Monitor – II pile.
7. Walkway – V – Connects Existing Tower Monitor – II pile to Mooring Dolphin – III.
8. Walkway – VI – Connects Mooring Dolphin – III to Mooring Dolphin – IV.
9. There are 4 nos of Berthing dolphins with a cast iron bollard.
10. The Walkway – III is connected with Berthing Dolphin – I & II with a steel ladder.
11. The Walkway – IV is connected with Berthing Dolphin – I & II with a steel ladder.
12. The Approach Trestle is made of RCC.
13. The Service platform is made of steel platform rested on steel piles with a RCC slab at top.
14. The loading arms are resting on the Service platform.

Table showing the length of existing walkway.

S. No	Structure	Length (Approx.) M
1	Walkway - I	64.3
2	Walkway - II	38
3	Walkway - III	53
4	Walkway - IV	53
5	Walkway - V	38
6	Walkway - VI	64.3

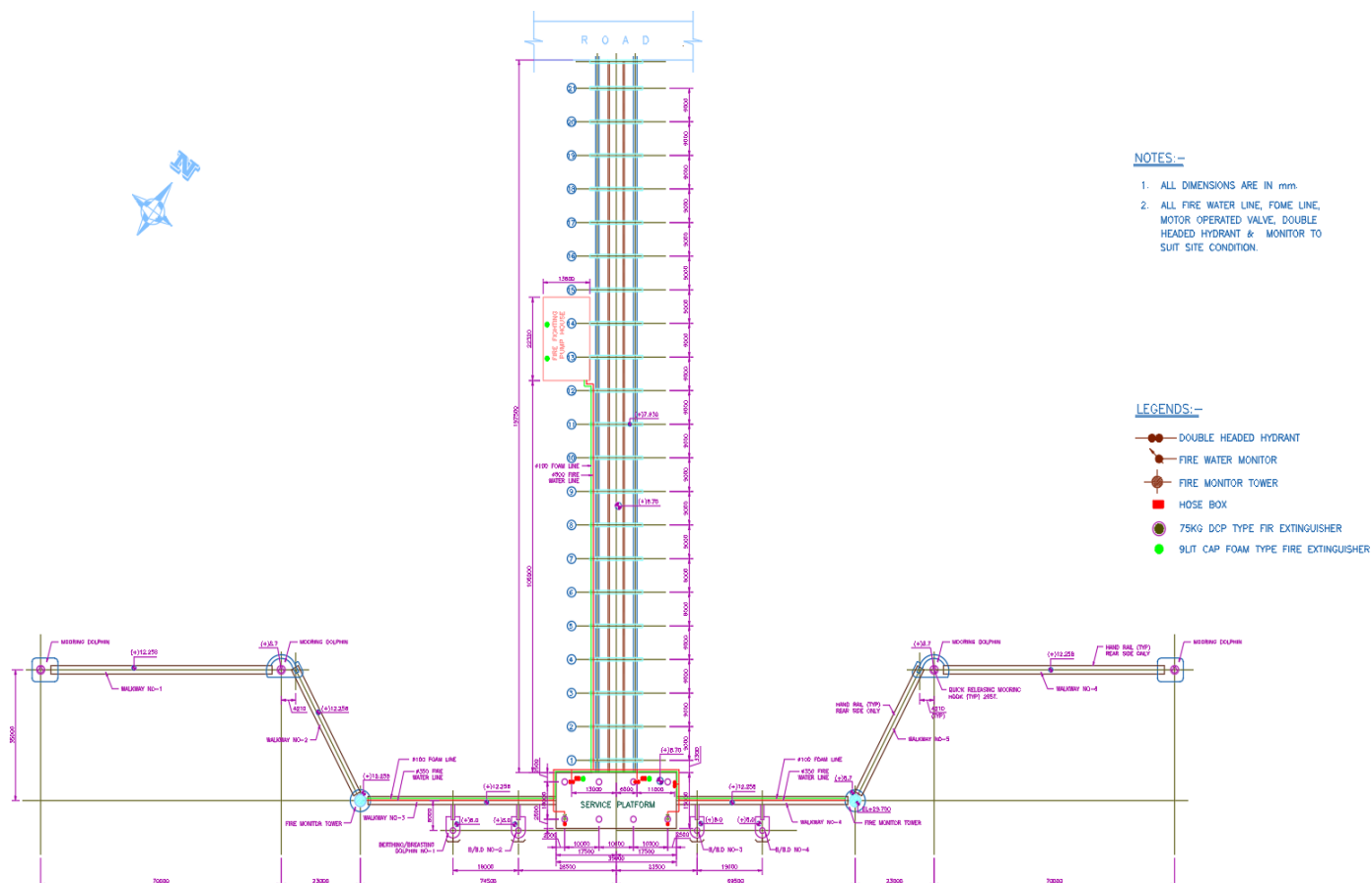


Figure 5.1 Layout of Existing HOJ – II

7.3.2 Condition of Existing Steel Walkways

The visual site inspection of the existing steel walkways shows the following. Additional damages can be present elsewhere.

- Based on the site inspection, it was found that all the walkways seem to be severely damaged.
- The platforms over all piles are also found to be corroded and severely damaged.
- The pile in which Walkway – II and Walkway – III was rested seems to be tilted and severely corroded & damaged.
- Walkway – II is found to be sagged due to severe corrosion.
- It is observed at site there are some temporary works being carried out at the starting of Walkway – III and Walkway IV connecting service platform. Photo attached.
- The platforms at berthing dolphin were also found to be corroded and damaged.

7.4 DETAIL SCOPE OF WORK:

- The dimensions shown in the below General Arrangement drawings are tentative.
- The overall proposed general arrangement drawing is shown in Fig. 5.2.
- It is proposed to dismantle all the existing steel walkways and platforms along with removal of electrical and firefighting lines/pipes as shown in Fig. 5.3.
- The layout of platforms to be revamped and new walkways to be installed as shown Fig. 5.4 & 5.5.
- The **platforms** shall be made of structural members of minimum thickness as per IS code. **Thickness shall be minimum 10 mm. MCU paint** shall be applied which shall have design life of minimum 15 years as mentioned in the BOQ specification and as approved by HDC.
- The existing QRMH and Bollard at Mooring and Berthing dolphins at the existing steel platforms shall be removed and placed over the new steel platforms with proper support.
- The **walkways** shall be made of tubular member in combination with structural members as required of minimum thickness as per IS code. Thickness of the main members of walkways shall be minimum **10 mm. MCU paint** shall be applied which shall have design life of minimum 15 years as mentioned in the BOQ specification and as approved by HDC as shown in the Fig. 5.6 & 5.7. The dimensions are tentative.
- The top level of the new platform shall be maintained at minimum (+) 8.50m.
- The level of the new walkways where the person walks shall be maintained minimum (+) 8.70m.
- GI grating shall be provided at the walking area.
- GI Hand railing shall be provided at required location.
- Marine fixtures like **ladder, mooring ring, eye hook for mooring ring, tide gauge** etc., shall be provided as per requirement.

7.4.1 Stage – I – Design Stage

- To submit design and methodology to make new steel platforms over Mooring Dolphin and Berthing Dolphin to hold the new steel walkways as mentioned below,

S. No	Description	Dimension (Tentative)	Placed Over	To Hold		Remarks
				One side	Other side	
1	New Steel Platform - I	7.5m × 6.5m	MD - I	Free	PWW - I	
2	New Steel Platform - II	10m × 6.5m	MD - II	PWW - I	Free	
3	New Steel Platform – III	6.3m × 10m	BD - I	PWW - II	PWW - III	
4	New Steel Platform - VI	6.3m × 10m	BD – II	PWW - III	PWW - VI	
5	New Steel Platform – V	6.3m × 10m	BD - III	PWW - V	PWW - VI	

6	New Steel Platform - VI	6.3m × 10m	BD - IV	PWW - VI	PWW - VII	
7	New Steel Platform - VII	10m × 6.5m	MD - III	PWW - VIII	PWW - IX	
8	New Steel Platform - VIII	7.5m × 6.5m	MD - IV	PWW - IX	Free	

Table 5.1: New Steel Platforms

Affixes:

1. PWW – Proposed Walkway
2. MD – Mooring Dolphin
3. BD – Berthing Dolphin

- To submit design and methodology to make new steel walkways as mentioned below,

S. No	Description	Length (Tentative)	From		To	
			Structure ID	Support	Structure ID	Support
1	Proposed Walkway - I	64.5 m	MD - I	Fixed	MD - II	Roller/Elastomeric
2	Proposed Walkway - II	18.5 m	TM - VI	Fixed	BD - I	Roller/Elastomeric
3	Proposed Walkway - III	15 m	BD - I	Roller/Elastomeric	BD - II	Fixed
4	Proposed Walkway - IV	7.5 m	BD - II	Roller/Elastomeric	SP	Fixed
5	Proposed Walkway - V	7.5 m	SP	Fixed	BD - III	Roller/Elastomeric
6	Proposed Walkway - VI	15 m	BD - III	Roller/Elastomeric	BD - VI	Fixed
7	Proposed Walkway - VII	15.5 m	BD - VI	Roller/Elastomeric	TM - IV	Fixed
8	Proposed Walkway - VIII	45.5 m	TM - IV	Fixed	MD - III	Roller/Elastomeric
9	Proposed Walkway - IX	64.5 m	MD - III	Roller/Elastomeric	MD - VI	Fixed

Table 5.2: New Steel Walkways

Affixes:

1. MD – Mooring Dolphin
 2. BD – Berthing Dolphin
 3. SP – Service Platform
 4. TM – Tower Monitor
- To submit the methodology to dismantle the 6 nos of old steel walkways.
 - To submit the methodology to dismantle the platforms in Mooring Dolphin and Berthing Dolphin.

7.4.2 Stage – II – Execution Stage

- To procure materials and fabricate 8 nos of new steel platform as mentioned in table 5.1 with specification in BOQ and as approved by HDC.
- To procure materials and fabricate 9 nos of new steel walkways as mentioned in table 5.2 with specification in BOQ and as approved by HDC.
- To dismantle the 6 nos of old steel walkways with proper methodology approved by HDC.
- To dismantle the platforms in Mooring Dolphin and Berthing Dolphin with the proper methodology as approved by HDC.
- To place newly fabricated steel platforms over Mooring Dolphin and Berthing Dolphin to hold the new walkways.
- To place newly fabricated steel walkways over the new platforms.

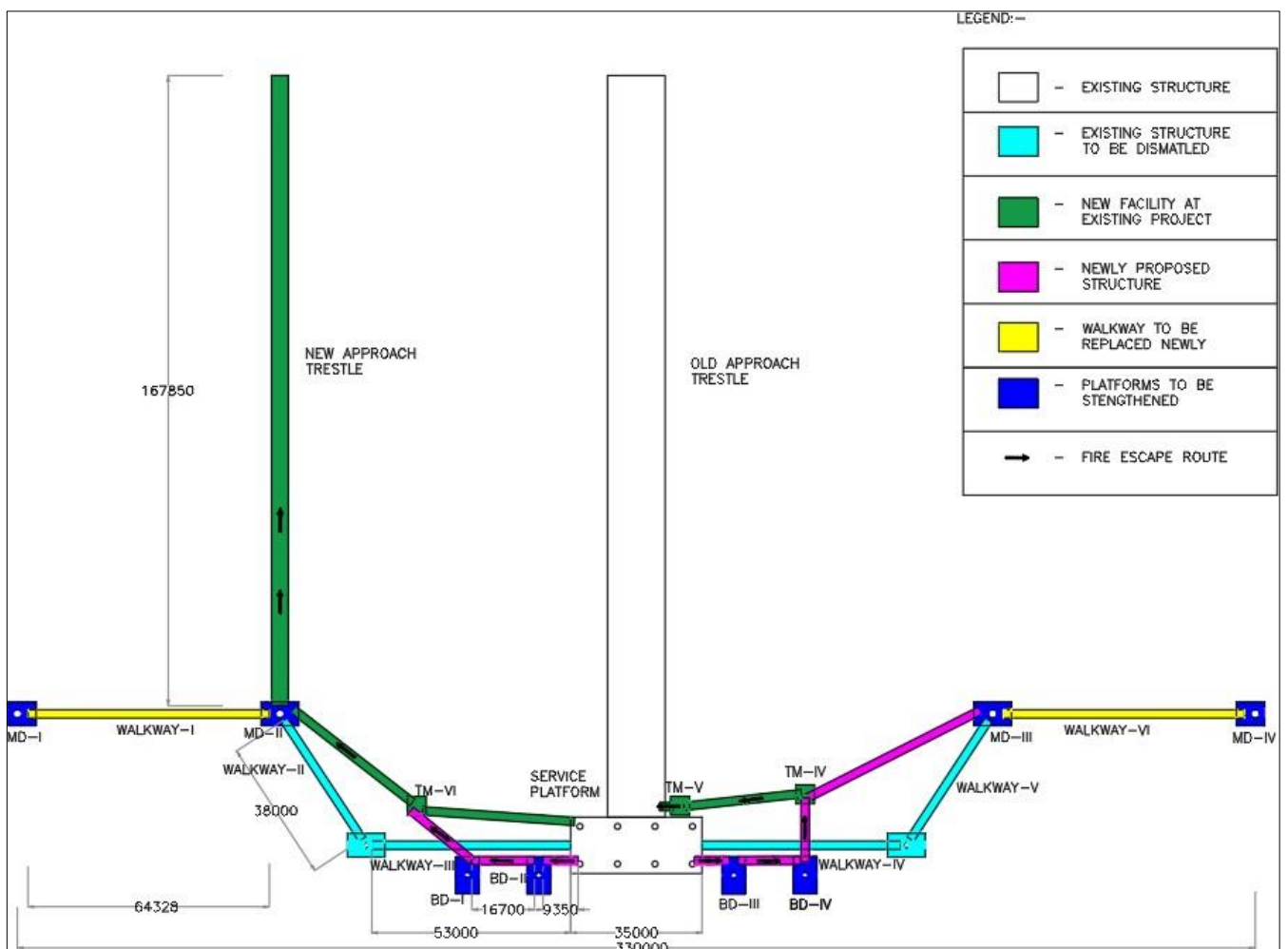


Figure 5.2 General arrangement Drawing (Dimensions are tentative)

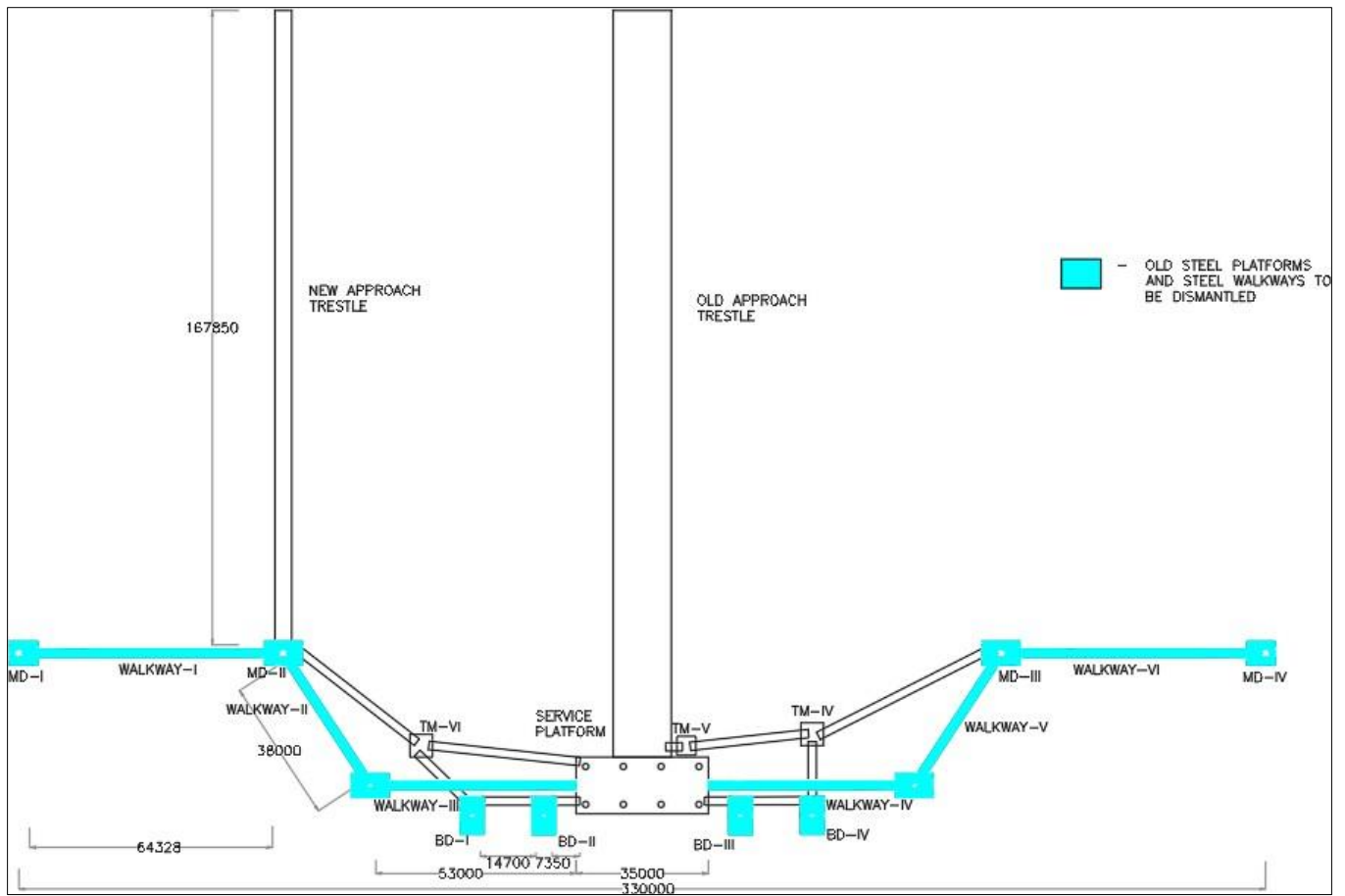


Figure 5.3 GA Showing walkways and platforms to be dismantled (Colored portion) (Dimensions are tentative)

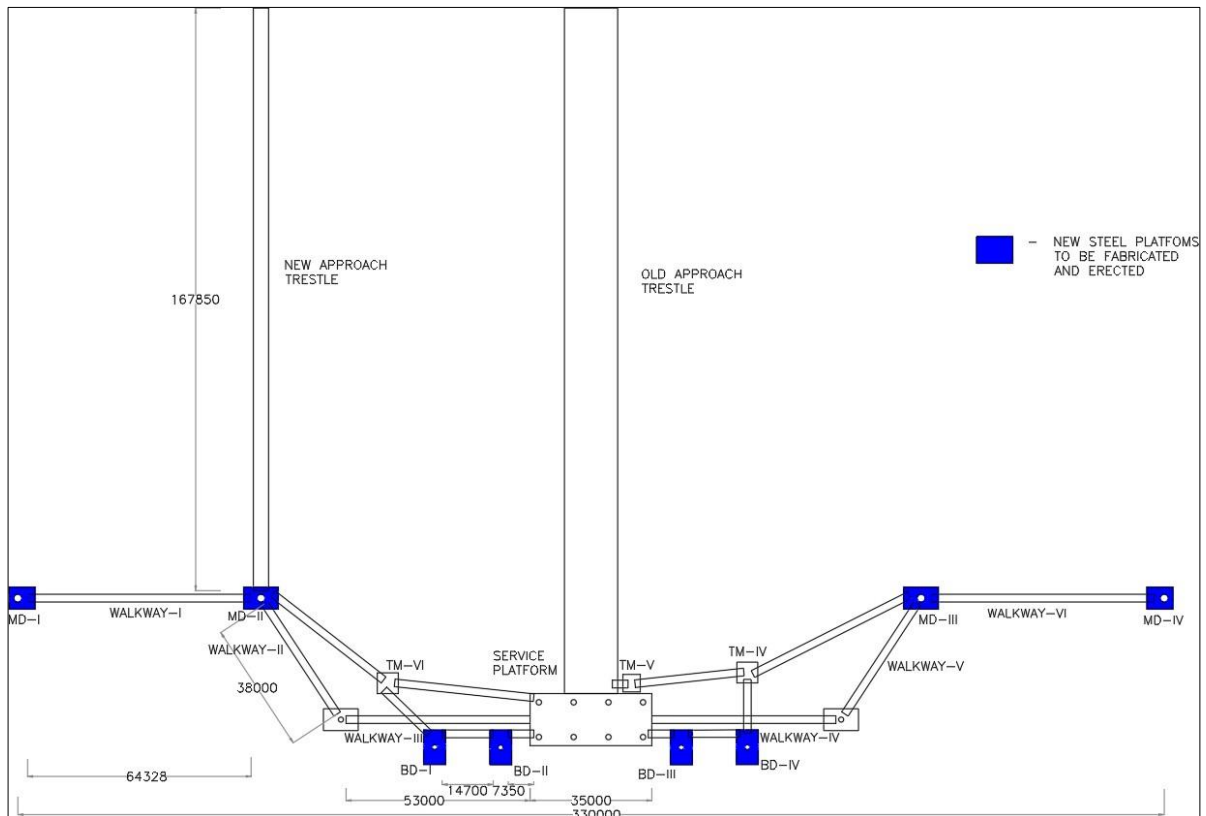


Figure 5.4 GA showing the platforms to be strengthened (Dimensions are tentative)

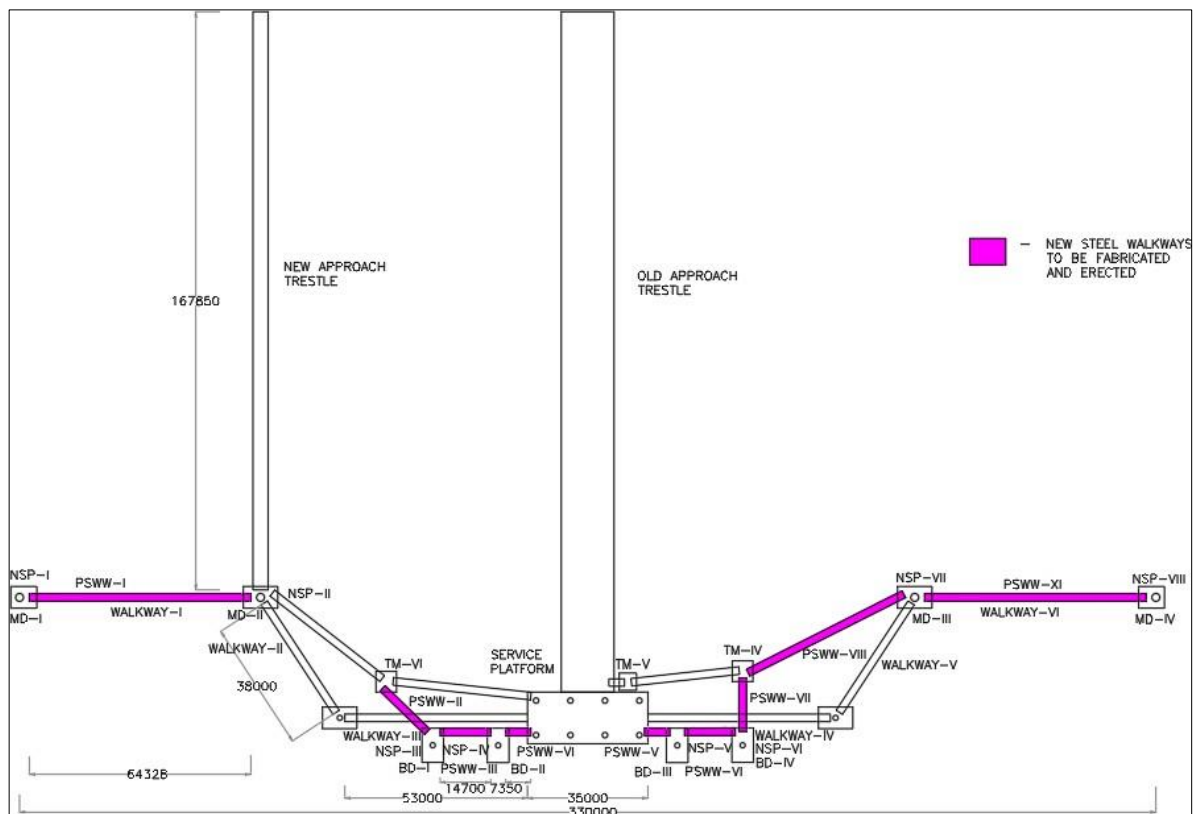


Figure 5.5 GA showing new walkways to be installed with structural steel (Dimensions are tentative)

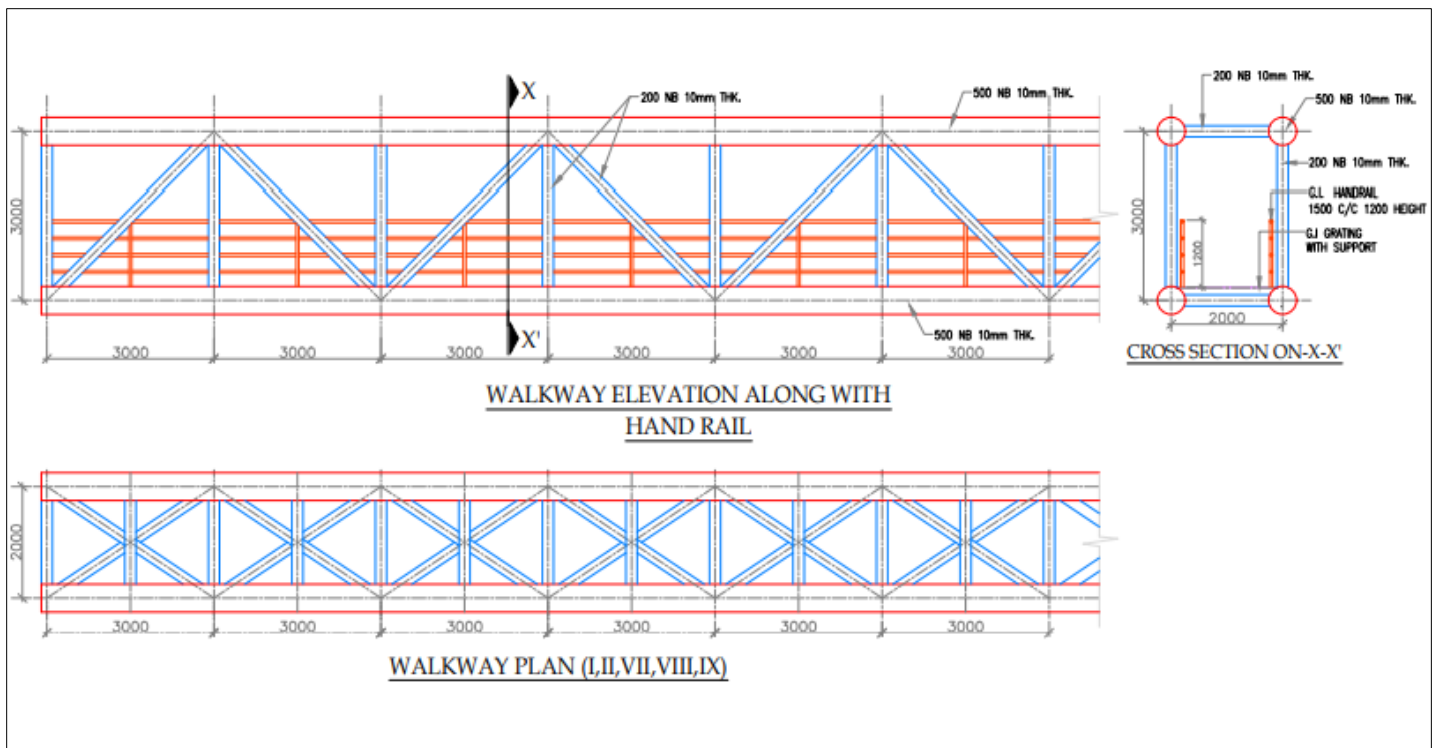


Figure 5.6 Tentative structural drawing for walkways to be installed
(Walkways – I,II,VII,VIII&IX) (Dimensions are tentative)

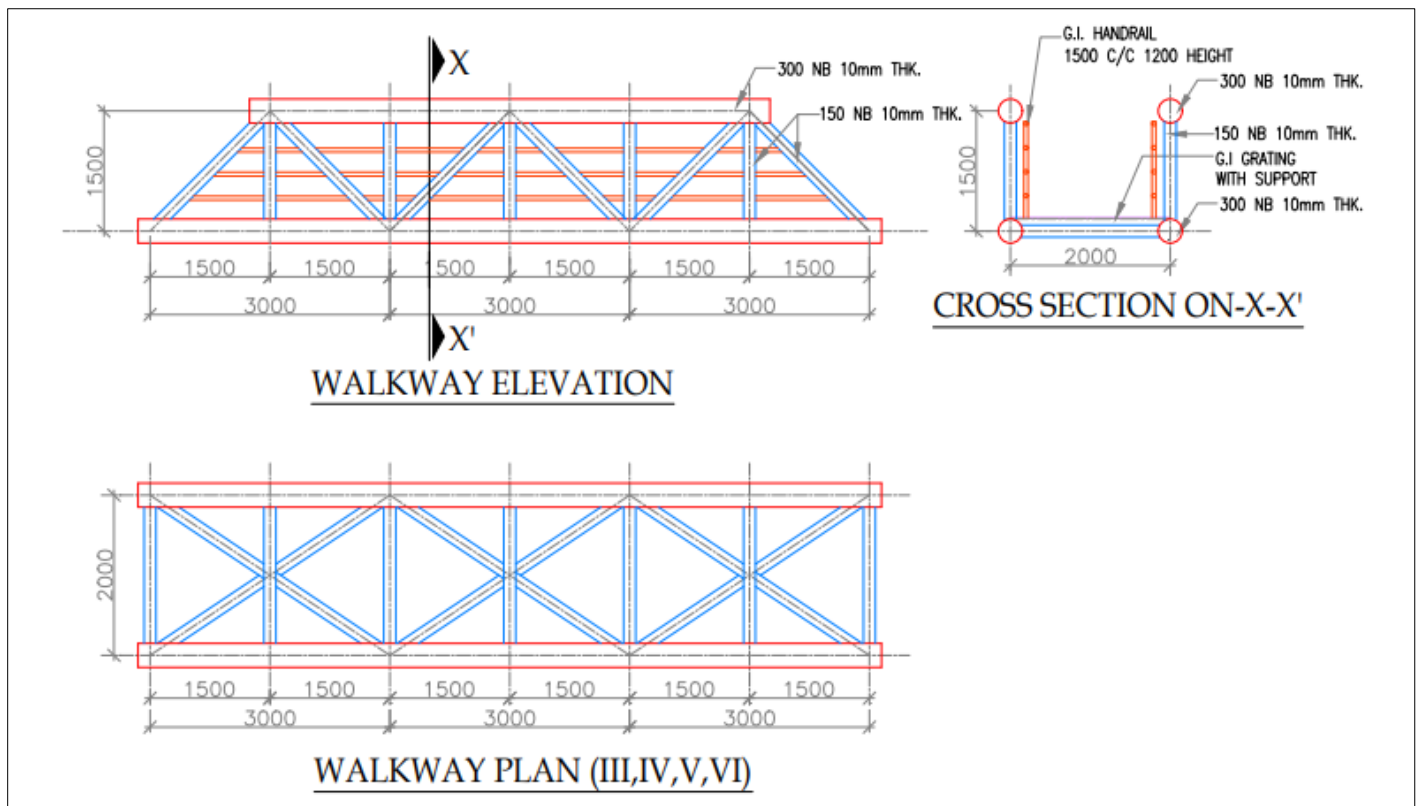


Figure 5.7 Tentative structural drawing for walkways to be installed
(Walkways – III,IV,V&VI) (Dimensions are tentative)

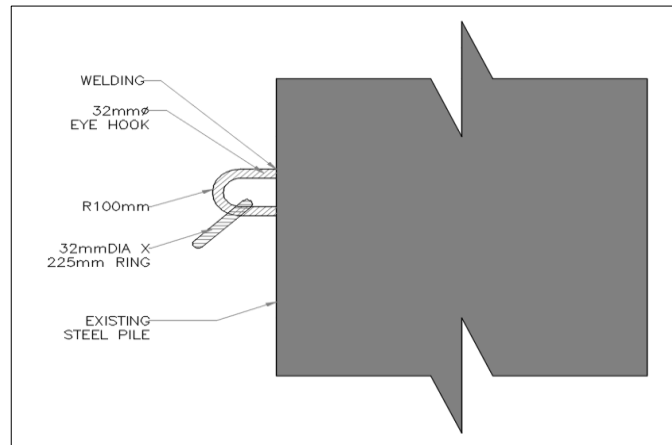


Figure 5.8 Tentative details of mooring ring to be fixed

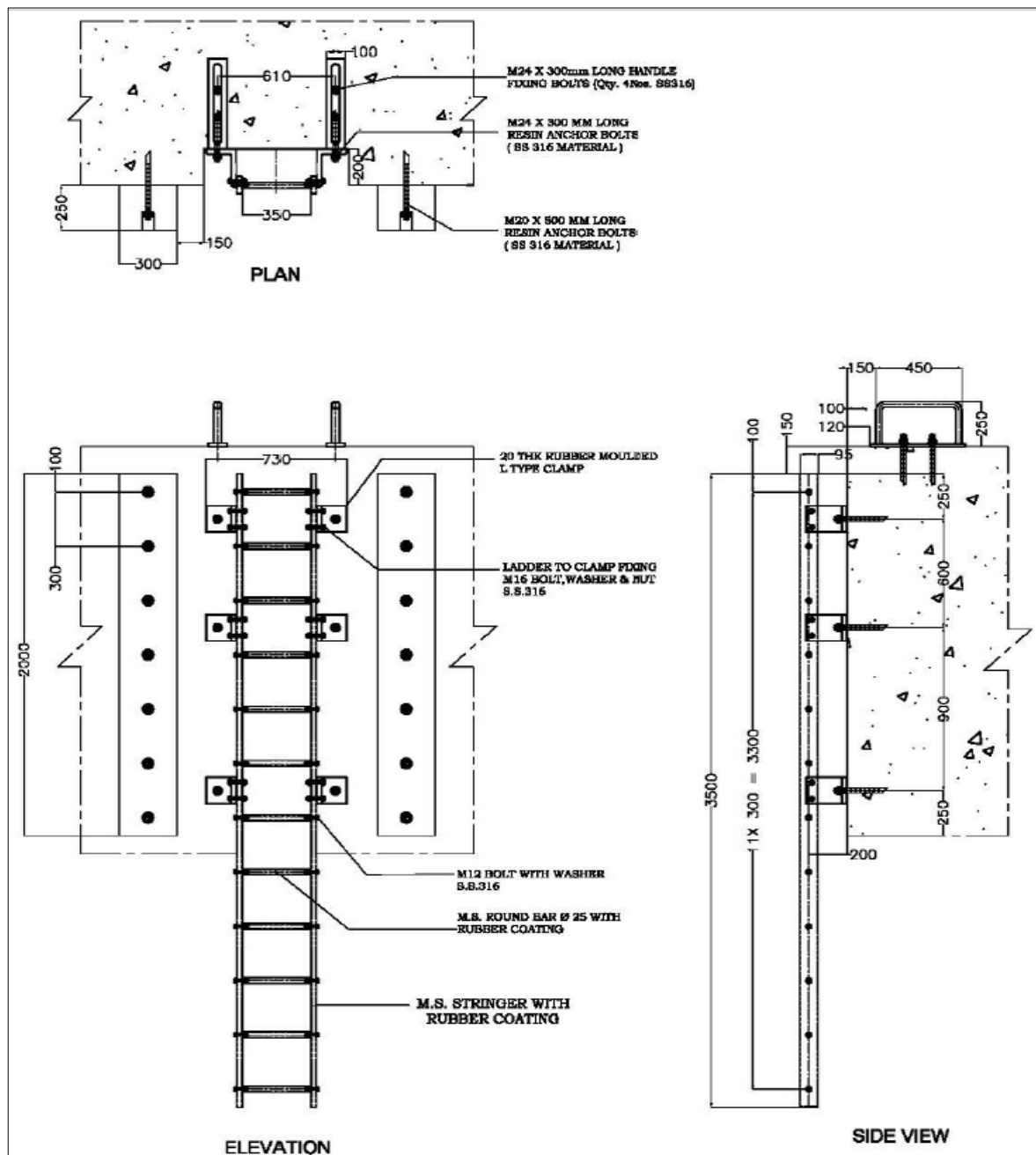


Figure 5.9 Tentative details of Rubber Moulded ladder to be fixed (Dimensions are tentative)

7.5 DESIGN LOADS

The following loads shall be considered to be acting on the structure.

7.5.1 Dead Loads

The dead loads shall be assessed considering following unit weight of materials.

- Self-weight of Steel : 78.5 kN/m³
- Bottom walkway plate load: 0.5kN/m²

7.5.2 Live load

The live load shall be considered as per IS 4651 (Part-III):1974 and IS 875 (part II). The live load considered for this component is tabulated below.

Structural Components	Uniform Vertical Live Load
Steel Walkways	5 KN/m ²
Steel platforms over Mooring Dolphins	Triple hook 80T QRMH
Steel platforms over Mooring Dolphins	80T cast iron bollard

The above-mentioned loads shall be considered during the design of the structures.

7.5.3 Seismic Force

Seismic force shall be calculated according to IS 1893-2002, considering 100 % dead load + 50 % live load acting on the structure. As per IS code, Kolkata- Haldia is under (Zone IV) and the basic horizontal seismic coefficient is calculated accordingly. The seismic force calculations are given below.

Horizontal seismic Coefficient

$$A_h = \frac{ZISa}{2Rg}$$

Where,

- Z = 0.24, Zone factor (Table 2 of IS1893-2002)
 I = 1.5, Importance factor (Table 6 of IS1893-2002)
 R = 5.0 Response reduction factor (Table 7 of IS1893-2002)
 $\frac{Sa}{g}$ = Average Response acceleration coefficient

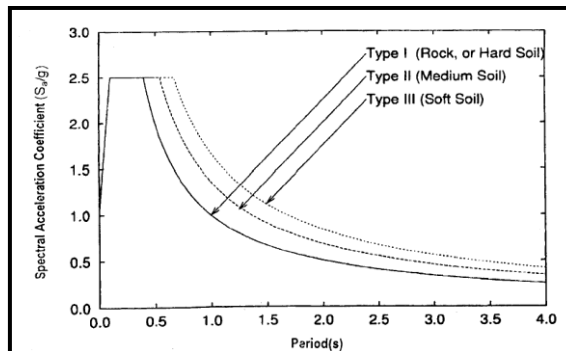


Figure 5.1 : Response spectra for rock and soil and sites for 5 percent damping

7.5.4 Current Force

The maximum current should as per IRC 6: 2014

Current pressure, P = 52 KV² kg/m²

Where, K = Constants for shape of piers = 0.66 as per IRC

V = Velocity of current at point where the pressure intensity is being calculated
 = 3 m/s

Pressure due to current will be applied to the submerged area of the structures.

7.5.5 Wind Force

Wind force is calculated according to IS 875 (PART-3) 2015.

Design wind speed	V_z	=	$V_b k_1 k_2 k_3$ (Cl 5.3)
	V_b	=	50m/s, Basics wind speed (Appendix A)
	k_1	=	Probability Factor
	k_2	=	Terrain, Height and Structure size factor
	k_3	=	Topography Factor
Design Wind Pressure	P_z	=	$0.6 V_z^2$ (Cl 5.4)

7.5.6 Load Combinations

Load combination factors for the analysis shall be considered as per IS 4651 (Part-IV) 2014. The load combinations for each structure varies with respect to the loads considered to be acting on the structure:

Limit state of serviceability

- $1.0 (DL) + 1.0(LL+CL)$
- $1.0 (DL) + 1.0(LL+CL+EL)$
- $1.0 (DL) + 0.5 (LL)$

Limit state of Collapsibility

- $1.5 (DL+LL) + 1.2(CL)$
- $1.5 (DL+LL)$
- $1.2 (DL+LL \pm EL)$
- $1.5(DL \pm EL)$
- $1.2 (DL+LL) + 1.0(CL) +$
- $1.2 (DL+LL) + 1.0(CL) + 1.2 (EL)$
- $1.2 (DL+LL) + 1.0(CL)$
- $0.9 (DL+LL) + 1.0(CL)$
- $0.9 (DL+LL) + 1.0(CL) \pm 1.5 (EL)$

where,

D.L – Dead Load

L.L – Live Load

E.L – Earthquake Load

C.L – Current Loads

7.6 GENERAL DESIGN CRITERIA

Contractor shall design the structure that shall be structurally and dynamically safe.

7.6.1 Design Life

- The design life of the structure shall be 50 years.

7.6.2 Indian specifications

The design shall be carried out in accordance with the applicable Indian codes and standards. Whenever, Indian standards are not available for a particular application, other reputed international codes or guidelines may be used. List of recommended codes and standards is given below:

IS 456-2000	:	PLAIN AND REINFORCED CONCRETE - CODE OF PRACTICE.
IS 2911-2010 (Part 1/ Sec 2)	:	DESIGN AND CONSTRUCTION OF PILE FOUNDATIONS — CODE OF PRACTICE
SP-16	:	DESIGN AIDS FOR REINFORCED CONCRETE TO IS 456-1978.
IS 4651 – 1974 Part I	:	PORTS AND HARBOURS - PLANNING AND DESIGN - CODE OF PRACTICE- SITE INVESTIGATION
IS 4651 – 1989 Part II	:	PORTS AND HARBOURS - PLANNING AND DESIGN - CODE OF PRACTICE- EARTH PRESSURE
IS 4651 – 1974 Part III	:	CODES OF PRACTICE FOR PLANNING AND DESIGN OF PORTS AND HARBOURS - LOADING.
IS 4651 – 2014 Part IV	:	PLANNING AND DESIGN OF PORTS AND HARBOURS - CODE OF PRACTICE - GENERAL DESIGN CONSIDERATIONS
IS 4651 – 1980 Part V	:	CODE OF PRACTICE FOR PLANNING AND DESIGN OF PORTS AND HARBOURS -LAYOUT & FUNCTIONAL REQUIREMENTS
IS 12269 – 2013	:	ORDINARY PORT LAND CEMENT – GRADE 53
IS 1786 – 2008	:	HIGH STRENGTH DEFORMED BARS
IS 875 - 1987(Part I)	:	CODE OF PRACTICE FOR DESIGN LOADS - UNIT WEIGHTS OF BUILDING MATERIALS AND STORED MATERIALS
IS 875 - 1987(Part II)	:	CODE OF PRACTICE FOR DESIGN LOADS-IMPOSED LOADS
IS 875 - 1987(Part III)	:	CODE OF PRACTICE FOR DESIGN LOADS-WIND LOADS
IRC 6 : 2000	:	CODE OF PRACTICE FOR ROAD BRIDGES - LOADS & STRESSES
IRC 21: 2000	:	CODE OF PRACTICE FOR ROAD BRIDGES - CEMENT CONCRETE (PLAIN & REINFORCED)
IS 1893 (Part 1) :2002	:	CRITERIA FOR EARTHQUAKE RESISTANT DESIGN OF STRUCTURES
IS 800: 2007	:	GENERAL CONSTRUCTION IN STEEL — CODE OF PRACTICE

7.7 TECHNICAL SPECIFICATIONS OF MATERIALS:

All Structural Steel Works including welding etc. would be checked/verified and approved by **TPIA/PMC** engaged by HDC.

7.7.1 Structural Steel (General Use)

- All structural steel shall be mild steel confirming to IS:2062. The finished materials shall be free from cracks, surface flows laminations, rough and imperfect edges and any other defects. Steel shall be free from rust, scaling and pitting.
- All structural steel tubes shall confirm to IS:1161.
- All fixtures permanently embedded in concrete structure shall comply with relevant IS codes for stainless steel of marine grade.
- Hexagon head bolts, screws and nuts of product grade-C (Part I) shall conform to IS:1363.
- All electrodes required for metal arc welding shall be covered electrodes and comply with the requirement of IS:816 and IS:814 unless otherwise specified.
- In addition to any mechanical tests required under previous clauses herein above, the Engineer may require the contractor to carry out independent tests of the material. The cost of such testing shall be borne by the contractor.

7.7.2 Cast Iron

- Cast iron shall generally comply with IS:210 'Gray Iron Castings'. Trench covers and gratings, if specified shall comply with the requirement of IS:1726 and shall be of heavy duty type unless otherwise indicated.

7.7.3 Cast Steel

- All steel castings shall be in accordance with IS: 1030-Steel Castings for General Engineering Purposes. The steel unless otherwise specified conform to Grade-I of this Code and shall satisfy all tests as specified in IS: 1030.

7.7.4 Stainless Steel

- All stainless steel materials shall conform to AISI:316 grade quality and fasteners shall be manufactured to IS:1367 (Part 14).

7.7.5 Fasteners

- Bolts and nuts of all types shall conform to IS: 1367.
- Black bolts and nuts shall conform to IS:1363.
- High strength Structural Bolts and Nuts shall conform to IS:3757 and IS: 1367 (Part-III) of Property Class 8.8 (Low Carbon Steel with additives).
- Plain washers shall conform to IS: 2016 and taper washers for I beams shall conform to IS: 5374.
- Countersunk head screws shall be in accordance with IS: 1365 and shall conform to product Grade-A as specified in the revision IS: 1367- Part II (Second Revision).

7.7.6 Electrodes

- Electrodes for metal arc welding shall conform to the requirements of IS: 816 and IS:814 and shall be of best heavy coated type and of approved make.

7.8. TECHNICAL SPECIFICATION OF WELDING & NDT:

7.8.1 WELDING PROCEDURES & DOCUMENTATION:

- Weld procedures shall be qualified as per ASME B31.3 (except 90-10 Cu-Ni) or ASME Code Section IX (for Cu-Ni piping). NDT shall be performed as per ASME B31.3/ ASME BPV Code Section-V.
- Mechanical testing of WPQT coupons for CS piping shall confirm to the requirements of ASME Sec.IX / ANSI B31.3. In addition to the above requirement, hardness testing shall be performed on each test coupon. Maximum hardness value shall be 325 HV10 for normal service piping. For piping in Sour Service, a maximum permitted hardness of 22 HRC (248 HV10) shall apply. Charpy Impact Testing of Carbon Steel Pipe work shall be performed in accordance with ASME B31.3 Table 323.2.2.

- The Contractor shall not commence welding until appropriately qualified welding procedures have been accepted by the Company representative.
- For each welding process, the welding procedures shall specify all equipment settings. The Contractor's Welding Supervisor shall check daily and record machine settings for each weld procedure used during welding activities. This record shall be available for audit by the Company representative.
- A welding procedures record shall be prepared by the Contractor prior to start of welding and shall be available for review by the Company representative. A welding summary recording progress of all welding shall be prepared by the Contractor daily.

7.8.2 WELDERS' QUALIFICATION:

- Welders and welding procedures shall be qualified as ASME Boiler and Pressure Vessel Code, Section IX.
- Qualification on production welds is not permitted.
- A welder shall not be permitted to weld on pipe work or attachments to pipe work unless they are qualified to the procedure in use and the documentary evidence has been sighted by the Company representative.
- Tack welds shall be made by a qualified welder using the same type of electrode as is used for the root pass.
- The Company representative shall be advised in advance that the Contractor's conducting welder qualification to enable auditing of test facilities. Qualification test welds shall be made on test coupons prepared in accordance with the relevant standard. A test certified amp/volt tong tester shall be available at the Contractor's establishment at all times.
- The Contractor shall be responsible for all costs, including labor and laboratory testing, associated with welder qualification tests and retests.
- The Company may request a retest of any welder at any time and from time to time during the work. If a welder fails to qualify, then at the discretion of the company representative, all non-installed welds completed by that welder shall be examined by additional radiographic tests, over and above that which would normally be required or specified in the drawings for that pipe work and the same shall be charged to the Contractor's account.
- Welds not identified and recorded, or welded by unqualified welders, shall automatically be rejected. It will be the Contractor's responsibility to prove that the welds conform to the applicable Specification. This may require 100% radiography.

7.8.3 INSPECTION, EXAMINATION & TESTING

- Destructive tests required by this Specification shall be performed by an accepted third-party laboratory
- Radiographic Examination:
- Radiography will be performed for every pipe thickness and material grouping and for each welding process and procedure, progressively throughout entire job. At least one of each type and position of weld made by each welder will be examined. A record shall be kept by the Contractor of the quality and extent of each welder's work.
- Because of the limited sensitivity of gamma radiography when used with heavy wall pipe, all welds in material over 19 mm thick shall, in addition to radiographic requirements, be 100% ultrasonically tested. If a single wall single image radiography technique is used the material thickness limit of 19 mm can be extended to 30mm.
- Welds, which cannot be radiographed because of their location, will be examined by ultrasonic, liquid penetrant or magnetic particle method as applicable. The extent of inspection shall be the same as for radiography.
- Radiography is not required for the welds on slip-on flanges or socket welds or seal welds.
- Fluorescent intensifying screens such as calcium tungsten shall not be used.

- For each weld found to be defective two additional welds made by the same welder who produced the defective weld will be subjected to radiographic examination. These additional examinations will be made immediately after the defective welds is found and are in addition to the minimum examination requirements for the line classes specified in the drawings or specifications.
- Weld repairs shall be re-examined by the same method used to detect the original defect.

7.8.4 QUALITY CONTROL, MATERIALS AND STORAGE

Quality Control Quality Control Procedures for welding operations shall include the following –

- Storage of Welding Electrodes: Electrodes shall be stored and handled in accordance with the recommendations of the electrode manufacturer, AWS D1.1 and the following. Electrodes that have been removed from their sealed containers, and exposed to atmospheric conditions, shall be returned to heating ovens for drying in accordance with the electrode manufacturer recommendations, and AWS D1.1 requirements. A positive means of identification of the electrodes held in the drying ovens, the drying cycle, temperature and time held, shall be established.
- The flux conditioning procedure shall detail methods of assuring dryness before use, recovery of flux after use, screening of foreign materials and flux, and the storage of flux to prevent contamination.

Welder Identification

- a) Each welder shall be issued with an identification card or badge after qualifying the welding test, which will be carried on his person and be visible at all times during working hours. The COMPANY shall have the right to inspect welder identification at any time to insure that all welders are qualified.
- b) The CONTRACTOR shall assign identifying letters or numbers to each welder employed, shall require each welder to stamp all welds he makes with his identification mark. The stamping of welds shall be done with a low stress stamp and shall be made adjacent to the weld. Alternatively, a resilient paint stamp may be used.

Materials and Storage

Welding materials (electrodes, fluxes, shielding) and storage of welding supplies shall meet the provisions of AWS D1.1, and the following provisions:

- Coated welding electrodes shall be of the low hydrogen type.
- SAW flux shall be supplied in clearly identified moisture-proof containers.
- SAW flux, not fused in welding, may be recycled, but shall be free from fused flux, mill scale, dirt and other foreign matter.
- All welding wires shall be clearly identified by manufacturer, grade and batch number.
- Manufacturer's batch test certificates.

Storage of Welding Supplies

- All welding materials shall be stored in a clean dry area until used, as described in AWS D1.1.
- Wet or damaged electrodes, contaminated flux and rusted filler wire shall be rejected and removed from the fabrication site.
- Welding wire and SAW flux shall be stored in a dry location at a minimum temperature of 21°C.

Protection from Weather

The welder and weld area shall be provided with protection during periods of inclement weather and/or excessive wind conditions. The procedures shall include means of protecting electrodes, wires, fluxes, etc. Suitable windshields must be provided when the wind velocity exceeds 32 km/h or 8 km/h in case of GMAW and gas shields FCAW.

APPENDIX-A HARDNESS TESTING

- Hardness testing shall be performed along the transverse shown in Fig. 1.
- The required hardness survey shall be tested on a suitable macro section machined from the same welded test assembly made to determine other weld joint properties. However, an additional bead-on-plate weld pass shall be made on the original weld test assembly for the purpose of determining maximum hardness at the toe of the weld. This pass shall be made with the lowest permissible heat input and lowest interpass temperature applicable to the cap passes of that procedure.
- The hardness surveys shall be prepared and tested in accordance with ASTM E 92, Standard Test Method for Vickers Hardness (Hv) of Metallic Materials, using an applied load of 10 kgf.
- Indentations shall be made along all of the transverses shown for each type of weld tested, approximately 1 mm below the surface of the base metal. In the weld metal, a minimum of three equally spaced indentations along the traverse shall be made. In the heat-affected zone, the indentations shall start as close to the fusion line as practicable. A minimum of three readings shall be taken at each weld toe. One additional reading shall be taken at least 20 mm from the fusion line at each traverse to represent unaffected base metal.
- The maximum hardness value obtained from any indentation shall not exceed 350 Hv. If any single value exceeds 350 Hv and a retest adjacent to the failed test also produces one or more values exceeding 350 Hv, the procedure qualification test has failed these requirements and a new test weld shall be made with some planned modifications of essential variables or techniques (change heat input, increase preheat, later bead sequence, etc.) and retest.

SURFACE PREPARATION

To achieve the maximum durability, one or more of following methods of surface preparation shall be followed, depending on condition of steel surface and as instructed by the Engineer-In-Charge.

- Manual or hand tool cleaning.
- Mechanical or power tool cleaning.

Blast cleaning to Swedish Standard SIS 055900 / ISO – 8501 - 1. All Steel steel structures shall be blast cleaned to SA 2½ of Swedish Standard. Mill scale, rust and foreign matter shall be removed by suitable means to ensure that a clean and dry surface is obtained. Blast cleaning shall be done wherever specified or recommended by the paint manufacturer. The minimum acceptable standard in case of hand tool cleaning shall be St.2 and power tool cleaning shall be St.3 as per Swedish Standard SIS55900- 1967 and in case of blast cleaning it shall be SA 2½ as per Swedish Standard SIS 055900 / ISO-8501-1. Irrespective of the method of surface preparation, the first coat of primer must be applied on dry surface immediately and in any case within four hours of cleaning of surface. However, during unfavourable weather conditions, blasting and painting shall be avoided as far as practicable.

PAINTS

MCU Paint as approved by HDC, has to be applied to all the steel structures as per manufacturers specification.

Colour code: Colour code scheme to be approved by HDC.

INSPECTION AND TESTING FOR PAINTING WORKS

All painting materials including primers and thinners brought to site by Contractor shall be accompanied by manufacturer's test certificates.

The painting work shall be subject to inspection by the Engineer-in-Charge at all times. In particular, following stage wise inspection will be performed.

- a) Surface Preparation
- b) Primer Application
- c) Each Coat of Paint

Contractor shall provide facilities for the above inspection / tests by providing manpower and relevant instruments such as standard thickness measurement instrument with appropriate range(s) for measuring dry film thickness of each coat, surface profile gauge for checking of surface profile in case of blast cleaning, holiday and pinhole detectors and potentiometer whenever required for checking in case of immersion conditions.

Final inspection shall include measurement of paint dry film thickness, check of finish and workmanship. The thickness should be measured at as many points / locations as decided by the Engineer-in-Charge.

Contractor shall rectify any defect noticed during the various stages of inspection to the entire satisfaction of the Engineer-In-Charge before proceeding further.

Irrespective of the inspection, repair and approval at intermediate stages of work, Contractor shall be responsible for making good any defects found during final inspection.

Dry film thickness (DFT) shall be checked and recorded after application of each coat and extra coat of paint shall be applied to make-up the DFT specified without any extra cost to Company.

Surface preparation & application should start only after availability of paint / coating manufacturer's inspectors and supervisors at site, wherever asked by Company.

7.9 STORAGE OF MATERIALS:

All materials shall be stored in accordance with the provisions of given hereunder and other relevant IS Specifications. All efforts must be made to store the materials in proper places so as to prevent their deterioration or contamination by foreign matter and to ensure their satisfactory quality and fitness for the work. The platform where aggregates are stockpiled shall be appropriately made. The area shall have slope and drain to drain off rain water. The storage space must also permit easy inspection, removal and storage of the materials. Aggregates of different sizes shall be stored in partitioned stack-yards. All such materials even though stored in approved godowns must be subjected to acceptance test as per these specifications immediately prior to their use.

7.8.1. General:-All materials may be stored at proper places so as to prevent their deterioration or intrusion by foreign matter and to ensure their satisfactory quality and fitness for the work. The storage space must also permit easy inspection, removal and re-storage of the materials. All such materials even though stored in approved godowns/places, must be subjected to acceptance test prior to their immediate use.

7.10 QUALITY CONTROL FOR WORKS:-

(i) The contractor shall carry out quality control tests on the materials and work to the frequency as per **QAP (Quality Assurance Plan)** to be submitted by the contractor subsequently approved by HDC. In the absence of clear indication about method and frequency of tests for any item, the instructions of Engineer shall be followed.

(ii) The contractor shall provide necessary co-operation and assistance in obtaining the samples for tests and carrying out the field tests as required by the Engineer from time to time. This may include provision of labour, attendants, assistance in packing and dispatching and any other assistance considered.

(iii) The contractor shall carry out modifications in the procedure of work, if found necessary, as directed by the Engineer during inspection. Works falling short of quality shall be rectified/ redone by the Contractor at his own cost, and defective work shall also be removed from the site of works by the Contractor at his own cost.

(iv) Cost of all equipment, tools, materials, labours & incidentals to perform tests and other operations of quality control according to the specification requirements shall be deemed to be incidental to the work and no extra payment shall be made for the same.

(v) Where essential tests are to be carried out at the manufacturer's plants or at laboratories other than the site laboratory, the cost of samples, sampling, testing and furnishing of test certificates shall be borne by the Contractor. He shall also furnish the test certificate to the Engineer.

(vii) DEFECTIVE MATERIALS: - All materials which the Engineer /his representative has determined as not conforming to the requirements of the contract shall be rejected whether in place or not they shall be removed immediately from the site as directed. Materials, which have been subsequently corrected, shall not be used in the work unless approval is accorded in writing by the Engineer. Upon failure of the contractor to comply with any order of the Engineer/his representative, given under this clause, the Engineer/ his representative shall have authority to cause the removal of rejected material and to deduct the removal cost thereof from any payments due to the contractor.

(viii) Works performed shall conform to the lines, grades, cross sections and dimensions shown on the drawings or as directed by the Engineer, subject to the permitted tolerances described here in after.

8. PREAMBLE TO THE BILL OF QUANTITIES

E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

8.1 The Bill of Quantities must be read with the General Conditions of Contract, the Special Conditions of Contract and the Particular Specifications of Work and the Bidder is deemed to have examined the above documents and to have thoroughly familiarise himself with the total scope of work and its mode of execution.

8.2 The quantities given in the Bill of Quantities are approximate only and are given to provide a common basis for tendering. Payment will be made according to the Payment Schedule attached as **ANNEX-Y**.

8.3 This being an **EPC tender**, the Bidder shall quote according to the overall project cost.

The Tender Price thus established would be taken for comparative evaluation of tenders.

9. TENTATIVE BILL OF QUANTITIES

E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

S.NO	DESCRIPTION OF WORK	Tentative QTY	Unit
1	Supplying, Fabricating, welding or bolting Walk way bridge connecting all as per the approved drawing by Tubular sections , trusses and framed work including cost of nuts, bolts, washers, cutting, hoisting, fixing in position along with G.I. grating walkway and with suitable hand rail as approved and applying MCU paint as per the Technical specification of approved brand by HDC along with grit blasting thoroughly before applying paint including transportation to site by floating crane, pontoon, barges etc., and as directed by the Engineer-in-Charge complete all labour and materials.	210.00	MT
2	Supplying, Fabricating, welding or reverting or bolting steel platform over berthing and mooring dolphins including one number tide gauge as approved by HDC, all as per the approved drawing by steel built up sections, trusses and framed work including cost of nuts, bolts, washers, cutting, drilling holes, hoisting, fixing in position and applying MCU paint as per the Technical specification of approved brand by HDC along with grit blasting thoroughly before applying paint including fixing of Hand railing at required location as directed, transportation to site by floating crane, pontoon, barges etc., and as directed by the Engineer-in-Charge complete. The rate is inclusive of removing of existing QRMH and Bollard from old platforms of mooring and berthing dolphins and again placing it in new platforms. All labour and materials.	80.00	MT
3	Design, Supply and fix in position Mooring ring 32mm dia 225 mm outer diameter stainless steel along with necessary fixing arrangements and as directed by the Engineer-in-charge complete all labour and materials as per drawing.	32.00	Nos
4	Design, Supply and fix in position moulded rubber ladder (rubber grade conforming to ASTM-D-2008-98C specification) of required length, 0.35m width rungs @0.30m C/C with vertical member and rungs of composite section made of MS channel and rubber as per sketch enclosed with suitable stainless steel (AISI-316) fixtures such as cleats, bolts, nuts & washers etc., as required and as directed by the Engineer-in-charge complete all labour and materials as per drawing.	8	Nos
5	Dismantling of existing old steel walkways including hand railings and stairs including existing Electrical fittings, of a total length of approx. 310m and having a weight on average of approx. 1000 Kg/m made of tubular section along with disconnection and dismantling of all electrical and firefighting pipes/lines including proper storage at site as directed by Engineer-in-charge. All material and labour inclusive. The dismantled steel material shall be deposited at HDC store after weighment. Proper care should be taken to avoid any spillage of dismantled steel materials in river during the dismantling work.	320.00	MT
6	Dismantling of existing old steel platforms supporting the walkways on a steel pile each of average of approx. 50 Sq.m made of structural steel (10 nos) along with disconnection and dismantling of all electrical and firefighting pipes/lines including proper storage at site as directed by Engineer-in-charge. All material and labour inclusive. The dismantled steel material shall be deposited at HDC store after weighment. Proper care should be taken to avoid any spillage of dismantled steel materials in river during the dismantling work.	10.00	Nos

NB: The Quantities are indicative only and not exhaustive.

PRICE SCHEDULE

[To be filled up and uploaded, duly signed & stamped]

E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."

SI No	DESCRIPTION	QTY.	Quoted Amount in Rs. (NOT TO BE QUOTED)
1.	"Design, Fabricate, Erect & Placing in Position New Steel Walkways Including Dismantling of All Existing Steel Walkways and other ancillary works at HOJ – II [17(O)], HDC, Haldia on EPC Mode." as per scope of work detailed in the tender document.	1 Unit	X

NOTE: The Tenderer shall furnish the quoted amount online through RailTel Portal (<https://kopt.enivida.in>).

DATE:

TENDERER SEAL

PAYMENT SCHEDULE

E-TENDER FOR “DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE.”		
SL No.	List of Work	% of work for each subdivision
01	Submission and Approval of design and methodology by HDC of all new steel platforms to be placed.	2%
02	Submission and Approval of design and methodology by HDC of all new steel walkway.	2%
03	Fabrication of steel walkways (Walkway - I) including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
04	Fabrication of steel walkways (Walkway - II & III) including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
05	Fabrication of steel walkways (Walkway - IV & V) including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
06	Fabrication of steel walkways (Walkway - VI & VII) including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
07	Fabrication of steel walkway (Walkway - VIII) including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
08	Fabrication of steel walkway (Walkway - IX) including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
09	Fabrication of 4 nos of steel platforms for Mooring dolphins including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
10	Fabrication of 4 nos of steel platforms for Berthing dolphins including Handrails & necessary Support Structure inside Dock area along with proper painting as directed.	5%
11	Dismantling of 6 nos of old steel walkways.	5%
12	Dismantling of 6 nos of old steel platforms.	5%
13	Erection & Placing in Position of 4 nos of steel platforms including necessary Support Structure/fixing arrangement for Berthing dolphins including necessary/patch Painting as directed.	5%
14	Erection & Placing in Position of 4 nos of steel platforms including necessary Support Structure/fixing arrangement for Mooring dolphins including necessary/patch Painting as directed.	5%
15	Erection & Placing in Position of 2 nos of steel walkways (Walkway - I & II) including necessary fixing arrangement as directed.	9%
16	Erection & Placing in Position of 5 nos of steel walkways (Walkway - III to VII) including necessary fixing arrangement as directed.	9%
17	Erection & Placing in Position of 2 nos of steel walkway (Walkway - VIII to IX) including necessary fixing arrangement as directed.	9%
18	Supply and fixing of marine fixtures like eye hook, mooring ring, steel reinforced rubber ladder and tidal gauge including Painting as directed.	3%
19	Painting of final coat of all steel structures erected including other necessary works as required as per site condition.	1%
20	Handing over of Site all complete including deposit of all the dismantled materials to HDC store after weighment.	5%
	Total	100%

DECLARATION BY THE BIDDER

(To be submitted on Company's Letter Head along with Techno Commercial Bid duly stamped and signed)

Sr. Dy. Manager (I&CF),
Haldia Dock Complex.
SMP, Kolkata

SUB:- **E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."**

Dear Sir,

We do hereby confirm that our offer is strictly in accordance with the terms and conditions of the Tender Document without any deviation / condition.

We further confirm that Part-II of the bid does not contain any condition / deviation.

Signature of the Bidder with Office Seal.

Date:

Place:

DECLARATION BY THE BIDDER

(To be submitted on Company's Letter Head along with Techno Commercial Bid duly stamped and signed)

Sr. Dy. Manager (I&CF),
Haldia Dock Complex.
SMP, Kolkata

SUB:- **"DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."**

Dear Sir,

a) The bidding firm has not been debarred / delisted by any Govt. / Quasi Govt. / Public sector undertaking in India.

b) The proprietor / partner(s)/ authorised signatory of the bidding firm is/are not associated with other firm bidding for the same work.

Signature of the Bidder with Office Seal.

Date:

Place:

"BID SECURITY DECLARATION" BY THE BIDDER

(To be submitted on Company's Letter Head along with Techno Commercial Bid duly stamped and signed)

Sr. Dy. Manager (I&CF),
Haldia Dock Complex.
SMP, Kolkata

SUB:- **E-TENDER FOR "DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE."**

Dear Sir,

I/We do hereby declared that I/We am/are accepting all the terms and conditions of tender and if I/We withdraw or modify our bid during period of validity etc., I/We will be suspended for three years.

Signature of the Bidder with Office Seal.

Date:

Place:

CONCURRENT COMMITMENT(S) OF THE BIDDER

Sl. No.	Full particulars of works to be executed concurrently by the bidder. (i) Name of work. (ii) Client. (iii) W.O. No. & Date.	Sanctioned Tender Value. (in Rs.)	Completion time as stated in tender.	Name and address to whom reference can be made.
1	(i)			
	(ii)			
	(iii)			
2	(i)			
	(ii)			
	(iii)			
3	(i)			
	(ii)			
	(iii)			
4	(i)			
	(ii)			
	(iii)			

BIDDER'S PROFILE

(To be submitted with Techno Commercial Bid)

The Bidders are also requested to furnish the following particulars:-

A) In case of Limited Company -

- 1) Name of Company :
- 2) Address of its present registered office. :
- 3) Date of its incorporation :
- 4) Full name and address of each of its Directors – :
any special particulars as to Directors if desire
to be stated.
- 5) Name, address and other necessary particulars :
of Managing Agents, if any appointed by the
Company.
- 6) Copies of Memorandum, Articles of Association :
(with the latest amendments, if any).
- 7) Copies of audited balance sheets of the :
Company for the last two years.

B) In case of a firm -

- 1) Name and address of the firm. :
- 2) When business started :
- 3) If registered a certified copy of certificate of :
registration.
- 4) A certified copy of the Deed of Partnership :
- 5) Full name and address of each of the partners :
and the interest of each partner in the
partnership – any special particulars as to
partners if desired to be stated.
- 6) Whether the firm pays income tax over Rs.10, :
000/- per year

C) In case of an Individual:

- 1) Full name and address of the Bidder any special :
particulars of the Bidder if desired to be stated.
- 2) Name of the father of the Bidder. :
- 3) Whether the Bidder carries on business in his :
own name or any other name.
- 4) When business was started and by whom. :
- 5) Whether any other person is interested in the :
business directly or indirectly, if so, name and
address etc. of such persons and the nature of
such interest.
- 6) Whether the Bidder pays Income Tax over Rs.10, :
000/- per year.

Dated:

(Full signature of Bidder)

ABSTRACT FORM OF TENDER (UNPRICED)

(To be submitted with Techno Commercial Bid)

I / We hereby tender for the under mentioned work for its execution within the specified time and in accordance, in all respects with the specifications, design, drawing and instructions in writing and with such materials as are provided for, by and in all other respects in accordance with such conditions so far as practicable.

(a) Name of Work. : **DESIGN, FABRICATE, ERECT & PLACING IN POSITION NEW STEEL WALKWAYS INCLUDING DISMANTLING OF ALL EXSITING STEEL WALKWAYS AND OTHER ANCILLARY WORKS AT HOJ – II [17(O)], HDC, HALDIA ON EPC MODE.**

(b) Time allowed for completion of the work : **08 (Eight) months.**

(c) Permanent I/T A/C No. :

(d) Maximum number of workmen to be engaged on any day. :

(e) Bank Details

Name of Bank: Branch:
Branch Code: Account Number:
IFS Code:-

(Signature of the Bidder)

Witness:

Address:

(Name in block letters)

Address:-

Occupation:-

FORM OF TENDER (UNPRICED)

(To be submitted with Techno Commercial Bid)

To
The Sr. Dy. Manager (I&CF),
Haldia Dock Complex

I/We _____ having examined the site of work, inspected the Drawings and read the specifications, General & Special Conditions of Contract and Conditions of the Tender, hereby tender and undertake to execute and complete all the works required to be performed in accordance with the Specification, Bill of Quantities, General & Special Conditions of Contract and Drawings prepared by or on behalf of the Trustees and at the rates & prices set out in the annexed Bill of Quantities within _____ months / weeks from the date of order to commence the work and in the event of our tender being accepted in full or in part. I / We also undertake to enter into a Contract Agreement in the form hereto annexed with such alterations or additions thereto which may be necessary to give effect to the acceptance of the Tender and incorporating such Specification, Bill of Quantities, Drawing and Special & General Conditions of Contract and I / We hereby agree that until such Contract Agreement is executed the said Specification, Bill of Quantities, Conditions of Contract and the Tender, together with the acceptance thereof in writing by or on behalf of the Trustees shall be the Contract.

I / We require _____ days / months preliminary time to arrange and procure the materials required by the work from the date of acceptance of tender before I We could commence the work.

I / We have deposited with the Trustees' Manager (Finance), HDC, vide Receipt No. _____ of _____ as Bid Document Fee.

I / We agree that the period for which the tender shall remain open for acceptance shall not be less than four months.

Dated:
Seal)

(Signature of Bidder with

WITNESS :

Name of the Bidder :

Signature :

Name :

Address :

(In Block letters)

Address :

Occupation :

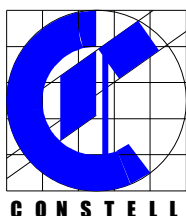
CHECK LIST

(TO BE FILLED- UP BY THE BIDDER)

1	Declarations a) The bidding firm has not been debarred / delisted by any Govt / Quasi Govt. / Public sector undertaking in India. b) The proprietor / partner(s)/ authorised signatory of the bidding firm is/are not associated with other firm bidding for the same work.	Declaration submitted	Yes / No
2	Application money towards cost of tender documents.	Deposited	Yes / No
3	Bid Document Fee.	Deposited	Yes / No
4	Declaration as per Annex-I that no conditions / deviations have been added in Volume-II in the tender offer.	Submitted on company's letter head.	Yes / No
5	GST registration certificate.	Submitted	Yes / No
6	Valid Trade License.	Valid up to	
		Submitted	Yes / No
7	Professional Tax Clearance Certificate. / Upto date tax payment challan.	Valid up to	
		Submitted	Yes / No
8	Valid Employees' Provident Fund Account	Submitted	Yes / No
		Photo copy of latest payment challan of EPF submitted	Yes / No
9	ESI registration	Submitted	Yes / No
		Photo copy of latest payment challan of ESI submitted	Yes / No
10	Details of firm as per Bidder's Profile	Format fill-up	Yes / No
11	Concurrent Commitments of the Bidder	Format fill-up	Yes / No
12	Credential within seven years	i) Amount	
		ii) Amount	
		iii) Amount	
		Credentials as per pre-qualification criteria.	Yes / No
		Letter of award works and completion certificate from owners are enclosed.	Yes / No
13	Certified copies of audited balance sheet	i) Turnover amount and year	
		ii) Turnover amount and year	
		iii) Turnover amount and year	
		Certified by the CA / FA	Yes / No

Signature of the bidder with seal

REPORT
ON
**GEOTECHNICAL INVESTIGATION BY EXPLORATION OF MARINE
BORE HOLES AT HOJ-I, HOJ-II, BARGE JETTY I & II AND UPCOMING
OUTER TERMINAL - II (OT-II) IN HALDIA**



**CONSTELL CONSULTANTS PVT. LTD.
KOLKATA**

JOB NUMBER: CCPL/20111216

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CHAPTER - I

1.0 INTRODUCTION

- 1.1** Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia was entrusted to Constell Consultants Pvt. Ltd., 7, Sristidhar Dutta Lane, Hatibagan, Kolkata-700 006 by M/s. RKEC Projects Limited, (Formerly known as M/s. RKEC Projects Pvt. Ltd.), # 10-12-1, Rednam Alcazar, Rednam Gardens, Visakhapatnam – 530 002.
- 1.2** The scope of the soil investigation work consisted of sinking eight (8) bore holes upto a maximum depth of 45.0m below the existing bed level in all kinds of soil formation including collection of undisturbed / disturbed soil samples and conducting Standard Penetration Tests.
- 1.3** The formation at the site is to be reported for various layers present at their respective depths along with their thickness. As ground water table location influences the method of construction of foundation at a site, its location also needs to be found out.
- 1.4** During sinking of bore holes soil samples both in disturbed and undisturbed conditions are to be collected for laboratory tests. The disturbed samples would be subjected to tests to obtain soil index properties. The undisturbed soil samples, however, would be used mainly for conducting tests to obtain shear strength parameters as well as compressibility characteristics of the soil representing the strata.
- 1.5** Since the investigation could not cover the regional sub-soil features, due weightage for the variations of sub-surface layers in its horizontal and vertical extent is to be given in selecting design basis.

C H A P T E R - I I

2.0 PROJECT DETAILS

2.1 The site for the investigation work is situated at HOJ-I, HOJ-II Barge Jetty I & II over river Hooghly inside Haldia Dock in Haldia, West Bengal.

2.2 The field work consisted of sinking eight (8) bore holes from the top of Barge for boring under water upto a maximum depth of 48.15m below bed level at specified locations. The details of field work like, location (Co-ordinate), bore hole no., RL at bore hole top, termination depth, water level and the dates of commencement and completion are furnished below.

Bore Hole No.	Location (Co-ordinate)		RL. at Bore Hole Top	Termination Depth	Water Level	Start Date	End Date
	North	East	(m)	(m)	(m)		
MBH-1	2436750.7	613481.7	(-)4.2	46.00	**Under Water	01.01.21	02.01.21
MBH-2	2436678.0	613489.0	(-)5.8	44.25		03.01.21	05.01.21
MBH-3	2436329.0	612989.0	(-)9.6	40.10		25.01.21	26.01.21
MBH-4	2436360.9	612955.6	(-)8.4	35.20		29.12.20	30.12.20
MBH-5	2436390.8	612929.2	(-)2.3	48.15		07.01.21	09.01.21
MBH-6	2436465.0	613119.0	(-)6.1	44.10		23.01.21	24.01.21
MBH-7	2436782.0	613456.8	(-)2.3	48.15		17.01.21	19.01.21
MBH-8	2436618.0	613363.0	(-)4.9	34.00		20.01.21	21.01.21
Note: ** = max. and min. water levels during field work are shown in respective borelogs							

2.3 The bore holes of 150 mm diameter were explored with the help of cable operated shell using engine driven mechanical winch as per IS 1892-1979. Shell is used which is a 127mm diameter steel cylinder with a cutting edge at the bottom and is fitted with a hinged one-way flap valve at the bottom. The bore hole is advanced by raising the shell upto a height and allowing it to fall and this is repeated several times till sufficient amount

of soil enters the shell. When the shell gets nearly filled with soil, it is lifted out of the bore hole and emptied. This method of boring is followed upto a suitable depth below the existing bed level.

For further advancement of bore hole mud rotary boring method was adopted. In this method the boring is advanced by a cutter fixed to drill pipes, which are rotated by means of pipe wrenches. Bentonite solution is pushed simultaneously by a mechanical pump. The slurry flowing out of cutter bottom mixes up with the cut soil and flows up to the ground surface, and slurry tank after passing through settling pits and back to the slurry tank. The process is continuous and the same slurry can be used several times. The cutting tool is lowered slowly with the help of a double pulley system fixed on a tripod. This method of boring was followed upto the explored depth of the bore hole.

- 2.4** Seamless flush jointed steel casings of Sx (150mm) size was used to prevent any caving of bore hole and was inserted simultaneously with the advancement of boring operation.
- 2.5** The undisturbed samples were collected from the bore holes at 3.0m interval wherever possible, with the help of a thin walled sampler, as per the IS: 2132-1986 "Code of practice for thin walled tube sampling of soils". The area ratio of the sampler is of the order of twelve percent and the inside clearance is around two percent. The sample tube about 500mm long and 100mm inner diameter, is coupled with the sampler with a drive head, vent holes and ball check valve to complete the sampling assembly. While sampling below the water table inside the bore hole, the entrapped water has the opportunity to escape through this valve at the top. The sampling assembly is then lowered inside the bore holes by connecting a string of 'A' / 'AW' size drill rods to it. The assembly is driven to a predetermined depth with the help of jarring link. On completion of sampling operation, the sampler is first rotated (so that the soil would shear off on a horizontal plane at the cutting shoe edge) and then raised to the surface. The undisturbed sample is waxed at both ends with proper identification mark on the tube sampler.

- 2.6** Standard Penetration Tests were conducted inside the bore holes at suitable intervals as per IS 2131-1981 “Method of standard penetration tests for soils”. The split spoon sampler used is of standard design and dimension. The spoon is advanced by driving with a drop hammer weighing 63.5 kg falling freely through a height of 75 cm. A record of the number of blows required to penetrate every 15 cm. to a depth of 45cm is kept. The number of blows required for the last 30 cm penetration of the split spoon sampler is recorded as ‘N’-value. On completion of the test, the sampler is lifted to the ground, opened and the specimen of the soil sample is stored in double polythene bags with the proper identification mark. The penetration number, ‘N’ has been shown against the corresponding depths in field bore logs.
- 2.7** Representative disturbed samples were collected regularly and wherever the stratum changed. These samples are taken from the cutting edge of undisturbed samples and the split spoon samplers after standard penetration tests. These samples are labelled depth wise and used in the preparation of bore hole log and for general identification and classification purposes.
- 2.8** The field investigation work was carried out from 29.12.2020 to 09.01.2021 and from 17.01.2021 to 26.01.2021.

CHAPTER - III

3.0 LABORATORY TESTING

3.1 The following laboratory tests are carried out on undisturbed and disturbed soil samples for identification and classification purposes and to obtain other relevant properties of the sub-surface formation.

- (a) Natural Moisture Content
- (b) Sieve analysis
- (c) Hydrometer analysis
- (d) Liquid Limit and Plastic Limit
- (e) Bulk and Dry Density
- (f) Unconfined Compression Test
- (g) Triaxial Shear Test (Unconsolidated Un-drained)
- (h) Direct shear test
- (i) Specific Gravity
- (j) Consolidation Test

3.2 All these tests are conducted as per relevant IS Code where such exists and the test results are tabulated in Tables attached herewith.

C H A P T E R - I V

4.0 DISCUSSION AND RECOMMENDATION

4.1 The sub-soil investigation work by exploration of marine bore holes has been carried out by sinking eight (8) bore holes upto a maximum depth of 48.15m below the existing bed level at specified locations. The field investigation data and the results of laboratory test conducted on samples collected from the bore holes indicate the presence of different layers. The details of layers like layer no., description of layer and the thickness of each layer as encountered in the bore holes are furnished below.

Layer No.	Description	Layer Thickness (m)			
		MBH-1	MBH-2	MBH-3	MBH-4
IA	Very soft / soft / firm silty clay with occasional high silt content and traces of sand	4.00	3.00	—	*1.50
IB	Firm / stiff / very stiff silty clay with occasional presence of calcareous nodules and sand	9.00	7.00	7.00	5.50
II	Medium dense / dense silty fine sand	12.00	13.50	15.00	13.50
III	Very stiff to hard silty clay	9.00	10.50	8.00	10.50
IIIA	Hard sandy silty clay	3.00	3.00	4.00	3.00
IV	Medium dense / dense silty fine sand	9.00	7.25	6.10	1.20
V	Hard silty clay	—	—	—	—
*0.5m thick band of very loose / loose silty fine sand is found to be present at the top of layer IA in MBH-4 as shown in sub-soil profile.					

Layer No.	Description	Layer Thickness (m)			
		MBH-5	MBH-6	MBH-7	MBH-8
IA	Very soft / soft / firm silty clay with occasional high silt content and traces of sand	7.00	4.00	7.00	3.00
IB	Firm / stiff / very stiff silty clay with occasional presence of calcareous nodules and sand	6.00	4.50	6.00	10.50
II	Medium dense / dense silty fine sand	15.00	15.00	15.00	11.50
III	Very stiff to hard silty clay	9.00	20.60	7.50	9.00
IIIA	Hard sandy silty clay	3.00	–	1.50	–
IV	Medium dense / dense silty fine sand	1.50	–	9.00	–
V	Hard silty clay	6.65	–	2.15	–

Note: The description of layers are very much generalized. For detail description refer respective bore hole logs.

4.2 The fluctuation of water level in the bore holes during the period of field work are shown in respective bore logs. The laboratory test results are tabulated in table nos. C/1-1 to C/8-2. The bore hole location plan is shown in fig. no.A/1. The graphical representation of field and corrected N-Values with R.L are shown in fig nos.B/1 to B/4. The sub soil formation as revealed by the bore holes are shown in fig nos. D/1 to D/4. The grain size distribution curves are shown in fig. nos. E/1 to E/42. Mohr's Diagrams from Triaxial Shear Test and Normal stress vs shear stress plots from Direct Shear Test are shown in fig. nos. F/1 to F/16. The e-logp curves from Consolidation Test are shown in fig nos.G/1 to G/23.

4.3 On close scrutiny of field and laboratory test results and based on experience and judgement, necessary soil parameters (bore hole wise) for the purpose of design of foundation are tabulated in the following table.

MBH-1

LAYER DETAILS					Corrected N Value	Bulk Density (<i>t/m³</i>)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(<i>m</i>)			
IA	Very soft silty clay with high silt content and occasional traces of sand	(-)4.2 (B.L.)	(-)8.2	4.0	0 to 1	1.771	c=0.9t/m ²
IB	Stiff silty clay with occasional presence of calcareous nodules and sand	(-)8.2	(-)17.2	9.0	11 to 16	1.944	c=5.8t/m ²
II	Medium dense silty fine sand	(-)17.2	(-)29.2	12.0	23 to 30	1.980	φ=34°
III	Very stiff to hard silty clay	(-)29.2	(-)35.2	6.0	20 & 27	1.978	§c=11.0t/m ²
		(-)35.2	(-)38.2	3.0	36 & 38	§2.060	§c=17.0t/m ²
IIIA	Hard sandy silty clay	(-)38.2	(-)41.2	3.0	34 & 37	§2.060	§c=16.0t/m ²
IV	Dense silty fine sand	(-)41.2	(-)50.2 (T.L.)	9.0	§40	§2.070	§φ=37°
B.L= Bed Level, T.L.= Termination Level, § = Suggested Value							

MBH-2

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(m)			
IA	Very soft / soft silty clay with occasional traces of sand	(-)5.8 (B.L.)	(-)8.8	3.0	2	1.773	$c=0.8t/m^2$
IB	Firm / stiff silty clay with occasional presence of calcareous nodules	(-)8.8	(-)15.8	7.0	7 to 9	1.886	$c=4.5t/m^2$
II	Medium dense silty fine sand	(-)15.8	(-)21.8	6.0	21 & 23	1.938	$\phi=33^\circ$
		(-)21.8	(-)29.3	7.5	26 to 27	§2.000	§ $\phi=34.5^\circ$
III	Very stiff to hard silty clay	(-)29.3	(-)38.3	9.0	16 to 26	1.959	$c=9.1t/m^2$
		(-)38.3	(-)39.8	1.5	42	§2.070	§ $c=19.0t/m^2$
IIIA	Hard sandy silty clay	(-)39.8	(-)42.8	3.0	38 & 40	§2.060	§ $c=17.5t/m^2$
IV	Medium dense to dense silty fine sand	(-)42.8	(-)50.1 (T.L.)	7.3	18 to 28	§1.965	§ $\phi=33.5^\circ$
B.L= Bed Level, T.L.= Termination Level, § = Suggested Value							

MBH-3

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(m)			
IB	Stiff silty clay with occasional presence of calcareous nodules and sand	(-)9.6 (B.L.)	(-)12.6	3.0	—	1.890	$c=5.9t/m^2$
		(-)12.6	(-)16.6	4.0	12 & 16	1.949	$c=7.0t/m^2$
II	Medium dense / dense silty fine sand	(-)16.6	(-)24.1	7.5	11 & 12	1.826	$\phi=31^\circ$
		(-)24.1	(-)31.6	7.5	21 to 31	§2.010	§ $\phi=35^\circ$
III	Very stiff to hard silty clay	(-)31.6	(-)34.6	3.0	16	1.948	$c=8.3t/m^2$
		(-)34.6	(-)39.6	5.0	38 to 44	§2.070	§ $c=18.0t/m^2$
IIIA	Hard sandy silty clay	(-)39.6	(-)43.6	4.0	56 & 58	§2.080	§ $c=25.5t/m^2$
IV	Dense silty fine sand	(-)43.6	(-)49.7 (T.L.)	6.1	30 to 37	§2.030	§ $\phi=36^\circ$
B.L= Bed Level, T.L.= Termination Level, § = Suggested Value							

MBH-4

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(m)			
IA	Soft silty clay with occasional traces of sand	(-)8.4 (B.L.)	(-)9.9	1.5	—	1.800	$c=1.4t/m^2$
IB	Stiff to very stiff silty clay with occasional presence of calcareous nodules and sand	(-)9.9	(-)11.4	1.5	8	§1.880	§ $c=4.0t/m^2$
		(-)11.4	(-)15.4	4.0	17 & 20	1.970	$c=8.1t/m^2$
II	Medium dense / dense silty fine sand	(-)15.4	(-)19.9	4.5	20	1.927	$\phi=33^\circ$
		(-)19.9	(-)28.9	9.0	26 to 33	§2.020	§ $\phi=35.5^\circ$
III	Very stiff to hard silty clay	(-)28.9	(-)33.4	4.5	20	1.954	$c=8.9t/m^2$
		(-)33.4	(-)36.4	3.0	34 & 38	§2.060	§ $c=16.0t/m^2$
		(-)36.4	(-)39.4	3.0	52 & 56	§2.080	§ $c=24.0t/m^2$
IIIA	Hard sandy silty clay	(-)39.4	(-)42.4	3.0	50 & 58	§2.080	§ $c=24.0t/m^2$
IV	Dense silty fine sand	(-)42.4	(-)43.6 (T.L.)	1.2	38	§2.060	§ $\phi=36.5^\circ$
B.L= Bed Level, T.L.= Termination Level, § = Suggested Value							

MBH-5

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(m)			
IA	Soft to firm silty clay with occasional traces of sand	(-)2.3 (B.L.)	(-)6.3	4.0	2 & 4	1.811	$c=1.6t/m^2$
		(-)6.3	(-)9.3	3.0	7	1.876	$c=2.7t/m^2$
IB	Stiff / very stiff silty clay with occasional presence of calcareous nodules and sand	(-)9.3	(-)15.3	6.0	20 & 15	1.963	$c=7.5t/m^2$
II	Medium dense silty fine sand	(-)15.3	(-)22.8	7.5	22 to 23	1.922	$\phi=33^\circ$
		(-)22.8	(-)30.3	7.5	25 to 28	\$2.000	$\phi=34.5^\circ$
III	Very stiff to hard silty clay	(-)30.3	(-)33.3	3.0	18	1.950	$c=8.6t/m^2$
		(-)33.3	(-)39.3	6.0	36 to 44	\$2.070	$\phi c=18.0t/m^2$
IIIA	Hard sandy silty clay	(-)39.3	(-)42.3	3.0	40 & 42	\$2.070	$\phi c=18.0t/m^2$
IV	Medium dense silty fine sand	(-)42.3	(-)43.8	1.5	22	\$1.950	$\phi=33^\circ$
V	Hard silty clay with varying percentage of sand	(-)43.8	(-)50.5 (T.L.)	6.7	44 to 52	\$2.070	$\phi c=22.0t/m^2$
B.L= Bed Level, T.L.= Termination Level, \$ = Suggested Value							

MBH-6

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick -ness			
		From	To	(m)			
IA	Soft silty clay	(-)6.1 (B.L.)	(-)10.1	4.0	2 & 3	1.809	$c=1.7t/m^2$
IB	Stiff silty clay with occasional presence of calcareous nodules	(-)10.1	(-)14.6	4.5	9	1.905	$c=4.5t/m^2$
II	Medium dense to dense silty fine sand	(-)14.6	(-)20.6	6.0	17 & 19	1.890	$\phi=32^\circ$
		(-)20.6	(-)29.6	9.0	24 to 27	\$2.000	$\S\phi=34.5^\circ$
III	Very stiff to hard silty clay	(-)29.6	(-)35.6	6.0	18 & 21	1.960	$c=9.0t/m^2$
		(-)35.6	(-)50.2 (T.L.)	14.6	32 to 46	\$2.070	$\S c=18.0t/m^2$
B.L= Bed Level, T.L.= Termination Level, \$ = Suggested Value							

MBH-7

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(m)			
IA	Soft / firm silty clay with occasional high silt content; soft silty clay with traces of decomposed wood observed from 4.0m depth	(-)2.3 (B.L.)	(-)6.3	4.0	2	1.793	$c=1.2t/m^2$
		(-)6.3	(-)9.3	3.0	4	1.737	$c=1.8t/m^2$
IB	Very stiff silty clay	(-)9.3	(-)15.3	6.0	20 & 22	1.960	$c=8.9t/m^2$
II	Medium dense silty fine sand	(-)15.3	(-)30.3	15.0	19 to 29	§1.980	$\phi=34^\circ$
III	Very stiff to hard silty clay	(-)30.3	(-)36.3	6.0	18 & 24	1.974	$c=9.5t/m^2$
		(-)36.3	(-)37.8	1.5	44	§2.070	$\phi c=20.0t/m^2$
IIIA	Hard sandy silty clay	(-)37.8	(-)39.3	1.5	36	§2.060	$\phi c=16.0t/m^2$
IV	Medium dense to dense silty fine sand	(-)39.3	(-)44.3	5.0	22 to 29	§1.995	$\phi=34^\circ$
		(-)44.3	(-)48.3	4.0	33	§2.030	$\phi=36^\circ$
V	Hard silty clay	(-)48.3	(-)50.5 (T.L.)	2.2	48 & 52	§2.080	$\phi c=22.5t/m^2$
B.L.= Bed Level, T.L.= Termination Level, § = Suggested Value							

MBH-8

LAYER DETAILS					Corrected N Value	Bulk Density (t/m^3)	Shear Strength parameter
No.	Description	R.L (m)		Thick- ness			
		From	To	(m)			
IA	Very soft to soft silty clay with high silt content	(-)4.9 (B.L.)	(-)7.9	3.0	2	1.785	c=1.0t/m ²
IB	Stiff to very stiff silty clay with occasional presence of calcareous nodules and sand	(-)7.9	(-)14.9	7.0	9 to 13	1.920	c=5.0t/m ²
		(-)14.9	(-)18.4	3.5	18	1.955	c=7.5t/m ²
II	Medium dense / dense silty fine sand	(-)18.4	(-)29.9	11.5	22 to 31	§2.000	§φ=34.5°
III	Very stiff to hard silty clay	(-)29.9	(-)34.4	4.5	18 & 23	1.960	c=9.2t/m ²
		(-)34.4	(-)37.4	3.0	34	2.024	§c=15.0t/m ²
		(-)37.4	(-)38.9 (T.L.)	1.5	44 & 49	§2.070	§c=21.0t/m ²
B.L.= Bed Level, T.L.= Termination Level, § = Suggested Value							

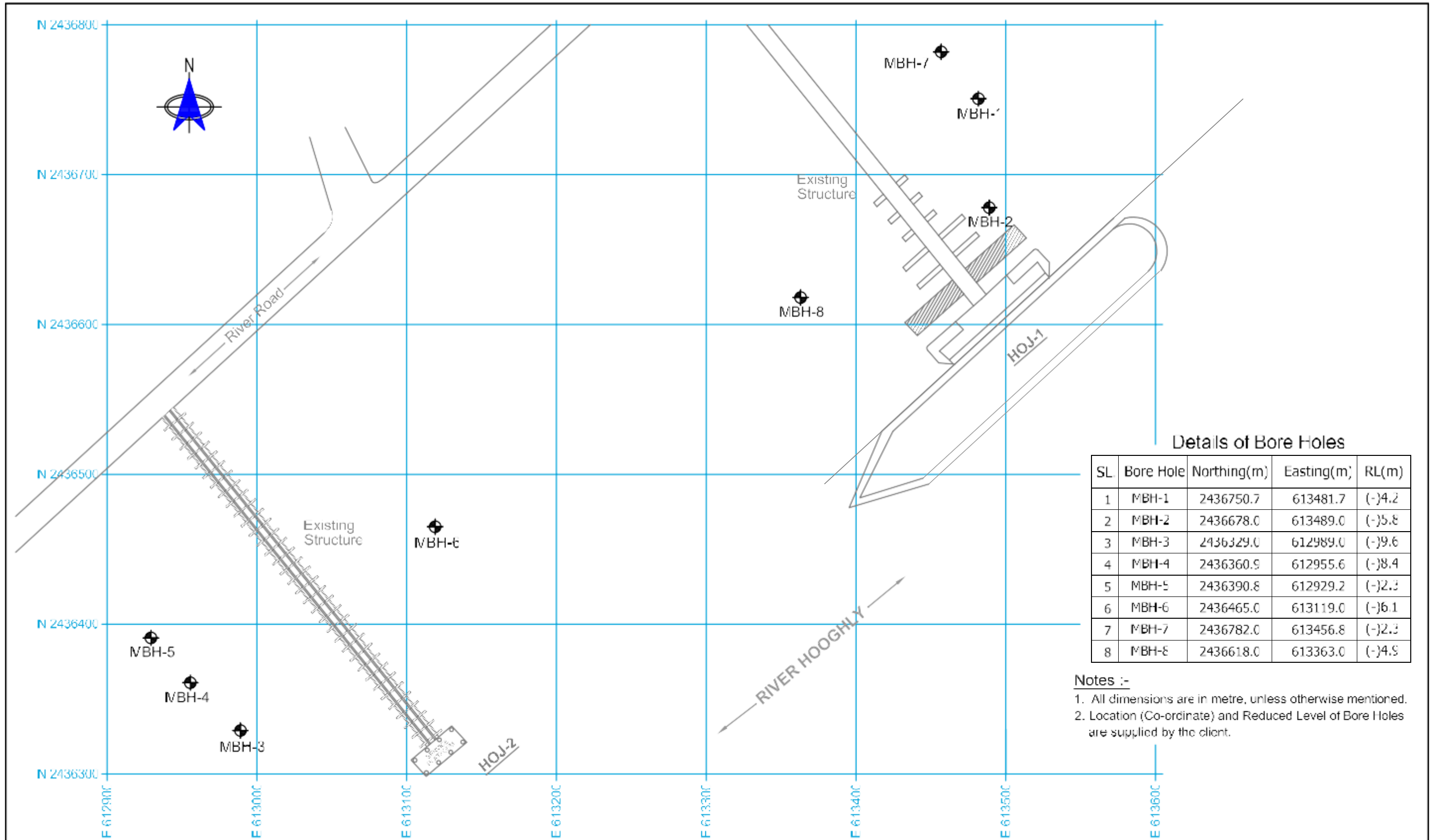
- 4.4** In view of the sub-soil formation encountered in this area suitable foundation system for the proposed structures may be designed considering the soil parameters provided in Article 4.3.

for **CONSTELL CONSULTANTS PRIVATE LIMITED**

Dated February 18, 2021

B. N. BASAK
M.E., MIE, MIGS, MIRC, MISEG
DIRECTOR

CHAPTER-V



Bore Hole Location Plan for Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and Upcoming Outer Terminal-II (OT-II) in Haldia

Job No.:
CCPL/20111216

Scale: 1:2500

Figure No : A/1

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-1

Location : N 2436750.7 , E 613481.7

Ground Elevation : (-)4.2m

Method of Boring / Drilling : Shell / Rotary

Water Level : 9.10m a.b.l (max.) at 13:00 hrs on 02/01

5.20m a.b.l (min.) at 08:00 hrs on 02/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-14.11m below bed level

Date : From 01.01.21 To 02.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
01/01	(-)4.2	0.00	0.50	0.50	U	-	-	-	-	-	-	-	-	-	Very soft grey silty clay with high silt content and occasional traces of sand
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
		1.50	1.95	0.45	P	0	0	0	-	0	-	-	-	-	
		3.00	3.45	0.45	P	0	1	0	-	1	-	-	-	-	
	(-)8.2	4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	4.00m Stiff bluish grey to greyish yellow silty clay with occasional presence of calcareous nodules and sand
		5.50	5.95	0.45	P	3	4	7	-	11	-	-	-	-	
		7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	
		8.50	8.95	0.45	P	4	6	10	-	16	-	-	-	-	
	(-)17.2	10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	13.00m Medium dense brownish yellow to yellowish grey silty fine sand; medium dense sandy silt with traces of clay observed at 16.0m depth
		11.50	11.95	0.45	P	3	4	7	-	11	-	-	-	-	
		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-	
		14.50	14.95	0.45	P	6	14	22	-	36	-	-	-	-	
		16.00	16.45	0.45	P	8	16	24	-	40	-	-	-	-	
		17.50	17.95	0.45	P	8	15	26	-	41	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-1

Location : N 2436750.7 , E 613481.7

Ground Elevation : (-)4.2m

Method of Boring / Drilling : Shell / Rotary

Water Level : 9.10m a.b.l (max.) at 13:00 hrs on 02/01

5.20m a.b.l (min.) at 08:00 hrs on 02/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-14.11m below bed level

Date : From 01.01.21 To 02.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
02/01	(-)29.2	19.00	19.45	0.45	P	10	18	26	-	44	-	-	-	-	Medium dense brownish yellow to yellowish grey silty fine sand; medium dense sandy silt with traces of clay observed at 16.0m depth
		20.50	20.95	0.45	P	7	15	24	-	39	-	-	-	-	
		22.00	22.45	0.45	P	8	16	24	-	40	-	-	-	-	
		23.50	23.95	0.45	P	6	18	44	-	62	-	-	-	-	
		25.00	25.45	0.45	P	10	13	14	-	27	-	-	-	-	25.00m
		26.50	27.00	0.50	U	-	-	-	-	-	-	-	-	-	Very stiff to hard yellowish grey to grey silty clay
		28.00	28.45	0.45	P	9	10	10	-	20	-	-	-	-	
		29.50	30.00	0.50	U	-	-	-	-	-	-	-	-	-	
		31.00	31.45	0.45	P	8	16	20	-	36	-	-	-	-	
		32.50	32.95	0.45	P	10	18	20	-	38	-	-	-	-	
	(-)38.2	34.00	34.45	0.45	P	10	14	20	-	34	-	-	-	-	34.00m
		35.50	35.95	0.45	P	8	16	21	-	37	-	-	-	-	Hard bluish grey sandy silty clay
	(-)41.2	37.00	37.38	0.38	P	20	58	42	-	>100	-	-	-	-	37.00m
		38.50	38.87	0.37	P	22	65	36	-	>100	-	-	-	-	Dense yellowish grey silty fine sand
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test 2. Level at which Artesian Condition experienced and its pressure, if any : 3. Water Loss with depth, if any : 4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-1

Location : N 2436750.7 , E 613481.7

Ground Elevation : (-)4.2m

Method of Boring / Drilling : Shell / Rotary

Water Level : 9.10m a.b.l (max.) at 13:00 hrs on 02/01

5.20m a.b.l (min.) at 08:00 hrs on 02/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-14.11m below bed level

Date : From 01.01.21 To 02.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
		40.00	40.36	0.36	P	36	62	38	-	>100	-	-	-	-	Dense yellowish grey silty fine sand
		42.00	42.37	0.37	P	22	58	42	-	>100	-	-	-	-	
		44.00	44.28	0.28	P	42	60	-	-	>100	-	-	-	-	
		46.00	46.40	0.40	P	18	42	60	-	>100	-	-	-	-	
		46.00	(Termination Depth)												
	(-)50.2	46.00													
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test														
	2. Level at which Artesian Condition experienced and its pressure, if any :														
	3. Water Loss with depth, if any :														
	4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-2

Location : N 2436678.0 , E 613489.0

Ground Elevation : (-)5.8m

Method of Boring / Drilling : Shell / Rotary

Water Level : 10.70m a.b.l (max.) at 14:00 hrs on 03/01
6.50m a.b.l (min.) at 09:30 hrs on 04/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-14.14m below bed level

Date : From 03.01.21 To 05.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
03/01	(-)5.8	0.00	0.50	0.50	U	-	-	-	-	-	-	-	-	-	Very soft / soft grey silty clay with occasional traces of sand
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
		1.50	1.95	0.45	P	0	1	1	-	2	-	-	-	-	
	(-)8.8	3.00	3.45	0.45	P	3	4	5	-	9	-	-	-	-	Firm / stiff bluish to yellowish grey silty clay with occasional presence of calcareous nodules
		4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	
		5.50	5.95	0.45	P	2	3	4	-	7	-	-	-	-	
		7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	
		8.50	8.95	0.45	P	3	4	5	-	9	-	-	-	-	
	(-)15.8	10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	Medium dense yellowish brown to yellowish grey silty fine sand
		11.50	11.95	0.45	P	8	12	16	-	28	-	-	-	-	
		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-	
04/01		14.50	14.95	0.45	P	8	16	18	-	34	-	-	-	-	
		16.00	16.45	0.45	P	10	16	26	-	42	-	-	-	-	
		17.50	17.95	0.45	P	10	18	26	-	44	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-2

Location : N 2436678.0 , E 613489.0

Ground Elevation : (-)5.8m

Method of Boring / Drilling : Shell / Rotary

Water Level : 10.70m a.b.l (max.) at 14:00 hrs on 03/01
6.50m a.b.l (min.) at 09:30 hrs on 04/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-14.14m below bed level

Date : From 03.01.21 To 05.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
05/01	(-)29.3	19.00	19.45	0.45	P	10	20	26	-	46	-	-	-	-	Medium dense yellowish brown to yellowish grey silty fine sand
		20.50	20.95	0.45	P	8	22	28	-	50	-	-	-	-	
		22.00	22.39	0.39	P	22	62	40	-	>100	-	-	-	-	
		23.50	23.95	0.45	P	6	10	16	-	26	-	-	-	-	23.50m
		25.00	25.50	0.50	U	-	-	-	-	-	-	-	-	-	Very stiff to hard bluish grey to grey silty clay
		26.50	26.95	0.45	P	4	6	10	-	16	-	-	-	-	
		28.00	28.50	0.50	U	-	-	-	-	-	-	-	-	-	
		29.50	29.95	0.45	P	9	10	10	-	20	-	-	-	-	
		31.00	31.50	0.50	U	-	-	-	-	-	-	-	-	-	
		32.50	32.95	0.45	P	16	18	24	-	42	-	-	-	-	
	(-)39.8	34.00	34.45	0.45	P	6	16	22	-	38	-	-	-	-	34.00m
		35.50	35.95	0.45	P	8	18	22	-	40	-	-	-	-	Hard bluish grey sandy silty clay
	(-)42.8	37.00	37.45	0.45	P	10	14	22	-	36	-	-	-	-	37.00m
		38.50	38.95	0.45	P	10	18	34	-	52	-	-	-	-	Medium dense to dense greyish yellow silty fine sand

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-2

Location : N 2436678.0 , E 613489.0

Ground Elevation : (-)5.8m

Method of Boring / Drilling : Shell / Rotary

Water Level : 10.70m a.b.l (max.) at 14:00 hrs on 03/01
6.50m a.b.l (min.) at 09:30 hrs on 04/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-14.14m below bed level

Date : From 03.01.21 To 05.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description	
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value						
	(-)50.1	40.00	40.45	0.45	P	7	16	38	-	54	-	-	-	-	Medium dense to dense greyish yellow silty fine sand	
		42.00	42.45	0.45	P	21	32	44	-	76	-	-	-	-		
		44.25	44.67	0.42	P	16	40	60	-	>100	-	-	-	-		
		(12cm)														
		44.25	(Termination Depth)													
NOTES	1. Abbreviation Used : U -Undisturbed Sample C -Core Sample D -Disturbed Sample P -Standard Penetration Test V -Vane Shear Test															
	2. Level at which Artesian Condition experienced and its pressure, if any :															
	3. Water Loss with depth, if any :															
	4. Colour of water during drilling :															
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216				



BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-3

Location : N 2436329.0 , E 612989.0

Ground Elevation : (-)9.6m

Method of Boring / Drilling : Shell / Rotary

Water Level : 13.20m a.b.l (max.) at 22:00 hrs on 25/01
10.20m a.b.l (min.) at 16:45 hrs on 26/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-8.96m below bed level

Date : From 25.01.21 To 26.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
25/01	(-)9.6	0.00	0.50	0.50	U	Slipped					-	-	-	-	Stiff grey to bluish grey silty clay with occasional presence of calcareous nodules and sand; loose grey sandy silt with traces of clay observed at 1.5m depth
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
		1.50	1.95	0.45	P	1	1	2	-	3	-	-	-	-	
		3.00	3.45	0.45	P	4	8	8	-	16	-	-	-	-	
		4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	
	(-)16.6	5.50	5.95	0.45	P	3	5	7	-	12	-	-	-	-	Medium dense / dense brownish yellow silty fine sand; stiff yellowish grey sandy silty clay observed at 10.0m depth
		7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	
		8.50	8.95	0.45	P	3	4	6	-	10	-	-	-	-	
		10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	
		11.50	11.95	0.45	P	4	5	7	-	12	-	-	-	-	
26/01		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-	
		14.50	14.95	0.45	P	6	20	28	-	48	-	-	-	-	
		16.00	16.45	0.45	P	8	21	32	-	53	-	-	-	-	
		17.50	17.95	0.45	P	10	18	30	-	48	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-3

Location : N 2436329.0 , E 612989.0

Ground Elevation : (-)9.6m

Method of Boring / Drilling : Shell / Rotary

Water Level : 13.20m a.b.l (max.) at 22:00 hrs on 25/01
10.20m a.b.l (min.) at 16:45 hrs on 26/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-8.96m below bed level

Date : From 25.01.21 To 26.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
	(-)31.6	19.00	19.45	0.45	P	8	14	20	-	34	-	-	-	-	Medium dense / dense brownish yellow silty fine sand; stiff yellowish grey sandy silty clay observed at 10.0m depth
		20.50	20.95	0.45	P	20	24	32	-	56	-	-	-	-	
		22.00	22.45	0.45	P	6	7	9	-	16	-	-	-	-	22.00m
		23.50	24.00	0.50	U	-	-	-	-	-	-	-	-	-	Very stiff to hard grey to yellowish grey silty clay
		25.00	25.45	0.45	P	10	16	22	-	38	-	-	-	-	
	(-)39.6	26.50	26.95	0.45	P	8	18	22	-	40	-	-	-	-	
		28.00	28.45	0.45	P	10	26	42	-	68	-	-	-	-	
		29.50	29.95	0.45	P	10	18	26	-	44	-	-	-	-	30.00m
		31.00	31.45	0.45	P	10	24	34	-	58	-	-	-	-	Hard brownish yellow sandy silty clay
		32.50	32.95	0.45	P	12	26	30	-	56	-	-	-	-	
	(-)43.6	34.00	34.45	0.45	P	14	31	45	-	76	-	-	-	-	34.00m
		36.00	36.45	0.45	P	18	34	44	-	78	-	-	-	-	Dense greyish yellow silty fine sand
		38.00	38.45	0.45	P	21	36	67	-	103	-	-	-	-	
	(-)49.7	40.10	40.55	0.45	P	14	31	58	-	89	-	-	-	-	
		40.10	(Termination Depth)												

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-4

Location : N 2436360.9 , E 612955.6

Ground Elevation : (-)8.4m

Method of Boring / Drilling : Shell / Rotary

Water Level : 13.50m a.b.l (max.) at 11:30 hrs on 30/12
9.40m a.b.l (min.) at 06:15 hrs on 30/12

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-10.19m below bed level

Date : From 29.12.20 To 30.12.20

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
29/12	(-)8.4	0.00	0.50	0.50	U	-	-	-	-	-	-	-	-	-	Soft grey silty clay with occasional traces of sand; very loose / loose grey silty fine sand observed at the top
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
	(-)9.9	1.50	1.95	0.45	P	2	4	4	-	8	-	-	-	-	1.50m Stiff to very stiff grey to bluish grey silty clay with occasional presence of calcareous nodules and sand
		3.00	3.45	0.45	P	4	7	13	-	20	-	-	-	-	
		4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	
		5.50	5.95	0.45	P	6	7	10	-	17	-	-	-	-	
	(-)15.4	7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	7.00m Medium dense / dense greyish yellow silty fine sand
		8.50	8.95	0.45	P	6	10	13	-	23	-	-	-	-	
		10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	
		11.50	11.95	0.45	P	16	22	24	-	46	-	-	-	-	
		13.00	13.45	0.45	P	7	20	29	-	49	-	-	-	-	
		14.50	14.95	0.45	P	10	22	28	-	50	-	-	-	-	
30/12		16.00	16.45	0.45	P	12	20	32	-	52	-	-	-	-	
		17.50	17.95	0.45	P	9	17	28	-	45	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-4

Location : N 2436360.9 , E 612955.6

Ground Elevation : (-)8.4m

Method of Boring / Drilling : Shell / Rotary

Water Level : 13.50m a.b.l (max.) at 11:30 hrs on 30/12
9.40m a.b.l (min.) at 06:15 hrs on 30/12

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-10.19m below bed level

Date : From 29.12.20 To 30.12.20

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
	(-)28.9	19.00	19.45	0.45	P	22	30	34	-	64	-	-	-	-	Medium dense / dense greyish yellow silty fine sand 20.50m Very stiff to hard yellowish grey to grey silty clay
		20.50	20.95	0.45	P	10	15	17	-	32	-	-	-	-	
		22.00	22.45	0.45	P	8	8	12	-	20	-	-	-	-	
		23.50	24.00	0.50	U	-	-	-	-	-	-	-	-	-	
		25.00	25.45	0.45	P	8	17	17	-	34	-	-	-	-	
		26.50	26.95	0.45	P	10	18	20	-	38	-	-	-	-	
		28.00	28.45	0.45	P	10	20	32	-	52	-	-	-	-	
	(-)39.4	29.50	29.95	0.45	P	12	22	34	-	56	-	-	-	-	31.00m Hard bluish grey to brownish yellow sandy silty clay
		31.00	31.45	0.45	P	11	22	28	-	50	-	-	-	-	
		33.00	33.45	0.45	P	14	24	34	-	58	-	-	-	-	
	(-)42.4	35.20	35.65	0.45	P	22	44	60	-	104	-	-	-	-	34.00m Dense greyish yellow silty fine sand
	(-)43.6	35.20	(Termination Depth)												
	NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test 2. Level at which Artesian Condition experienced and its pressure, if any : 3. Water Loss with depth, if any : 4. Colour of water during drilling :													
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			



BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-5

Location : N 2436390.8 , E 612929.2

Ground Elevation : (-)2.3m

Method of Boring / Drilling : Shell / Rotary

Water Level : 7.10m a.b.l (max.) at 18:30 hrs on 07/01
4.00m a.b.l (min.) at 12:00 hrs on 07/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling:Sx (150mm)

Casing Lowered : Sx-13.32m below bed level

Date : From 07.01.21 To 09.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
07/01	(-)2.3	0.00	0.50	0.50	U	Slipped					-	-	-	-	Soft to firm grey silty clay with occasional traces of sand
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
		1.50	1.95	0.45	P	1	1	1	-	2	-	-	-	-	
		3.00	3.45	0.45	P	1	2	2	-	4	-	-	-	-	
		4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	
		5.50	5.95	0.45	P	2	3	4	-	7	-	-	-	-	
08/01	(-)9.3	7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	7.00m Stiff / very stiff brownish yellow silty clay with occasional presence of calcareous nodules and sand
		8.50	8.95	0.45	P	8	8	12	-	20	-	-	-	-	
		10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	
	(-)15.3	11.50	11.95	0.45	P	7	7	8	-	15	-	-	-	-	13.00m Medium dense yellowish grey to brownish yellow silty fine sand
		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-	
		14.50	14.95	0.45	P	8	14	20	-	34	-	-	-	-	
		16.00	16.45	0.45	P	8	14	18	-	32	-	-	-	-	
		17.50	17.95	0.45	P	10	16	20	-	36	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216



BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-5

Location : N 2436390.8 , E 612929.2

Ground Elevation : (-)2.3m

Method of Boring / Drilling : Shell / Rotary

Water Level : 7.10m a.b.l (max.) at 18:30 hrs on 07/01
4.00m a.b.l (min.) at 12:00 hrs on 07/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling:Sx (150mm)

Casing Lowered : Sx-13.32m below bed level

Date : From 07.01.21 To 09.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
09/01	(-)30.3	19.00	19.45	0.45	P	8	16	22	-	38	-	-	-	-	Medium dense yellowish grey to brownish yellow silty fine sand
		20.50	20.95	0.45	P	14	22	24	-	46	-	-	-	-	
		22.00	22.45	0.45	P	14	24	28	-	52	-	-	-	-	
		23.50	23.95	0.45	P	10	22	31	-	53	-	-	-	-	
		25.00	25.45	0.45	P	12	24	32	-	56	-	-	-	-	
		26.50	26.95	0.45	P	8	22	28	-	50	-	-	-	-	
		28.00	28.45	0.45	P	4	6	12	-	18	-	-	-	-	
		29.50	30.00	0.50	U	-	-	-	-	-	-	-	-	-	Very stiff to hard yellowish grey to grey silty clay
		31.00	31.45	0.45	P	10	14	22	-	36	-	-	-	-	
		32.50	32.95	0.45	P	10	16	25	-	41	-	-	-	-	
	(-)39.3	34.00	34.45	0.45	P	8	18	26	-	44	-	-	-	-	Hard yellowish grey sandy silty clay
		35.50	35.95	0.45	P	9	14	26	-	40	-	-	-	-	
		37.00	37.45	0.45	P	10	16	26	-	42	-	-	-	-	
		38.50	38.95	0.45	P	8	14	26	-	40	-	-	-	-	
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test														
	2. Level at which Artesian Condition experienced and its pressure, if any :														
	3. Water Loss with depth, if any :														
	4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-5

Location : N 2436390.8 , E 612929.2

Ground Elevation : (-)2.3m

Method of Boring / Drilling : Shell / Rotary

Water Level : 7.10m a.b.l (max.) at 18:30 hrs on 07/01
4.00m a.b.l (min.) at 12:00 hrs on 07/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling:Sx (150mm)

Casing Lowered : Sx-13.32m below bed level

Date : From 07.01.21 To 09.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
	(-)42.3	40.00	40.45	0.45	P	10	26	28	-	54	-	-	-	-	40.00m Medium dense yellowish grey silty fine sand
	(-)43.8	41.50	41.95	0.45	P	12	22	28	-	50	-	-	-	-	41.50m Hard bluish grey silty clay with varying percentage of sand
		43.00	43.45	0.45	P	12	16	28	-	44	-	-	-	-	
		44.50	44.95	0.45	P	14	18	30	-	48	-	-	-	-	
		46.00	46.45	0.45	P	16	20	32	-	52	-	-	-	-	
		48.15	48.60	0.45	P	9	13	21	-	34	-	-	-	-	
	(-)50.5	48.15	(Termination Depth)												
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test 2. Level at which Artesian Condition experienced and its pressure, if any : 3. Water Loss with depth, if any : 4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-6

Location : N 2436465.0 , E 613119.0

Ground Elevation : (-)6.1m

Method of Boring / Drilling : Shell / Rotary

Water Level : 10.40m a.b.l (max.) at 07:30 hrs on 23/01
8.10m a.b.l (min.) at 14:30 hrs on 24/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-8.13m below bed level

Date : From 23.01.21 To 24.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
23/01	(-)6.1	0.00	0.50	0.50	U	Slipped					-	-	-	-	Soft grey silty clay
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
		1.50	1.95	0.45	P	0	1	1	-	2	-	-	-	-	
		3.00	3.45	0.45	P	1	1	2	-	3	-	-	-	-	
	(-)10.1	4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	4.00m
		5.50	5.95	0.45	P	3	3	6	-	9	-	-	-	-	Stiff bluish to yellowish grey silty clay with occasional presence of calcareous nodules; silty sandy clay observed at 7.0m depth
		7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	
	(-)14.6	8.50	8.95	0.45	P	5	7	10	-	17	-	-	-	-	8.50m
		10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	Medium dense to dense brownish to greyish yellow silty fine sand
		11.50	11.95	0.45	P	5	9	13	-	22	-	-	-	-	
		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-	
		14.50	14.95	0.45	P	10	19	22	-	41	-	-	-	-	
		16.00	16.45	0.45	P	8	20	22	-	42	-	-	-	-	
		17.50	17.95	0.45	P	8	19	26	-	45	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216



BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-6

Location : N 2436465.0 , E 613119.0

Ground Elevation : (-)6.1m

Method of Boring / Drilling : Shell / Rotary

Water Level : 10.40m a.b.l (max.) at 07:30 hrs on 23/01
8.10m a.b.l (min.) at 14:30 hrs on 24/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-8.13m below bed level

Date : From 23.01.21 To 24.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
24/01	(-)29.6	19.00	19.45	0.45	P	10	18	28	-	46	-	-	-	-	Medium dense to dense brownish to greyish yellow silty fine sand
		20.50	20.95	0.45	P	8	16	24	-	40	-	-	-	-	
		22.00	22.45	0.45	P	16	36	62	-	98	-	-	-	-	
		23.50	23.95	0.45	P	5	10	11	-	21	-	-	-	-	23.50m
		25.00	25.50	0.50	U	-	-	-	-	-	-	-	-	-	Very stiff to hard yellowish grey silty clay
		26.50	26.95	0.45	P	6	8	10	-	18	-	-	-	-	
		28.00	28.50	0.50	U	-	-	-	-	-	-	-	-	-	
		29.50	29.95	0.45	P	8	14	18	-	32	-	-	-	-	
		31.00	31.45	0.45	P	16	18	22	-	40	-	-	-	-	
		32.50	32.95	0.45	P	14	20	24	-	44	-	-	-	-	
		34.00	34.45	0.45	P	10	18	24	-	42	-	-	-	-	
		35.50	35.95	0.45	P	12	20	24	-	44	-	-	-	-	
		37.00	37.45	0.45	P	14	20	26	-	46	-	-	-	-	
		38.50	38.95	0.45	P	12	18	22	-	40	-	-	-	-	
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test														
	2. Level at which Artesian Condition experienced and its pressure, if any :														
	3. Water Loss with depth, if any :														
	4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-6

Location : N 2436465.0 , E 613119.0

Ground Elevation : (-)6.1m

Method of Boring / Drilling : Shell / Rotary

Water Level : 10.40m a.b.l (max.) at 07:30 hrs on 23/01
8.10m a.b.l (min.) at 14:30 hrs on 24/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-8.13m below bed level

Date : From 23.01.21 To 24.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
	(-)50.2	40.00	40.45	0.45	P	10	14	22	-	36	-	-	-	-	Very stiff to hard yellowish grey silty clay
		42.00	42.45	0.45	P	12	20	26	-	46	-	-	-	-	
		44.10	44.55	0.45	P	10	14	20	-	34	-	-	-	-	
		44.10	(Termination Depth)												
NOTES	1. Abbreviation Used : U -Undisturbed Sample C -Core Sample D -Disturbed Sample P -Standard Penetration Test V -Vane Shear Test														
	2. Level at which Artesian Condition experienced and its pressure, if any :														
	3. Water Loss with depth, if any :														
	4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-7

Location : N 2436782.0 , E 613456.8

Ground Elevation : (-)2.3m

Method of Boring / Drilling : Shell / Rotary

Water Level : 7.40m a.b.l (max.) at 14:10 hrs on 17/01
4.10m a.b.l (min.) at 09:30 hrs on 19/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-9.78m below bed level

Date : From 17.01.21 To 19.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description	
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value						
17/01	(-)2.3	0.00	0.50	0.50	U	Slipped					-	-	-	-	-	Soft / firm grey silty clay with occasional high silt content; soft grey silty clay with traces of decomposed wood observed from 4.0m depth
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-		
		1.50	1.95	0.45	P	3	4	5	-	9	-	-	-	-		
		3.00	3.45	0.45	P	0	1	1	-	2	-	-	-	-		
		4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-		
		5.50	5.95	0.45	P	0	2	2	-	4	-	-	-	-		
18/01	(-)9.3	7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	7.00m Very stiff yellowish grey silty clay	
		8.50	8.95	0.45	P	6	8	12	-	20	-	-	-	-		
		10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-		
	(-)15.3	11.50	11.95	0.45	P	5	9	13	-	22	-	-	-	-	13.00m Medium dense brownish to greyish yellow silty fine sand	
		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-		
		14.50	14.95	0.45	P	4	14	18	-	32	-	-	-	-		
		16.00	16.45	0.45	P	6	16	18	-	34	-	-	-	-		
		17.50	17.95	0.45	P	8	16	24	-	40	-	-	-	-		
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test															
	2. Level at which Artesian Condition experienced and its pressure, if any :															
	3. Water Loss with depth, if any :															
	4. Colour of water during drilling :															
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216				

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-7

Location : N 2436782.0 , E 613456.8

Ground Elevation : (-)2.3m

Method of Boring / Drilling : Shell / Rotary

Water Level : 7.40m a.b.l (max.) at 14:10 hrs on 17/01
4.10m a.b.l (min.) at 09:30 hrs on 19/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-9.78m below bed level

Date : From 17.01.21 To 19.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
19/01	(-)30.3	19.00	19.45	0.45	P	8	18	26	-	44	-	-	-	-	Medium dense brownish to greyish yellow silty fine sand
		20.50	20.95	0.45	P	7	17	27	-	44	-	-	-	-	
		22.00	22.45	0.45	P	8	16	26	-	42	-	-	-	-	
		23.50	23.95	0.45	P	10	22	36	-	58	-	-	-	-	
		25.00	25.45	0.45	P	6	11	21	-	32	-	-	-	-	
		26.50	26.95	0.45	P	10	20	27	-	47	-	-	-	-	Very stiff to hard bluish grey to grey silty clay
		28.00	28.45	0.45	P	6	9	9	-	18	-	-	-	-	
		29.50	30.00	0.50	U	-	-	-	-	-	-	-	-	-	
		31.00	31.45	0.45	P	7	9	15	-	24	-	-	-	-	
		32.50	33.00	0.50	U	-	-	-	-	-	-	-	-	-	
		34.00	34.45	0.45	P	12	20	24	-	44	-	-	-	-	Hard bluish grey sandy silty clay
		35.50	35.95	0.45	P	8	14	22	-	36	-	-	-	-	
		37.00	37.45	0.45	P	8	20	28	-	48	-	-	-	-	
	(-)39.3	38.50	38.95	0.45	P	10	22	32	-	54	-	-	-	-	Medium dense to dense yellowish grey silty fine sand

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-7

Location : N 2436782.0 , E 613456.8

Ground Elevation : (-)2.3m

Method of Boring / Drilling : Shell / Rotary

Water Level : 7.40m a.b.l (max.) at 14:10 hrs on 17/01
4.10m a.b.l (min.) at 09:30 hrs on 19/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-9.78m below bed level

Date : From 17.01.21 To 19.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
	(-)48.3	40.00	40.45	0.45	P	14	30	48	-	78	-	-	-	-	Medium dense to dense yellowish grey silty fine sand
		42.00	42.45	0.45	P	18	42	52	-	94	-	-	-	-	
		44.00	44.40	0.40	P	30	52	50	-	>100	-	-	-	-	
								(10cm)							
		46.00	46.45	0.45	P	14	20	28	-	48	-	-	-	-	
															46.00m
															Hard yellowish grey silty clay

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-8

Location : N 2436618.0 , E 613363.0

Ground Elevation : (-)4.9m

Method of Boring / Drilling : Shell / Rotary

Water Level : 9.40m a.b.l (max.) at 16:00 hrs on 20/01

6.80m a.b.l (min.) at 10:30 hrs on 21/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-12.68m below bed level

Date : From 20.01.21 To 21.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
20/01	(-)4.9	0.00	0.50	0.50	U	-	-	-	-	-	-	-	-	-	Very soft to soft grey silty clay with high silt content
		1.00	1.50	0.50	U	-	-	-	-	-	-	-	-	-	
		1.50	1.95	0.45	P	1	1	1	-	2	-	-	-	-	
	(-)7.9	3.00	3.45	0.45	P	3	4	5	-	9	-	-	-	-	<div style="text-align: center;">3.00m</div> Stiff to very stiff grey to yellowish grey silty clay with occasional presence of calcareous nodules and sand
		4.00	4.50	0.50	U	-	-	-	-	-	-	-	-	-	
		5.50	5.95	0.45	P	5	5	8	-	13	-	-	-	-	
		7.00	7.50	0.50	U	-	-	-	-	-	-	-	-	-	
		8.50	8.95	0.45	P	4	6	6	-	12	-	-	-	-	
		10.00	10.50	0.50	U	-	-	-	-	-	-	-	-	-	
		11.50	11.95	0.45	P	4	6	12	-	18	-	-	-	-	
		13.00	13.50	0.50	U	-	-	-	-	-	-	-	-	-	
21/01	(-)18.4	14.50	14.95	0.45	P	8	16	18	-	34	-	-	-	-	<div style="text-align: center;">13.50m</div> Medium dense / dense brownish yellow to yellowish grey silty fine sand
		16.00	16.45	0.45	P	14	14	18	-	32	-	-	-	-	
		17.50	17.95	0.45	P	18	28	36	-	64	-	-	-	-	

NOTES

1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test
2. Level at which Artesian Condition experienced and its pressure, if any :
3. Water Loss with depth, if any :
4. Colour of water during drilling :

Site Engineer : A.Sarkar

Driller: K.Haldar

Job No.: CCPL/20111216

BORE / DRILL LOG

Project: Geotechnical Investigation by exploration of Marine Bore Holes at
HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II
(OT-II) in Haldia

Bore Hole No. : MBH-8

Location : N 2436618.0 , E 613363.0

Ground Elevation : (-)4.9m

Method of Boring / Drilling : Shell / Rotary

Water Level : 9.40m a.b.l (max.) at 16:00 hrs on 20/01

6.80m a.b.l (min.) at 10:30 hrs on 21/01

Boring / Drilling Equipment : Mechanical Winch (W-4)

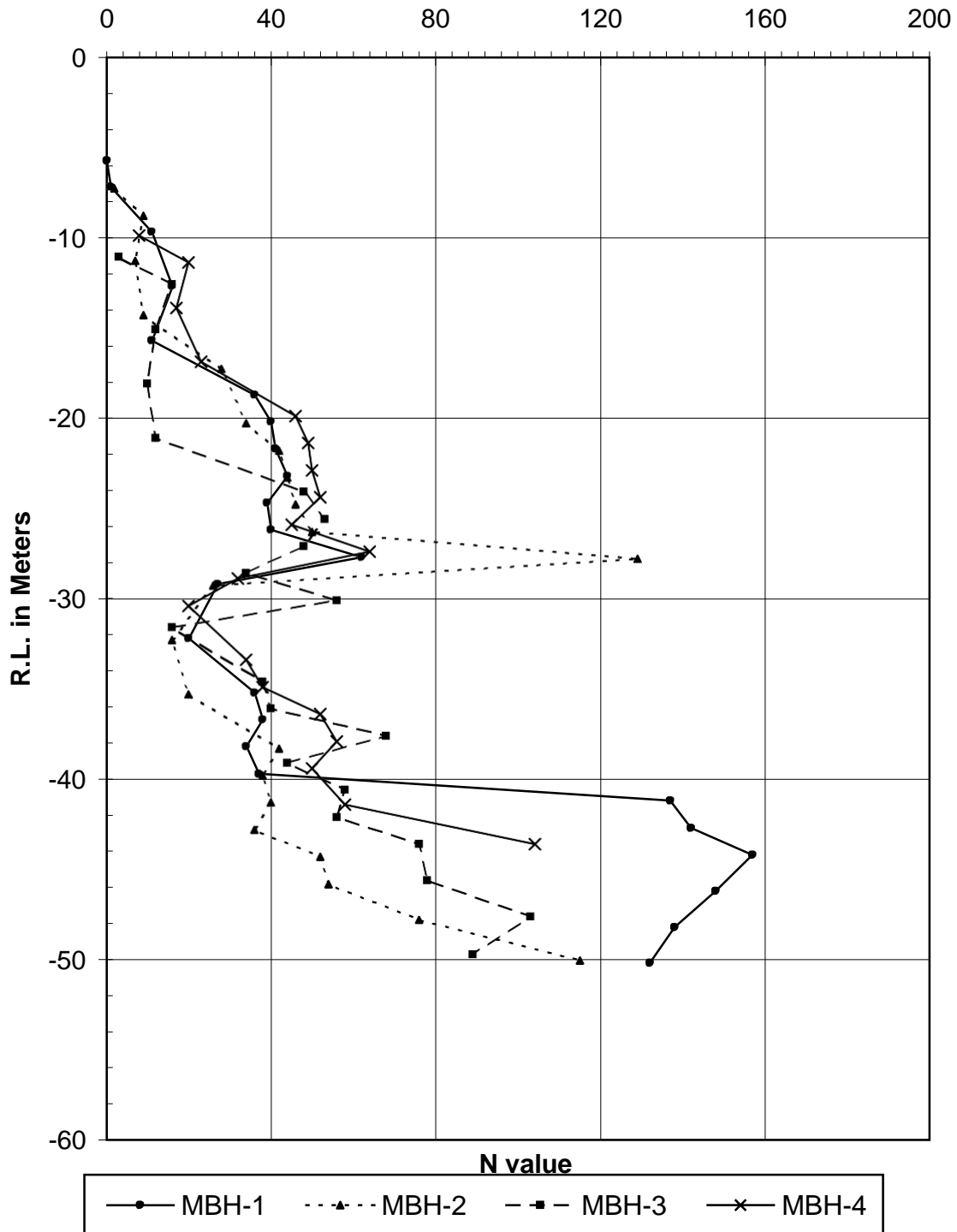
Dia.of Boring / Drilling: Sx (150mm)

Casing Lowered : Sx-12.68m below bed level

Date : From 20.01.21 To 21.01.21

Date (dd / mm)	Elevation (m)	Depth / RUN (m)		Length (m)	Nature of Sampling	SPT : No. of blows					Time Taken (min)	Total length of Core Pieces (m)	Core Recovery (%)	R.Q.D. (%)	Description
		From	To			0-15 cm	15-30 cm	30-45 cm	45-60 cm	N' Value					
	(-)29.9	19.00	19.45	0.45	P	14	28	30	-	58	-	-	-	-	Medium dense / dense brownish yellow to yellowish grey silty fine sand
		20.50	20.95	0.45	P	12	22	28	-	50	-	-	-	-	
		22.00	22.45	0.45	P	10	24	30	-	54	-	-	-	-	
		23.50	23.95	0.45	P	20	36	64	-	100	-	-	-	-	
		25.00	25.45	0.45	P	7	10	13	-	23	-	-	-	-	
		26.50	27.00	0.50	U	-	-	-	-	-	-	-	-	-	
		28.00	28.45	0.45	P	4	7	11	-	18	-	-	-	-	
		29.50	30.00	0.50	U	-	-	-	-	-	-	-	-	-	
		31.00	31.45	0.45	P	10	14	20	-	34	-	-	-	-	
		32.50	32.95	0.45	P	16	18	26	-	44	-	-	-	-	
	34.00	34.45	0.45	P	10	20	29	-	49	-	-	-	-		
	(-)38.9	34.00	(Termination Depth)												25.00m Very stiff to hard bluish to yellowish grey silty clay
NOTES	1. Abbreviation Used : U-Undisturbed Sample C-Core Sample D-Disturbed Sample P-Standard Penetration Test V-Vane Shear Test 2. Level at which Artesian Condition experienced and its pressure, if any : 3. Water Loss with depth, if any : 4. Colour of water during drilling :														
Site Engineer : A.Sarkar						Driller: K.Haldar						Job No.: CCPL/20111216			

GRAPHICAL REPRESENTATION OF FIELD N-VALUE WITH R.L.

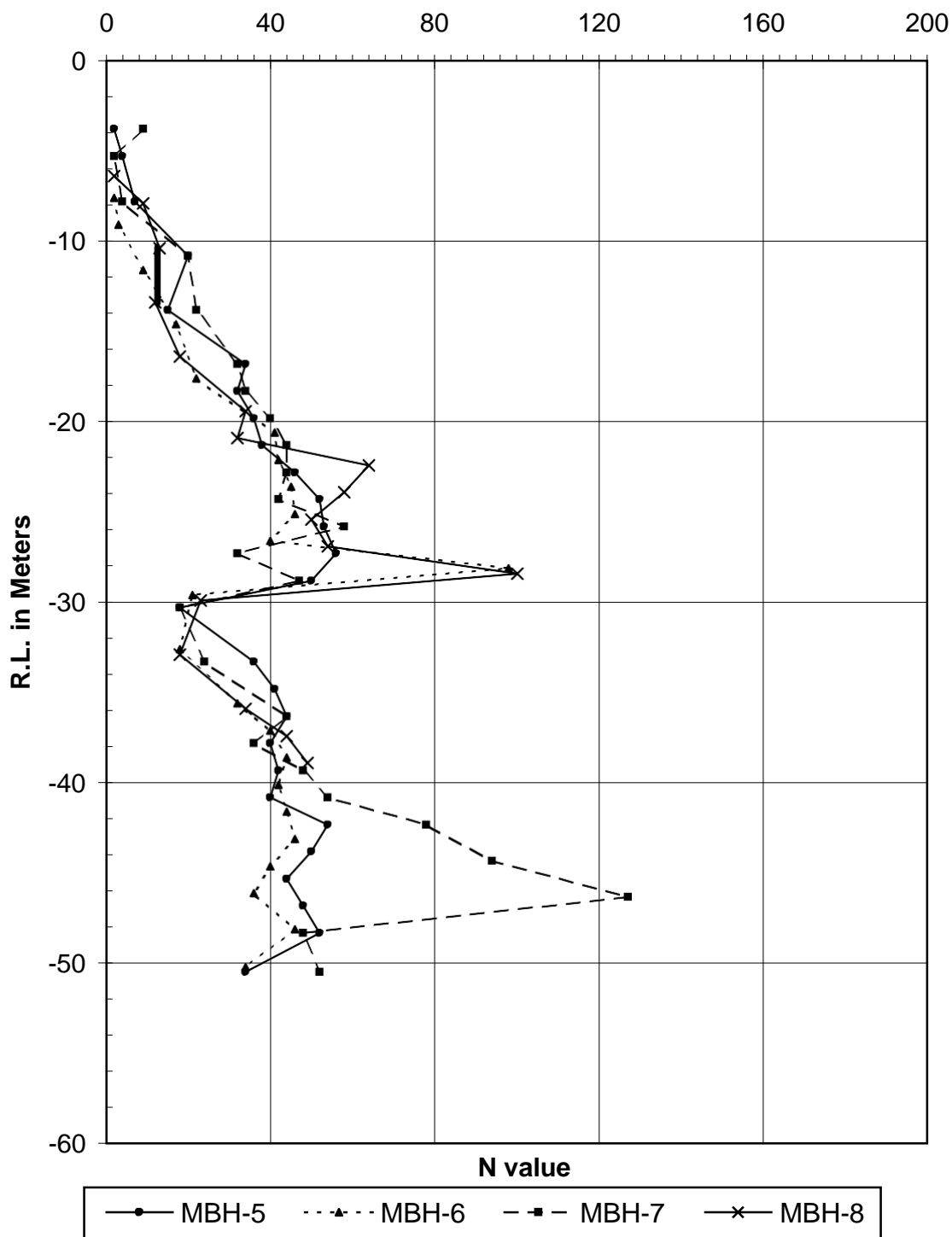


Project : Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.: CCPL/20111216

Fig No.: B/1

GRAPHICAL REPRESENTATION OF FIELD N-VALUE WITH R.L.

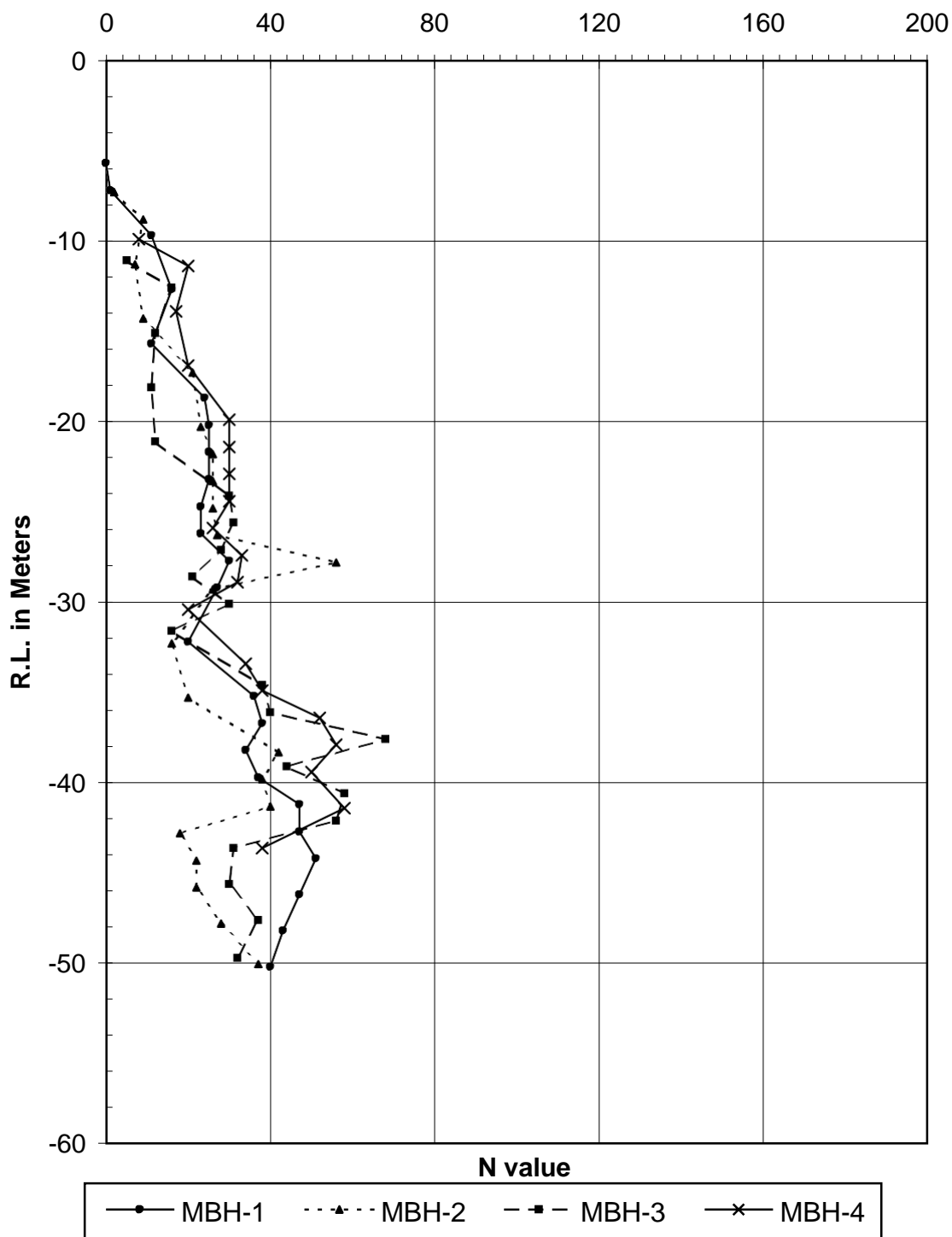


Project : Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.: CCPL/20111216

Fig No.: B/2

GRAPHICAL REPRESENTATION OF CORRECTED N-VALUE WITH R.L.

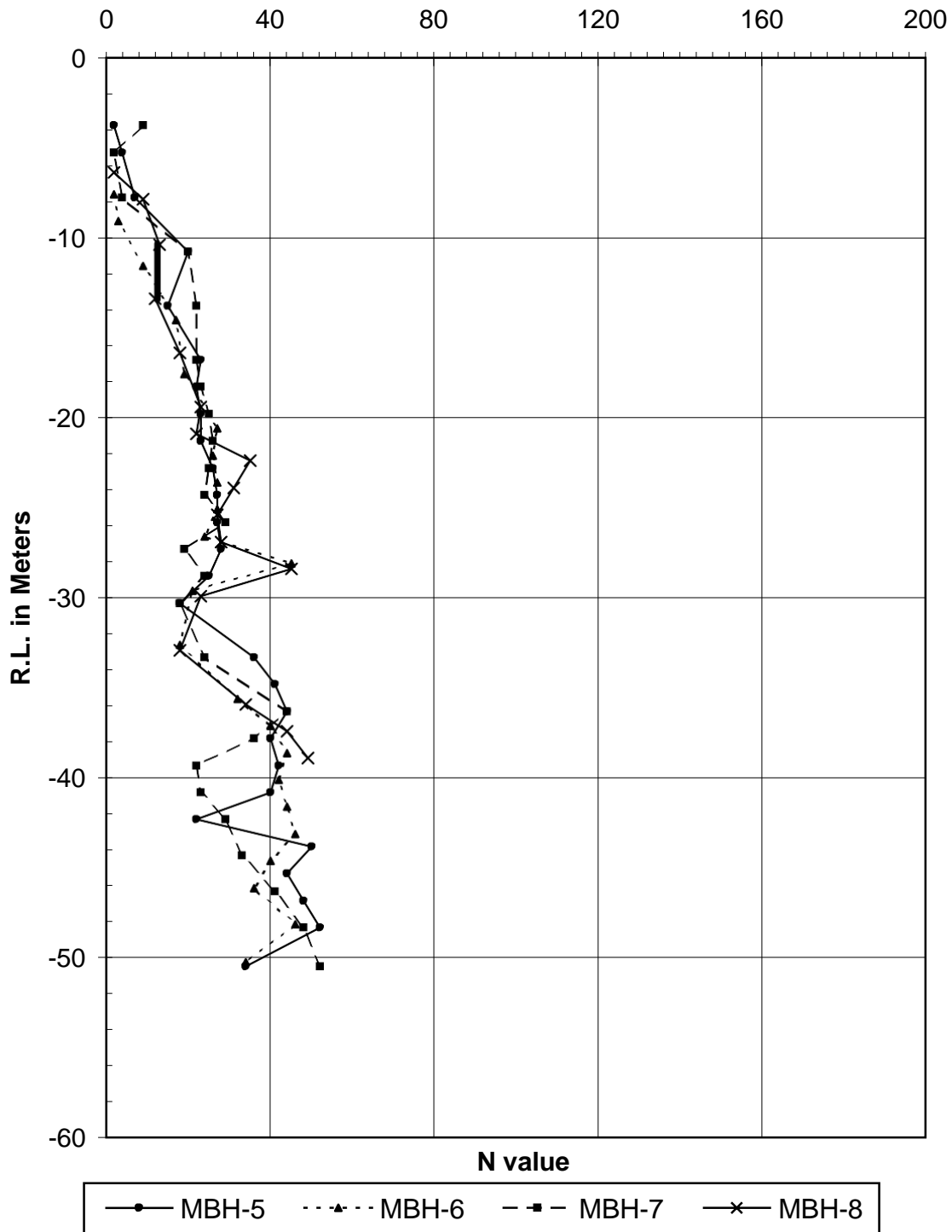


Project : Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.: CCPL/20111216

Fig No.: B/3

GRAPHICAL REPRESENTATION OF CORRECTED N-VALUE WITH R.L.



Project : Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.: CCPL/20111216

Fig No.: B/4

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor	
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀		
MBH-1	0.00	Very soft grey silty clay with high silt content and occasional traces of sand	-	-	-	2.6	80.2	17.2	37.0	1.741	1.271	37.9	20.7	17.2	UU	8	1.5	-	-	-	-	0.36	
	1.00		-	-	-	12.1	78.1	9.8	32.8	1.801	1.356	34.0	21.9	12.1	UU	9	2.0	-	-	-	-	0.40	
	1.50		0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	3.00		1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	4.00	————— 4.00m —————	-	-	-	4.5	57.7	37.8	24.7	1.927	1.545	55.0	20.1	34.9	UC	53	-	2.68	0.2786	0.1606	0.7343	3.46	
	5.50	Stiff bluish grey to greyish yellow silty clay with occasional presence of calcareous nodules and sand	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.00		-	-	5.5	7.7	46.3	40.5	23.7	1.959	1.584	61.0	19.7	41.3	UC	68	-	-	-	-	-	3.65	
	8.50		16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	10.00		-	-	-	22.8	57.8	19.4	24.1	1.947	1.569	39.4	18.5	20.9	UU	54	4.5	2.68	0.2393	0.1401	0.7082	3.47	
	11.50	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	13.00	————— 13.00m —————	-	-	-	79.8	*20.2	23.0	1.980	1.610	Non-plastic			DS	18	34.0	-	-	-	-	-	0.73	
	14.50	Medium dense brownish yellow to yellowish grey silty fine sand; medium dense sandy silt with traces of clay observed at 16.0m depth	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.00		40	25	-	27.4	65.8	6.8	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.48	
	17.50		41	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	19.00		44	25	-	80.9	*19.1	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	0.74
*Combined percentage of silt & clay																							
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																							
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/1-1				

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-1	20.50	Medium dense brownish yellow to yellowish grey silty fine sand; medium dense sandy silt with traces of clay observed at 16.0m depth	39	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22.00		40	23	-	84.1	*15.9	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	0.78
	23.50		62	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	25.00		27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26.50	Very stiff to hard yellowish grey to grey silty clay	-	-	-	0.2	66.9	32.9	24.2	1.974	1.589	47.8	18.5	29.3	UU	93	2.0	2.69	0.1950	0.1152	0.6925	3.93
	28.00		20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	29.50		-	-	-	0.5	69.3	30.2	23.7	1.982	1.602	49.3	20.2	29.1	UU	96	2.5	-	-	-	-	3.96
	31.00		36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	32.50	38	38	-	8.6	52.9	38.5	-	-	-	58.1	20.5	37.6	-	-	-	-	-	-	-	-	-
	34.00	34	34	-	16.4	53.4	30.2	-	-	-	42.4	18.0	24.4	-	-	-	-	-	-	-	-	-
	35.50	Hard bluish grey sandy silty clay	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.00		#137	47	-	69.6	*30.4	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	-
	38.50		#142	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	40.00		#157	51	-	84.4	*15.6	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	-
	42.00	#148	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	44.00	#138	43	0.7	80.0	*19.3	-	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	-
	46.00	#132	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	# Extrapolated N Values for N>100			*Combined percentage of silt & clay																		
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/1-2			



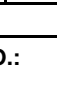
Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor	
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀		
MBH-2	0.00	Very soft / soft grey silty clay with occasional traces of sand	-	-	-	14.3	74.4	11.3	34.5	1.777	1.321	36.1	21.6	14.5	UU	6	2.0	-	-	-	-	0.41	
	1.00		-	-	-	5.3	77.0	17.7	35.0	1.769	1.310	37.6	20.7	16.9	UU	10	1.5	-	-	-	-	0.37	
	1.50		2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	3.00		3.00m		9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	4.00	Firm / stiff bluish to yellowish grey silty clay with occasional presence of calcareous nodules	-	-	1.8	4.1	58.1	36.0	29.1	1.870	1.448	54.1	20.5	33.6	UC	44	-	2.68	0.2707	0.1463	0.8502	3.33	
	5.50		7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	7.00		-	-	-	1.8	75.0	23.2	27.6	1.901	1.490	42.1	20.1	22.0	UU	46	2.0	2.67	0.2657	0.1483	0.7922	3.36	
	10.00		10.00m		-	-	-	82.2	*17.8	25.9	1.934	1.536	Non-plastic			DS	13	33.0	-	-	-	-	0.75
	11.50	Medium dense yellowish brown to yellowish grey silty fine sand	28	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	13.00		-	-	-	84.2	*15.8	24.3	1.941	1.562	Non-plastic			DS	10	33.5	-	-	-	-	-	0.76	
	14.50		34	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	16.00		42	26	-	72.3	*27.7	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.71	
	17.50		44	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	19.00	46	26	-	84.4	*15.6	-	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	0.78
	*Combined percentage of silt & clay																						
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																							
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/2-1				



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor		
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀			
MBH-2	20.50	Medium dense yellowish brown to yellowish grey silty fine sand	50	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	22.00		#129	56	-	81.7	*18.3	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.77			
	23.50	————— 23.50m —————	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	25.00	Very stiff to hard bluish grey to grey silty clay	-	-	-	0.2	68.2	31.6	25.6	1.955	1.557	50.7	20.8	29.9	UU	87	2.5	2.68	0.2334	0.1356	0.7218	3.87		
	26.50		16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	28.00		-	-	-	2.3	50.8	46.9	26.0	1.960	1.556	65.9	21.9	44.0	UC	93	-	-	-	-	-	3.93		
	29.50		20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	31.00		-	-	-	4.5	60.4	35.1	24.8	1.962	1.572	53.7	19.6	34.1	UU	92	4.0	2.68	-	-	-	-		
	32.50	Hard bluish grey sandy silty clay	42	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	34.00		38	38	-	37.6	49.8	12.6	-	-	-	28.8	17.5	11.3	-	-	-	-	-	-	-			
	35.50		40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	37.00		36	18	-	84.2	*15.8	-	-	-	Non-plastic			-	-	-	-	-	-	-	-			
	38.50	Medium dense to dense greyish yellow silty fine sand	52	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	40.00		54	22	-	72.8	*27.2	-	-	-	Non-plastic			-	-	-	-	-	-	-	-			
	42.00		76	28	-	79.7	*20.3	-	-	-	Non-plastic			-	-	-	-	-	-	-	-			
	44.25		#115	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
# Extrapolated N Values for N>100					*Combined percentage of silt & clay																			
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																								
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/2-2					



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor	
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀		
MBH-3	1.50	Stiff grey to bluish grey silty clay with occasional presence of calcareous nodules and sand; loose grey sandy silt with traces of clay observed at 1.5m depth	3	5	-	38.3	57.7	4.0	-	-	-			18.8	36.6		-	-	-	-	-	-	0.52
	3.00		16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4.00		-	-	-	6.3	72.0	21.7	25.0	1.949	1.559	42.2	18.8	23.4	UU	70	3.5	2.68	0.2367	0.1377	0.7188	3.67	
	5.50	7.00m Medium dense / dense brownish yellow silty fine sand; stiff yellowish grey sandy silty clay observed at 10.0m depth	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.00		-	-	-	57.7	33.6	8.7	28.6	1.820	1.415				DS	20	30.0	-	-	-	-	0.62	
	8.50		10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	10.00		-	-	-	25.0	65.0	10.0	25.3	1.923	1.535	33.8	21.7	12.1	UU	52	4.5	2.67	0.2251	0.1294	0.7397	3.44	
	13.00		-	-	-	86.9	*13.1		26.3	1.832	1.451				DS	0	32.0	-	-	-	-	0.78	
	14.50		48	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.00		53	31	-	81.2	*18.8		-	-	-				Non-plastic	-	-	-	-	-	-	-	0.77
	17.50		48	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19.00		34	21	-	87.2	*12.8		-	-	-				Non-plastic	-	-	-	-	-	-	-	0.77
						*Combined percentage of silt & clay																	
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																							
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/3-1				

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor	
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀		
MBH-3	20.50	Medium dense / dense brownish yellow silty fine sand; stiff yellowish grey sandy silty clay observed at 10.0m depth	56	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	22.00	22.00m	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	23.50	Very stiff to hard grey to yellowish grey silty clay	-	-	-	2.5	75.7	21.8	24.4	1.948	1.566	43.8	17.3	26.5	UU	83	2.5	2.68	0.2264	0.1323	0.7115	3.82	
	25.00		38	38	-	4.8	74.8	20.4	-	-	-	40.0	20.0	20.0	-	-	-	-	-	-	-		
	26.50		40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	28.00		68	68	0.2	11.1	76.0	12.7	-	-	-	35.1	20.5	14.6	-	-	-	-	-	-	-		
	29.50	30.00m	44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	31.00	Hard brownish yellow sandy silty clay	58	58	-	12.7	72.8	14.5	-	-	-	34.6	17.7	16.9	-	-	-	-	-	-	-	-	
	32.50		56	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	34.00	34.00m	76	31	-	51.8	*48.2	-	-	-	Non-plastic			-	-	-	-	-	-	-	-		
	36.00	Dense greyish yellow silty fine sand	78	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	38.00		103	37	-	55.7	*44.3	-	-	-	Non-plastic			-	-	-	-	-	-	-	-		
	40.10		89	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
						*Combined percentage of silt & clay																	
	Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/3-2				

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor					
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀						
MBH-4	0.00	Soft grey silty clay with occasional traces of sand;	-	-	-	74.6	*25.4	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.70						
	1.00	very loose / loose grey silty fine sand observed at the top	-	-	0.3	11.3	55.2	33.2	33.0	1.800	1.353	50.7	18.3	32.4	UU	14	2.5	-	-	-	0.61						
	1.50	1.50m	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	3.00	Stiff to very stiff grey to bluish grey silty clay with occasional presence of calcareous nodules and sand	20	20	6.7	12.0	45.8	35.5	-	-	-	**53.5	18.0	35.5	-	-	-	-	-	-	-						
	4.00		-	-	-	18.3	53.7	28.0	23.4	1.970	1.596	44.7	18.0	26.7	UU	81	3.5	2.68	0.1923	0.1146	0.6787	3.80					
	5.50		17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	7.00	7.00m	-	-	-	62.0	31.6	6.4	25.6	1.915	1.525	Non-plastic			DS	14	32.5	-	-	-	-	0.59					
	8.50	Medium dense / dense greyish yellow silty fine sand	23	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	10.00		-	-	-	80.7	*19.3	-	24.1	1.938	1.562	Non-plastic			DS	11	33.5	-	-	-	-	0.73					
	11.50		46	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	13.00		49	30	-	80.4	*19.6	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.75					
	14.50		50	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	16.00		52	30	-	79.6	*20.4	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.75					
	17.50		45	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	19.00		64	33	-	84.4	*15.6	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.79					
*Combined percentage of silt & clay																							**LL & PL conducted on sample passing through 425 micron sieve				
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																											
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																JOB NO.: CCPL/20111216			TABLE NO.: C/4-1								



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor	
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀		
MBH-4	20.50	———— 20.50m ————	32	32	-	1.7	65.0	33.3	-	-	-	51.3	20.9	30.4	-	-	-	-	-	-	-	-	
	22.00	Very stiff to hard yellowish grey to grey silty clay	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	23.50		-	-	-	3.1	72.1	24.8	25.7	1.954	1.554	44.2	19.7	24.5	UU	89	3.0	2.67	0.2059	0.1199	0.7176	3.89	
	25.00		34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	26.50		38	38	-	2.5	75.9	21.6	-	-	-	41.7	20.8	20.9	-	-	-	-	-	-	-	-	
	28.00		52	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	29.50	56	56	-	4.5	74.4	21.1	-	-	-	41.2	21.1	20.1	-	-	-	-	-	-	-	-	-	
	31.00	———— 31.00m ————	50	50	-	25.5	64.7	9.8	-	-	-	28.4	19.1	9.3	-	-	-	-	-	-	-	-	-
	33.00	Hard bluish grey to brownish yellow sandy silty clay	58	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	35.20		———— 34.00m ————	104	38	-	61.2	*38.8	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	-
*Combined percentage of silt & clay																							
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																							
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/4-2				

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-5	1.00	Soft to firm grey silty clay with occasional traces of sand	-	-	12.2	8.9	51.8	27.1	33.1	1.811	1.361	**54.9	18.7	36.2	UU	16	2.5	-	-	-	-	1.81
	1.50		2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	3.00		4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	4.00		-	-	2.3	12.9	75.0	9.8	28.4	1.876	1.461	34.6	21.9	12.7	UU	27	4.5	-	-	-	-	3.04
	5.50	7.00m Stiff / very stiff brownish yellow silty clay with occasional presence of calcareous nodules and sand	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.00		-	-	-	10.6	55.2	34.2	23.1	1.965	1.596	45.4	18.9	26.5	UC	78	-	2.67	0.2354	0.1407	0.6726	3.77
	8.50		20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10.00		-	-	-	7.8	64.8	27.4	23.6	1.960	1.586	45.8	19.7	26.1	UU	72	2.5	2.68	0.2233	0.1321	0.6900	3.70
	11.50		15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13.00		-	-	-	71.1	*28.9	-	24.9	1.922	1.539	Non-plastic			DS	12	33.0	-	-	-	-	0.63
	14.50		34	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.00		32	22	-	83.5	*16.5	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.78
	17.50	36	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	19.00	38	23	-	79.5	*20.5	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.72	
					*Combined percentage of silt & clay							**LL & PL conducted on sample passing through 425 micron sieve										
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216			TABLE NO.: C/5-1		



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-5	20.50	Medium dense yellowish grey to brownish yellow silty fine sand	46	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	22.00		52	27	-	77.5	*22.5	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.73	
	23.50		53	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	25.00		56	28	-	79.6	*20.4	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.74	
	26.50	Very stiff to hard yellowish grey to grey silty clay	50	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	28.00		18	18	-	1.5	66.2	32.3	-	-	-	51.1	20.5	30.6	-	-	-	-	-	-	-	
	29.50		-	-	-	0.3	64.2	35.5	26.1	1.950	1.546	57.1	21.8	35.3	UU	86	1.0	2.69	0.2460	0.1414	0.7395	3.85
	31.00		36	36	-	1.8	68.4	29.8	-	-	-	49.0	20.7	28.3	-	-	-	-	-	-	-	
	32.50		41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	34.00		44	44	-	4.9	74.5	20.6	-	-	-	39.6	20.5	19.1	-	-	-	-	-	-	-	
	35.50		40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	37.00		42	42	-	14.5	68.1	17.4	-	-	-	35.5	19.9	15.6	-	-	-	-	-	-	-	
	38.50		40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	40.00		54	22	-	73.1	*26.9	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	
	41.50		50	50	-	14.0	67.7	18.3	-	-	-	37.5	20.8	16.7	-	-	-	-	-	-	-	
	43.00		44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	44.50		48	48	-	22.6	63.3	14.1	-	-	-	35.7	21.1	14.6	-	-	-	-	-	-	-	
	46.00		52	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	48.15		34	34	-	1.4	67.7	30.9	-	-	-	49.6	21.1	28.5	-	-	-	-	-	-	-	
	*Combined percentage of silt & clay																					
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia															JOB NO.: CCPL/20111216			TABLE NO.: C/5-2				




Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G_s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	ϕ (degrees)		C_c	$\frac{C_c}{1+e_0}$	Void Ratio, e_0	
MBH-6	1.00	Soft grey silty clay	-	-	-	8.5	54.3	37.2	33.5	1.809	1.355	56.2	19.3	36.9	UU	17	2.0	-	-	-	-	0.41
	1.50		2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3.00		3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4.00	4.00m	-	-	6.2	6.9	45.6	41.3	26.0	1.905	1.512	57.2	16.5	40.7	UC	45	-	2.68	0.2529	0.1427	0.7726	3.34
	5.50	Stiff bluish to yellowish grey silty clay with occasional presence of calcareous nodules; silty sandy clay observed at 7.0m depth	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.00		-	-	-	42.5	39.7	17.8	25.7	1.920	1.527	37.8	20.7	17.1	UU	40	4.0	2.67	0.1934	0.1106	0.7480	3.26
	8.50		17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8.50m						3.6														
	13.00		-	-	-	72.3	*27.7		26.1	1.907	1.512				DS	10	32.5	-	-	-	-	0.71
	14.50		41	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.00		42	26	-	59.1	*40.9		-	-	-				Non-plastic	-	-	-	-	-	-	0.65
	17.50		45	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19.00		46	27	-	84.7	*15.3		-	-	-				Non-plastic	-	-	-	-	-	-	0.77
*Combined percentage of silt & clay																						
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/6-1			



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-6	20.50	Medium dense to dense brownish to greyish yellow silty fine sand	40	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22.00		98	45	-	81.3	*18.7	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.74	
	23.50	23.50m Very stiff to hard yellowish grey silty clay	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	25.00		-	-	-	0.7	73.9	25.4	25.3	1.963	1.567	47.3	21.0	26.3	UU	91	1.5	-	-	-	3.91	
	26.50		18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	28.00		-	-	-	0.2	69.5	30.3	25.9	1.957	1.554	53.2	22.7	30.5	UU	88	2.0	2.68	0.2514	0.1458	0.7241	3.88
	29.50		32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	31.00		40	40	-	1.3	71.5	27.2	-	-	-	44.1	21.2	22.9	-	-	-	-	-	-	-	-
	32.50		44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	34.00		42	42	-	1.8	79.3	18.9	-	-	-	39.3	20.0	19.3	-	-	-	-	-	-	-	-
	35.50		44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.00		46	46	-	0.9	77.6	21.5	-	-	-	39.3	21.4	17.9	-	-	-	-	-	-	-	-
	38.50		40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	40.00		36	36	-	1.1	72.2	26.7	-	-	-	45.4	18.9	26.5	-	-	-	-	-	-	-	-
	42.00		46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	44.10		34	34	-	1.4	76.8	21.8	-	-	-	40.2	19.1	21.1	-	-	-	-	-	-	-	-
					*Combined percentage of silt & clay																	
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																JOB NO.: CCPL/20111216		TABLE NO.: C/6-2				



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G_s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	ϕ (degrees)		C_c	$\frac{C_c}{1+e_0}$	Void Ratio, e_0	
MBH-7	1.00	Soft / firm grey silty clay with occasional high silt content; soft grey silty clay with traces of decomposed wood observed from 4.0m depth	-	-	-	5.5	83.6	10.9	33.4	1.793	1.344	37.4	23.1	14.3	UU	12	2.0	-	-	-	-	0.37
	1.50		9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	3.00		2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	4.00		-	-	-	1.2	67.6	31.2	43.5	1.737	1.210	55.7	26.2	29.5	UU	18	2.0	2.63	0.6311	0.2905	1.1728	0.36
	5.50	7.00m Very stiff yellowish grey silty clay	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.00		-	-	-	5.2	58.6	36.2	25.2	1.953	1.560	59.3	18.5	40.8	UC	86	-	-	-	-	-	3.85
	8.50		20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	10.00		-	-	-	5.5	76.1	18.4	23.3	1.966	1.594	38.1	19.2	18.9	UU	91	2.5	2.67	0.2136	0.1275	0.6745	3.91
	11.50		22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	13.00		13.00m Medium dense brownish to greyish yellow silty fine sand	-	-	-	77.9	*22.1	-	26.2	1.946	1.542	Non-plastic			DS	5	33.0	-	-	-	-
	14.50	32		22	-	72.8	*27.2	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.69	
	16.00	34		23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17.50	40		25	-	68.9	*31.1	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.66	
	19.00	44		26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Combined percentage of silt & clay																						
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/7-1			

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-7	20.50	Medium dense brownish to greyish yellow silty fine sand	44	25	-	74.9	*25.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.65
	22.00		42	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23.50		58	29	-	68.7	*31.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.64
	25.00		32	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26.50		47	24	3.8	81.1	*15.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.41
	28.00	————— 28.00m —————	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	29.50	Very stiff to hard bluish grey to grey silty clay	-	-	-	0.3	72.1	27.6	24.8	1.967	1.576	45.9	21.7	24.2	UU	91	2.0	2.68	0.2284	0.1343	0.7004	3.91
	31.00		24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	32.50		-	-	-	4.5	71.3	24.2	23.5	1.980	1.603	44.8	20.0	24.8	UU	98	2.5	-	-	-	-	-
	34.00		44	44	-	0.7	51.1	48.2	-	-	-	58.8	20.1	38.7	-	-	-	-	-	-	-	-
	35.50	————— 35.50m —————	36	36	-	17.7	58.9	23.4	-	-	-	38.9	16.9	22.0	-	-	-	-	-	-	-	-
		Hard bluish grey sandy silty clay																				
	37.00		————— 37.00m —————	48	22	-	51.9	*48.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	38.50		Medium dense to dense yellowish grey silty fine sand	54	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	40.00			78	29	-	76.8	*23.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	42.00		94	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Combined percentage of silt & clay																						
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																JOB NO.: CCPL/20111216		TABLE NO.: C/7-2				



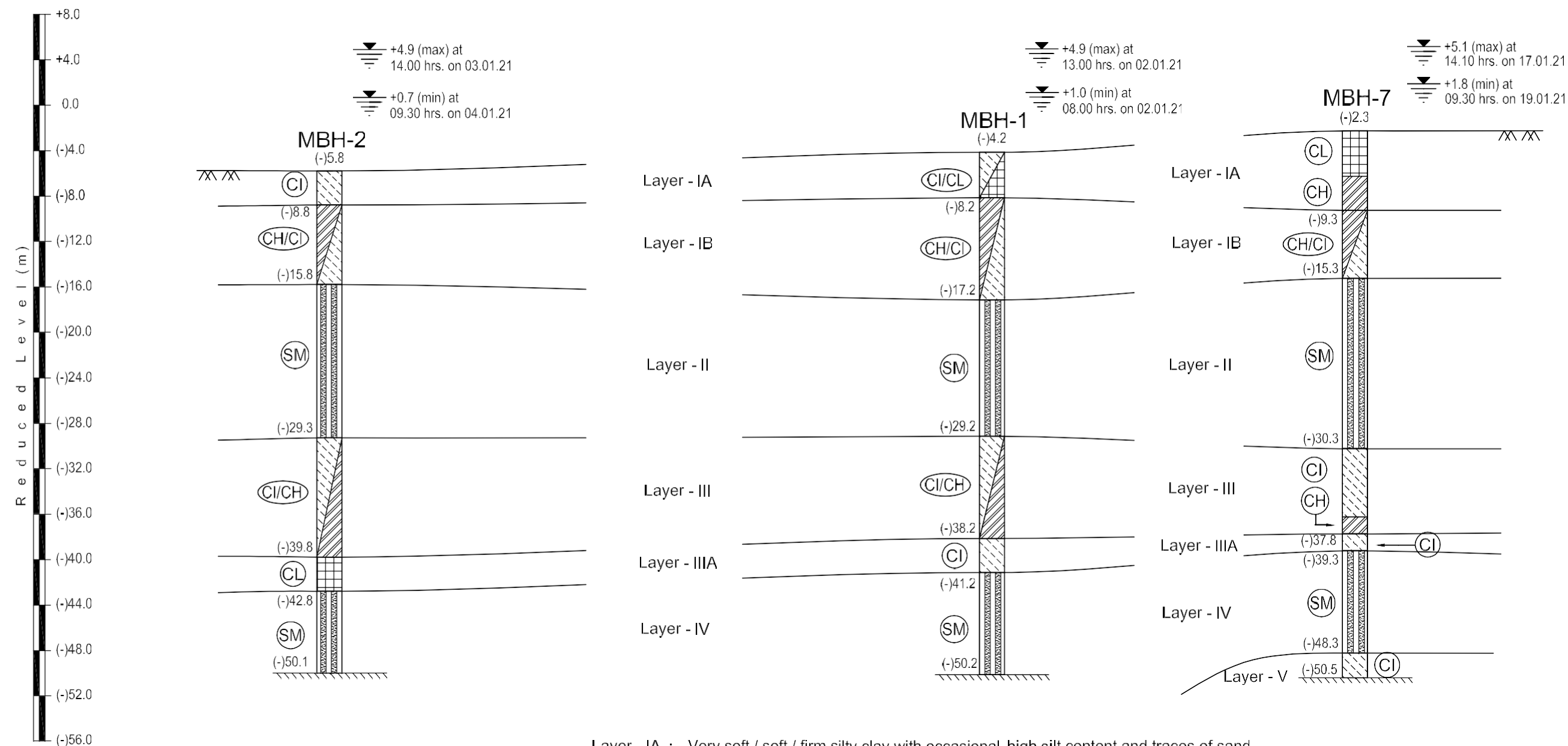
Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-7	44.00	Medium dense to dense yellowish grey silty fine sand	#127	41	-	82.9	*17.1	-	-	-	Non-plastic			-	-	-	-	-	-	-	-	
	46.00	46.00m	48	48	-	9.7	64.6	25.7	-	-	-	43.8	23.4	20.4	-	-	-	-	-	-	-	
	48.15	Hard yellowish grey silty clay	52	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	# Extrapolated N Values for N>100			*Combined percentage of silt & clay																		
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																JOB NO.: CCPL/20111216		TABLE NO.: C/7-3				



Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G _s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	φ (degrees)		C _c	$\frac{C_c}{1+e_0}$	Void Ratio, e ₀	
MBH-8	0.00	Very soft to soft grey silty clay with high silt content	-	-	-	5.5	83.9	10.6	33.3	1.763	1.323	34.3	21.3	13.0	-	-	-	-	-	-	-	-
	1.00		-	-	-	5.9	85.1	9.0	32.7	1.806	1.361	34.8	23.0	11.8	UU	10	3.0	-	-	-	-	0.37
	1.50		2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3.00	———— 3.00m ————	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4.00	Stiff to very stiff grey to yellowish grey silty clay with occasional presence of calcareous nodules and sand	-	-	10.3	7.6	50.0	32.1	25.9	1.903	1.512	50.2	18.6	31.6	UU	45	2.5	2.69	0.2655	0.1492	0.7797	3.34
	5.50		13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.00		-	-	1.1	3.0	57.9	38.0	25.5	1.937	1.543	50.5	18.6	31.9	UC	55	-	-	-	-	-	3.48
	8.50		12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10.00		-	-	-	9.5	77.6	12.9	24.2	1.951	1.571	33.0	22.5	10.5	UU	72	4.0	2.67	0.2275	0.1338	0.6997	3.70
	11.50		18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13.00		-	-	-	18.0	70.7	11.3	23.5	1.959	1.586	34.9	21.0	13.9	UU	77	3.0	-	-	-	-	3.75
	14.50	———— 13.50m ————	34	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.00	Medium dense / dense brownish yellow to yellowish grey silty fine sand	32	22	-	77.4	*22.6	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.75
	17.50		64	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19.00		58	31	-	67.6	*32.4	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.70
*Combined percentage of silt & clay																						
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/8-1			

Bore Hole Number	Depth below G.L. in ' m'	Description	Standard Penetration Resistance 'N' Value	Corrected 'N' Value	Grain Size Analysis				Density and Moisture Test			Atterberg Limits			Shear Strength Parameters			Specific Gravity G_s	Consolidation Characteristics			Silt Factor
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Natural Moisture Content (%)	Bulk Density (gms/cc)	Dry Density (gms/cc)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Type of Test	C (kPa)	ϕ (degrees)		C_c	$\frac{C_c}{1+e_0}$	Void Ratio, e_0	
MBH-8	20.50	Medium dense / dense brownish yellow to yellowish grey silty fine sand	50	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22.00		54	28	-	86.6	*13.4	-	-	-	-	Non-plastic			-	-	-	-	-	-	-	0.73
	23.50		100	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	25.00	25.00m Very stiff to hard bluish to yellowish grey silty clay	23	23	0.1	2.1	65.1	32.7	-	-	-	51.4	24.4	27.0	-	-	-	-	-	-	-	-
	26.50	Very stiff to hard bluish to yellowish grey silty clay	-	-	-	0.3	75.8	23.9	25.2	1.960	1.565	52.5	22.2	30.3	UU	92	2.0	2.68	0.2296	0.1341	0.7119	3.92
	28.00		18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	29.50		-	-	0.5	3.8	72.2	23.5	22.5	2.024	1.652	42.3	18.0	24.3	UU	122	4.5	-	-	-	-	4.21
	31.00		34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	32.50		44	44	5.4	5.0	76.8	12.8	-	-	-	34.8	21.2	13.6	-	-	-	-	-	-	-	-
	34.00		49	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Combined percentage of silt & clay																						
Abbreviations used : (i) UU = Unconsolidated Undrained Triaxial Test (ii) UC = Unconfined Compressive Strength (iii) DS = Direct Shear test																						
Bore hole data and Laboratory test results of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia																	JOB NO.: CCPL/20111216		TABLE NO.: C/8-2			



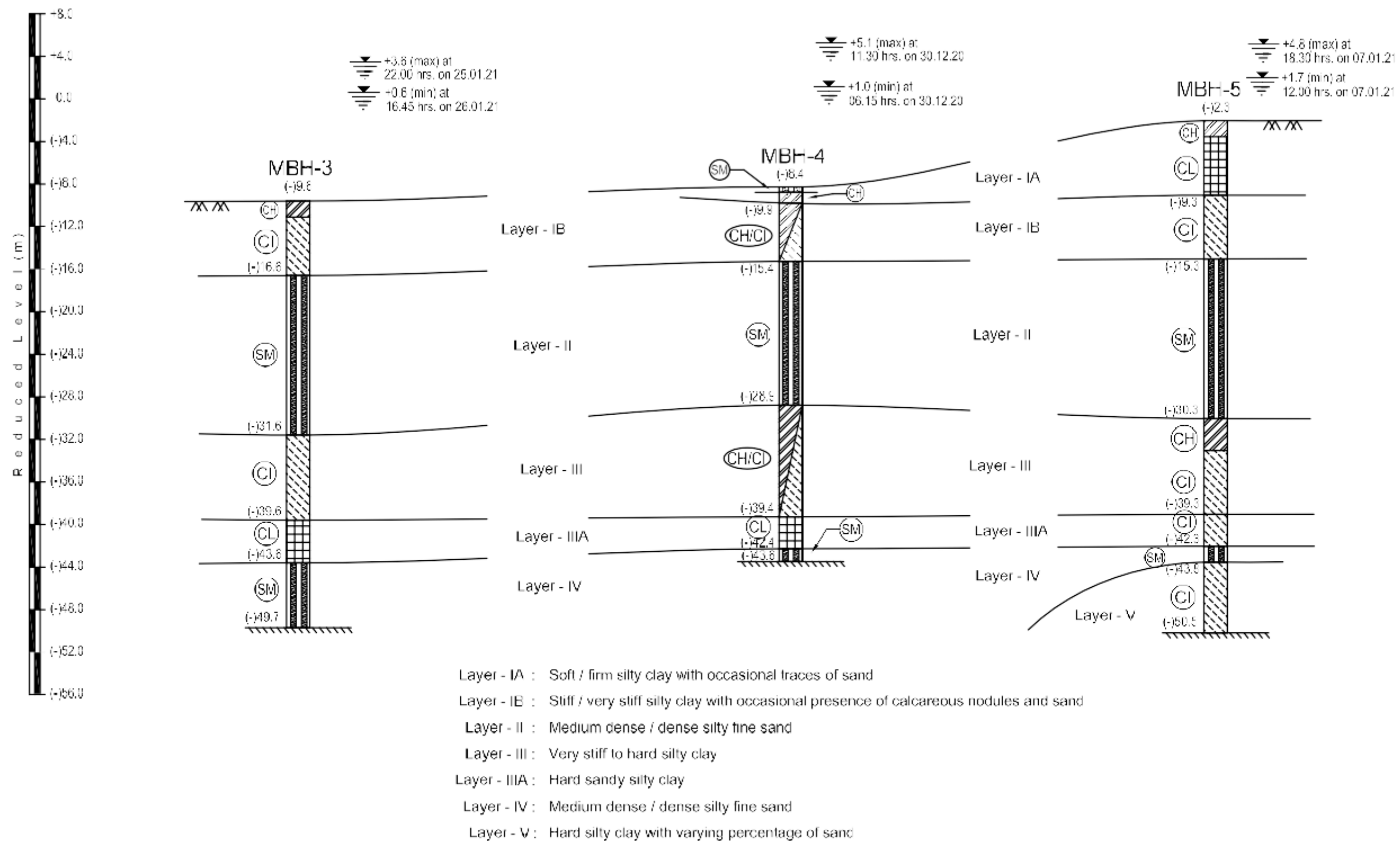


Generalised Soil Profile for Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and Upcoming Outer Terminal-II (OT-II) in Haldia

Job No.:
 CCPL/20111216

Scale : Vertical : 1:400
 Horizontal : 1:500

Figure No.: D/1

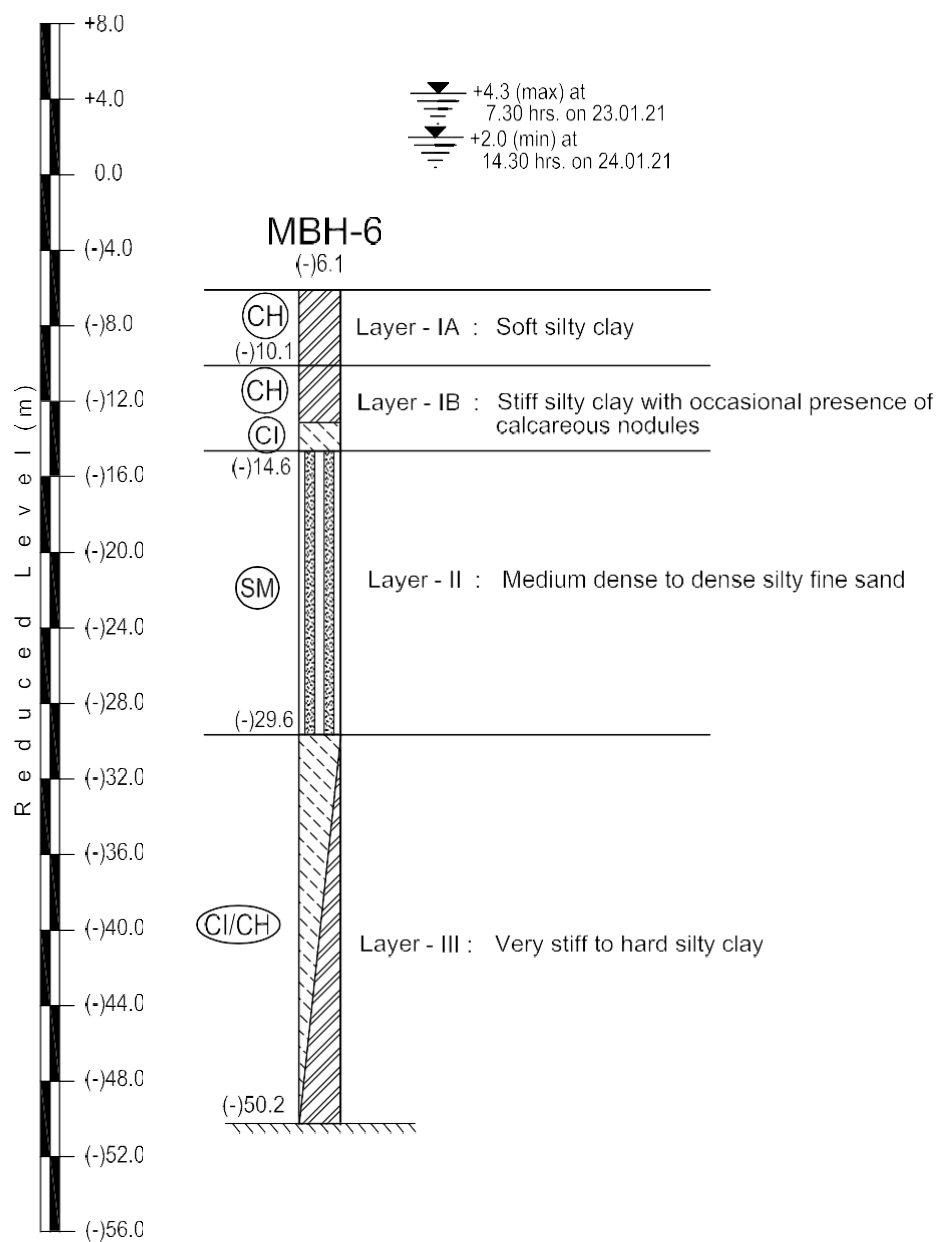


Generalised Soil Profile for Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and Upcoming Outer Terminal-II (OT-II) in Haldia

Job No.:
CCPL/20111216

Scale : Vertical : 1:400
Horizontal : 1:400

Figure No.: D/2

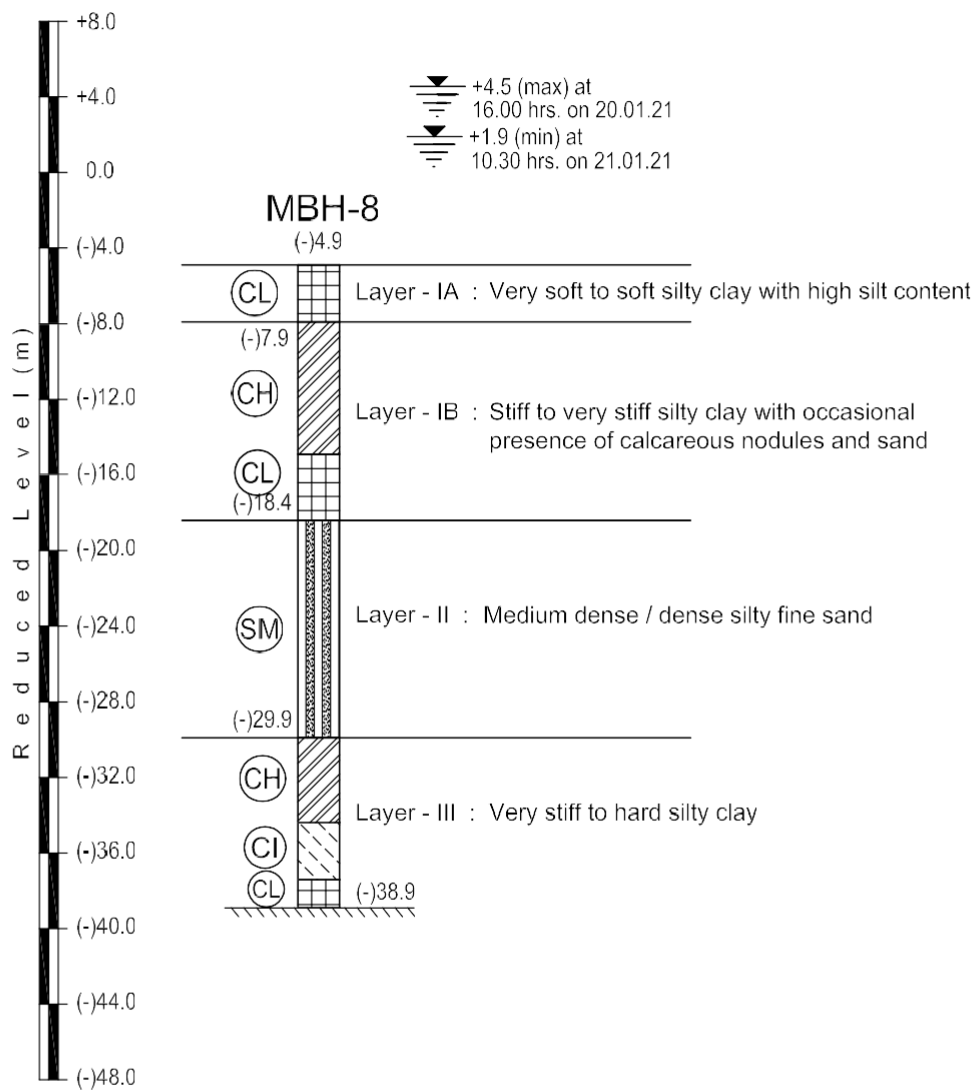


Generalised Soil Profile for Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and Upcoming Outer Terminal-II (OT-II) in Haldia

Job No.:
CCPL/20101216

Scale : Vertical : 1:400

Figure No.: D/3



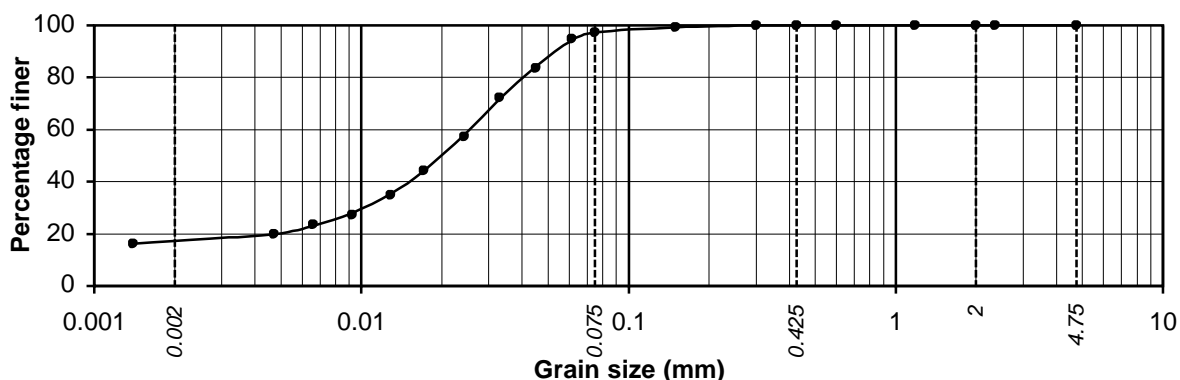
Generalised Soil Profile for Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and Upcoming Outer Terminal-II (OT-II) in Haldia

Job No.:
CCPL/20101216

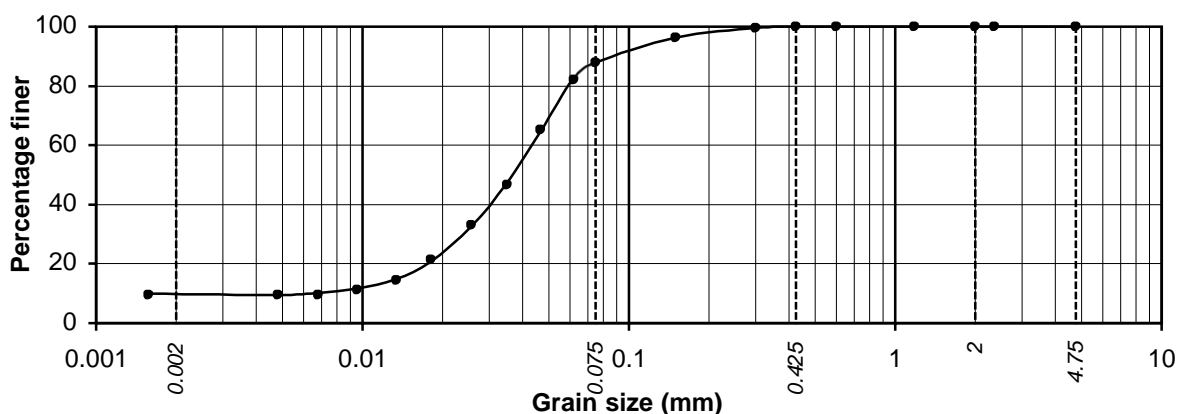
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Figure No.: D/4

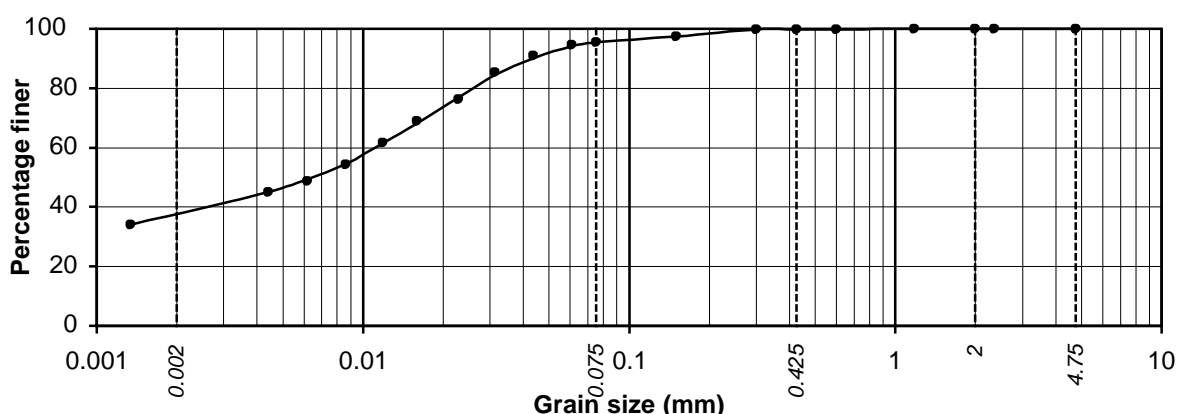
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-1, 0.00m	17.2	80.2	2.6	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-1, 1.00m	9.8	78.1	12.1	0.0	0.0	0.0



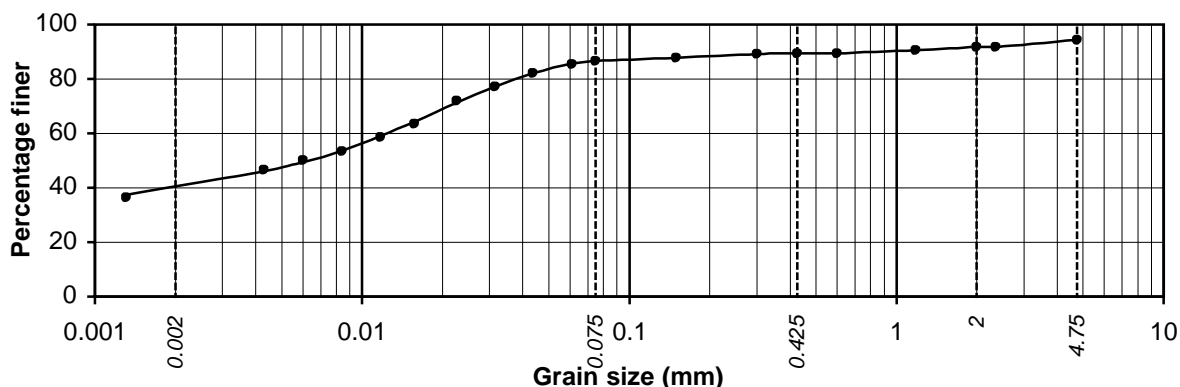
Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-1, 4.00m	37.8	57.7	4.3	0.2	0.0	0.0

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

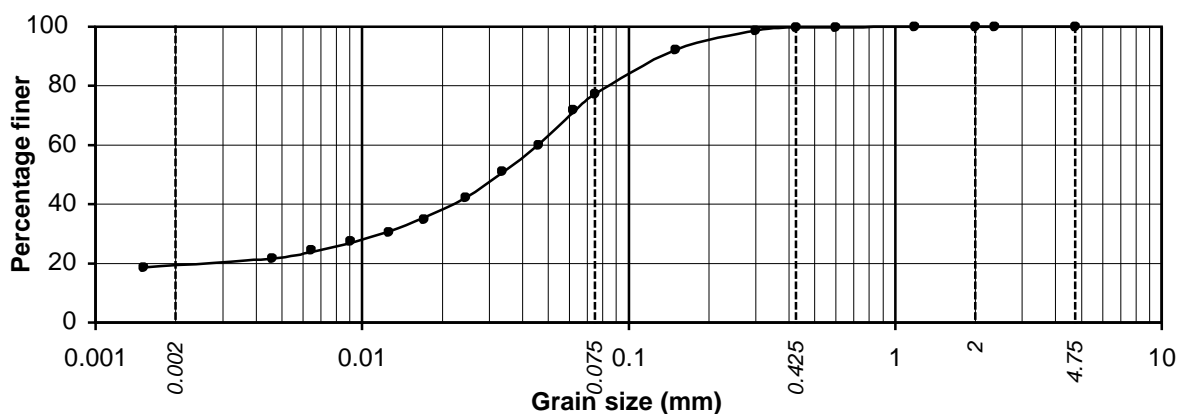
Job No.
CCPL/20111216

Fig. No.
E/1

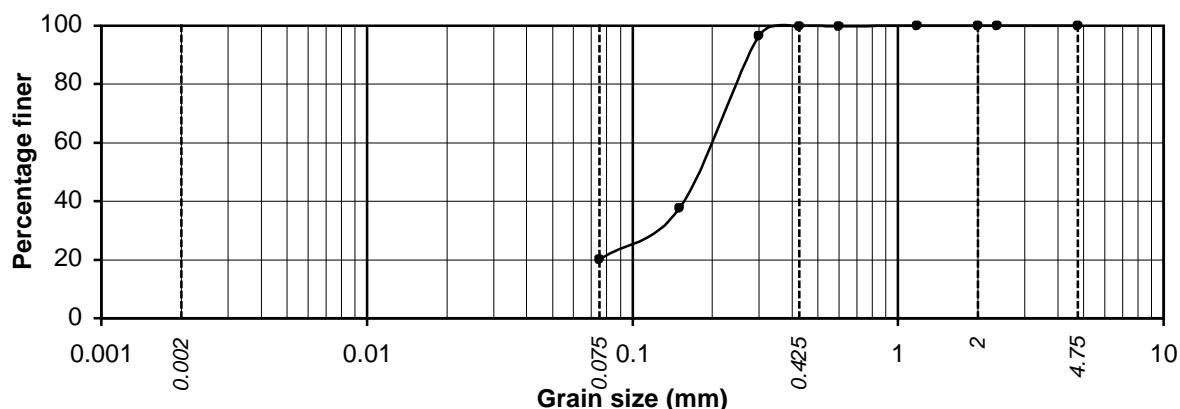
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 7.00m	40.5	46.3	2.6	2.5	2.6	5.5



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 10.00m	19.4	57.8	22.5	0.3	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 13.00m	*20.2	79.6	0.2	0.0	0.0	0.0

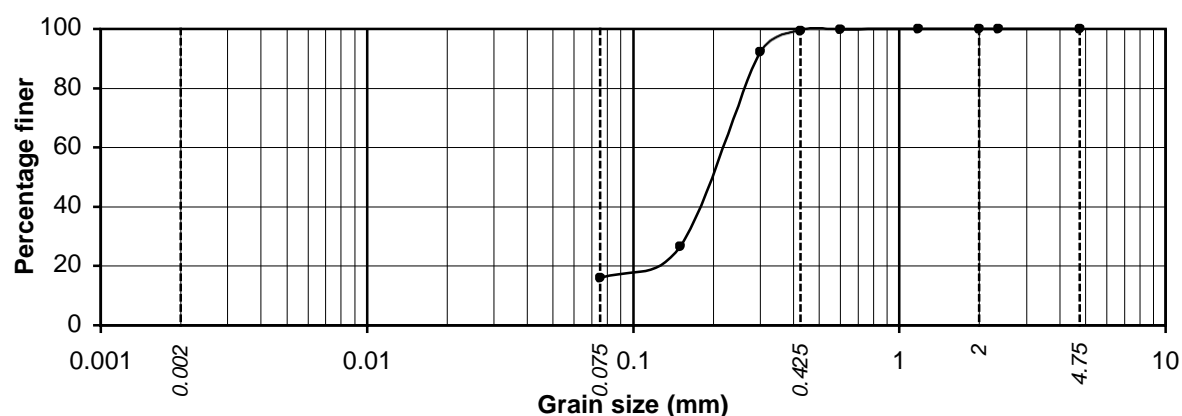
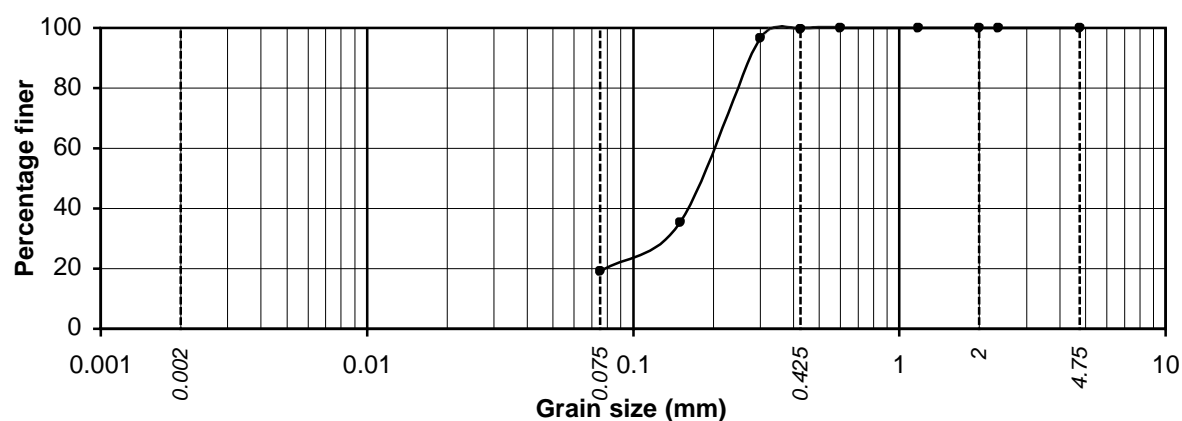
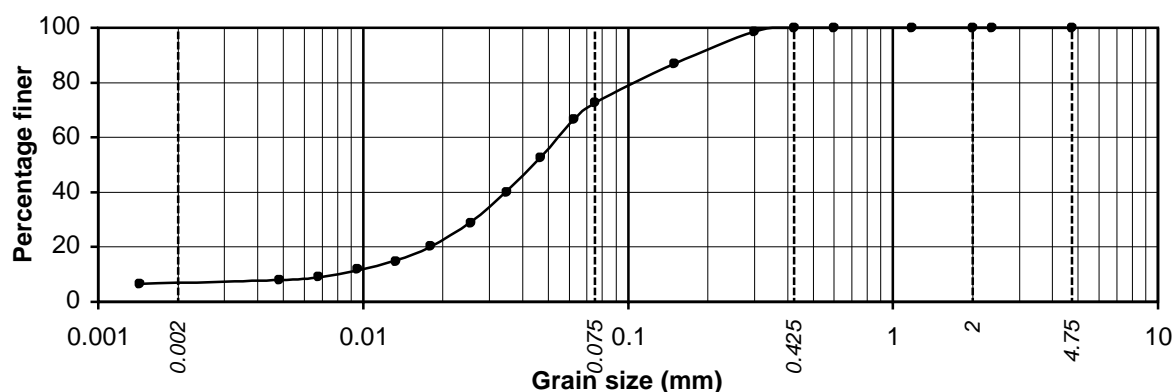
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
E/2

GRAIN SIZE DISTRIBUTION CURVES



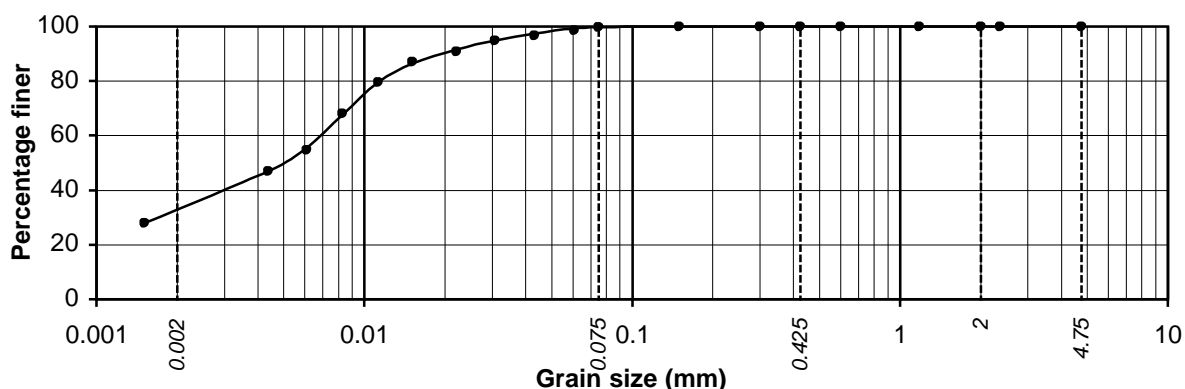
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

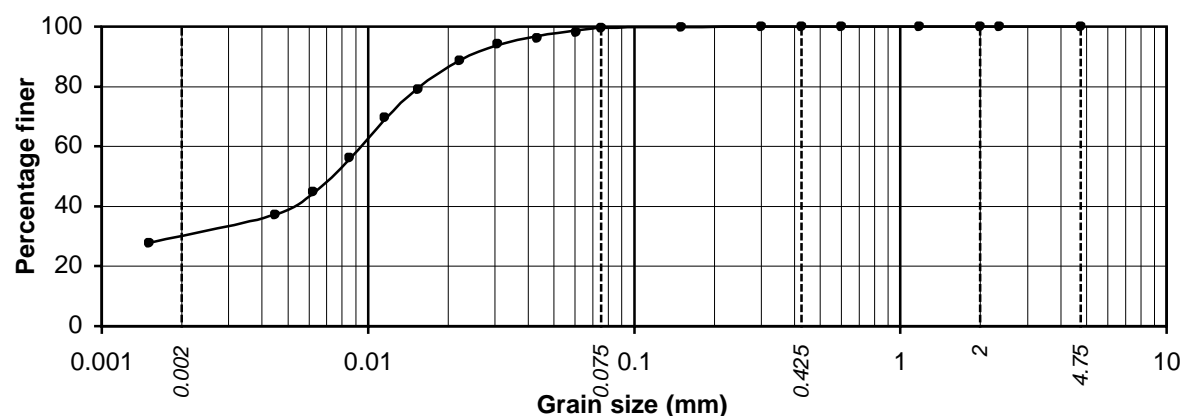
Job No.
CCPL/20111216

Fig. No.
E/3

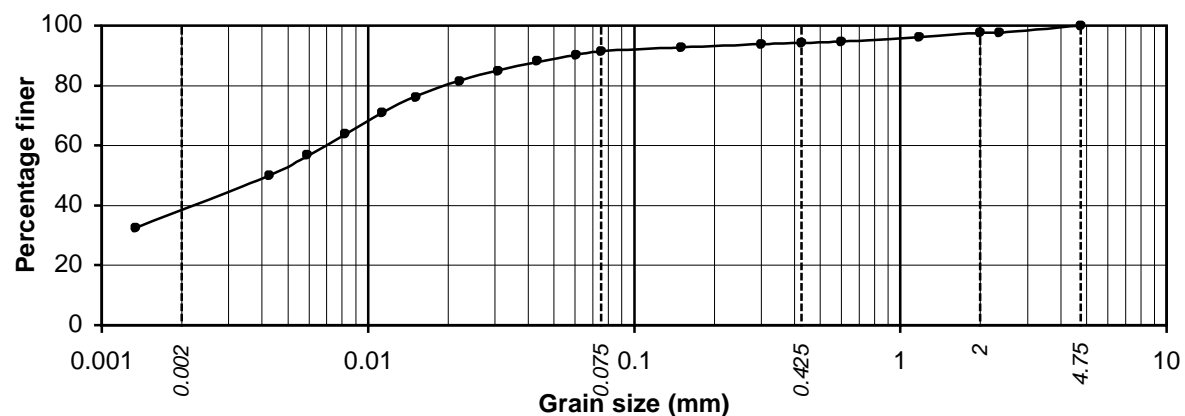
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 26.50m	32.9	66.9	0.2	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 29.50m	30.2	69.3	0.5	0.0	0.0	0.0

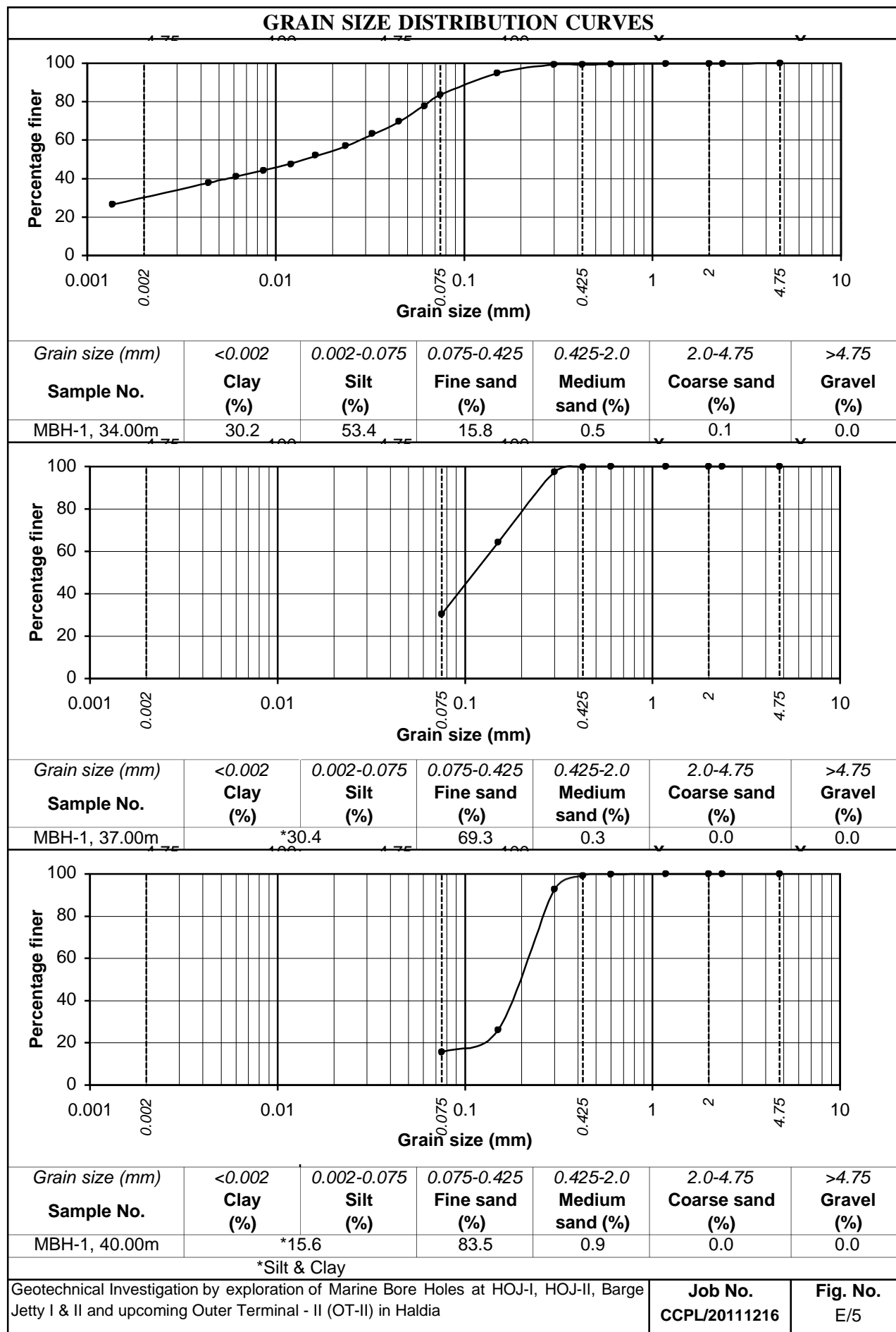


Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 32.50m	38.5	52.9	2.8	3.4	2.4	0.0

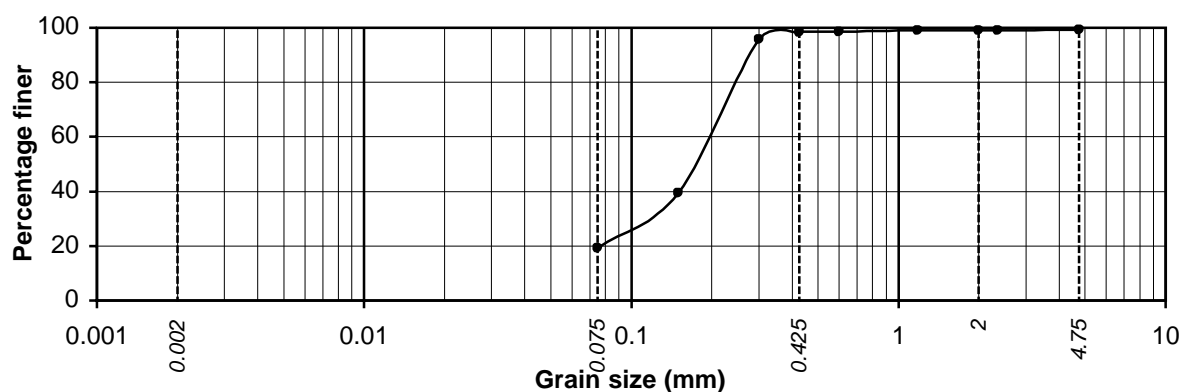
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
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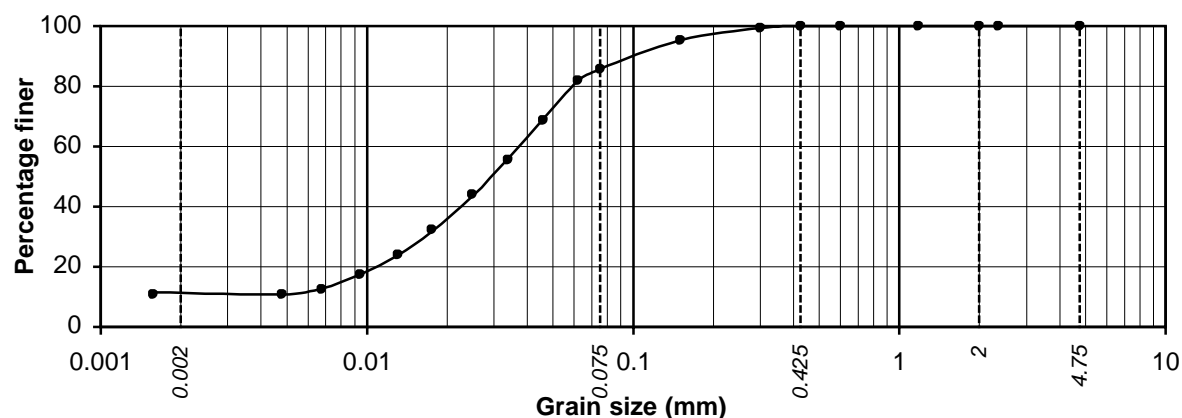
Fig. No.
E/4



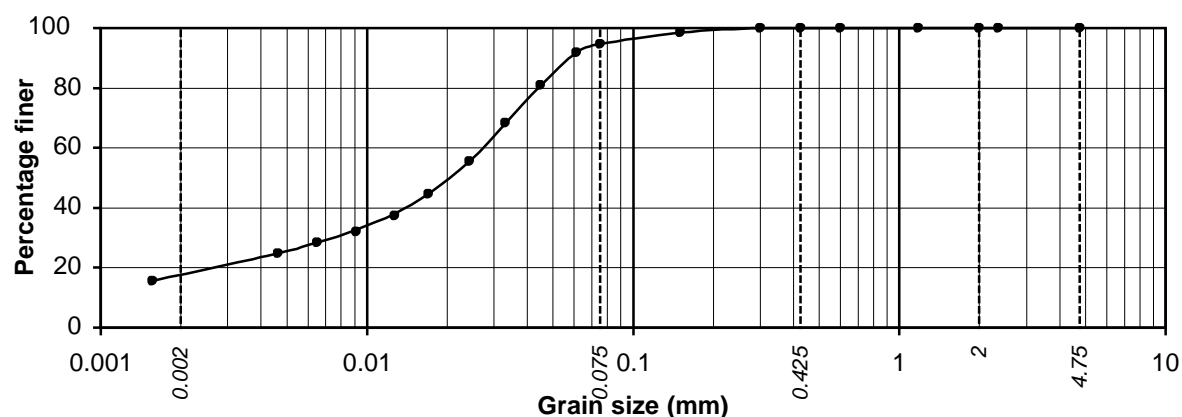
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-1, 44.00m		*19.3	79.2	0.6	0.2	0.7



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-2, 0.00m	11.3	74.4	14.3	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-2, 1.00m	17.7	77.0	5.3	0.0	0.0	0.0

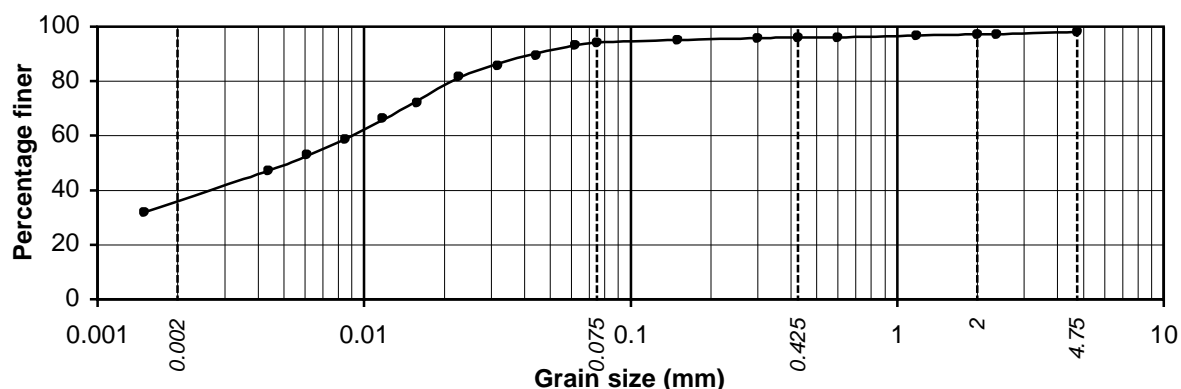
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

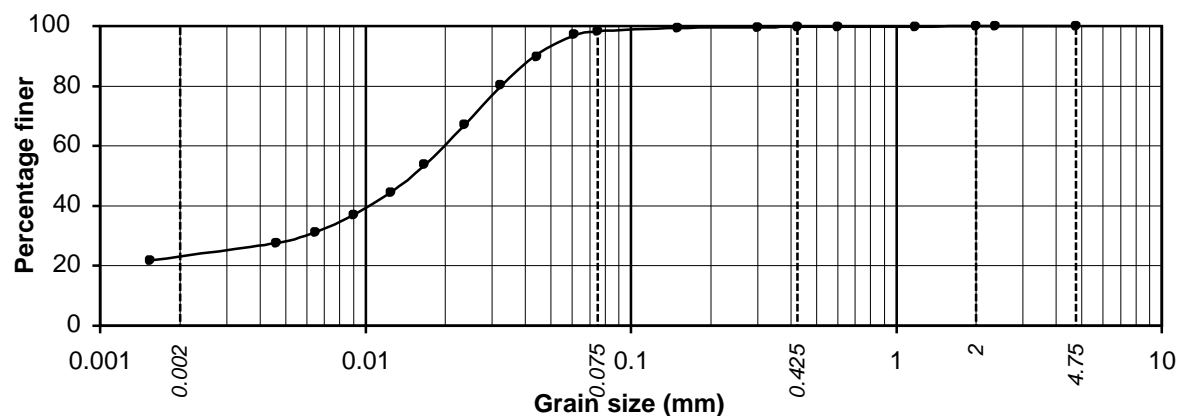
Job No.
CCPL/20111216

Fig. No.
E/6

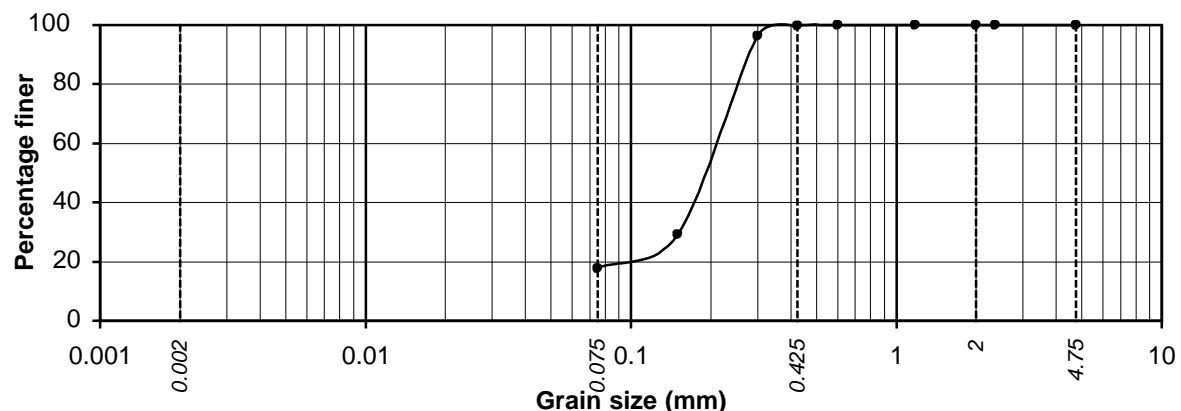
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-2, 4.00m	36.0	58.1	1.8	1.2	1.1	1.8



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-2, 7.00m	23.2	75.0	1.5	0.3	0.0	0.0



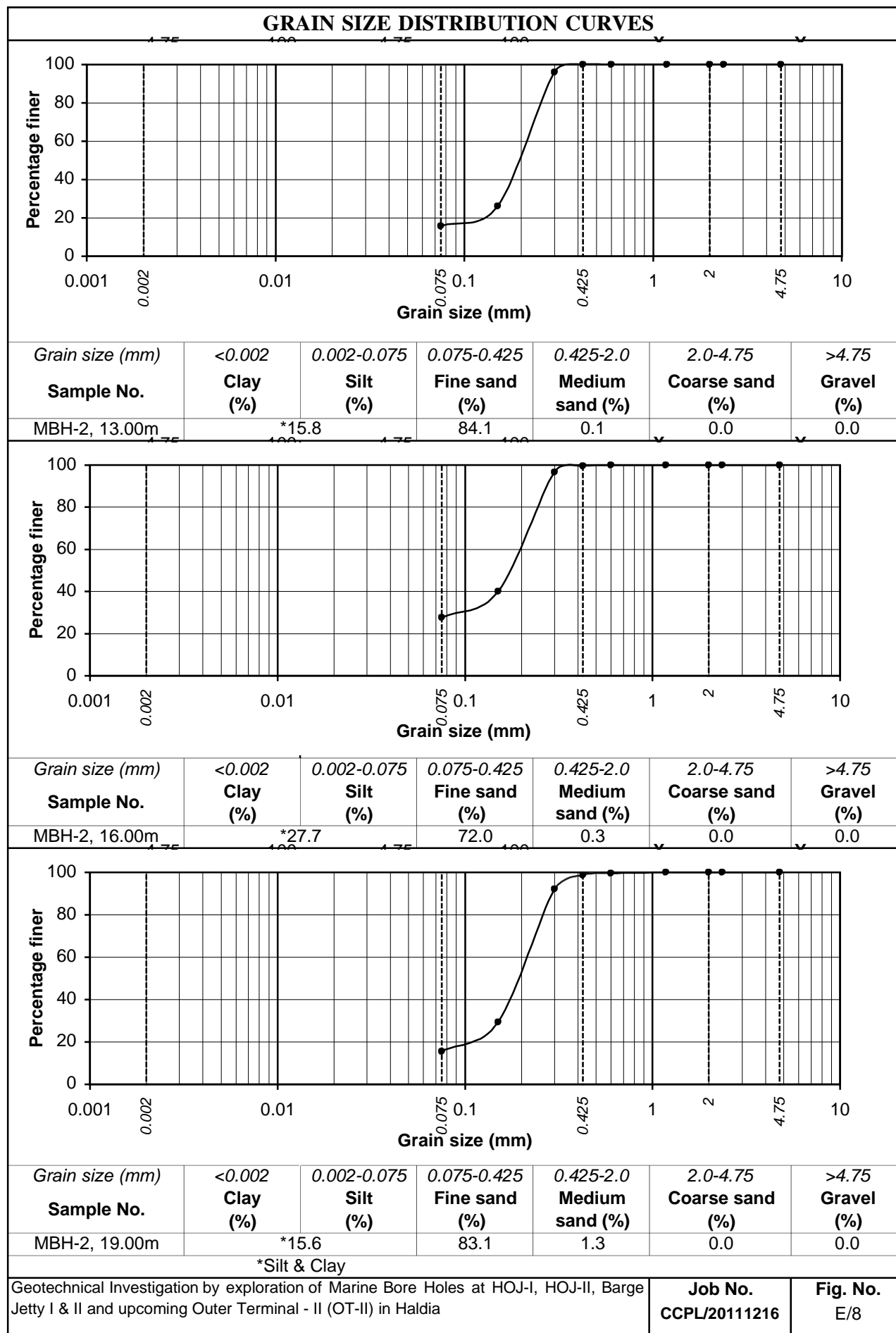
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-2, 10.00m	*17.8		81.9	0.3	0.0	0.0

*Silt & Clay

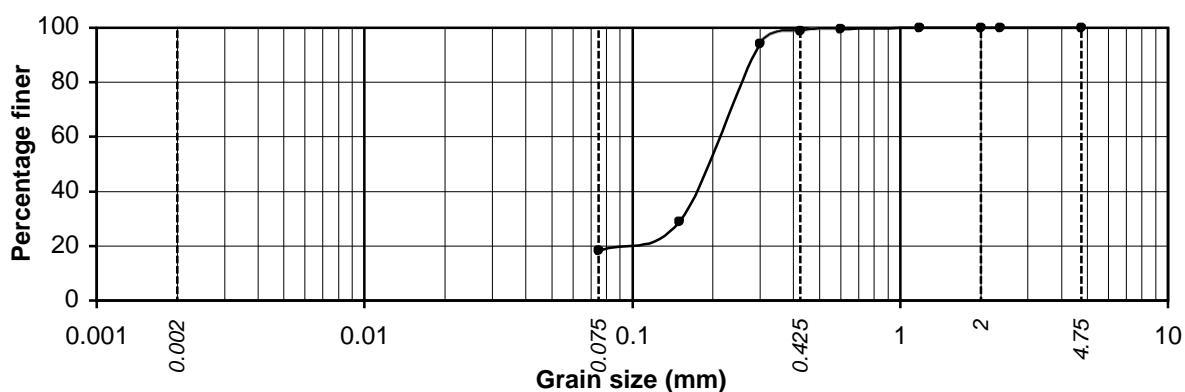
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
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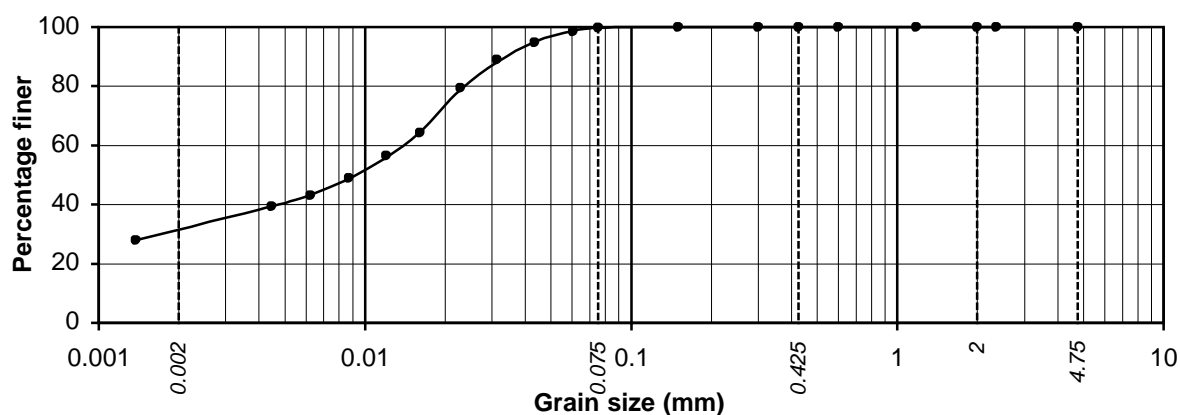
Fig. No.
E/7



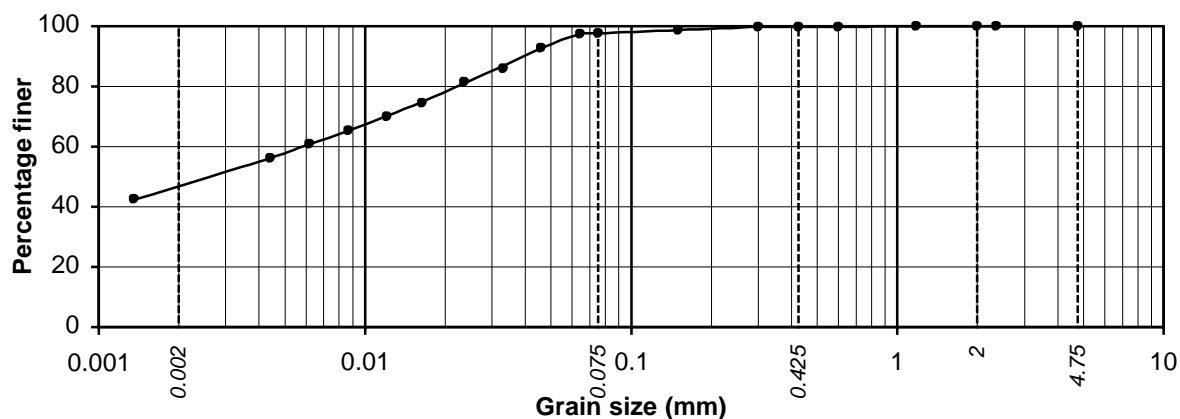
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 22.00m		*18.3	80.6	1.1	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 25.00m	31.6	68.2	0.2	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 28.00m	46.9	50.8	2.1	0.2	0.0	0.0

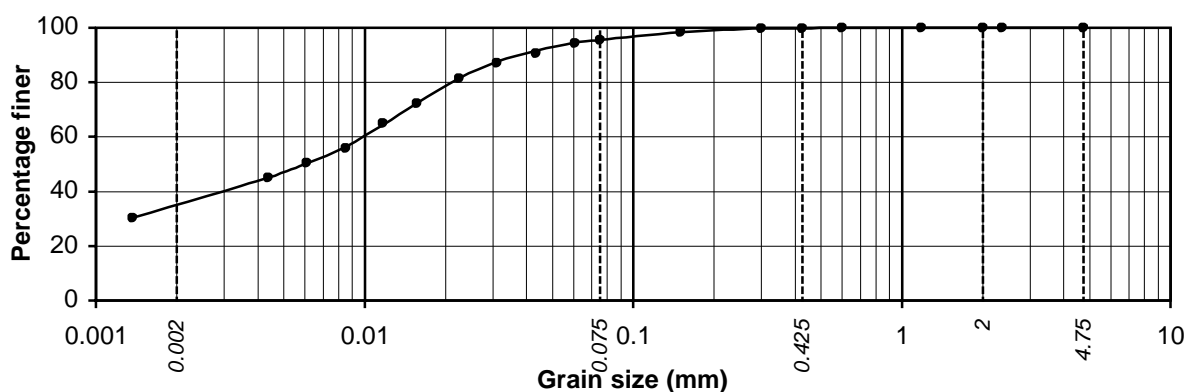
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

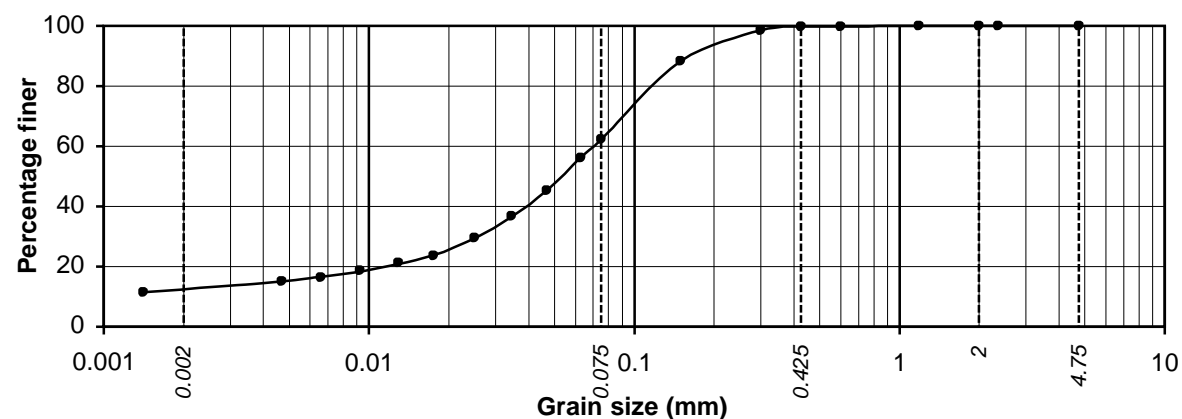
Job No.
CCPL/20111216

Fig. No.
E/9

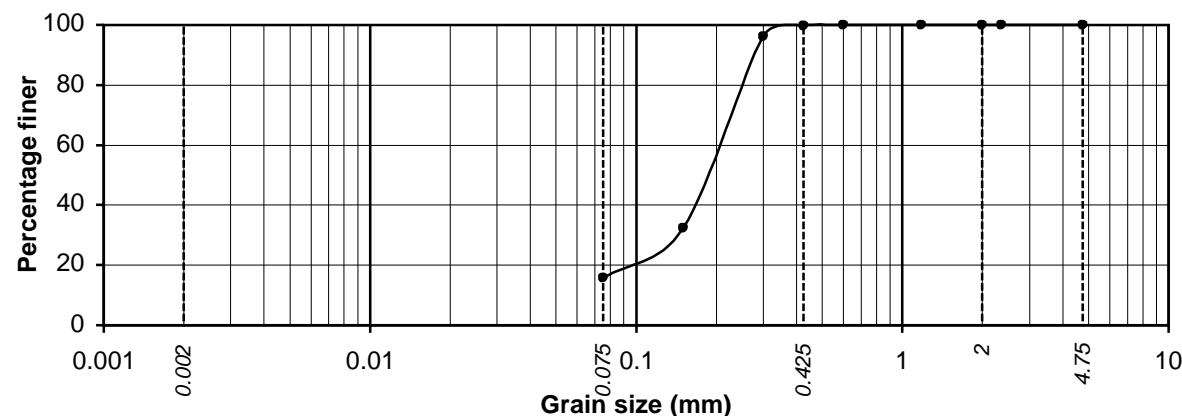
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 31.00m	35.1	60.4	4.3	0.2	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 34.00m	12.6	49.8	37.4	0.2	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 37.00m	*15.8		84.0	0.2	0.0	0.0

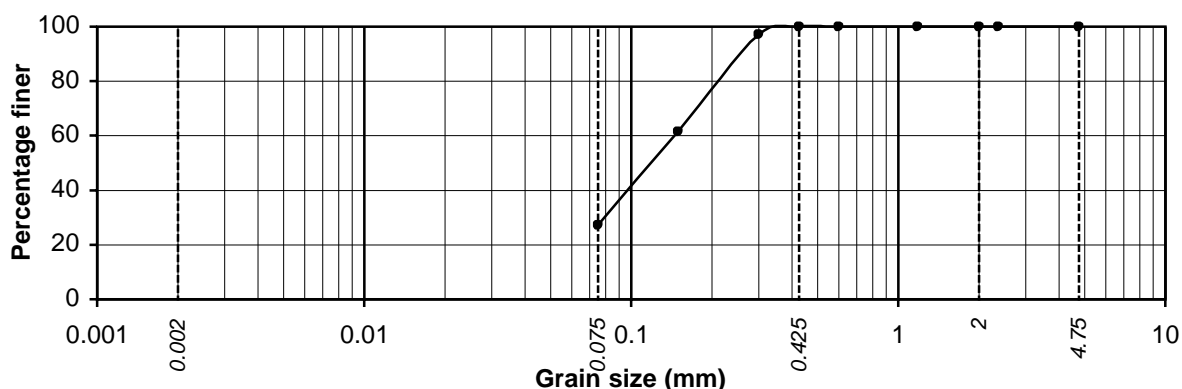
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

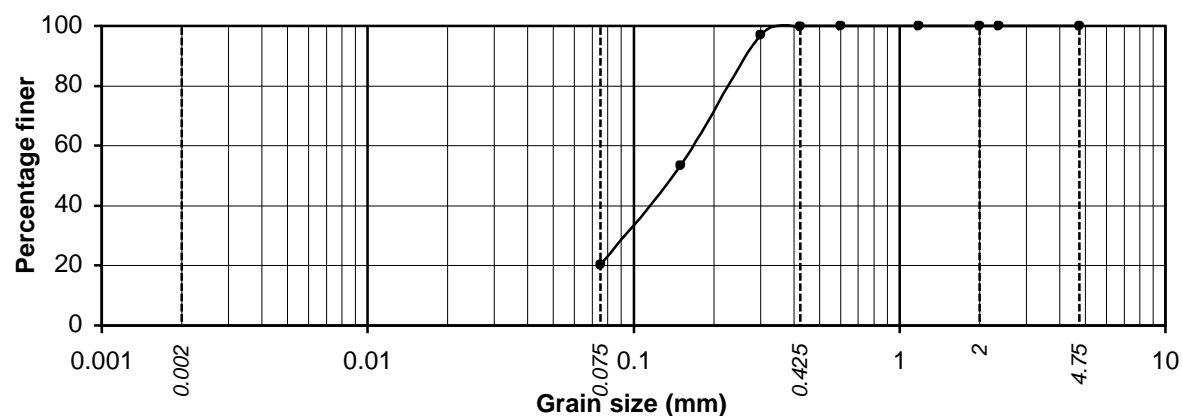
Job No.
CCPL/20111216

Fig. No.
E/10

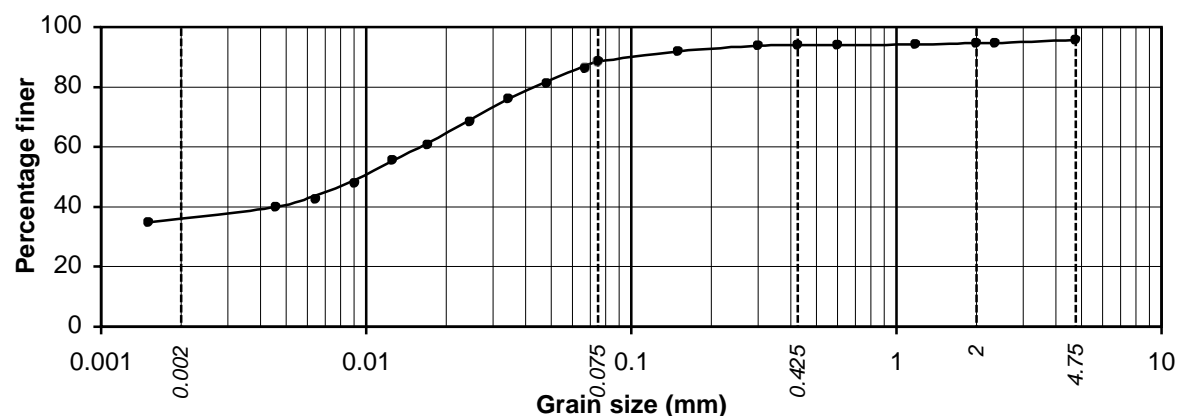
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 40.00m		*27.2	72.8	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-2, 42.00m		*20.3	79.6	0.1	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 1.00m	36.2	52.4	5.4	0.8	0.9	4.3

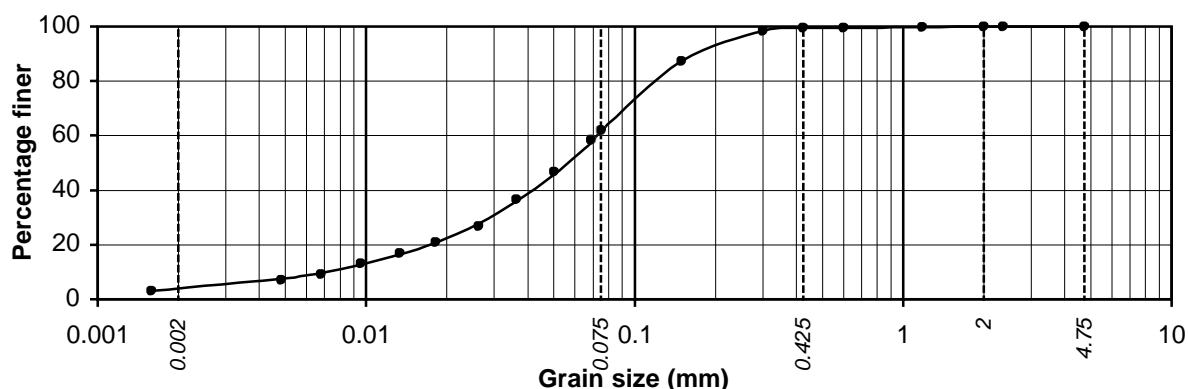
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

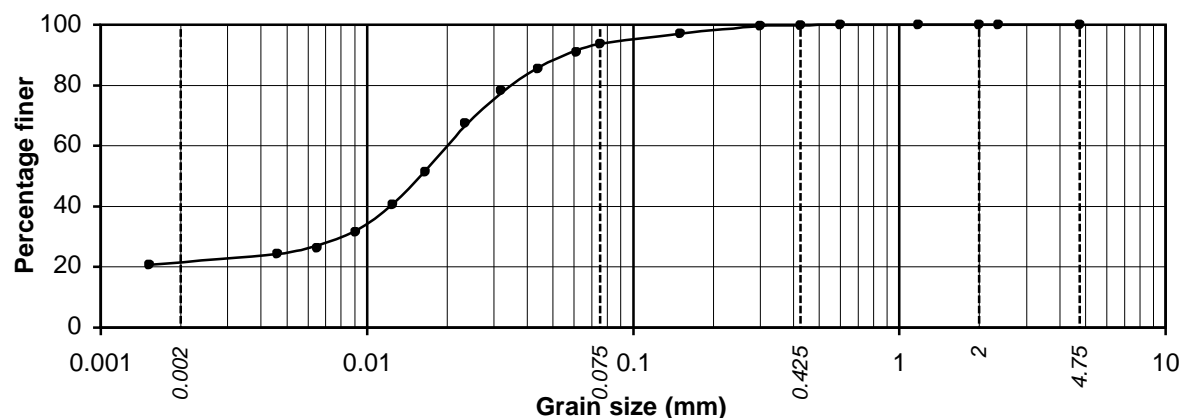
Job No.
CCPL/20111216

Fig. No.
E/11

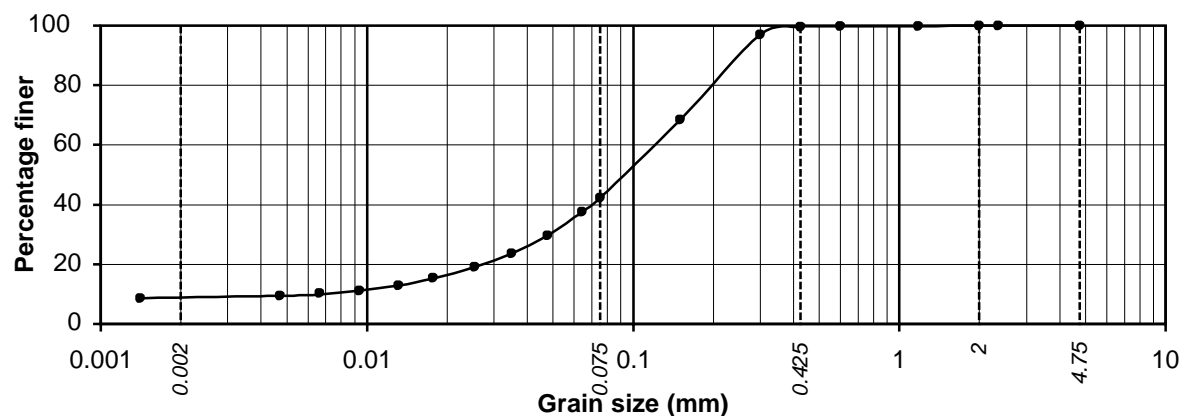
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 1.50m	4.0	57.7	37.8	0.4	0.1	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 4.00m	21.7	72.0	6.1	0.2	0.0	0.0



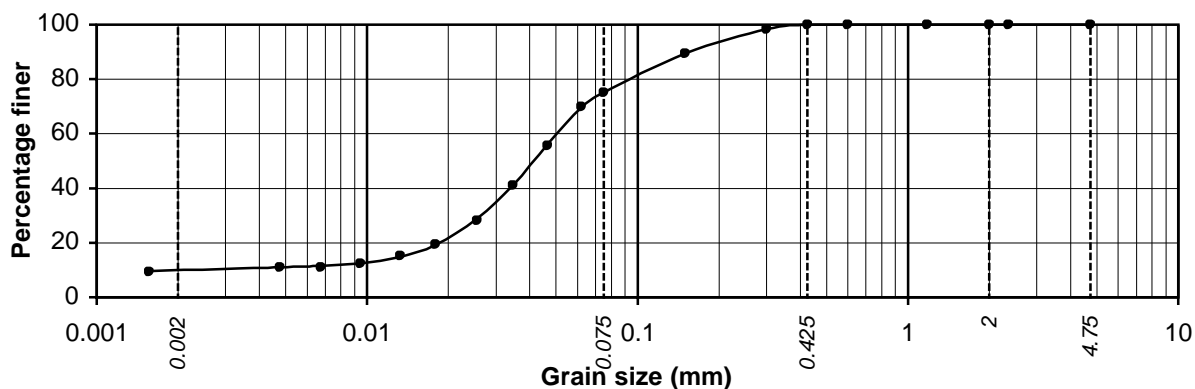
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 7.00m	8.7	33.6	57.3	0.4	0.0	0.0

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

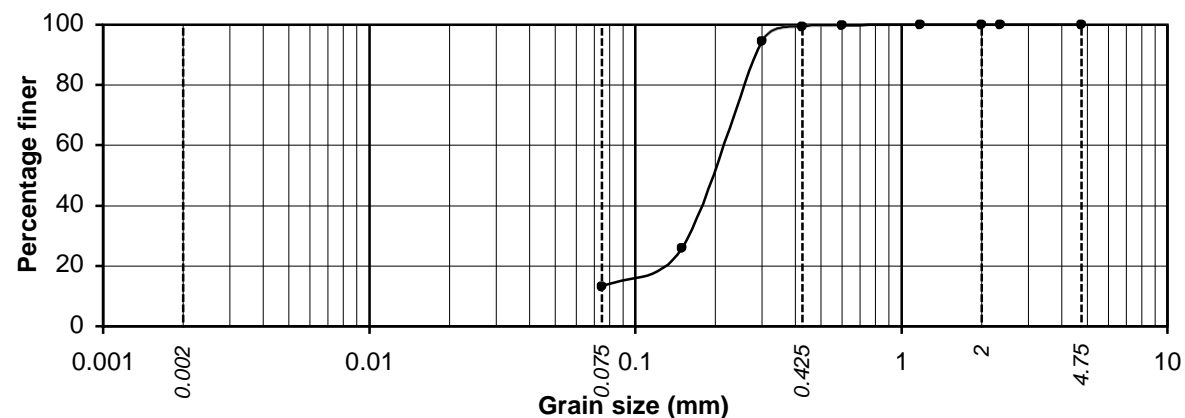
Job No.
CCPL/20111216

Fig. No.
E/12

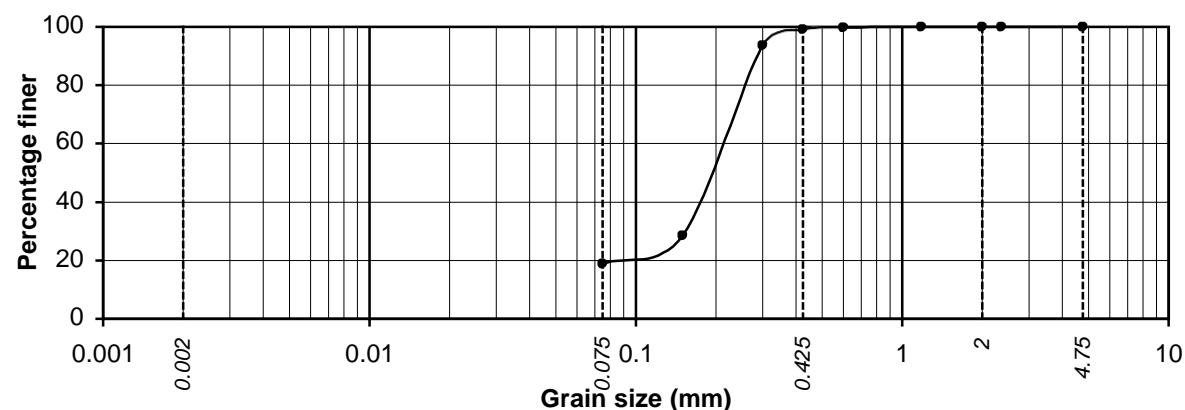
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 10.00m	10.0	65.0	24.9	0.1	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 13.00m	*13.1		86.4	0.5	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 16.00m	*18.8		80.4	0.8	0.0	0.0

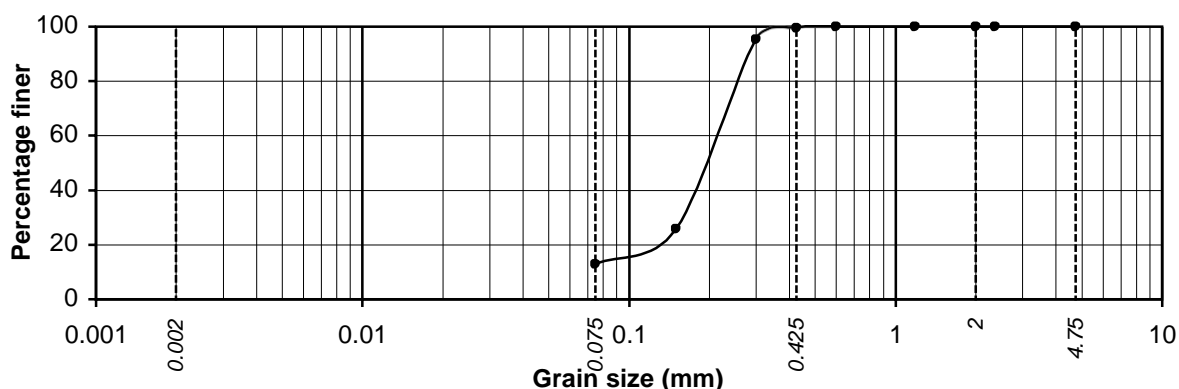
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

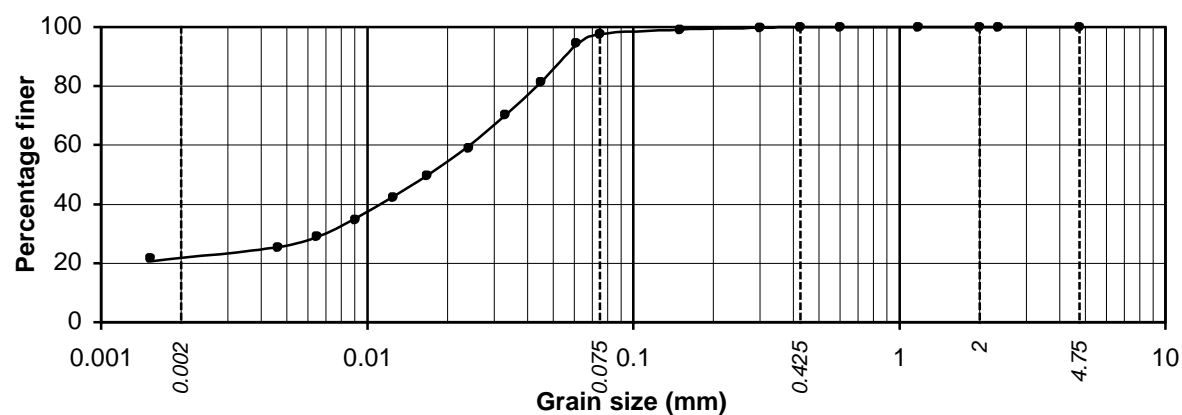
Job No.
CCPL/20111216

Fig. No.
E/13

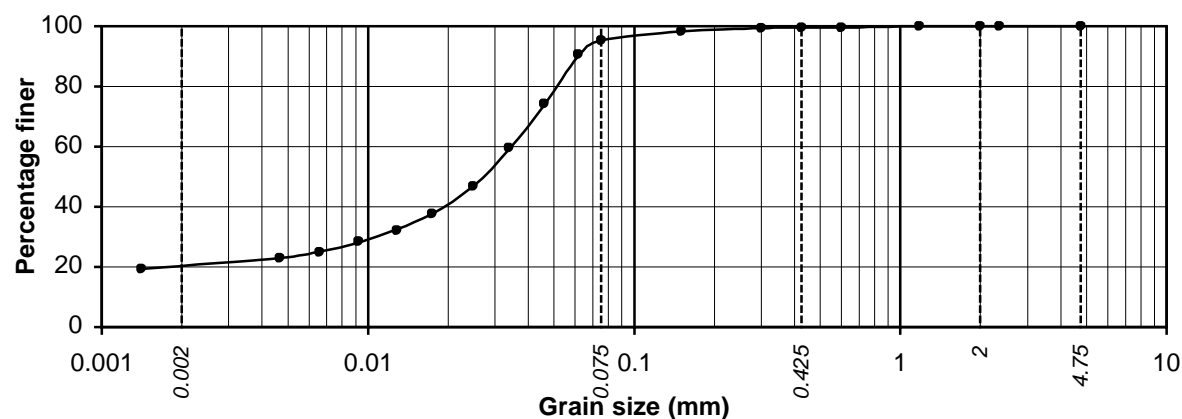
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 19.00m		*12.8	86.7	0.5	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 23.50m	21.8	75.7	2.4	0.1	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-3, 25.00m	20.4	74.8	4.4	0.4	0.0	0.0

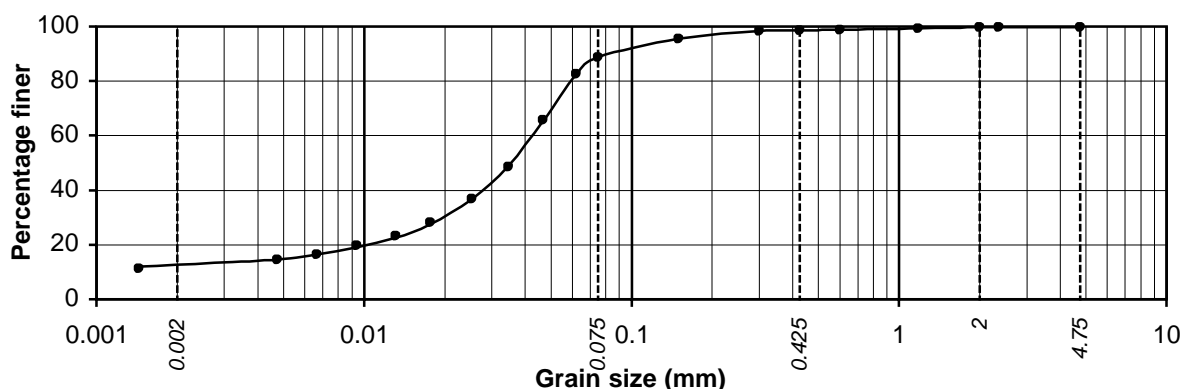
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

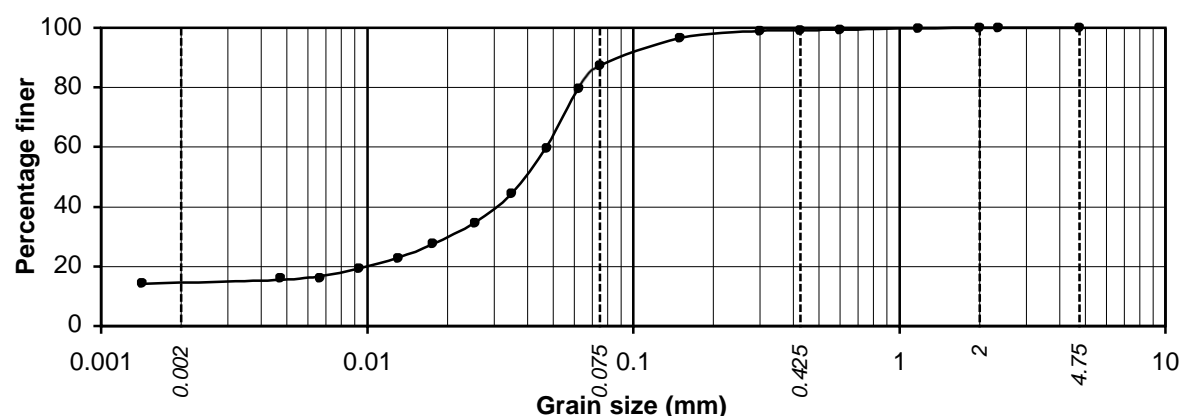
Job No.
CCPL/20111216

Fig. No.
E/14

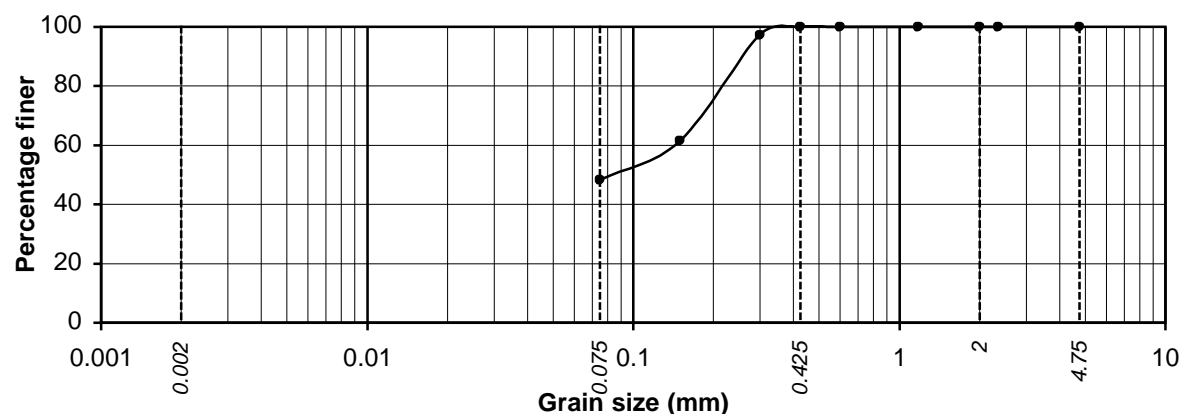
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 28.00m	12.7	76.0	9.8	1.3	0.0	0.2



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 31.00m	14.5	72.8	11.8	0.9	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 34.00m	*48.2		51.8	0.0	0.0	0.0

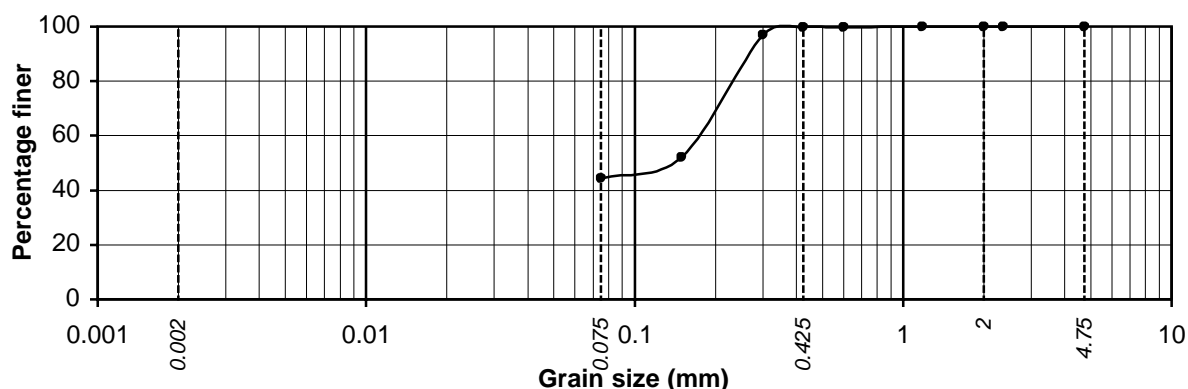
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

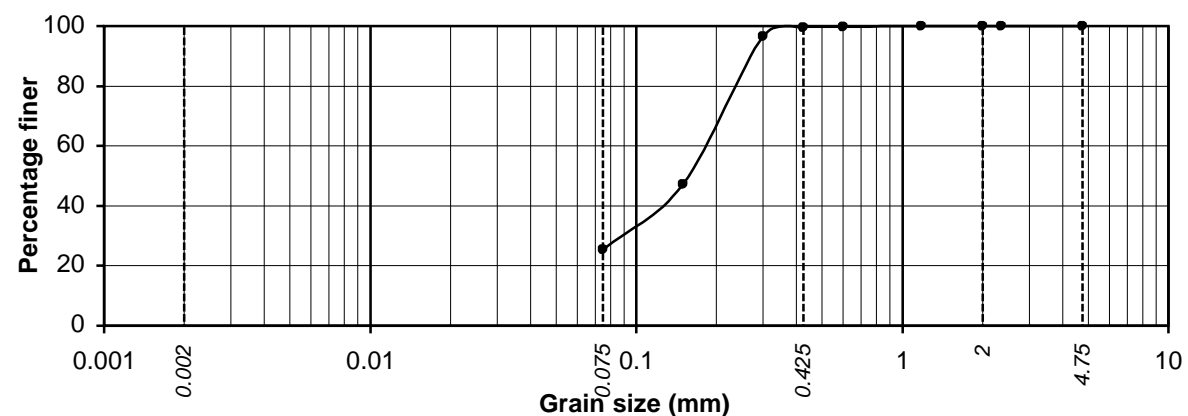
Job No.
CCPL/20111216

Fig. No.
E/15

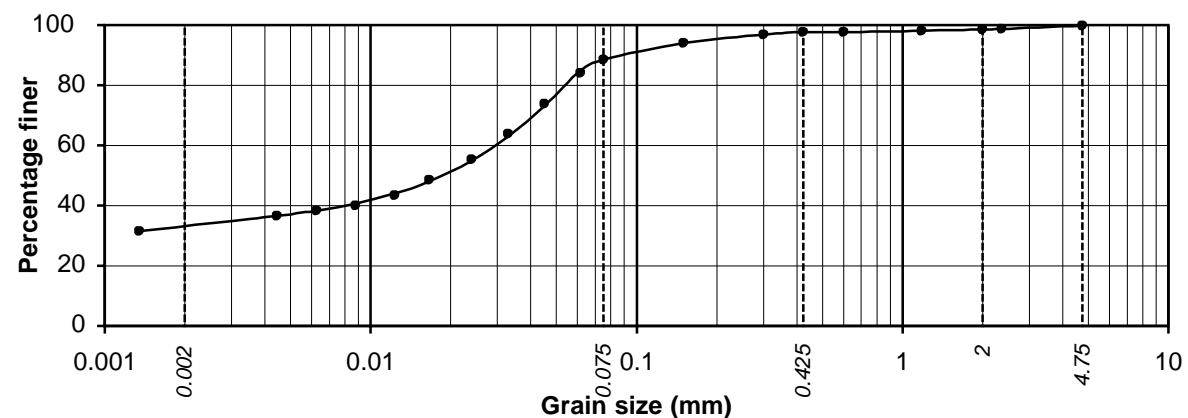
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-3, 38.00m		*44.3	55.4	0.3	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 0.00m		*25.4	74.2	0.4	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 1.00m	33.2	55.2	9.1	1.0	1.2	0.3

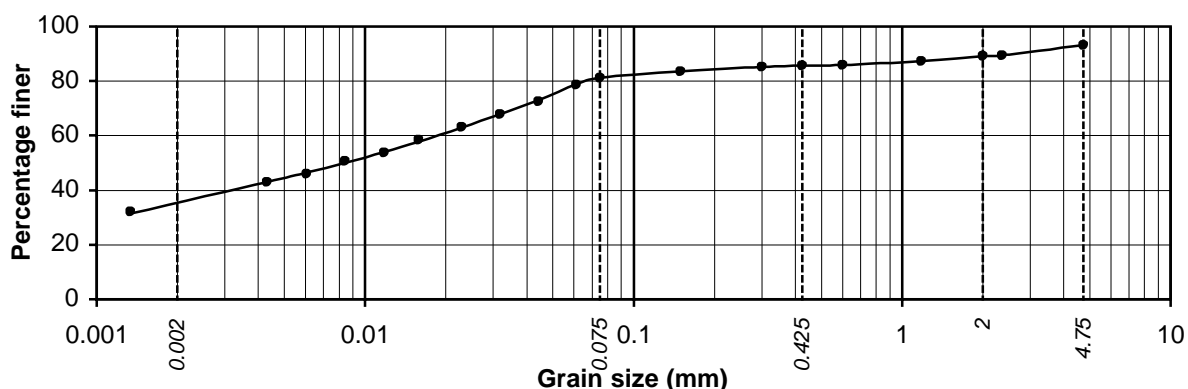
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

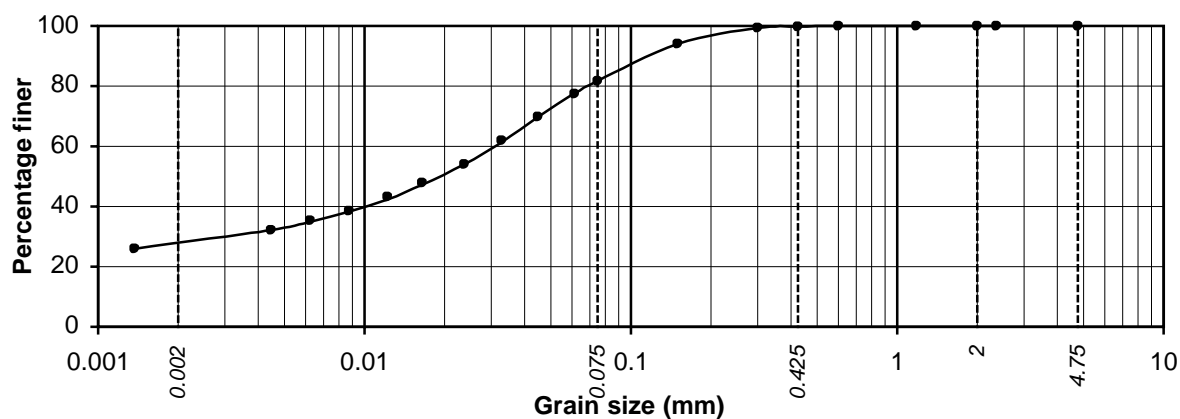
Job No.
CCPL/20111216

Fig. No.
E/16

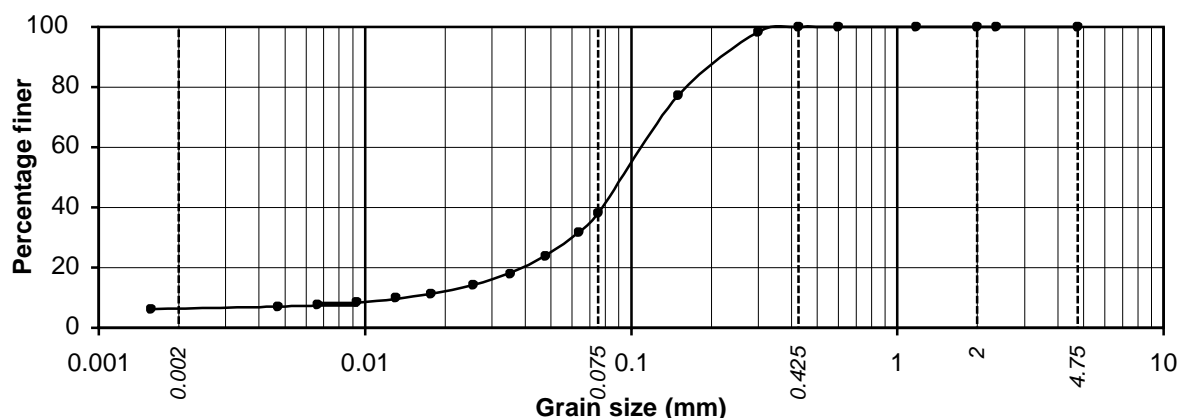
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 3.00m	35.5	45.8	4.3	3.6	4.1	6.7



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 4.00m	28.0	53.7	18.2	0.1	0.0	0.0

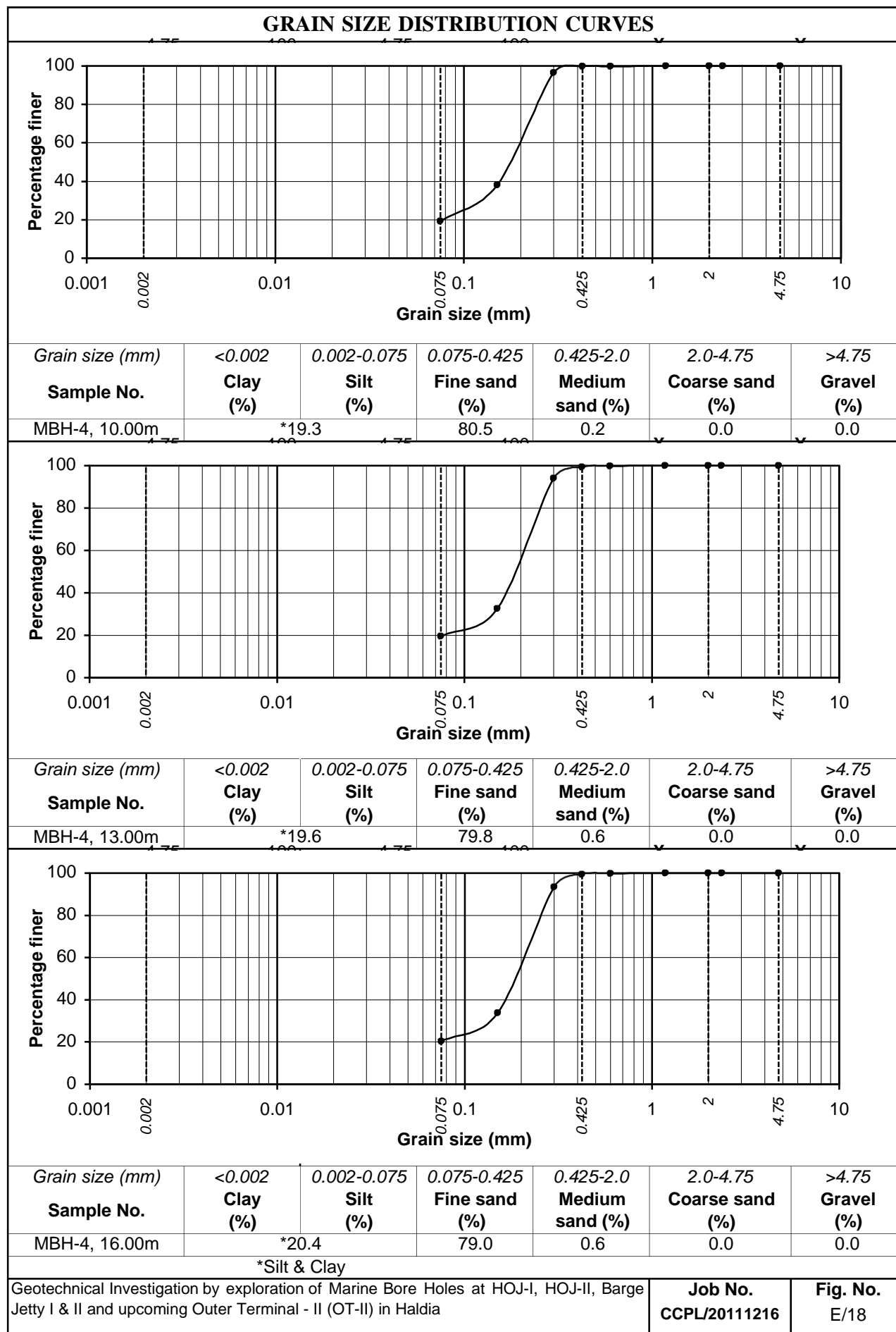


Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 7.00m	6.4	31.6	62.0	0.0	0.0	0.0

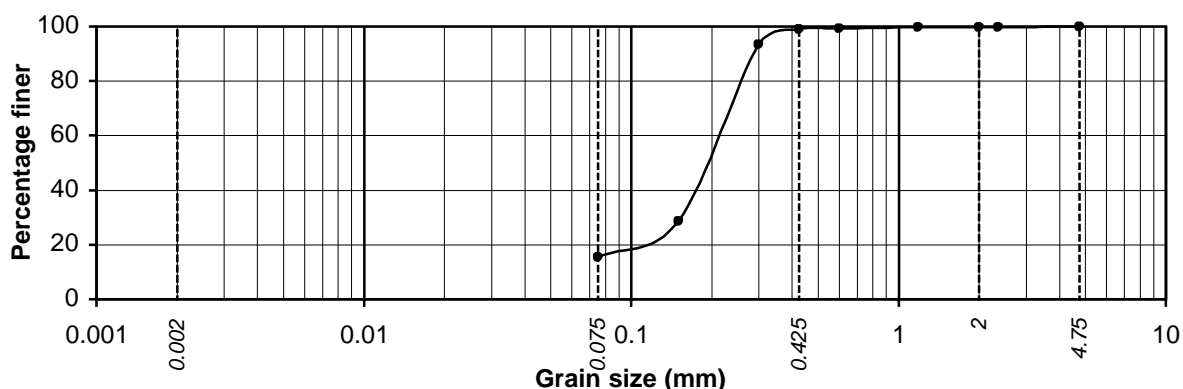
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

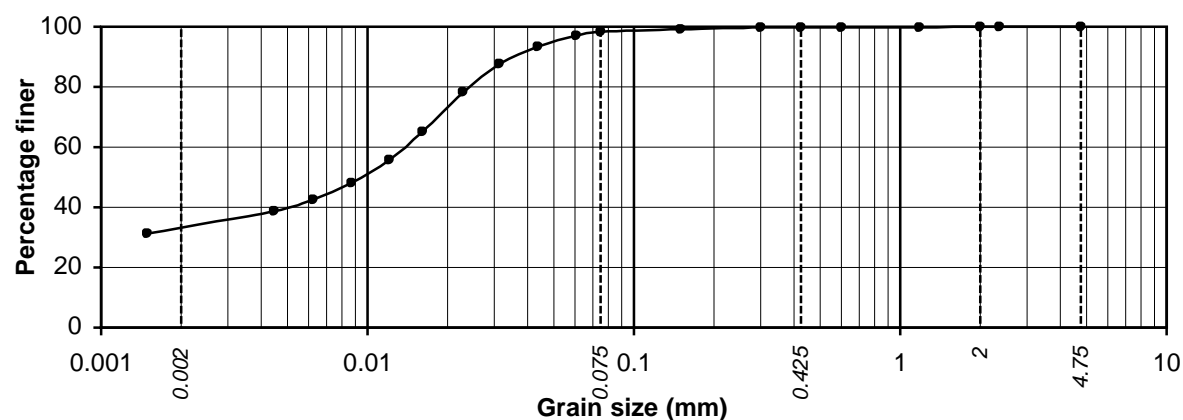
Fig. No.
E/17



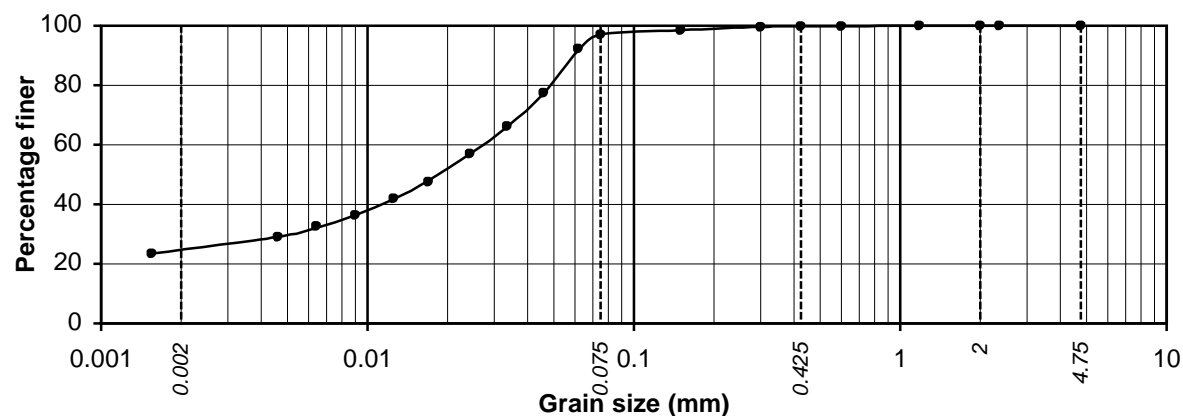
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 19.00m		*15.6	83.4	0.8	0.2	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 20.50m	33.3	65.0	1.5	0.2	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 23.50m	24.8	72.1	2.8	0.3	0.0	0.0

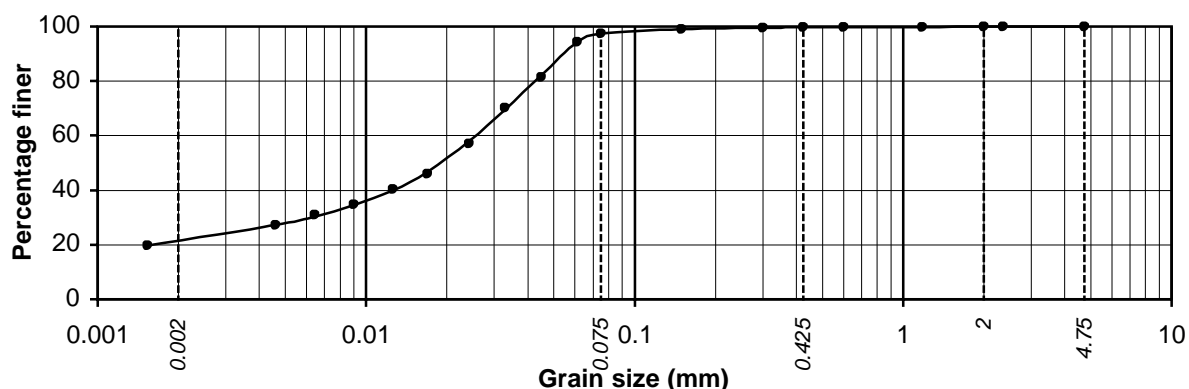
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

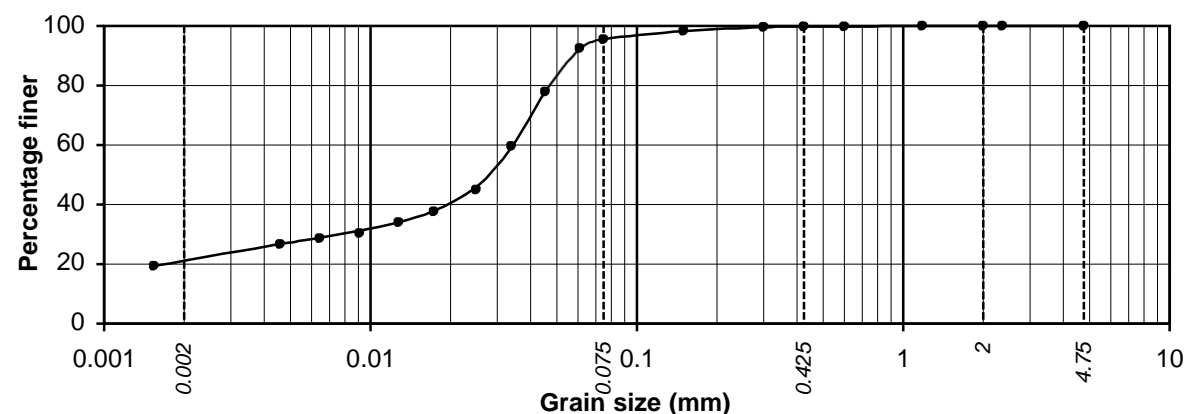
Job No.
CCPL/20111216

Fig. No.
E/19

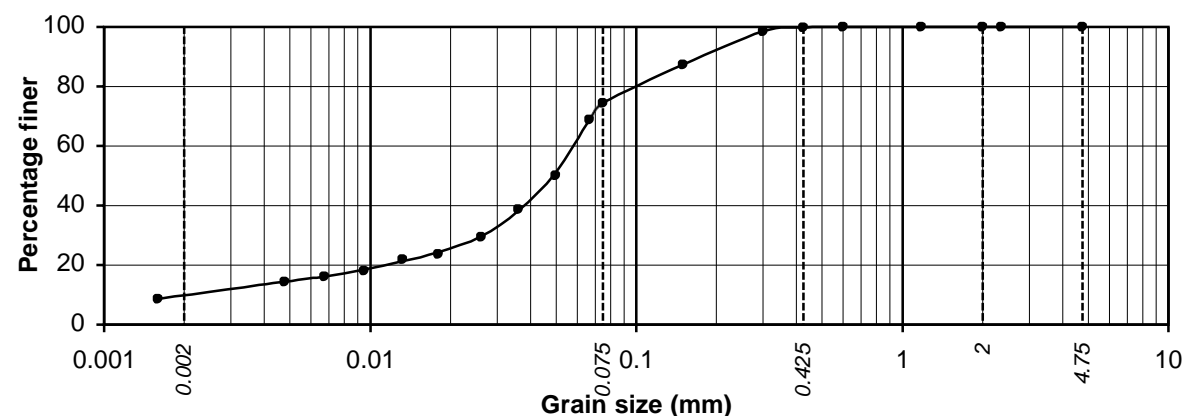
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 26.50m	21.6	75.9	2.2	0.3	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 29.50m	21.1	74.4	4.2	0.3	0.0	0.0



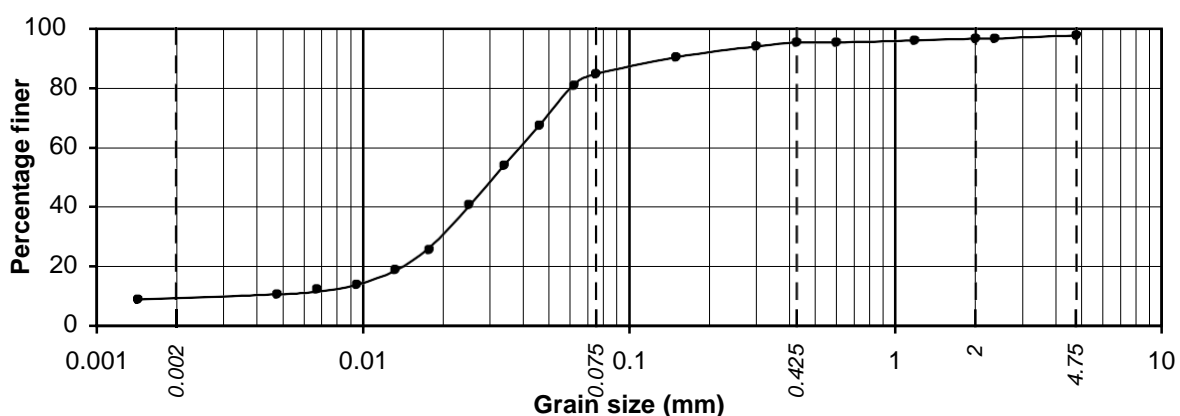
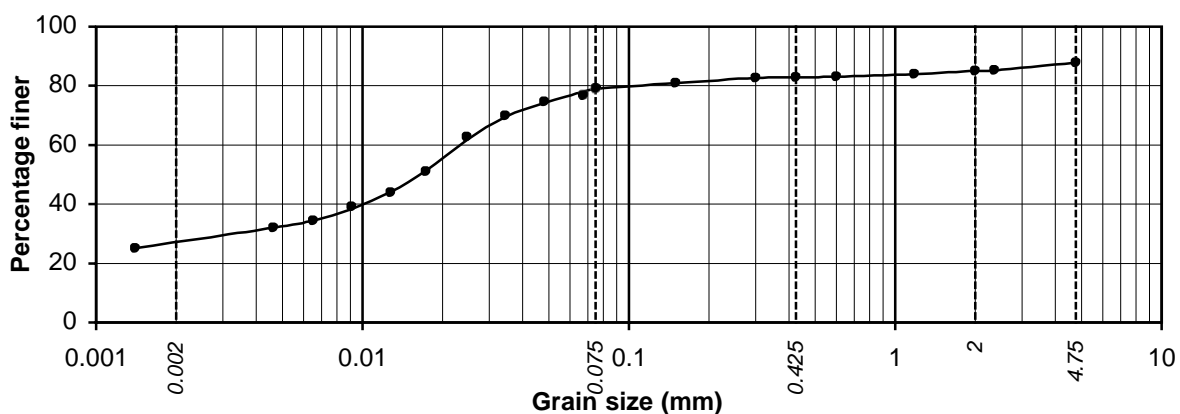
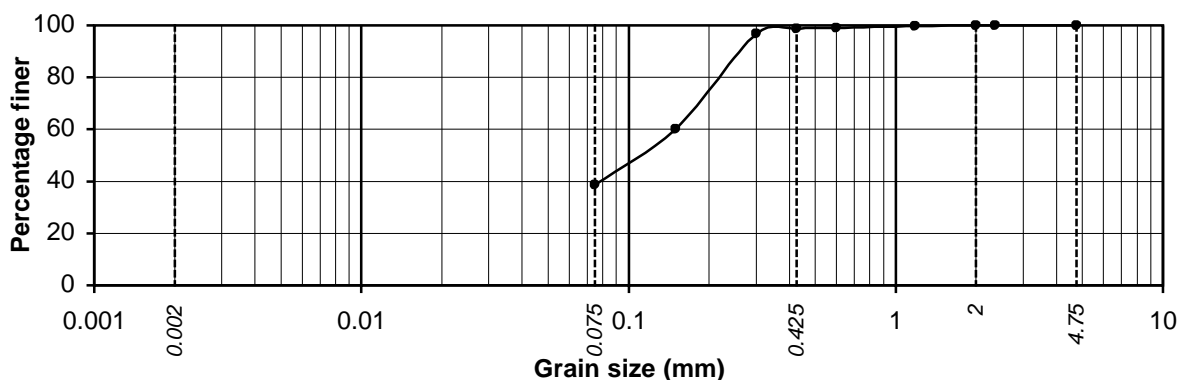
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-4, 31.00m	9.8	64.7	25.4	0.1	0.0	0.0

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
E/20

GRAIN SIZE DISTRIBUTION CURVES



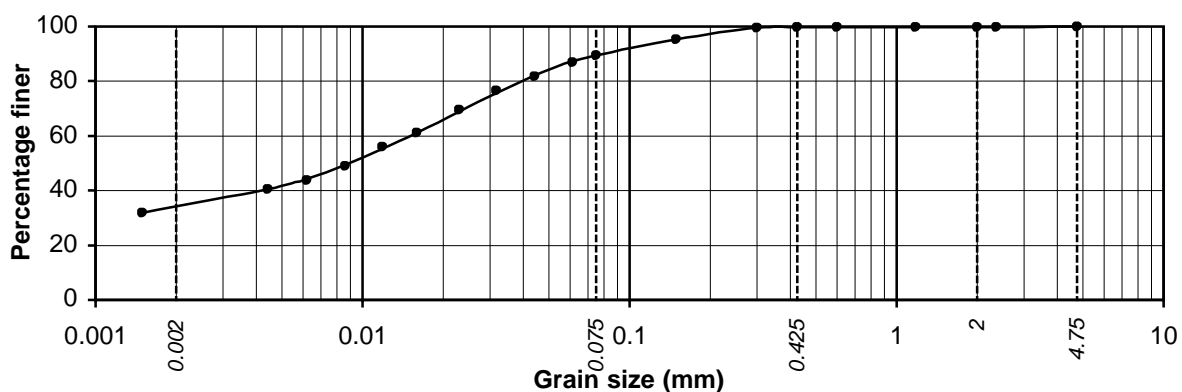
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

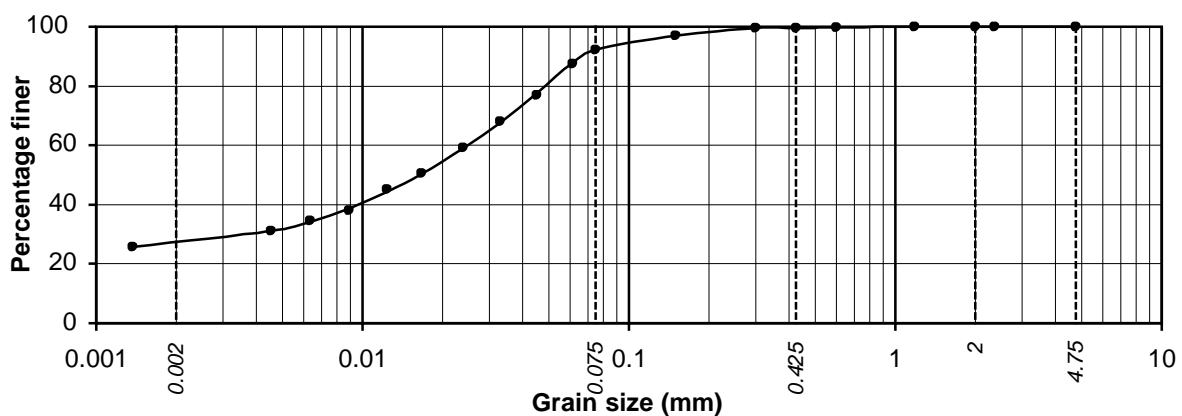
Job No.
CCPL/20111216

Fig. No.
E/21

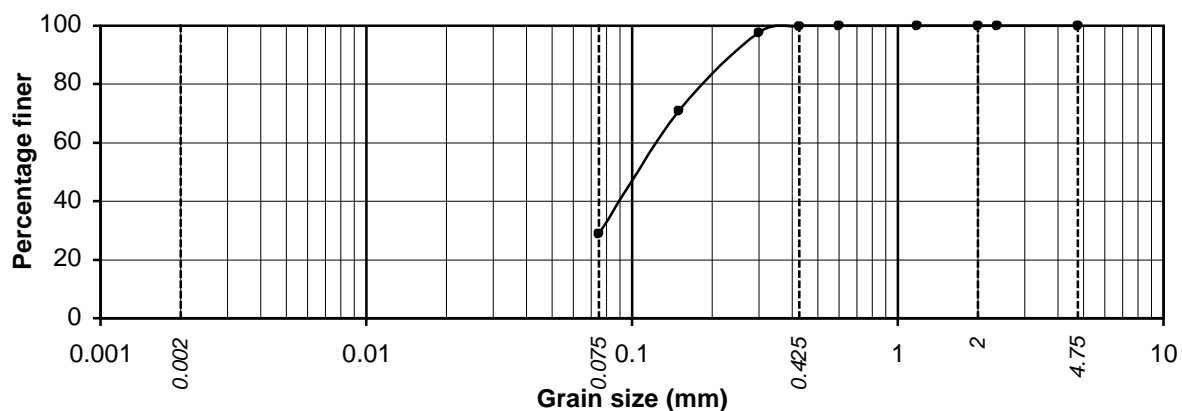
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 7.00m	34.2	55.2	10.3	0.2	0.1	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 10.00m	27.4	64.8	7.5	0.3	0.0	0.0



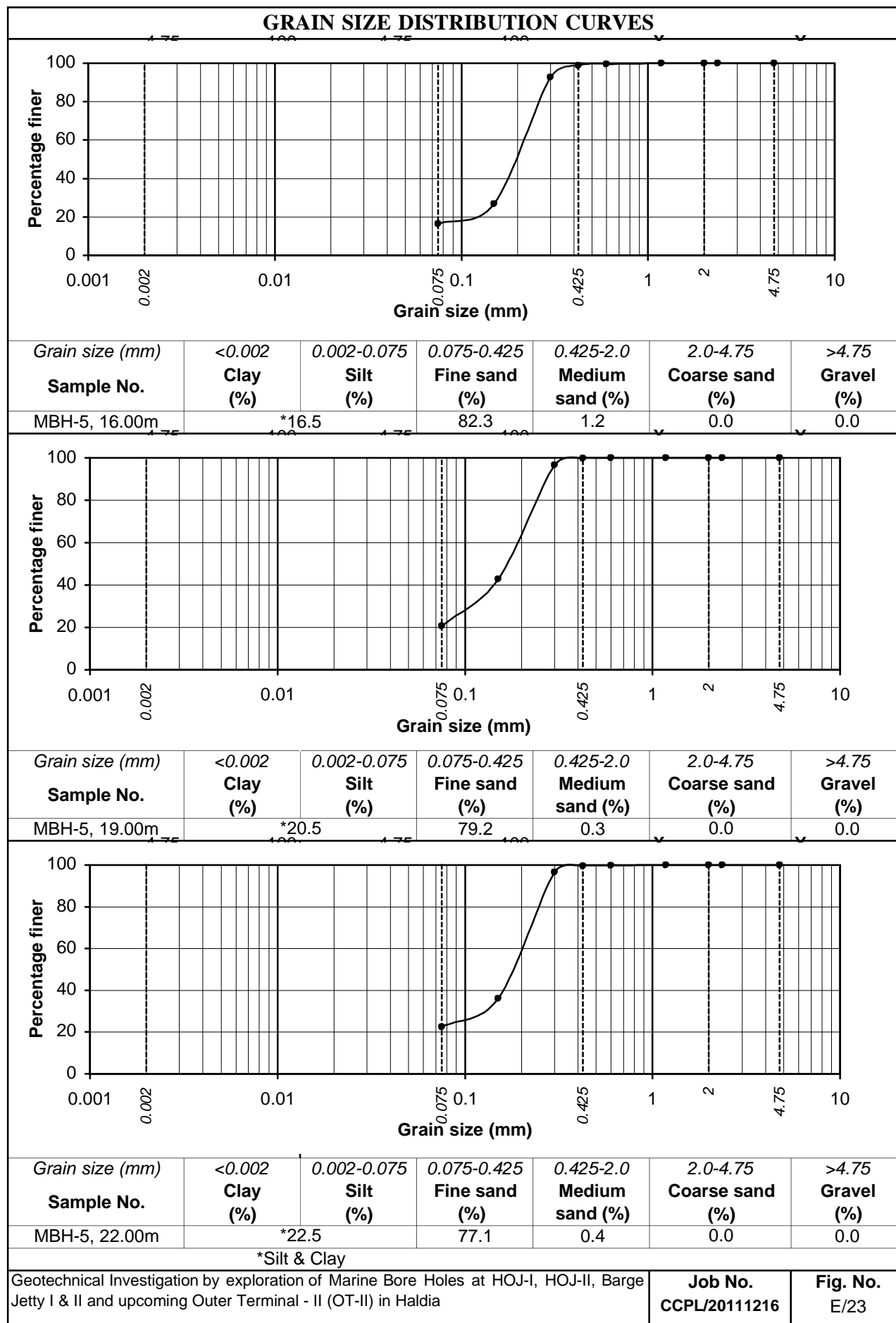
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 13.00m	*28.9		70.9	0.2	0.0	0.0

*Silt & Clay

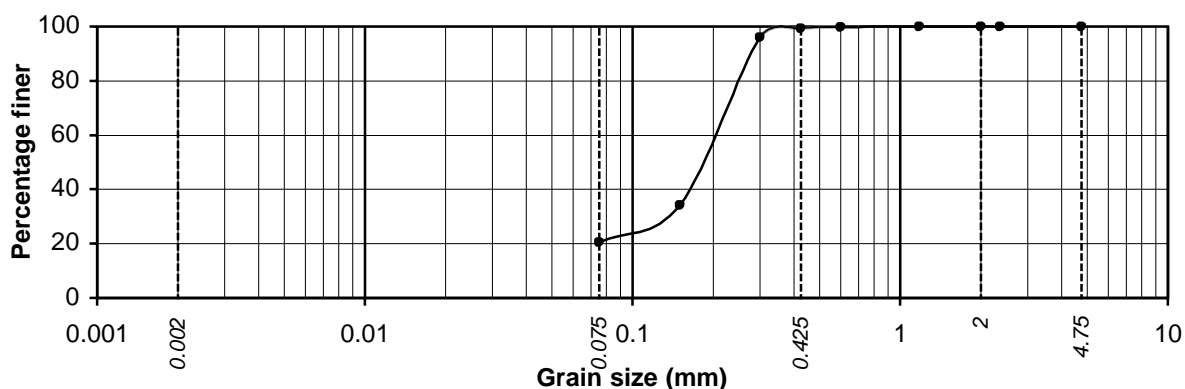
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

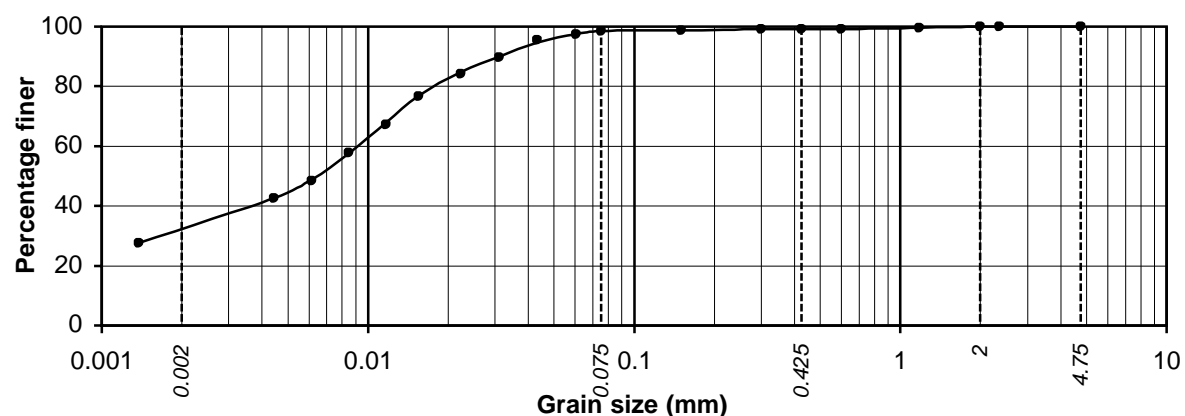
Fig. No.
E/22



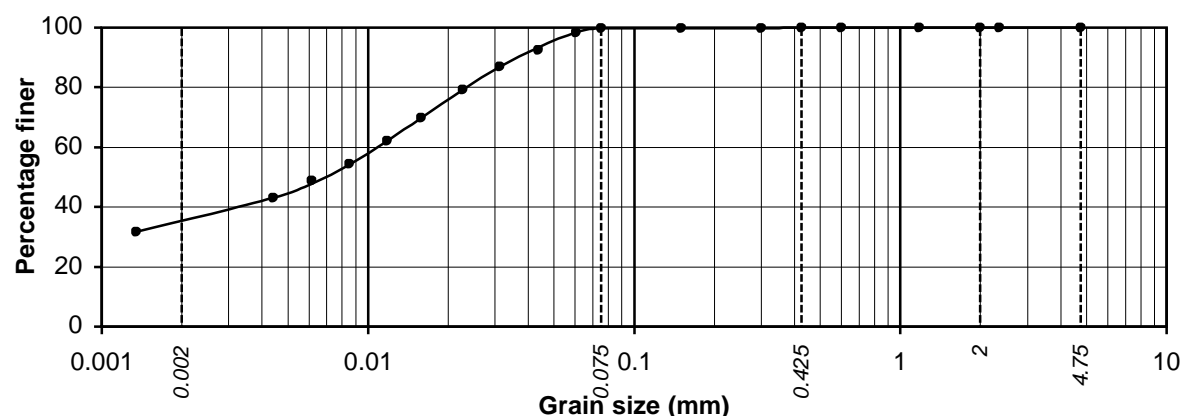
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 25.00m		*20.4	79.0	0.6	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 28.00m	32.3	66.2	0.7	0.7	0.1	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 29.50m	35.5	64.2	0.2	0.1	0.0	0.0

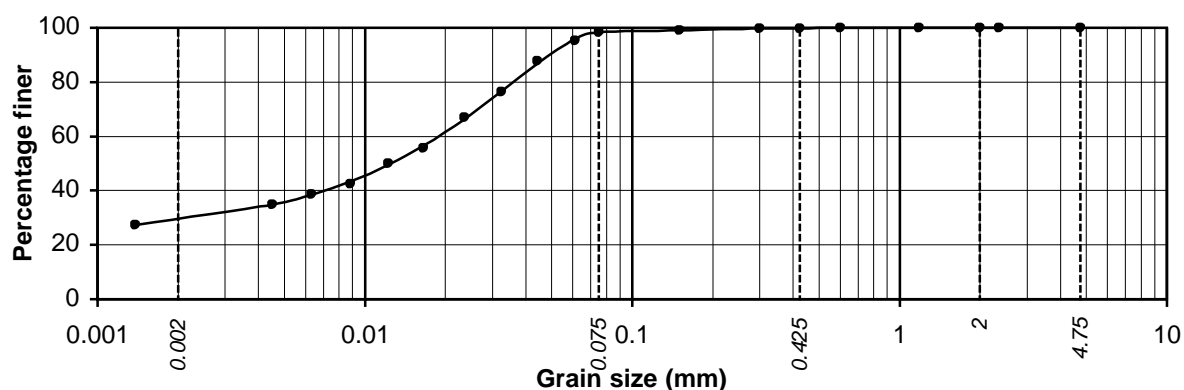
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

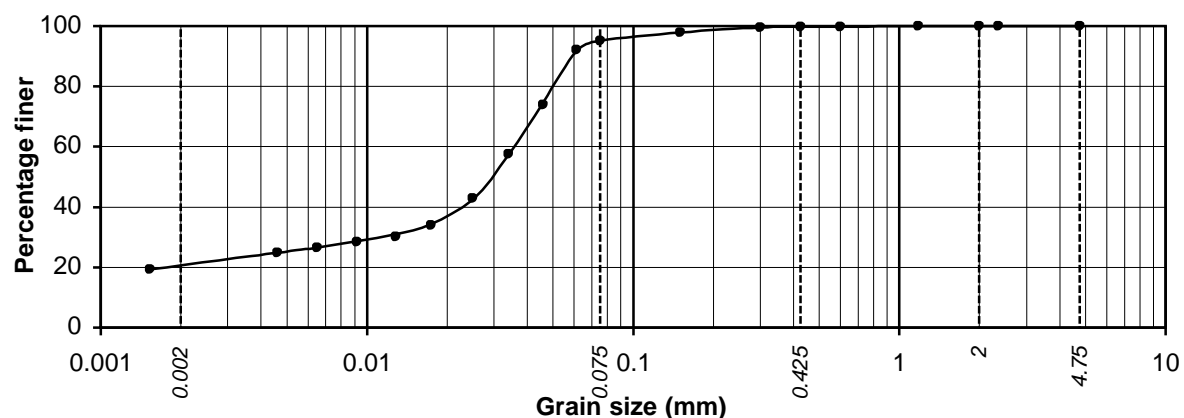
Job No.
CCPL/20111216

Fig. No.
E/24

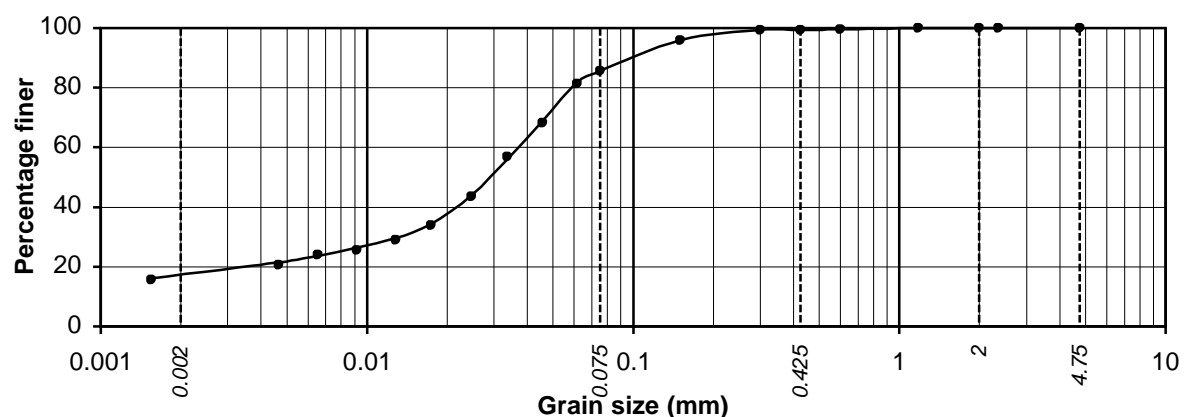
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 31.00m	29.8	68.4	1.6	0.2	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 34.00m	20.6	74.5	4.7	0.2	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 37.00m	17.4	68.1	13.9	0.6	0.0	0.0

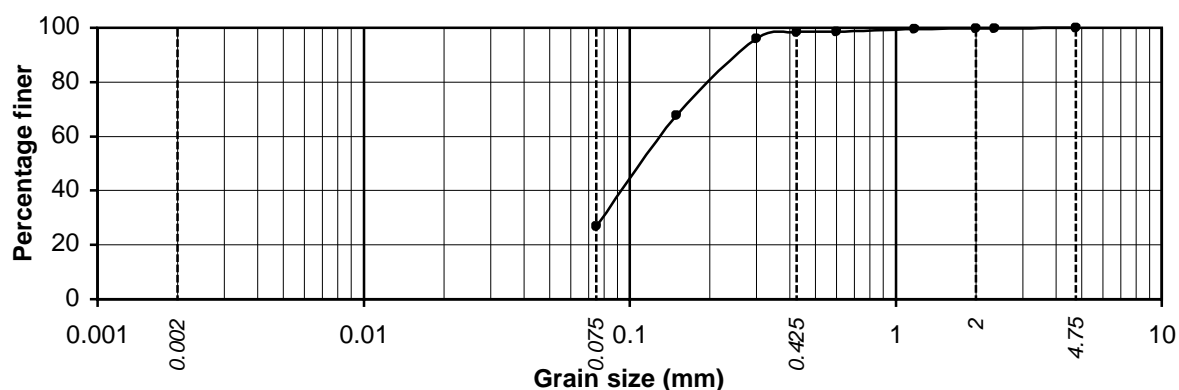
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

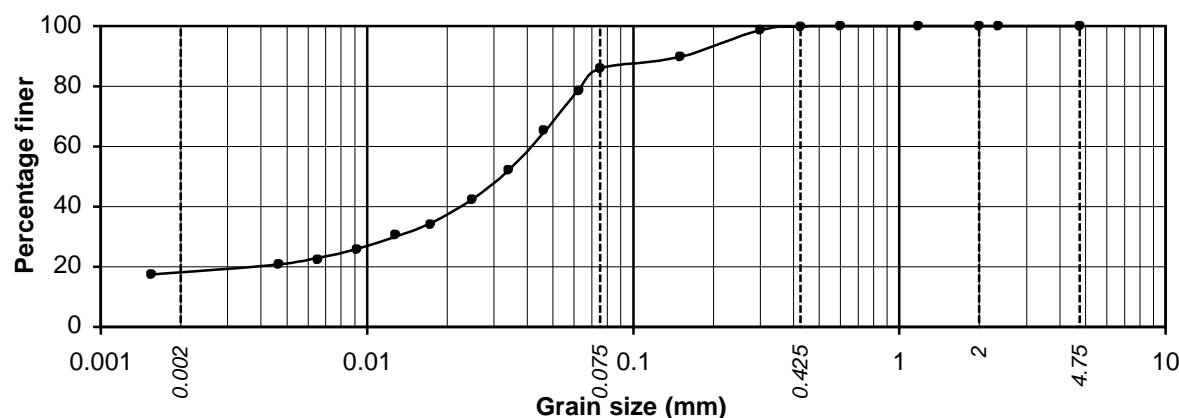
Job No.
CCPL/20111216

Fig. No.
E/25

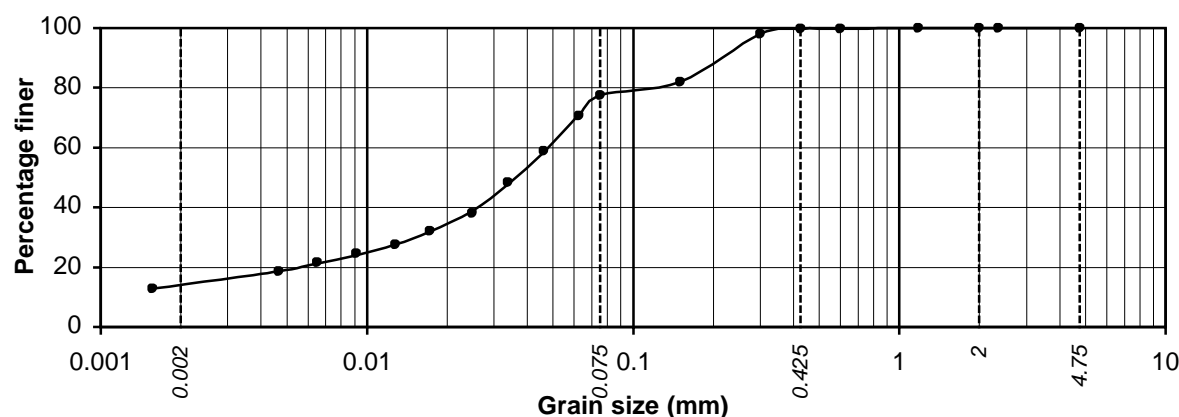
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 40.00m		*26.9	71.5	1.3	0.3	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 41.50m	18.3	67.7	13.9	0.1	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-5, 44.50m	14.1	63.3	22.3	0.3	0.0	0.0

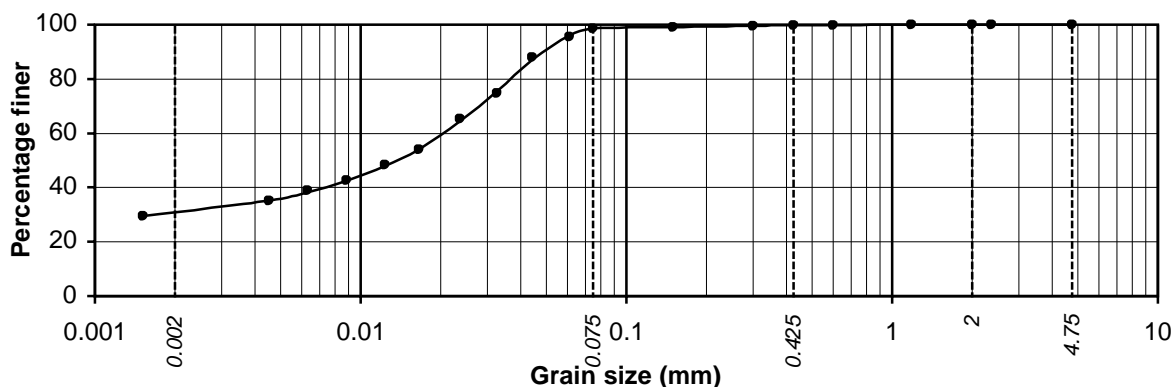
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

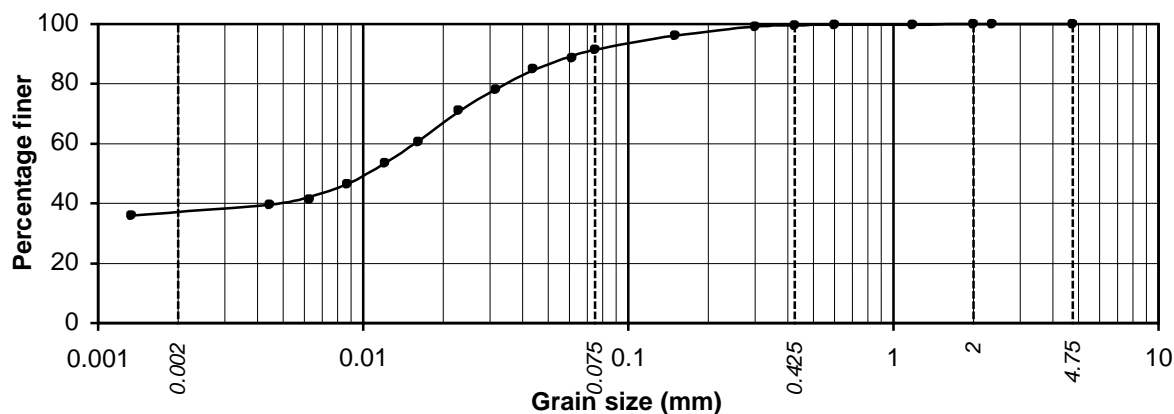
Job No.
CCPL/20111216

Fig. No.
E/26

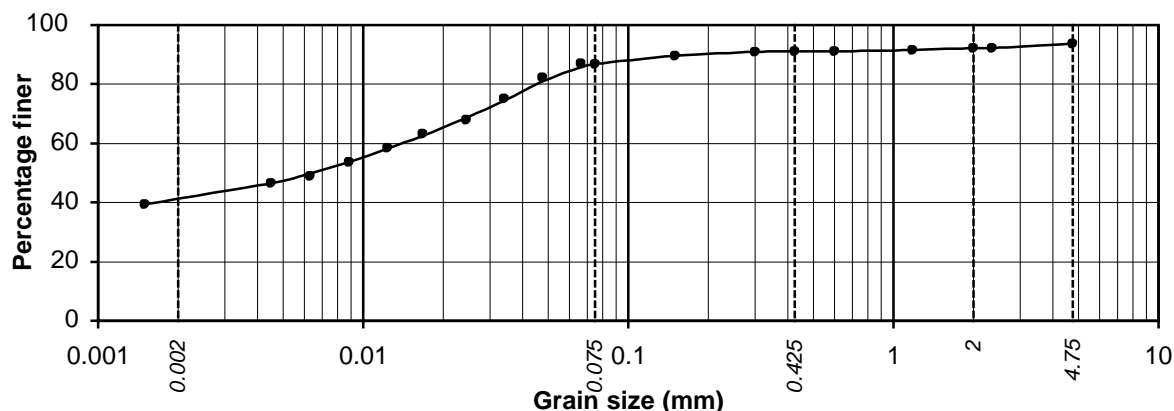
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-5, 48.15m	30.9	67.7	1.1	0.3	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 1.00m	37.2	54.3	8.2	0.3	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 4.00m	41.3	45.6	4.2	1.1	1.6	6.2

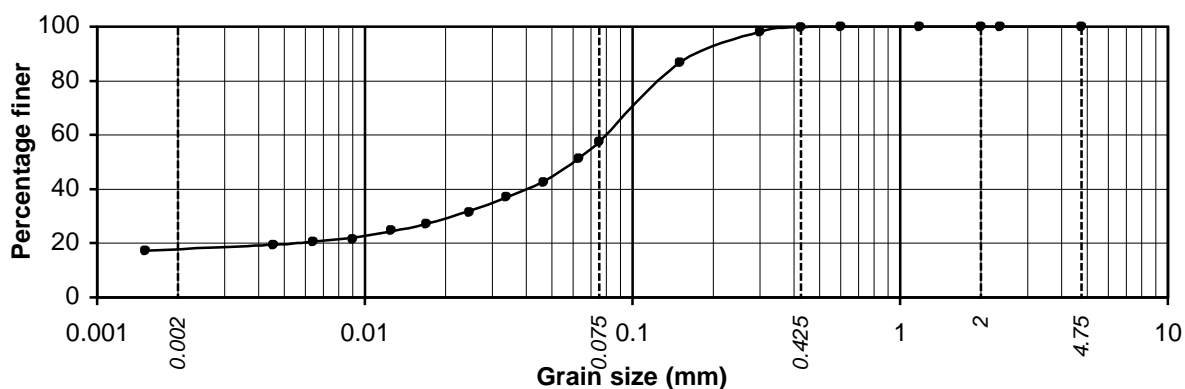
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

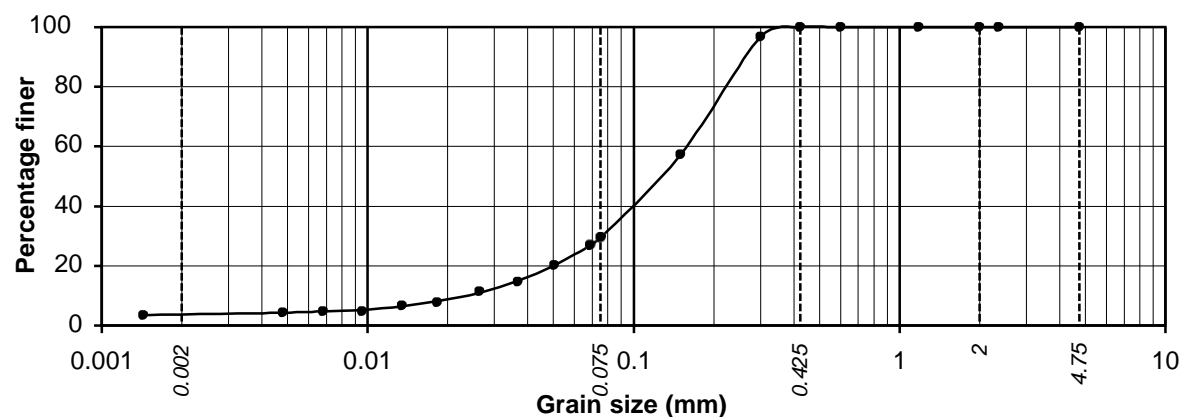
Job No.
CCPL/20111216

Fig. No.
E/27

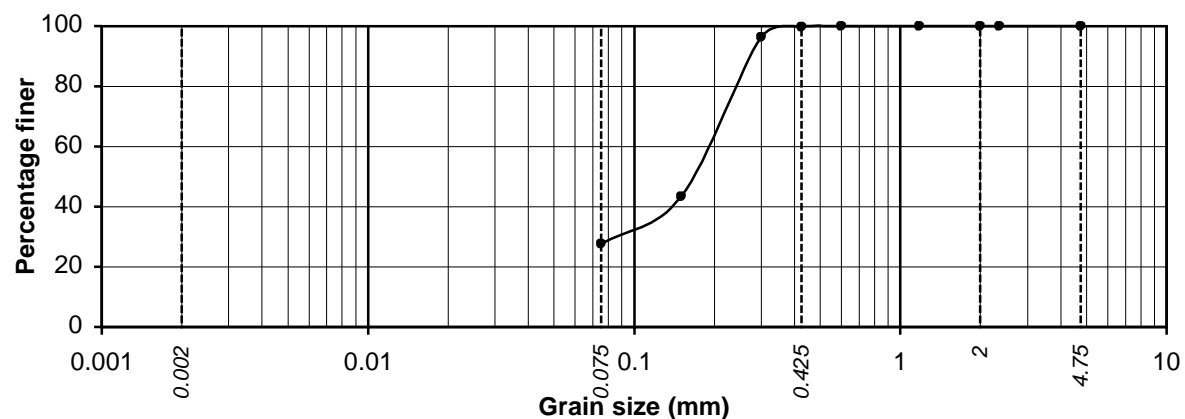
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 7.00m	17.8	39.7	42.3	0.2	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 10.00m	3.6	25.8	70.5	0.1	0.0	0.0

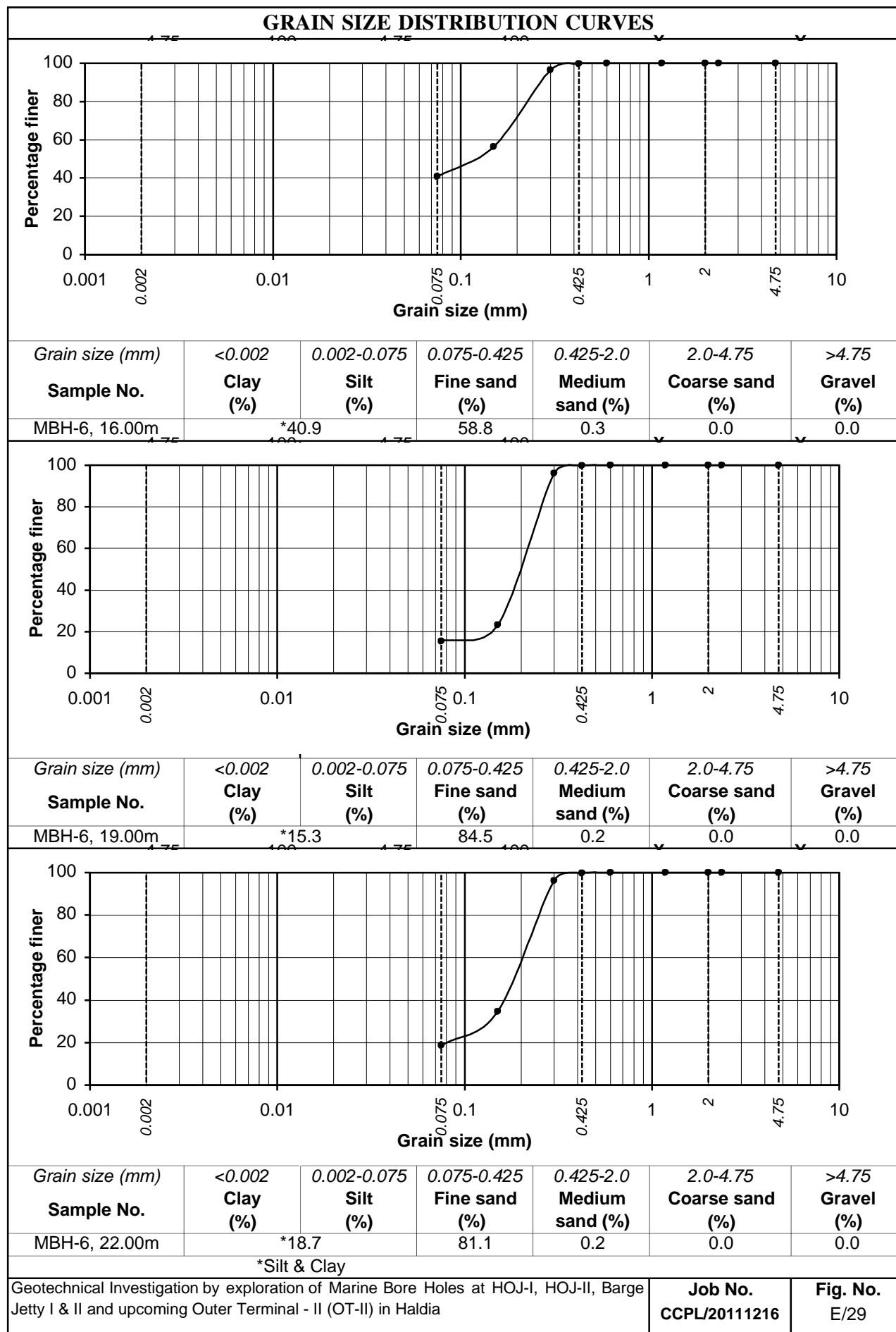


Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 13.00m		*27.7	72.0	0.3	0.0	0.0
*Silt & Clay						

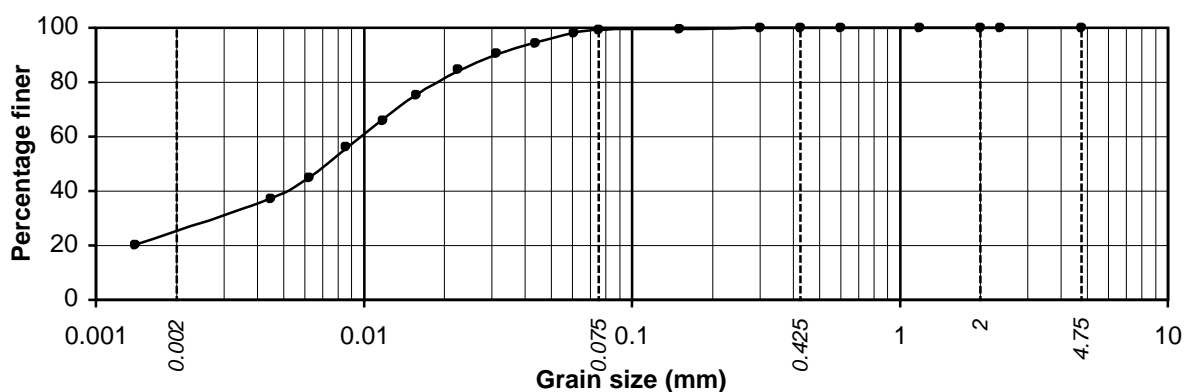
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

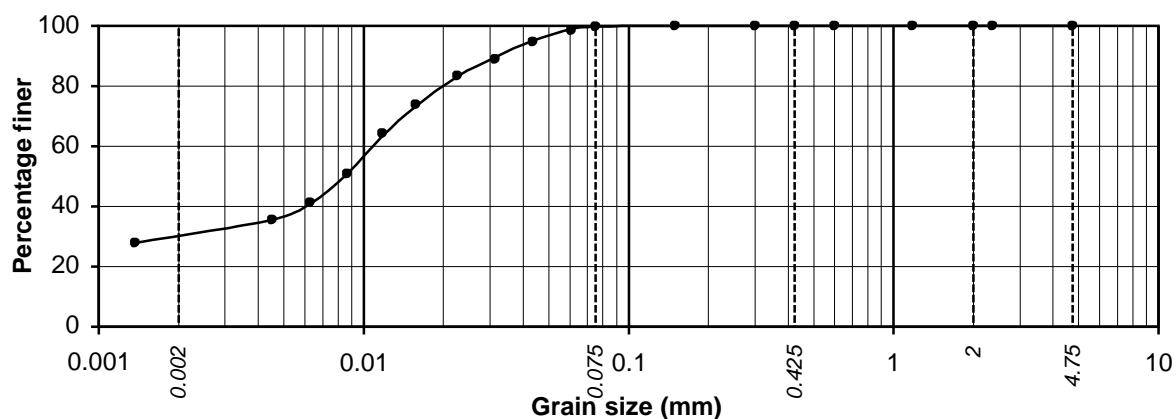
Fig. No.
E/28



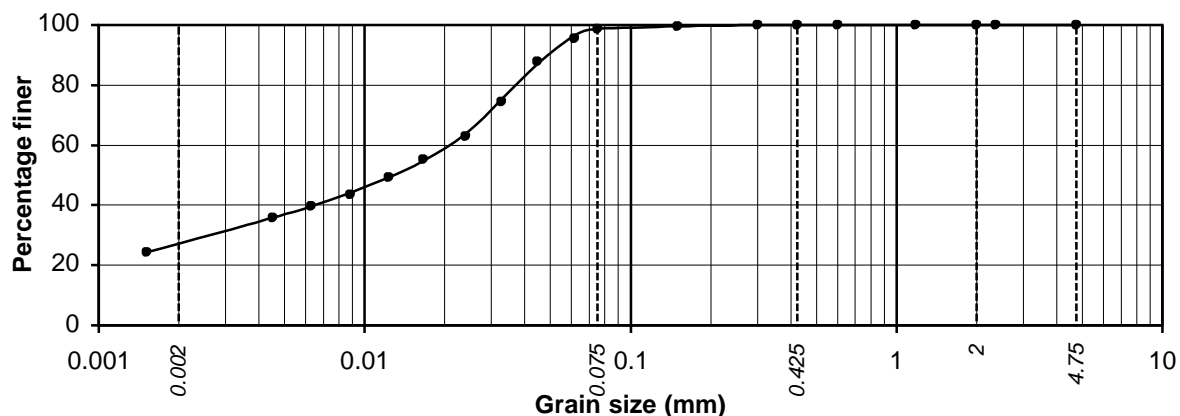
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 25.00m	25.4	73.9	0.7	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 28.00m	30.3	69.5	0.2	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-6, 31.00m	27.2	71.5	1.3	0.0	0.0	0.0

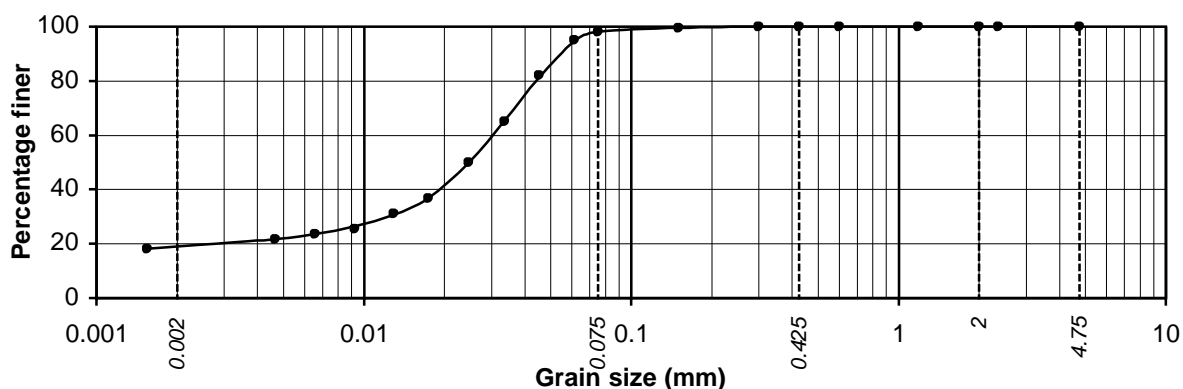
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

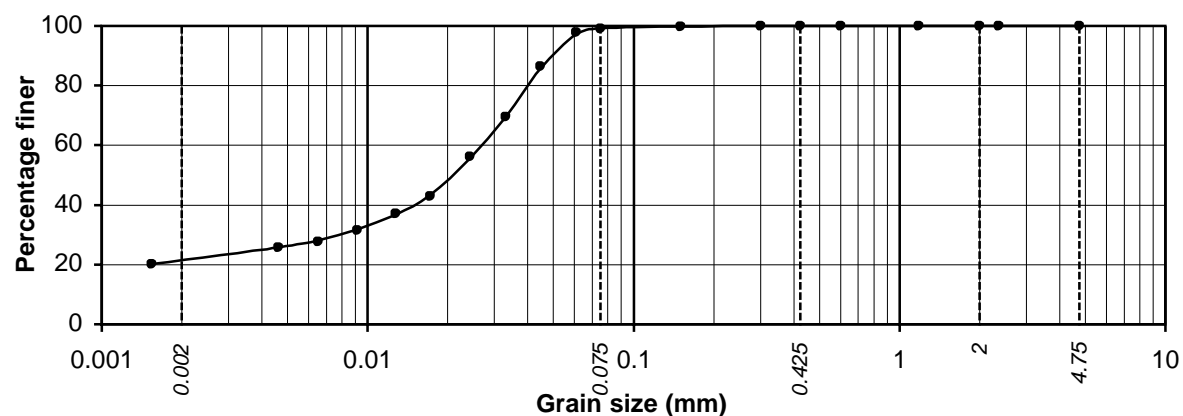
Job No.
CCPL/20111216

Fig. No.
E/30

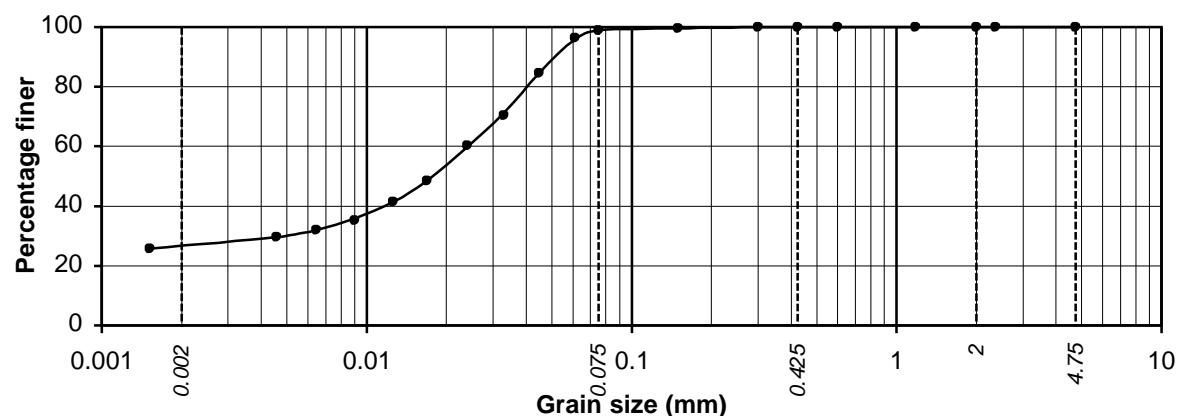
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-6, 34.00m	18.9	79.3	1.8	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-6, 37.00m	21.5	77.6	0.9	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-6, 40.00m	26.7	72.2	1.1	0.0	0.0	0.0

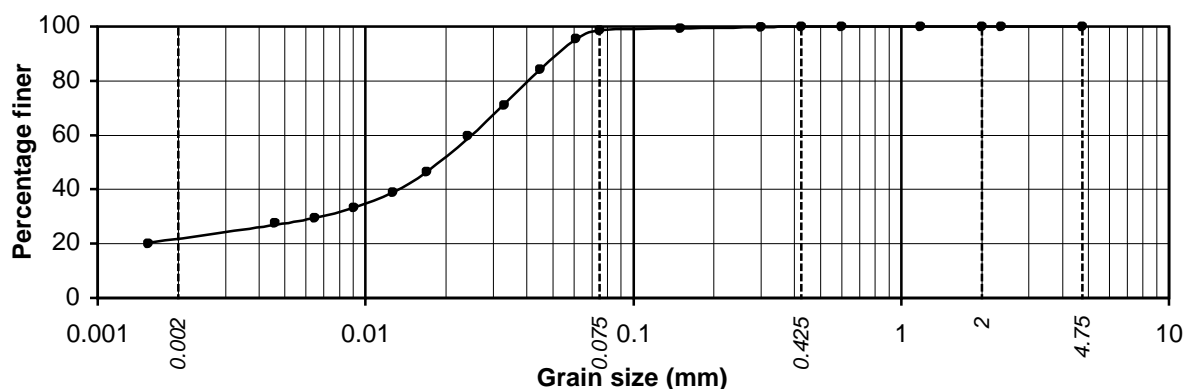
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

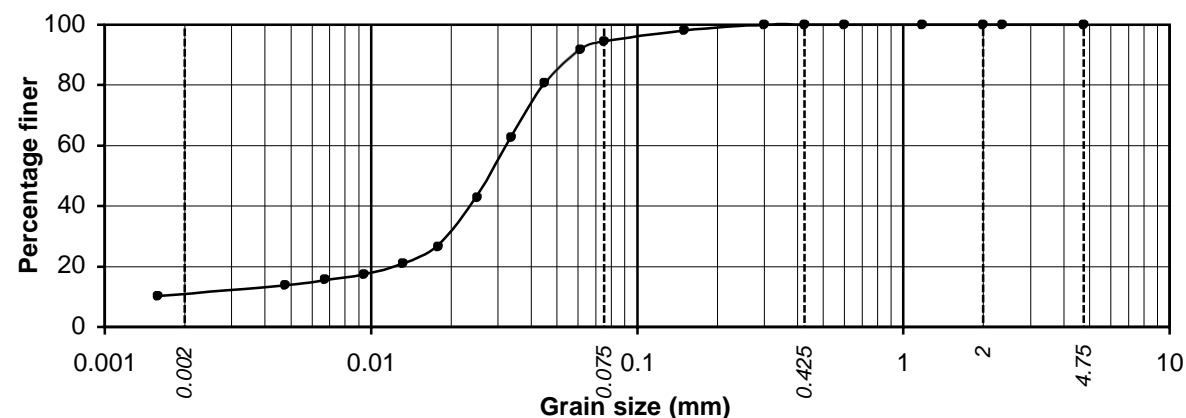
Job No.
CCPL/20111216

Fig. No.
E/31

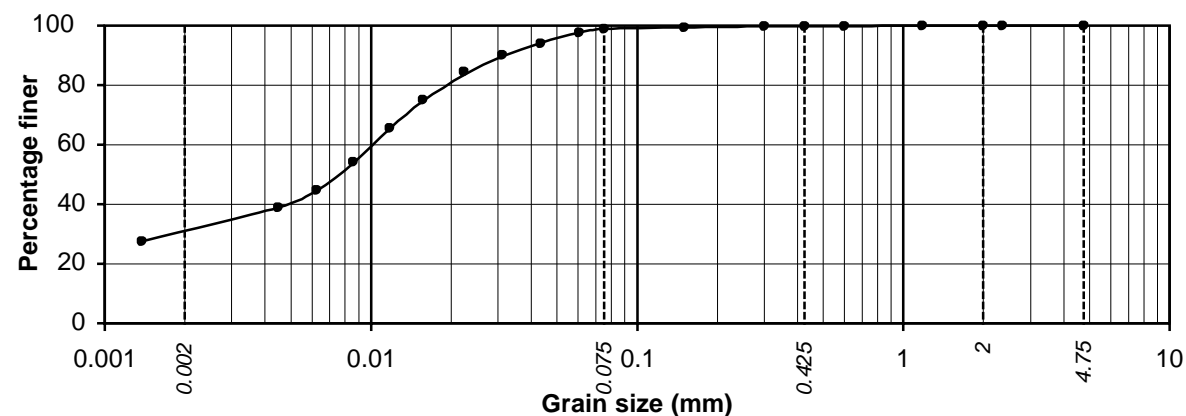
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-6, 44.10m	21.8	76.8	1.4	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 1.00m	10.9	83.6	5.5	0.0	0.0	0.0



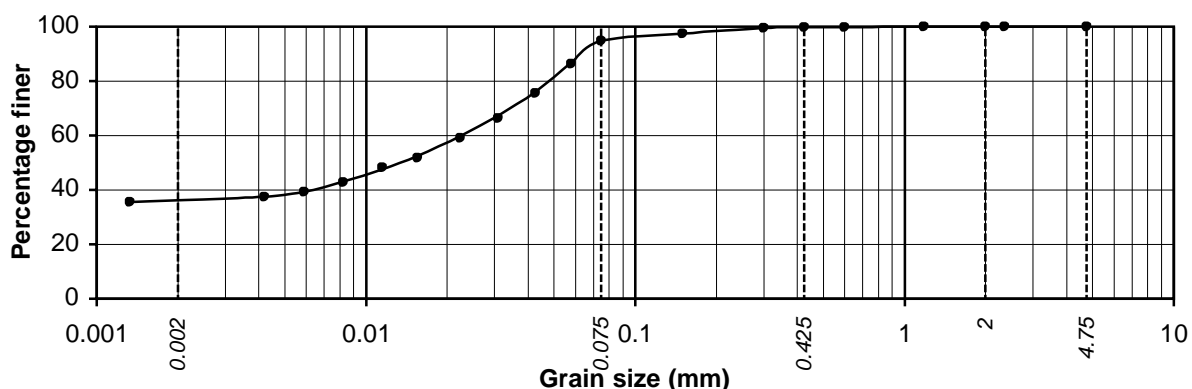
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 4.00m	31.2	67.6	0.9	0.3	0.0	0.0

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

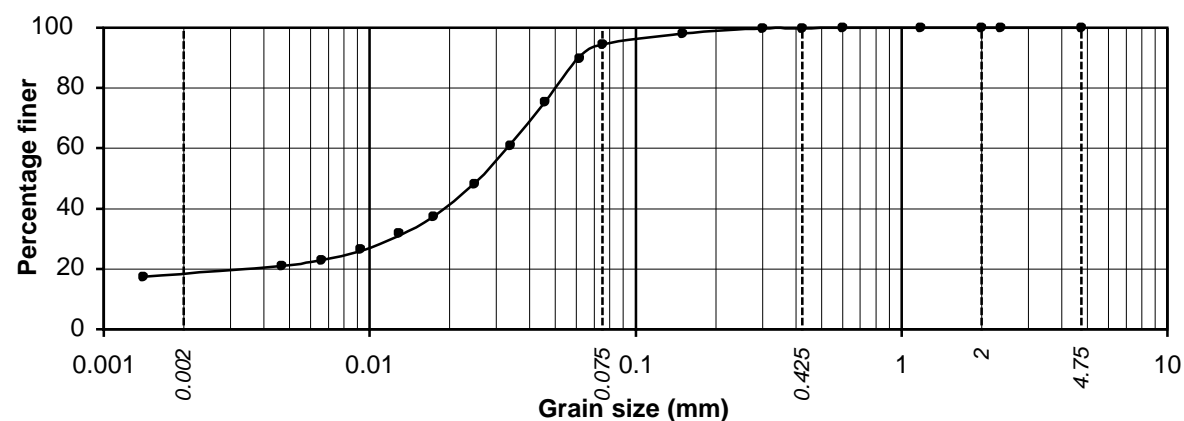
Job No.
CCPL/20111216

Fig. No.
E/32

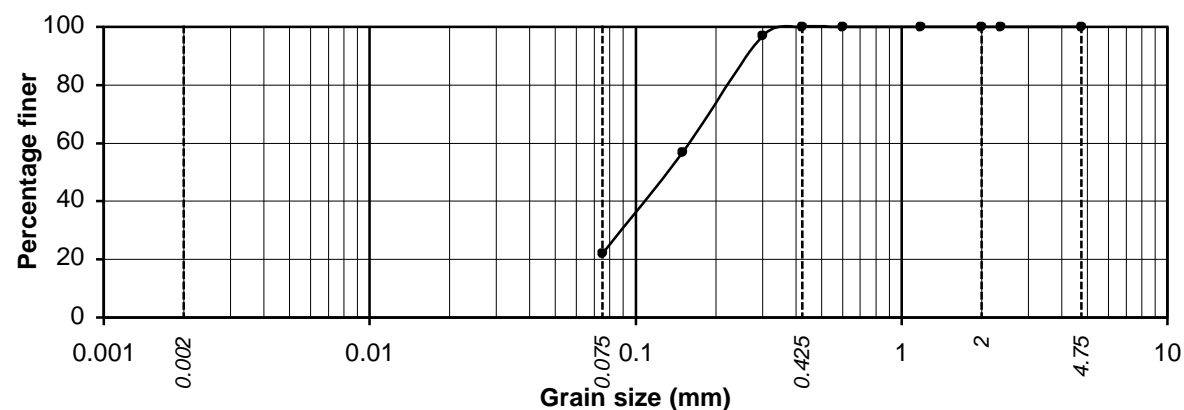
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 7.00m	36.2	58.6	4.9	0.3	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 10.00m	18.4	76.1	5.4	0.1	0.0	0.0



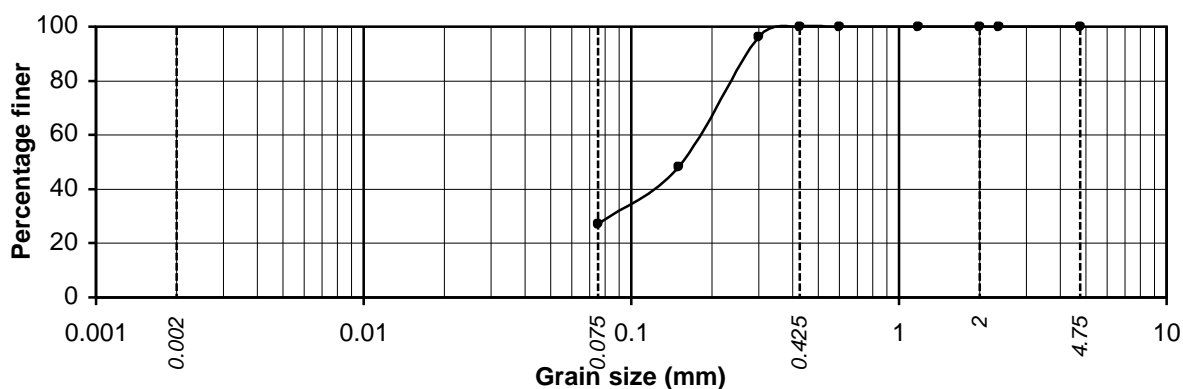
Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 13.00m	*22.1	77.9	0.0	0.0	0.0	0.0
*Silt & Clay						

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

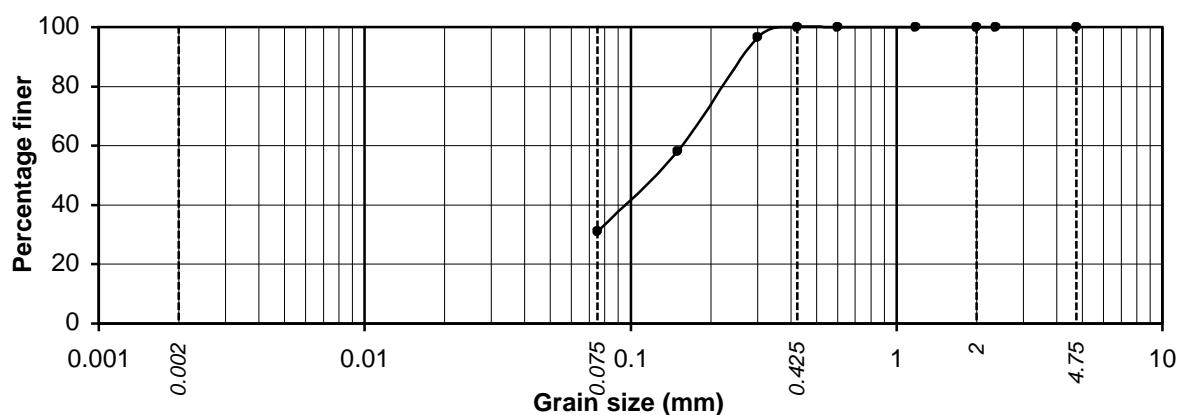
Job No.
CCPL/20111216

Fig. No.
E/33

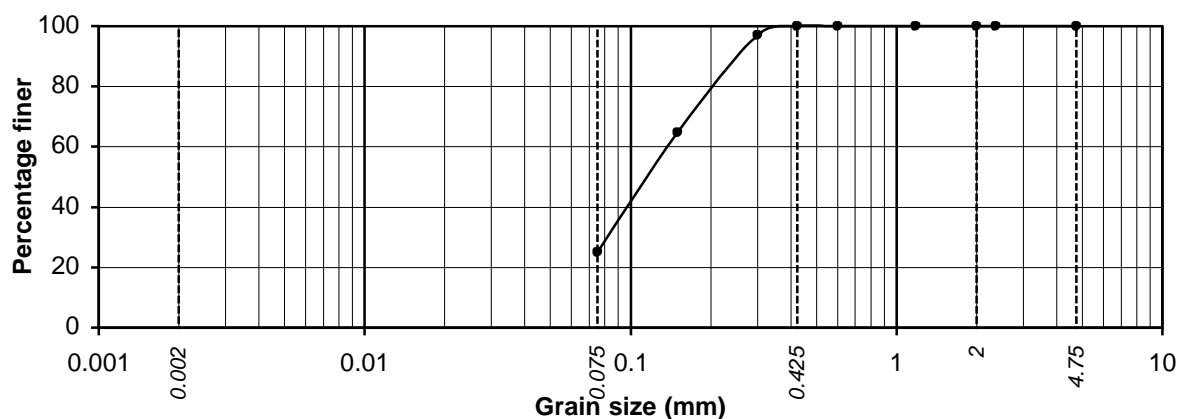
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 14.50m		*27.2	72.8	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 17.50m		*31.1	68.9	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 20.50m		*25.1	74.9	0.0	0.0	0.0

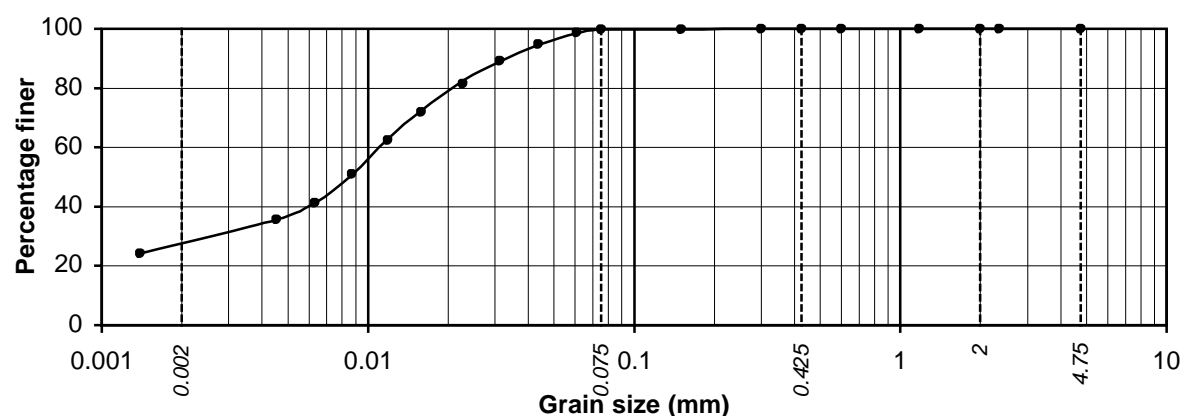
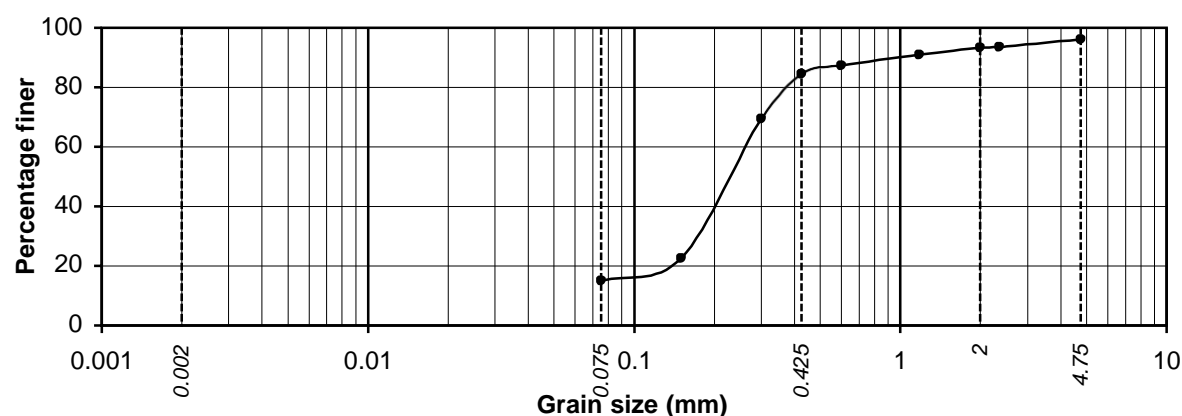
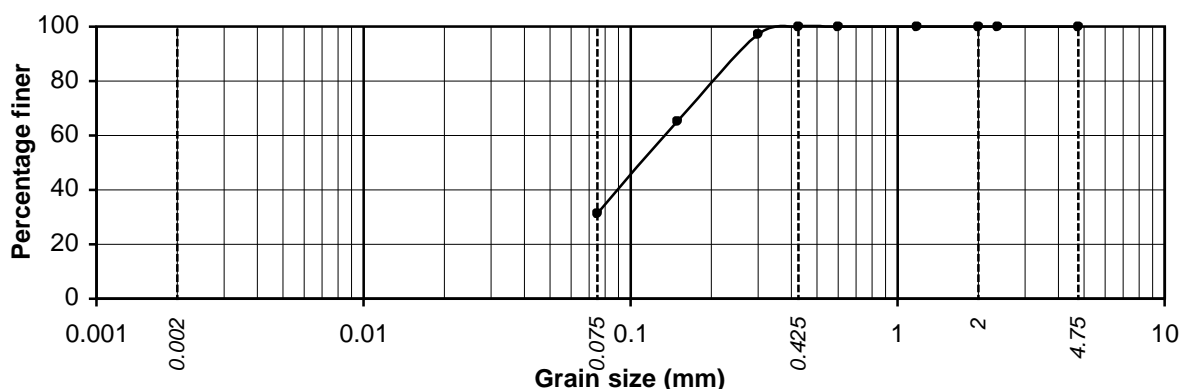
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
E/34

GRAIN SIZE DISTRIBUTION CURVES



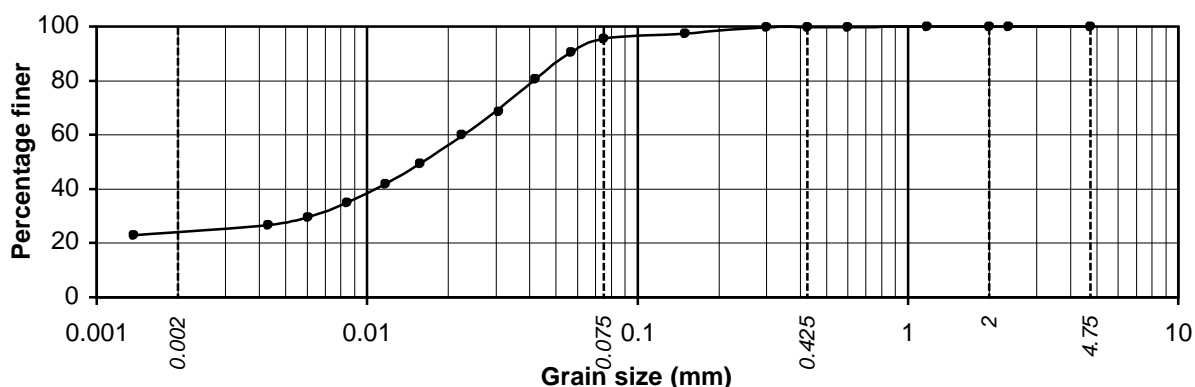
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

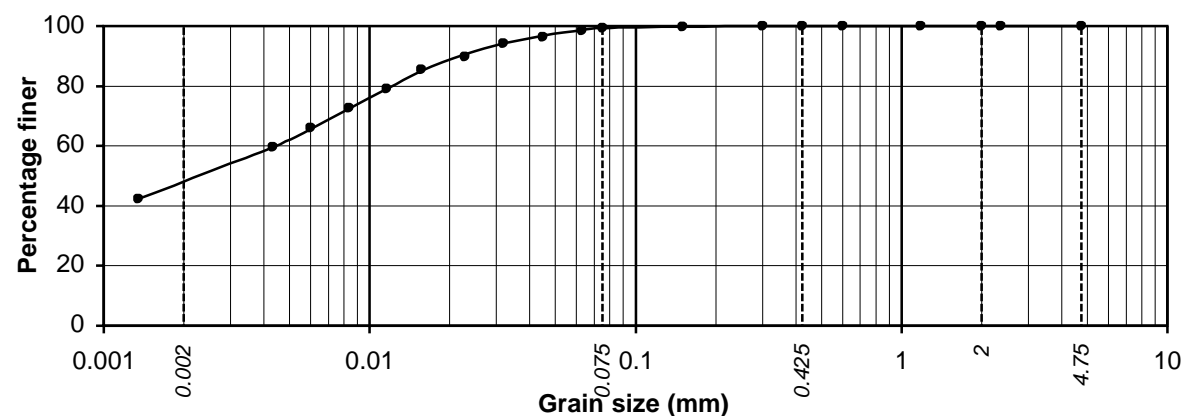
Job No.
CCPL/20111216

Fig. No.
E/35

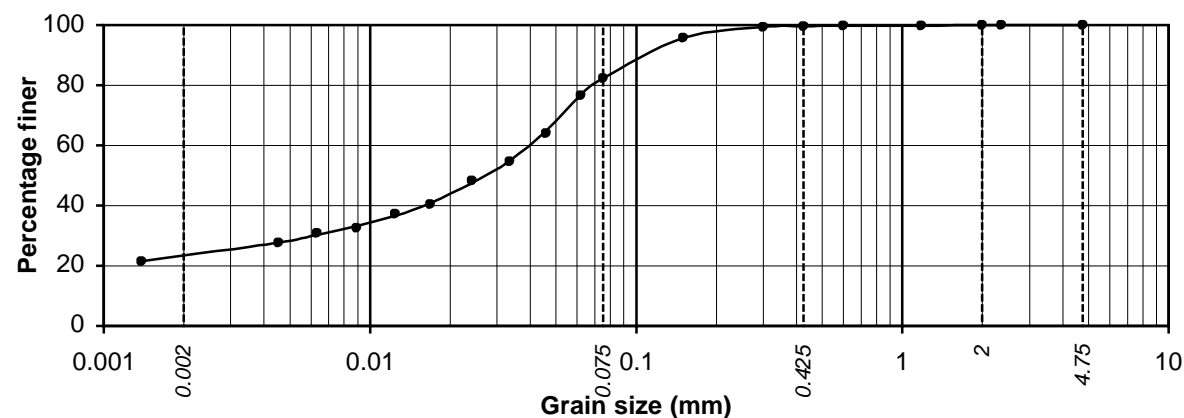
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 32.50m	24.2	71.3	4.3	0.2	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 34.00m	48.2	51.1	0.7	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 35.50m	23.4	58.9	17.3	0.3	0.1	0.0

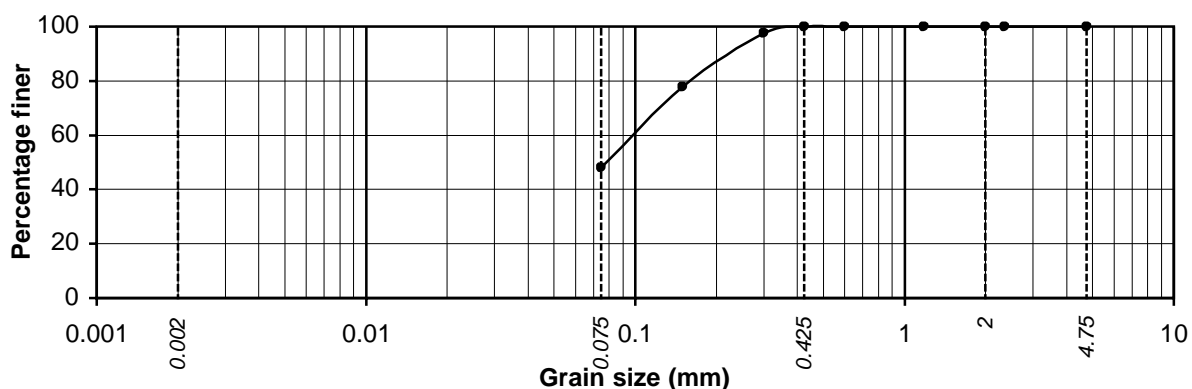
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

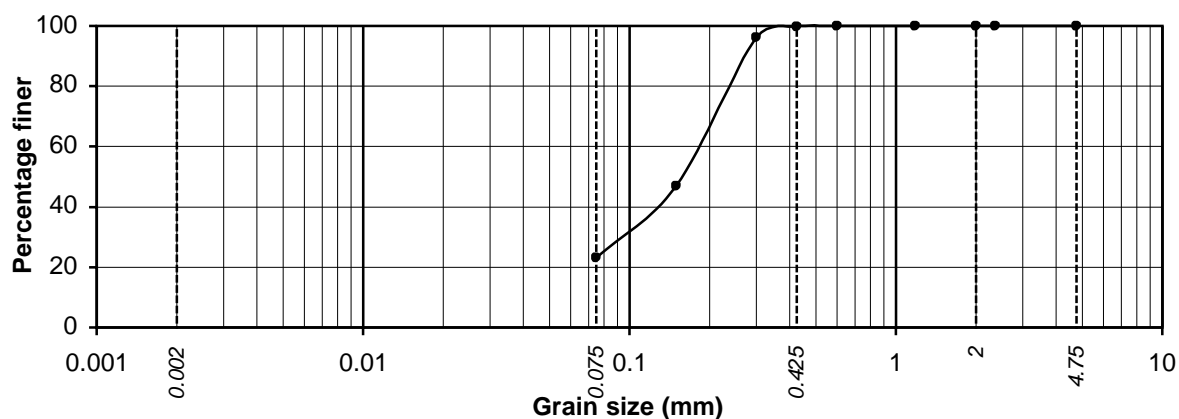
Job No.
CCPL/20111216

Fig. No.
E/36

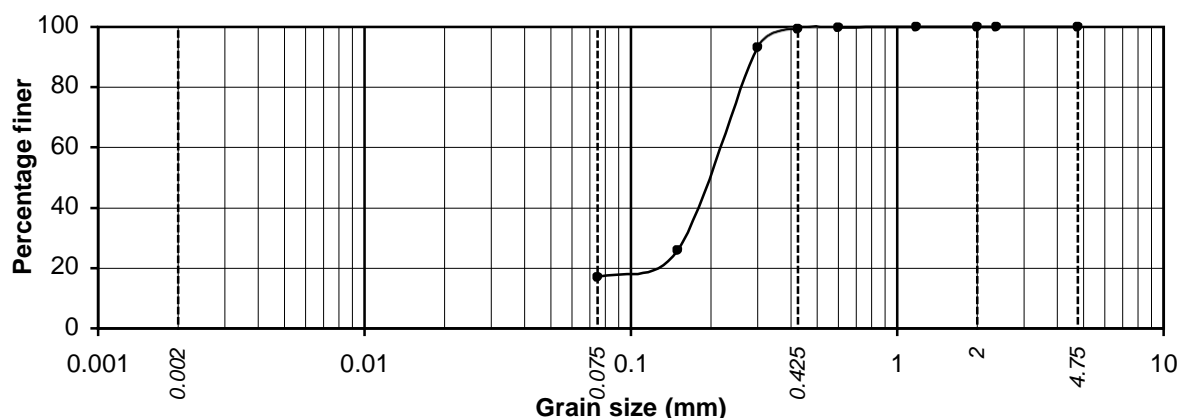
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 37.00m		*48.1	51.9	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 40.00m		*23.2	76.6	0.2	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-7, 44.00m		*17.1	82.2	0.7	0.0	0.0

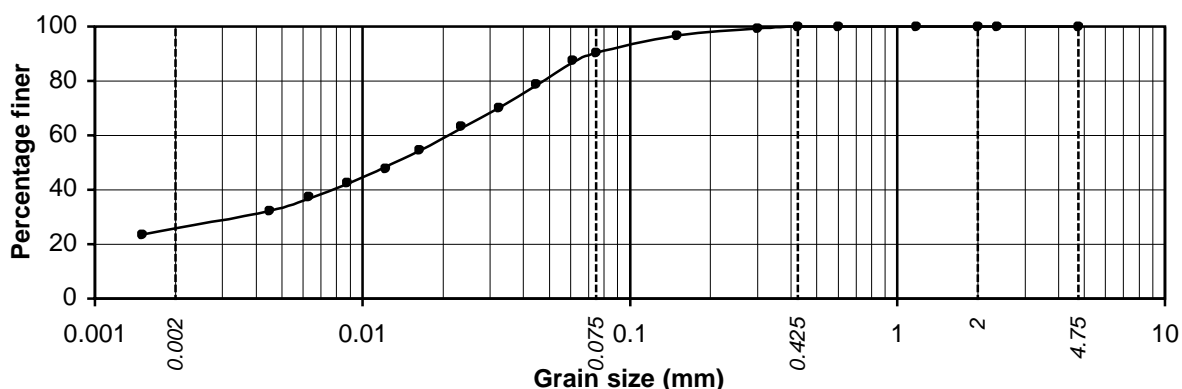
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

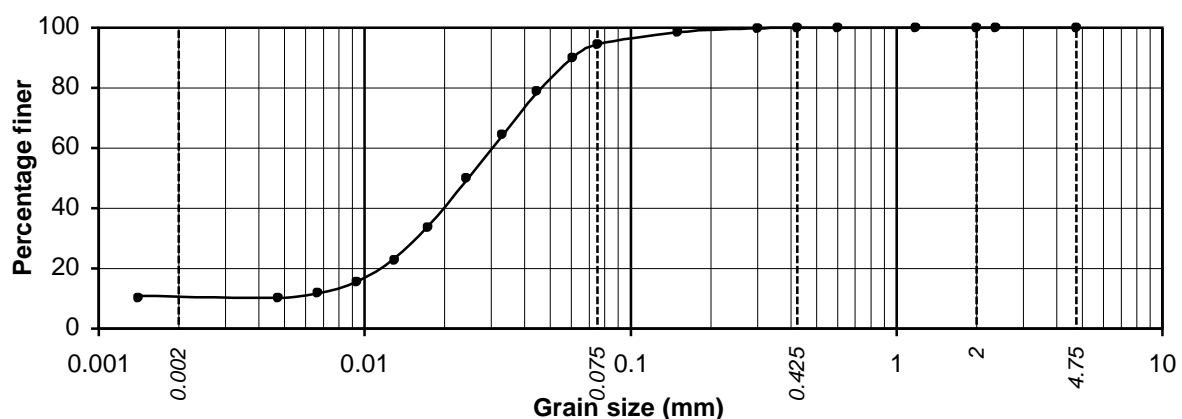
Job No.
CCPL/20111216

Fig. No.
E/37

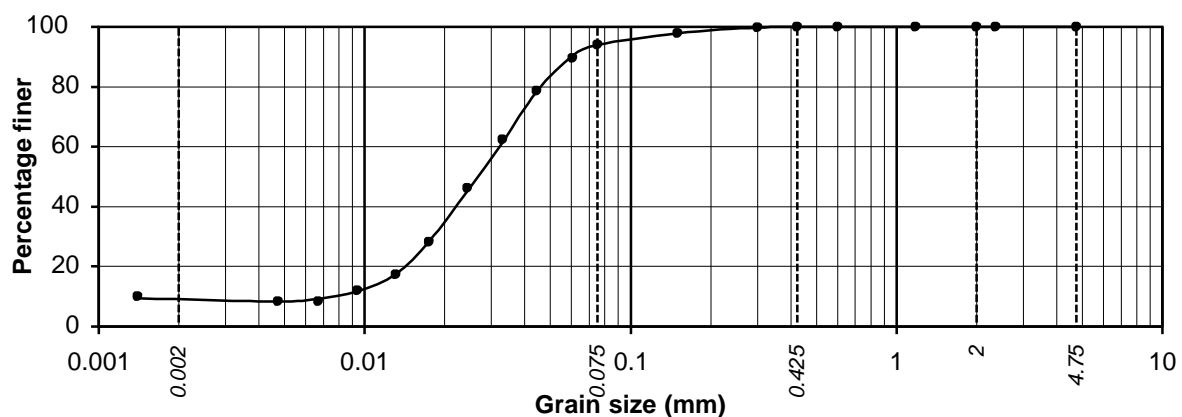
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-7, 46.00m	25.7	64.6	9.7	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-8, 0.00m	10.6	83.9	5.5	0.0	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-8, 1.00m	9.0	85.1	5.9	0.0	0.0	0.0

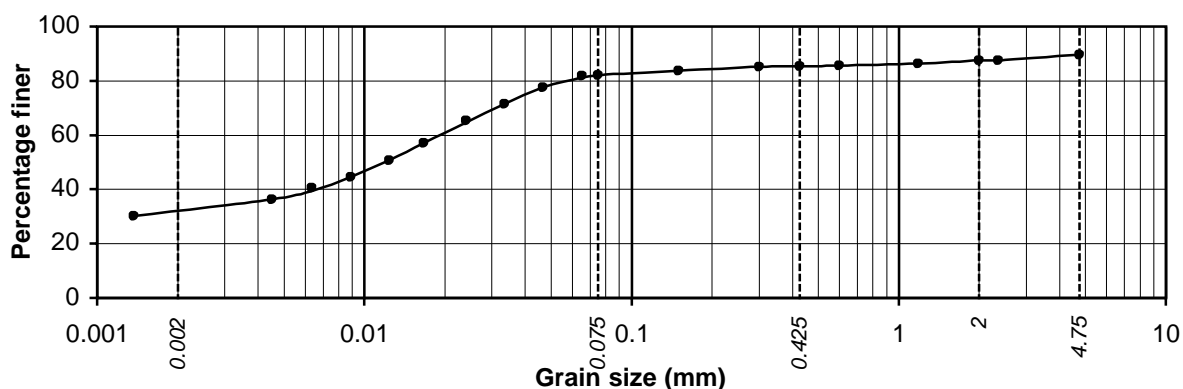
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

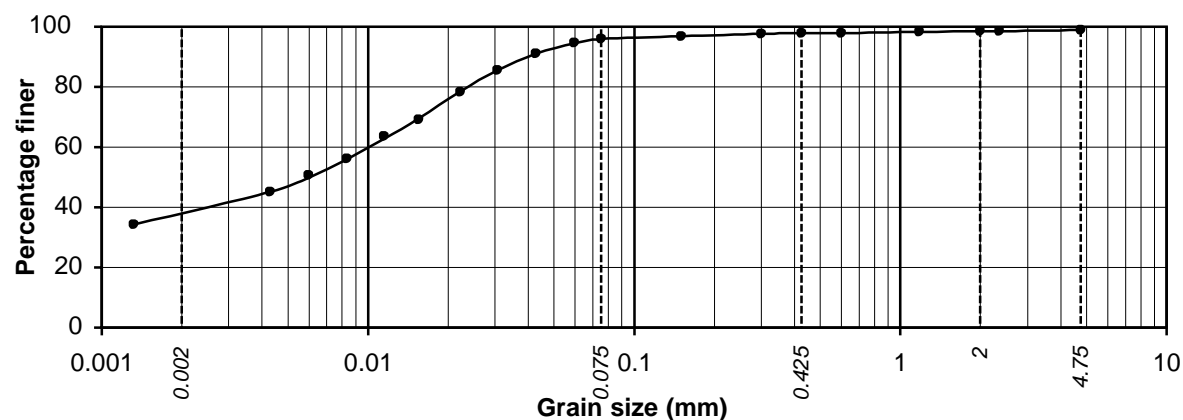
Job No.
CCPL/20111216

Fig. No.
E/38

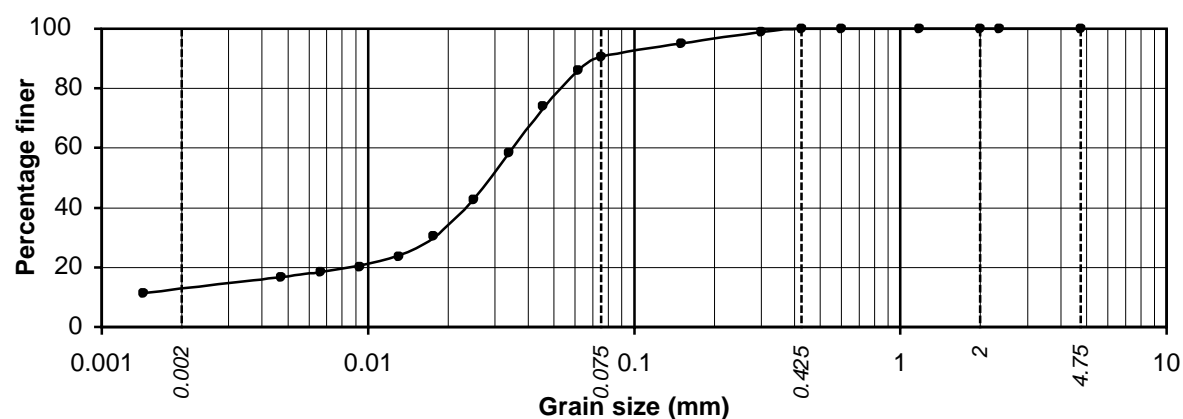
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 4.00m	32.1	50.0	3.3	2.0	2.3	10.3



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 7.00m	38.0	57.9	1.8	0.7	0.5	1.1



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 10.00m	12.9	77.6	9.5	0.0	0.0	0.0

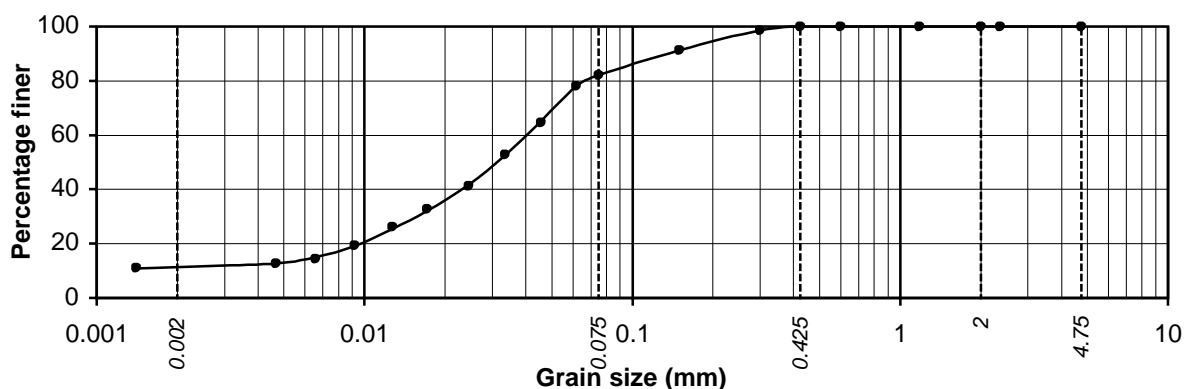
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

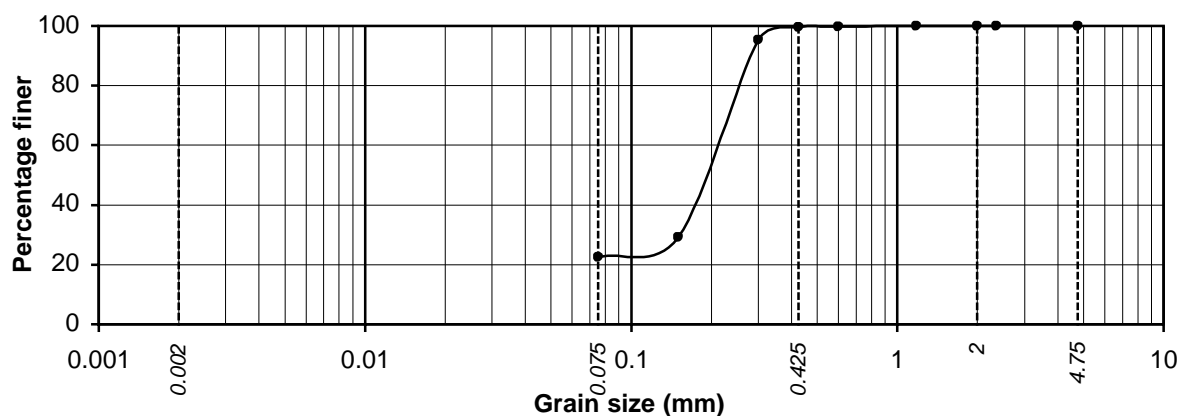
Job No.
CCPL/20111216

Fig. No.
E/39

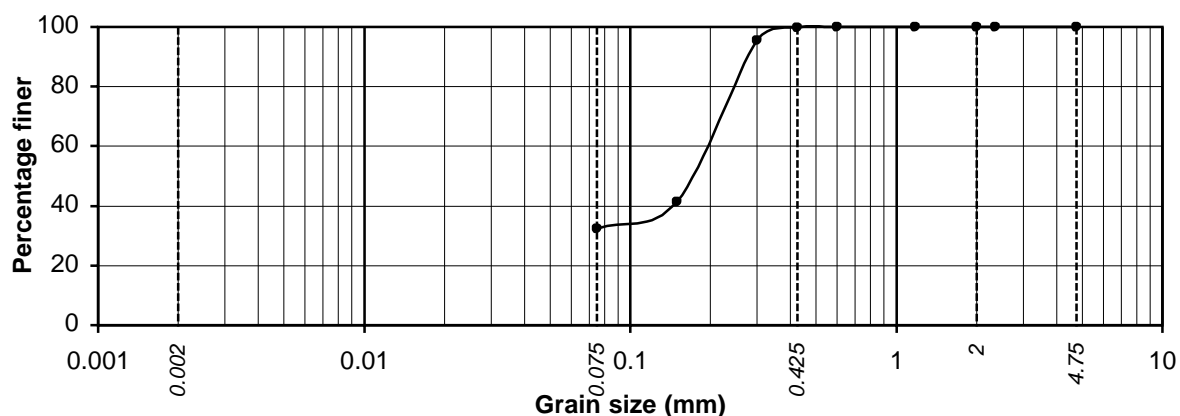
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 13.00m	11.3	70.7	18.0	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 16.00m	*22.6	77.0	0.4	0.0	0.0	0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 19.00m	*32.4	67.4	0.2	0.0	0.0	0.0

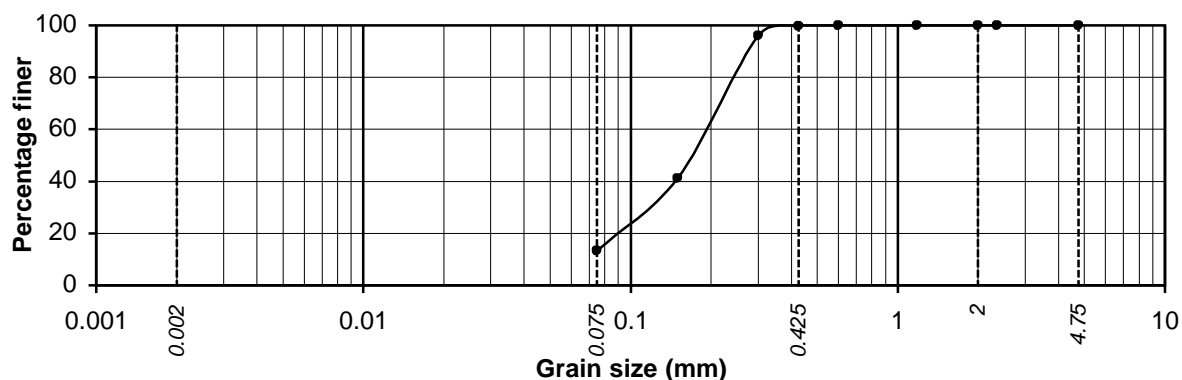
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

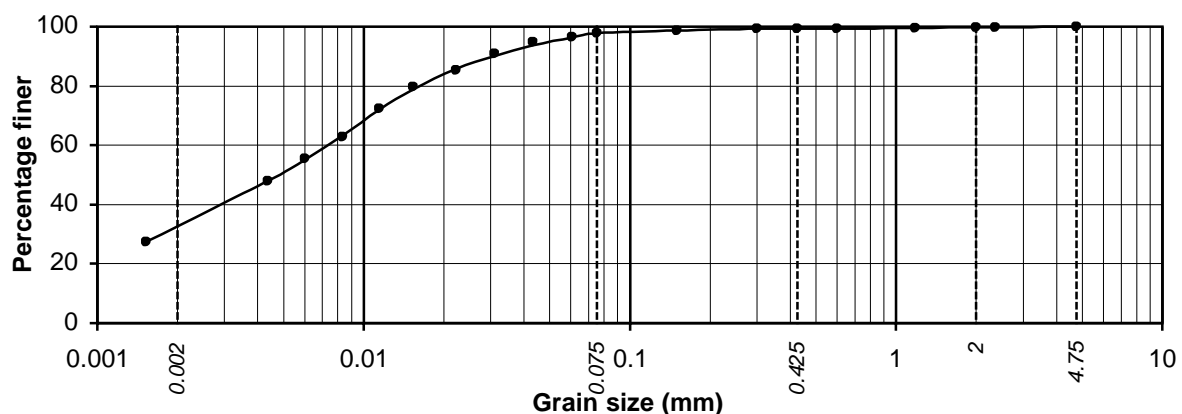
Job No.
CCPL/20111216

Fig. No.
E/40

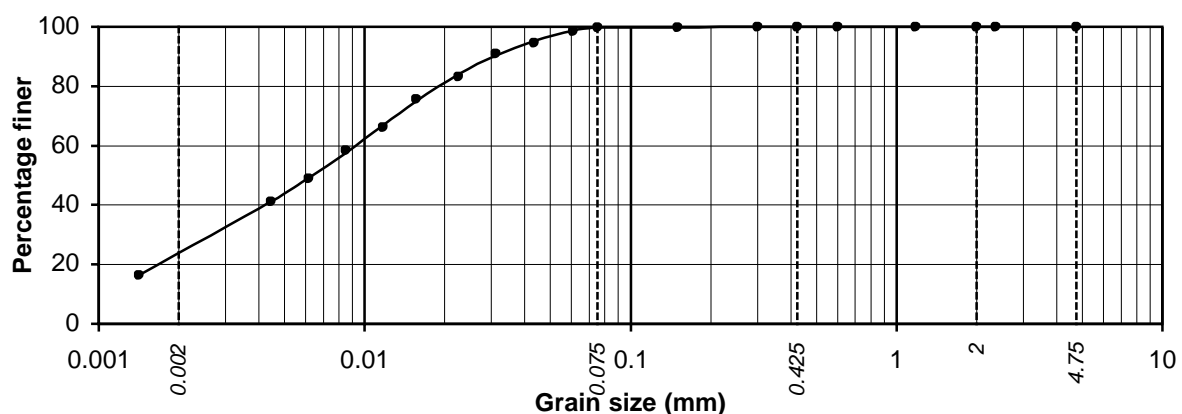
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-8, 22.00m		*13.4	86.4	0.2	0.0	0.0



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-8, 25.00m	32.7	65.1	1.5	0.4	0.2	0.1



Grain size (mm)	<0.002 Clay (%)	0.002-0.075 Silt (%)	0.075-0.425 Fine sand (%)	0.425-2.0 Medium sand (%)	2.0-4.75 Coarse sand (%)	>4.75 Gravel (%)
Sample No.						
MBH-8, 26.50m	23.9	75.8	0.3	0.0	0.0	0.0

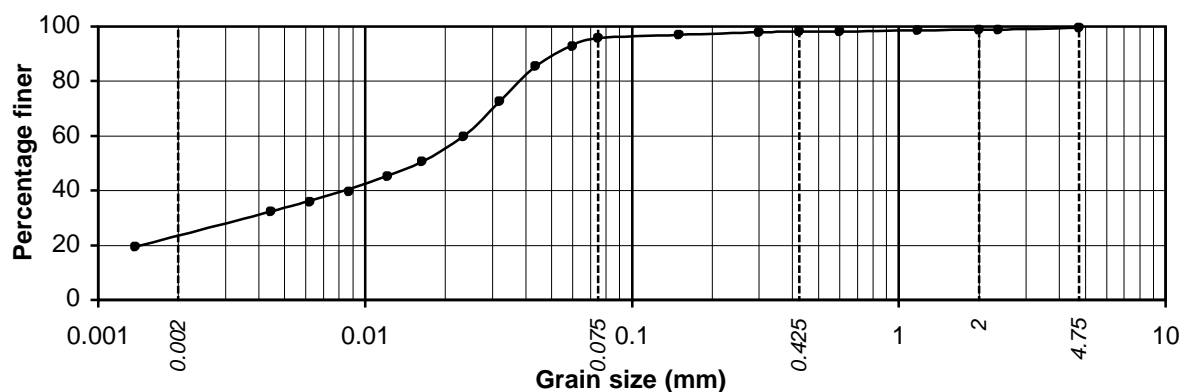
*Silt & Clay

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

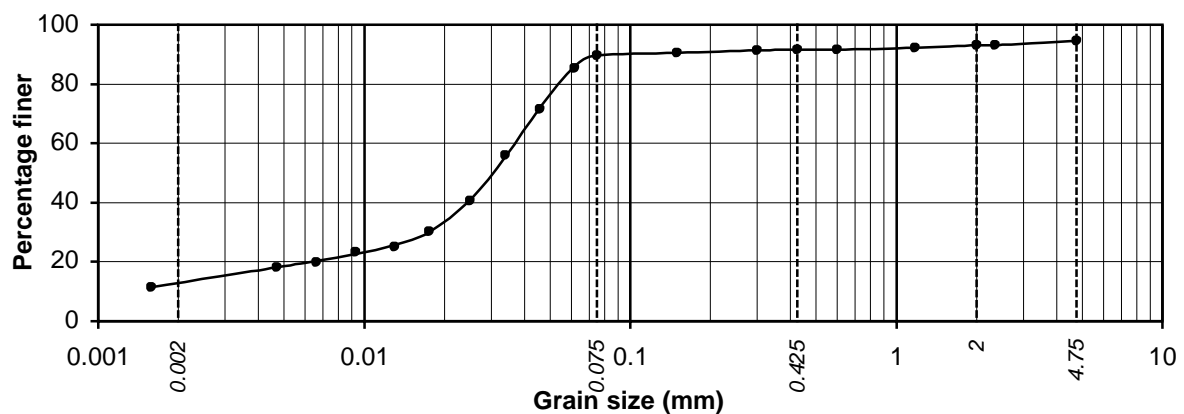
Job No.
CCPL/20111216

Fig. No.
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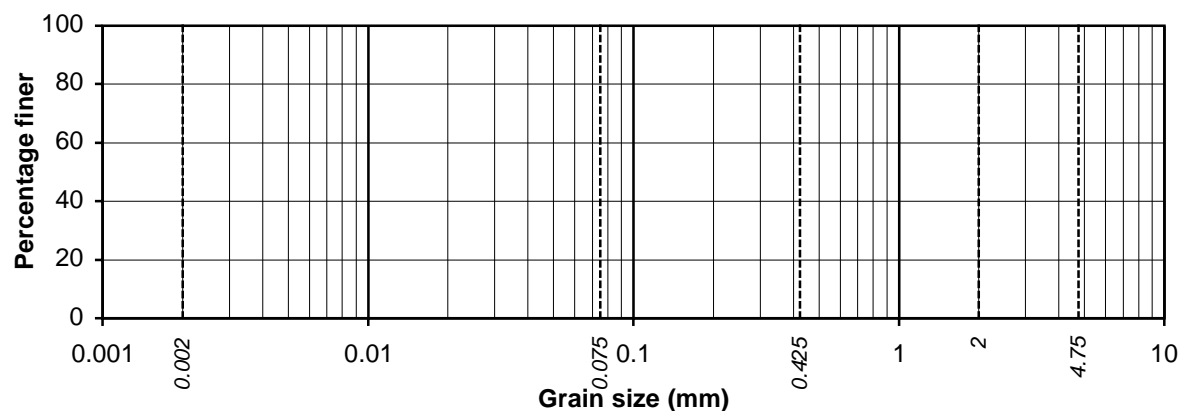
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 29.50m	23.5	72.2	2.3	0.9	0.6	0.5



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 32.50m	12.8	76.8	1.9	1.5	1.6	5.4



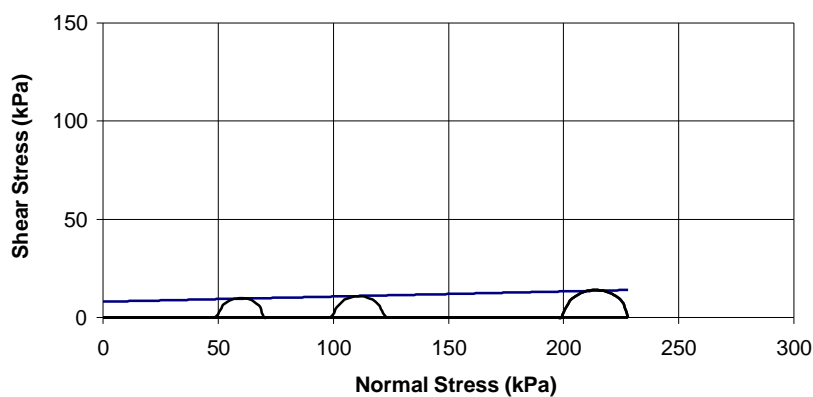
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.0	2.0-4.75	>4.75
Sample No.	Clay (%)	Silt (%)	Fine sand (%)	Medium sand (%)	Coarse sand (%)	Gravel (%)
MBH-8, 32.50m	12.8	76.8	1.9	1.5	1.6	5.4

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
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Fig. No.
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Mohr-Diagram

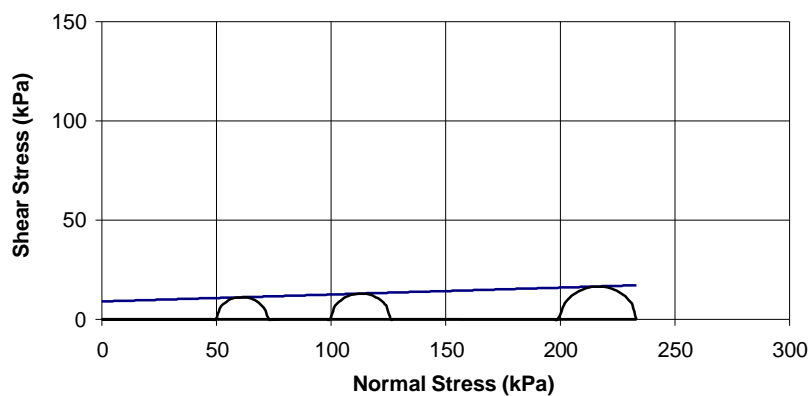


BH No.: MBH-1
Depth: 0.00 m

Test Type: UU

$c : 8 \text{ kPa}$
 $\phi : 1.5^\circ$

Mohr-Diagram

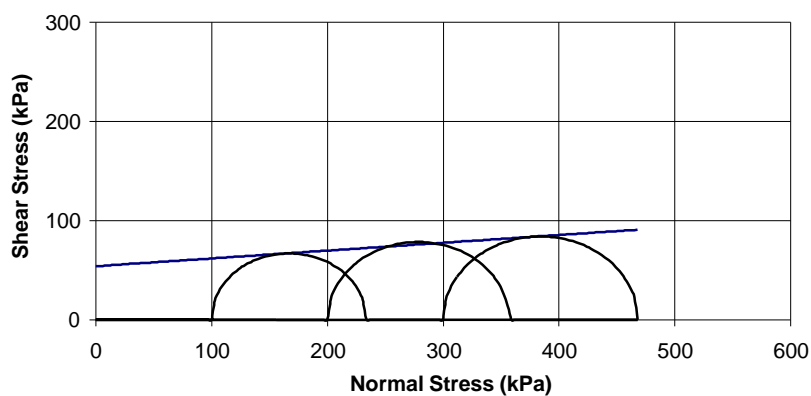


BH No.: MBH-1
Depth: 1.00 m

Test Type: UU

$c : 9 \text{ kPa}$
 $\phi : 2.0^\circ$

Mohr-Diagram



BH No.: MBH-1
Depth: 10.00 m

Test Type: UU

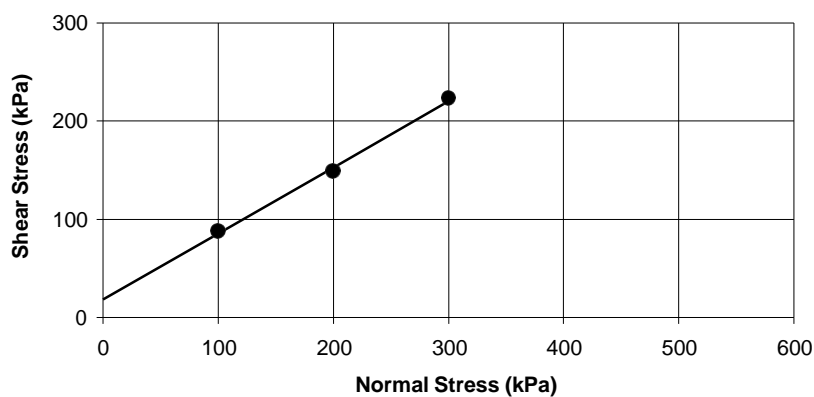
$c : 54 \text{ kPa}$
 $\phi : 4.5^\circ$

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/1

Direct Shear Test

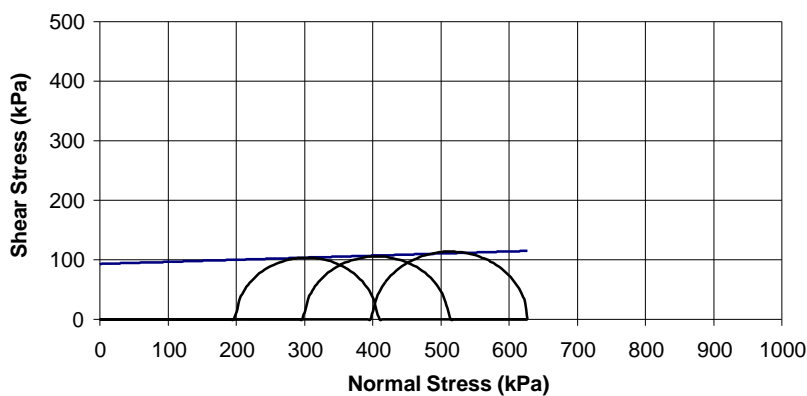


BH No.: MBH-1
Depth: 13.00 m

Test Type: DS

c : 18 kPa
 ϕ : 34.0°

Mohr-Diagram

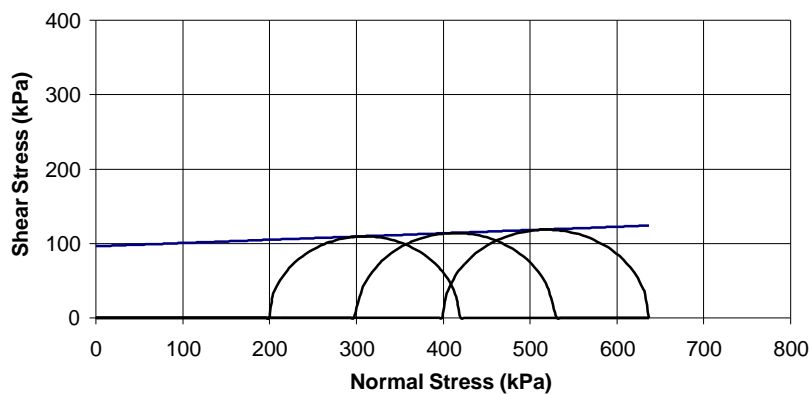


BH No.: MBH-1
Depth: 26.50 m

Test Type: UU

c : 93 kPa
 ϕ : 2.0°

Mohr-Diagram



BH No.: MBH-1
Depth: 29.50 m

Test Type: UU

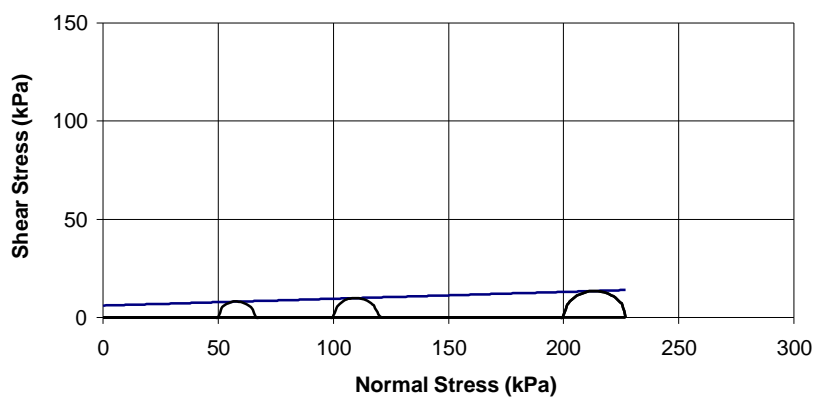
c : 96 kPa
 ϕ : 2.5°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/2

Mohr-Diagram

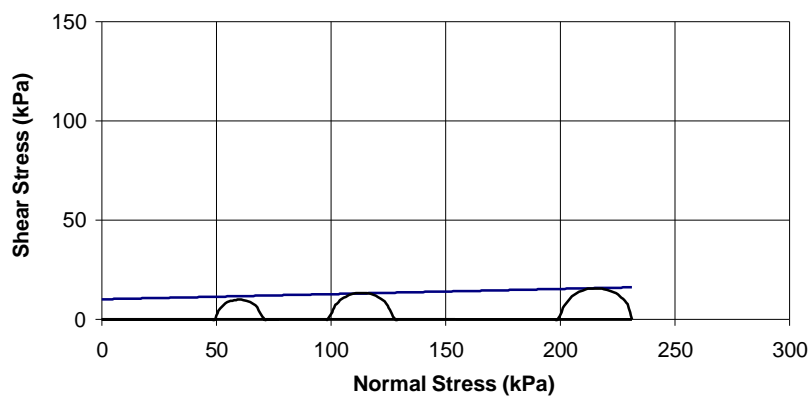


BH No.: MBH-2
Depth: 0.00 m

Test Type: UU

$c : 6 \text{ kPa}$
 $\phi : 2.0^\circ$

Mohr-Diagram

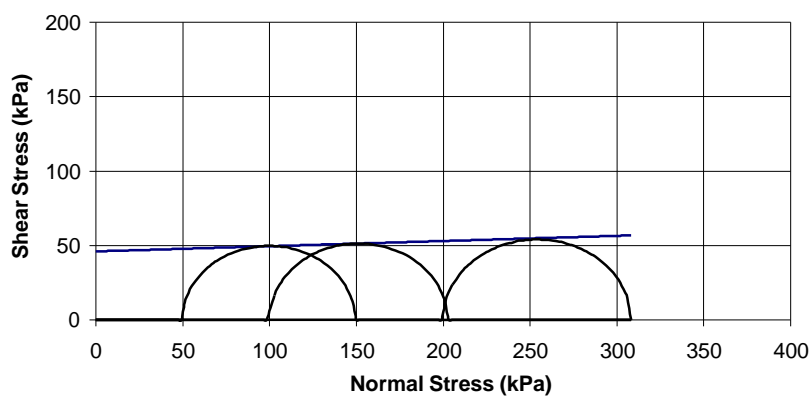


BH No.: MBH-2
Depth: 1.00 m

Test Type: UU

$c : 10 \text{ kPa}$
 $\phi : 1.5^\circ$

Mohr-Diagram



BH No.: MBH-2
Depth: 7.00 m

Test Type: UU

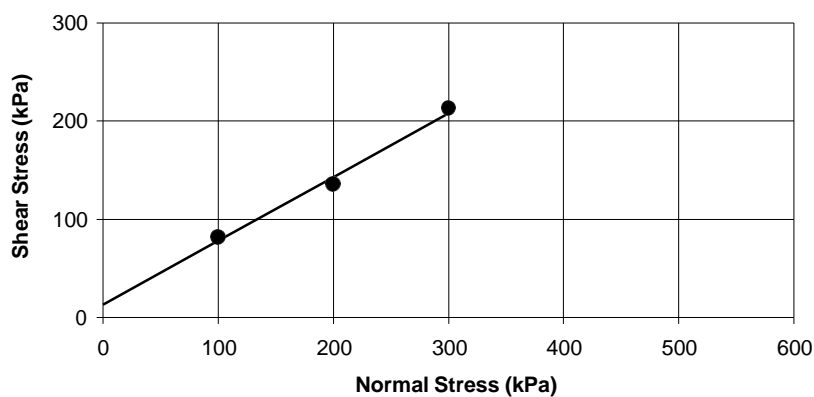
$c : 46 \text{ kPa}$
 $\phi : 2.0^\circ$

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/3

Direct Shear Test

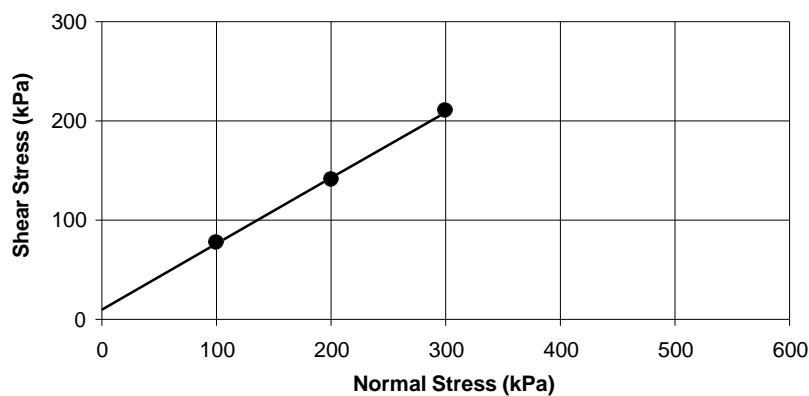


BH No.: MBH-2
Depth: 10.00 m

Test Type: DS

c : 13 kPa
 ϕ : 33.0°

Direct Shear Test

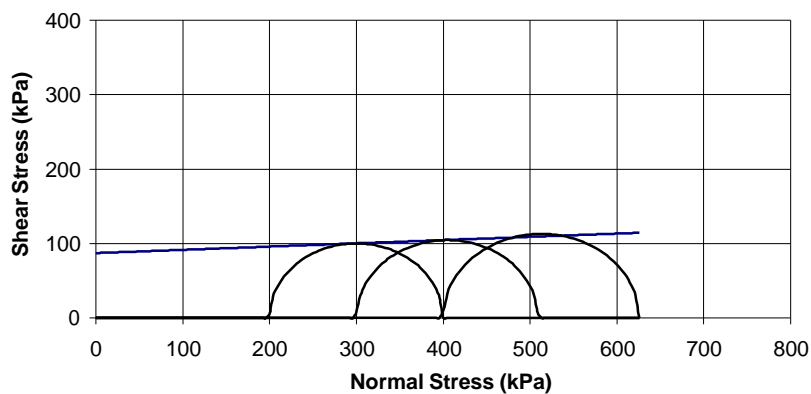


BH No.: MBH-2
Depth: 13.00 m

Test Type: DS

c : 10 kPa
 ϕ : 33.5°

Mohr-Diagram



BH No.: MBH-2
Depth: 25.00 m

Test Type: UU

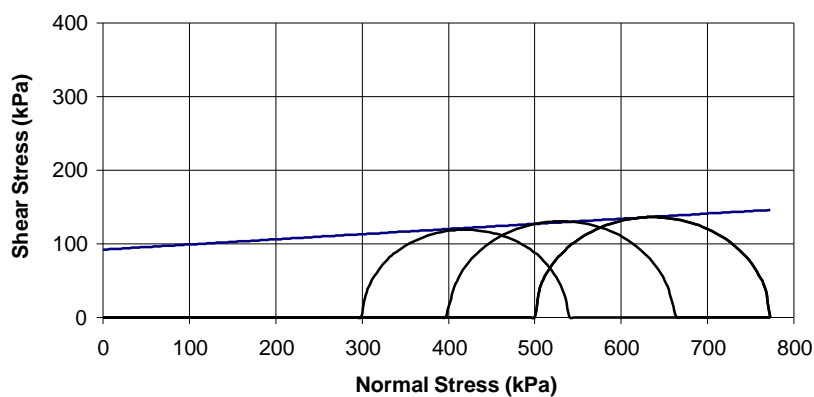
c : 87 kPa
 ϕ : 2.5°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/4

Mohr-Diagram

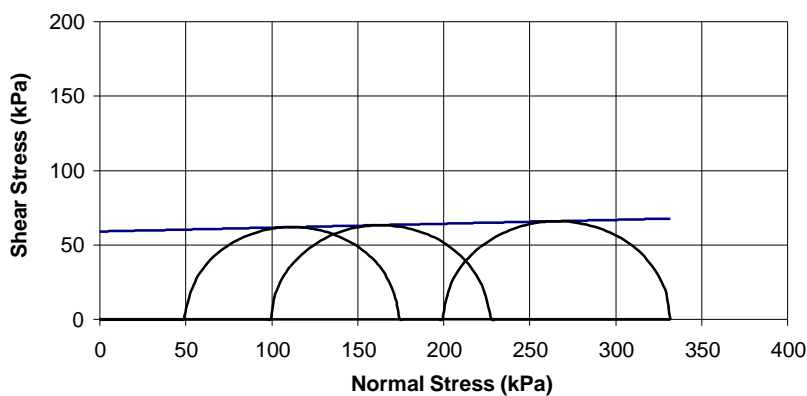


BH No.: MBH-2
Depth: 31.00 m

Test Type: UU

c : 92 kPa
 ϕ : 4.0°

Mohr-Diagram

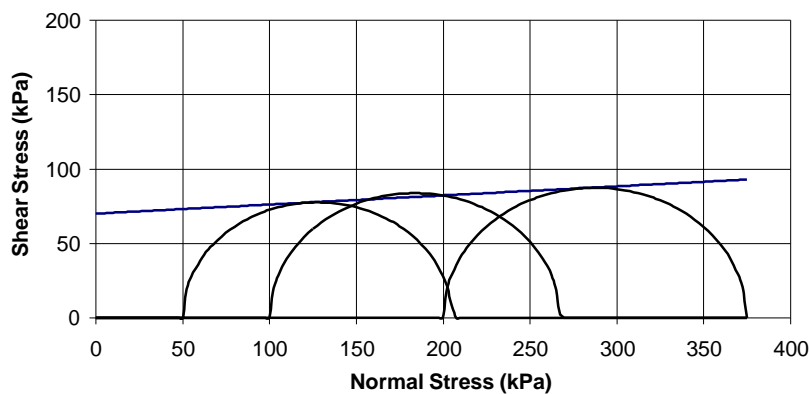


BH No.: MBH-3
Depth: 1.00 m

Test Type: UU

c : 59 kPa
 ϕ : 1.5°

Mohr-Diagram



BH No.: MBH-3
Depth: 4.00 m

Test Type: UU

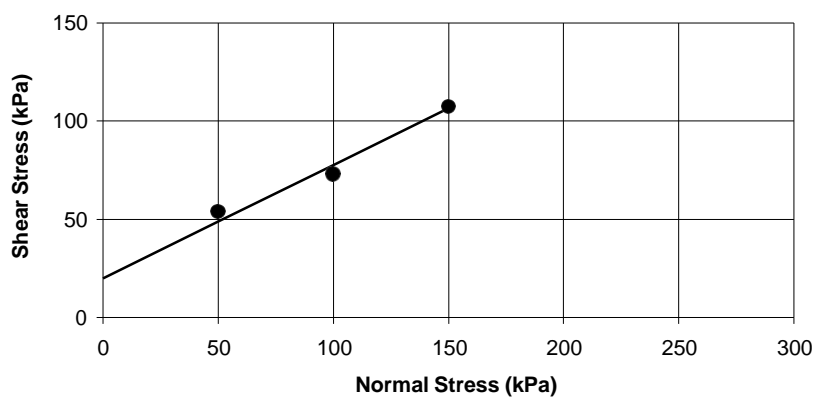
c : 70 kPa
 ϕ : 3.5°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/5

Direct Shear Test

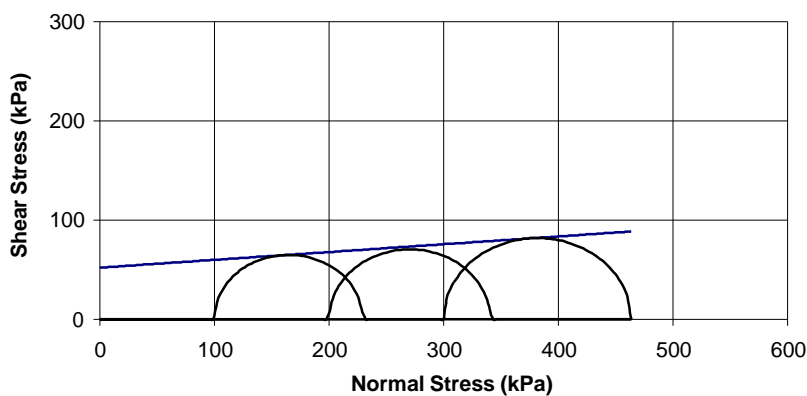


BH No.: MBH-3
Depth: 7.00 m

Test Type: DS

c : 20 kPa
 ϕ : 30.0°

Mohr-Diagram

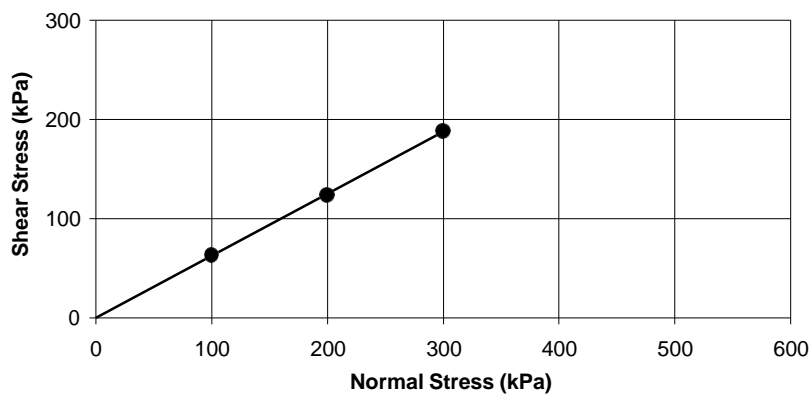


BH No.: MBH-3
Depth: 10.00 m

Test Type: UU

c : 52 kPa
 ϕ : 4.5°

Direct Shear Test



BH No.: MBH-3
Depth: 13.00 m

Test Type: DS

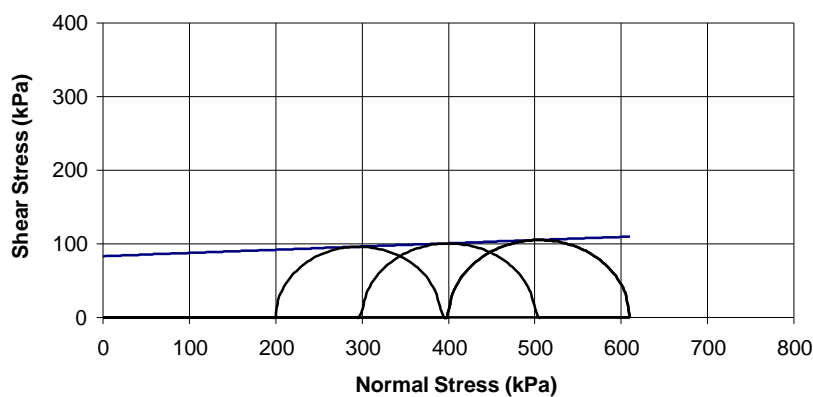
c : 0 kPa
 ϕ : 32.0°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/6

Mohr-Diagram

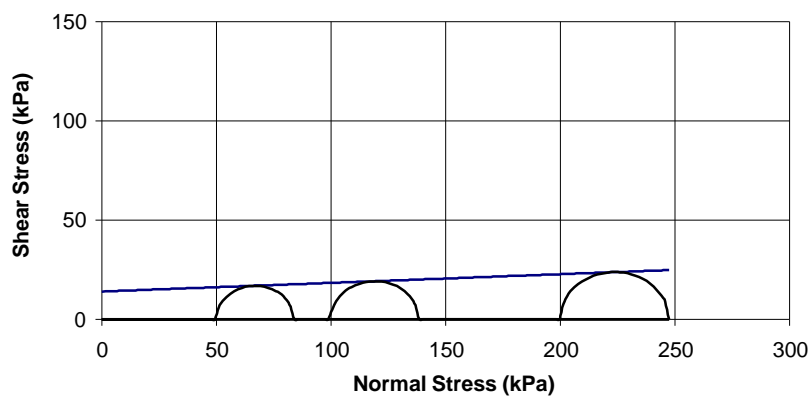


BH No.: MBH-3
Depth: 23.50 m

Test Type: UU

$c : 83 \text{ kPa}$
 $\phi : 2.5^\circ$

Mohr-Diagram

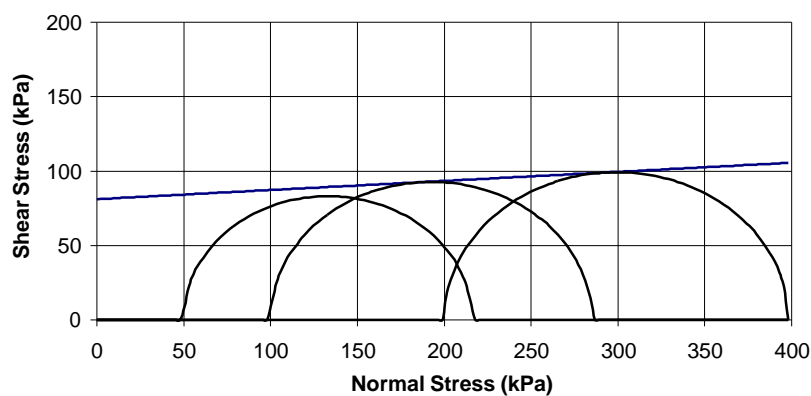


BH No.: MBH-4
Depth: 1.00 m

Test Type: UU

$c : 14 \text{ kPa}$
 $\phi : 2.5^\circ$

Mohr-Diagram



BH No.: MBH-4
Depth: 4.00 m

Test Type: UU

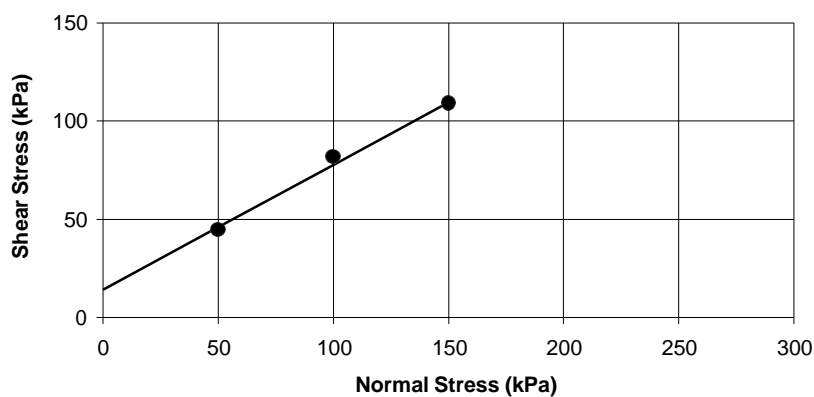
$c : 81 \text{ kPa}$
 $\phi : 3.5^\circ$

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/7

Direct Shear Test

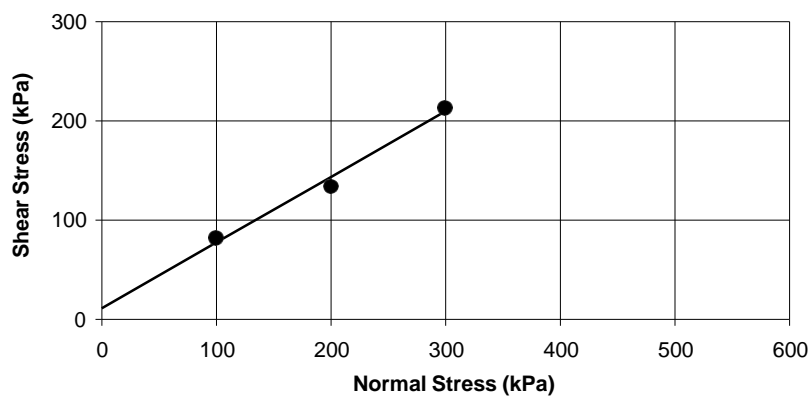


BH No.: MBH-4
Depth: 7.00 m

Test Type: DS

c : 14 kPa
 ϕ : 32.5°

Direct Shear Test

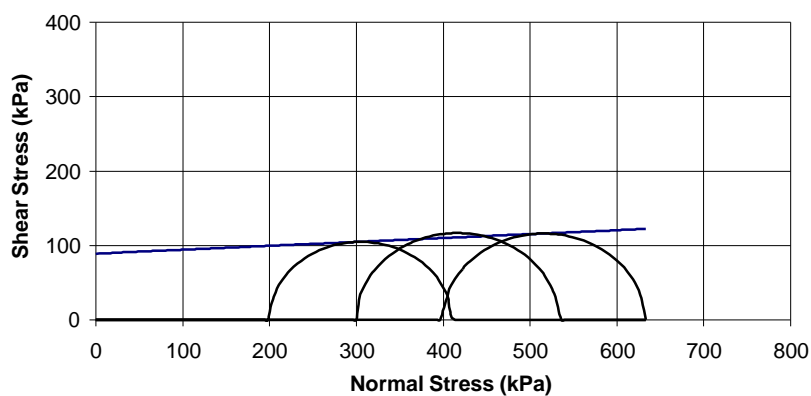


BH No.: MBH-4
Depth: 10.00 m

Test Type: DS

c : 11 kPa
 ϕ : 33.5°

Mohr-Diagram



BH No.: MBH-4
Depth: 23.50 m

Test Type: UU

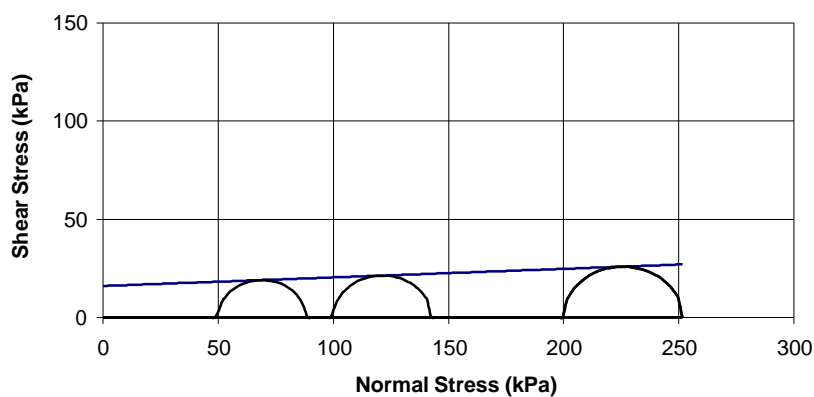
c : 89 kPa
 ϕ : 3.0°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/8

Mohr-Diagram

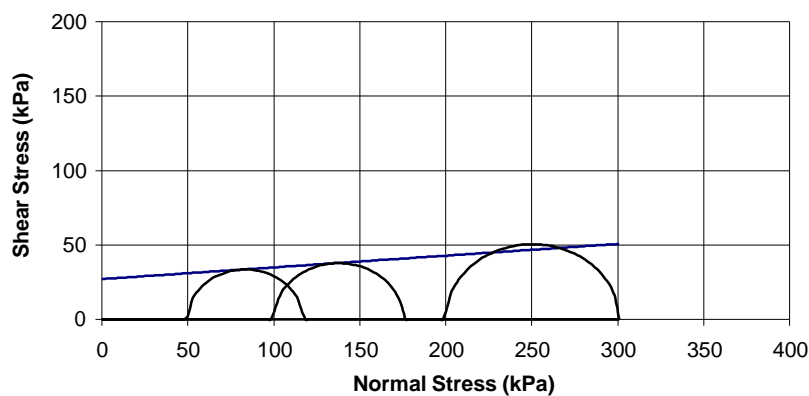


BH No.: MBH-5
Depth: 1.00 m

Test Type: UU

$c : 16 \text{ kPa}$
 $\phi : 2.5^\circ$

Mohr-Diagram

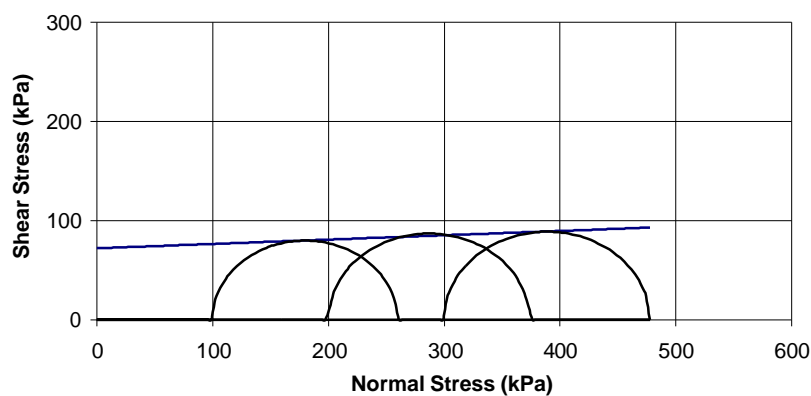


BH No.: MBH-5
Depth: 4.00 m

Test Type: UU

$c : 27 \text{ kPa}$
 $\phi : 4.5^\circ$

Mohr-Diagram



BH No.: MBH-5
Depth: 10.00 m

Test Type: UU

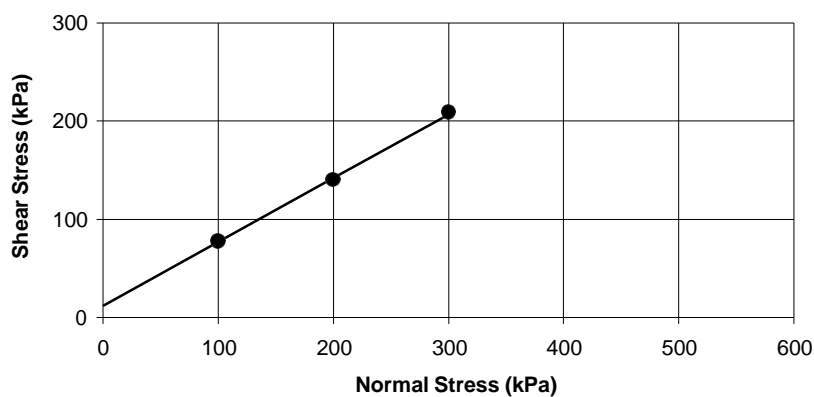
$c : 72 \text{ kPa}$
 $\phi : 2.5^\circ$

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/9

Direct Shear Test

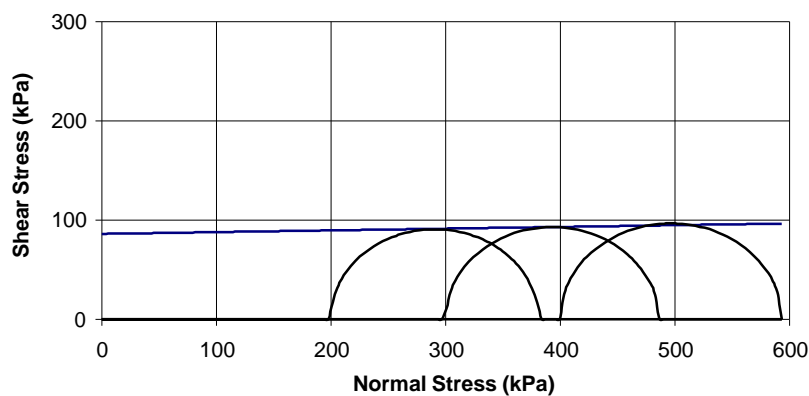


BH No.: MBH-5
Depth: 13.00 m

Test Type: DS

c : 12 kPa
 ϕ : 33.0°

Mohr-Diagram

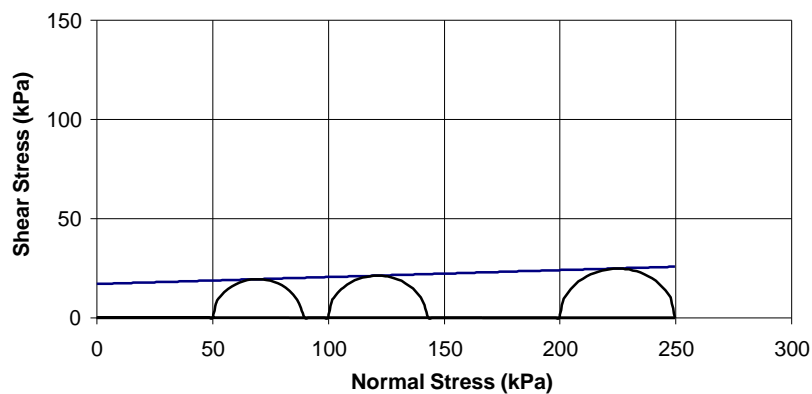


BH No.: MBH-5
Depth: 29.50 m

Test Type: UU

c : 86 kPa
 ϕ : 1.0°

Mohr-Diagram



BH No.: MBH-6
Depth: 1.00 m

Test Type: UU

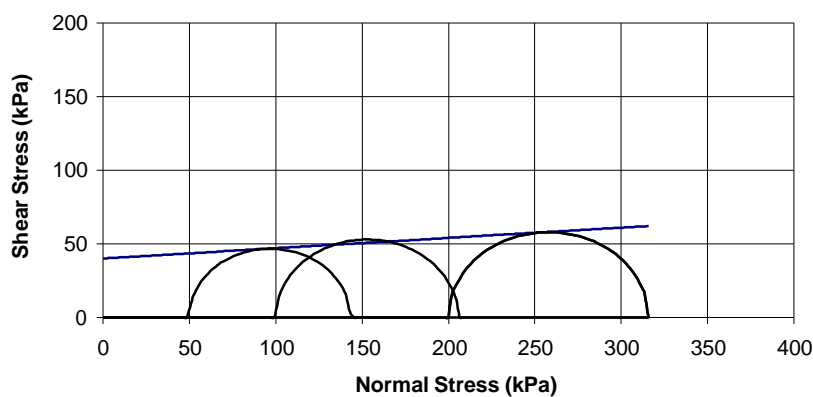
c : 17 kPa
 ϕ : 2.0°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/10

Mohr-Diagram

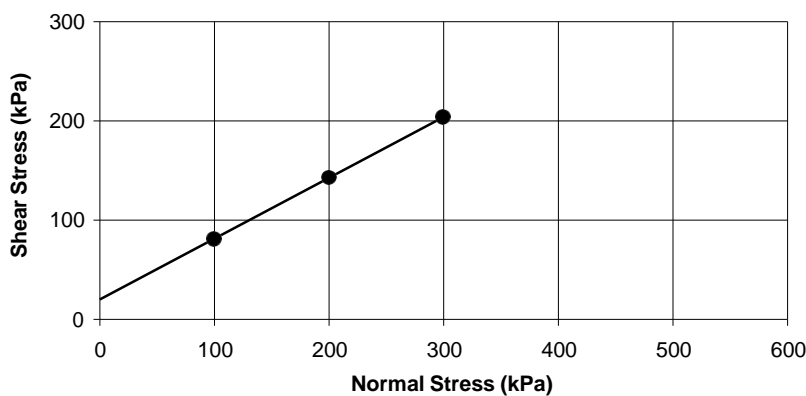


BH No.: MBH-6
Depth: 7.00 m

Test Type: UU

c : 40 kPa
 ϕ : 4.0°

Direct Shear Test

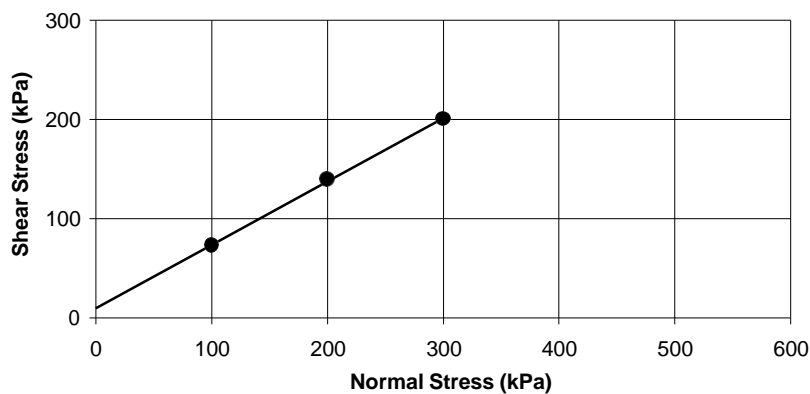


BH No.: MBH-6
Depth: 10.00 m

Test Type: DS

c : 20 kPa
 ϕ : 31.5°

Direct Shear Test



BH No.: MBH-6
Depth: 13.00 m

Test Type: DS

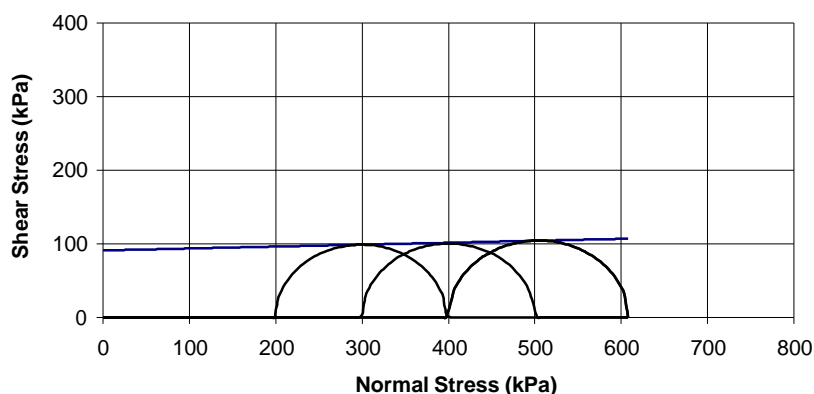
c : 10 kPa
 ϕ : 32.5°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/11

Mohr-Diagram

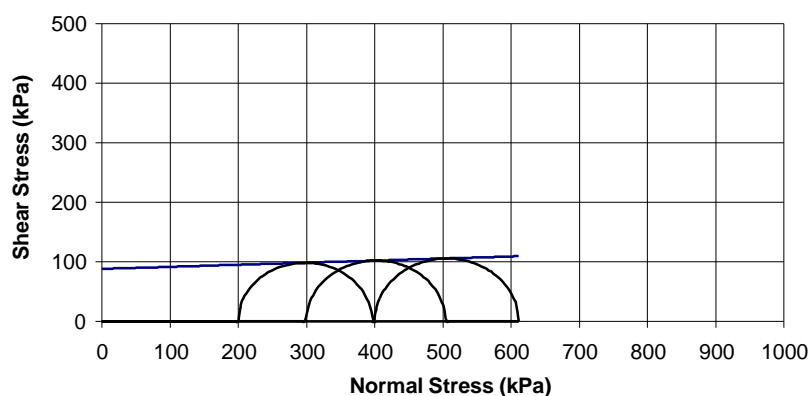


BH No.: MBH-6
Depth: 25.00 m

Test Type: UU

c : 91 kPa
 ϕ : 1.5°

Mohr-Diagram

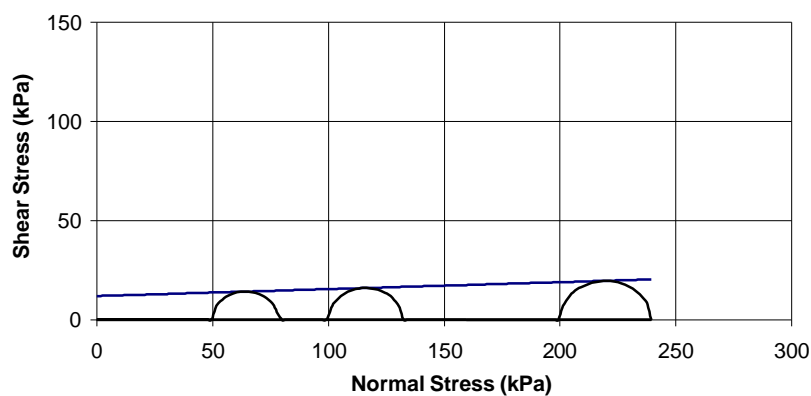


BH No.: MBH-6
Depth: 28.00 m

Test Type: UU

c : 88 kPa
 ϕ : 2.0°

Mohr-Diagram



BH No.: MBH-7
Depth: 1.00 m

Test Type: UU

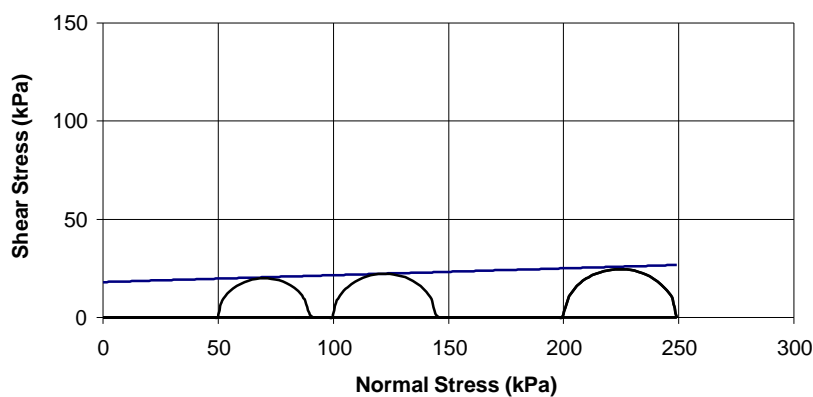
c : 12 kPa
 ϕ : 2.0°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/12

Mohr-Diagram

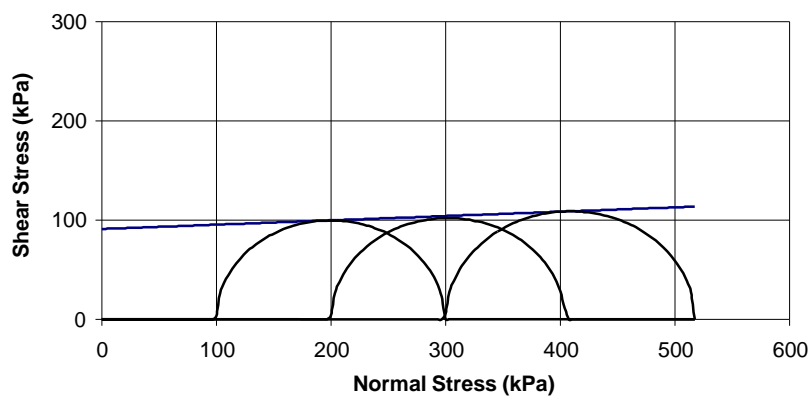


BH No.: MBH-7
Depth: 4.00 m

Test Type: UU

c : 18 kPa
 ϕ : 2.0°

Mohr-Diagram

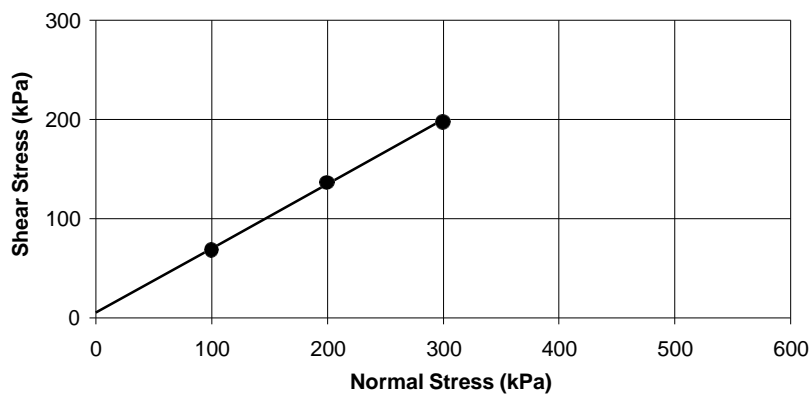


BH No.: MBH-7
Depth: 10.00 m

Test Type: UU

c : 91 kPa
 ϕ : 2.5°

Direct Shear Test



BH No.: MBH-7
Depth: 13.00 m

Test Type: DS

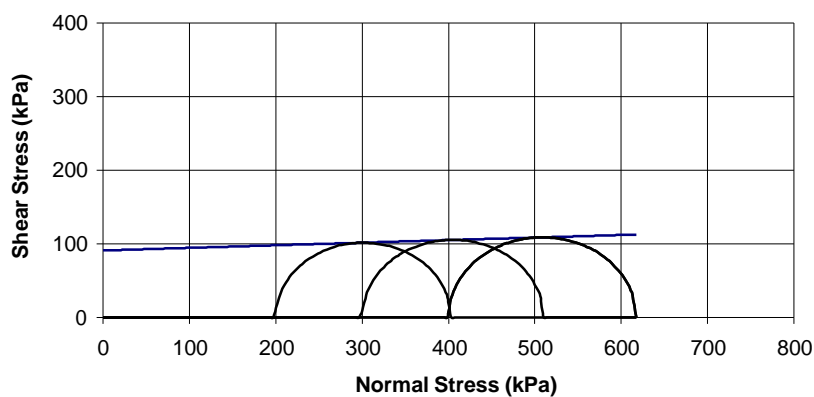
c : 5 kPa
 ϕ : 33.0°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/13

Mohr-Diagram

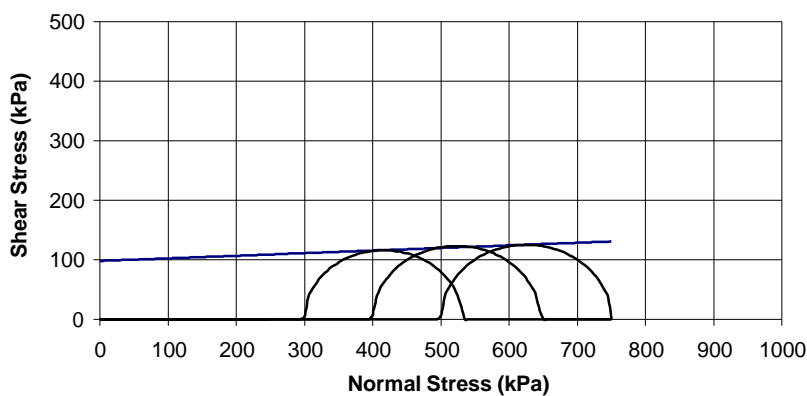


BH No.: MBH-7
Depth: 29.50 m

Test Type: UU

c : 91 kPa
 ϕ : 2.0°

Mohr-Diagram

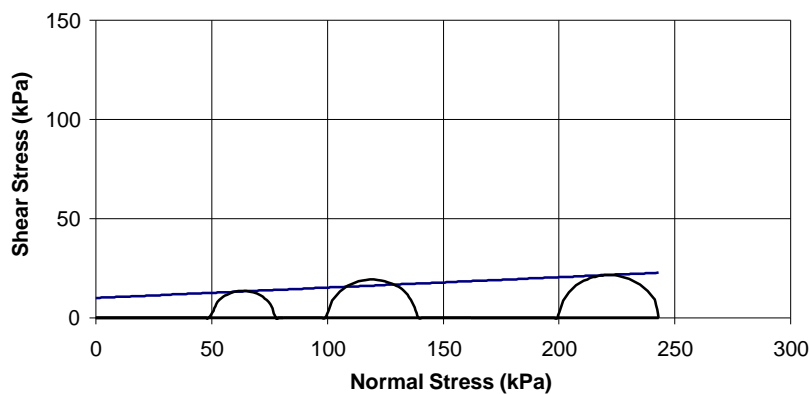


BH No.: MBH-7
Depth: 32.50 m

Test Type: UU

c : 98 kPa
 ϕ : 2.5°

Mohr-Diagram



BH No.: MBH-8
Depth: 1.00 m

Test Type: UU

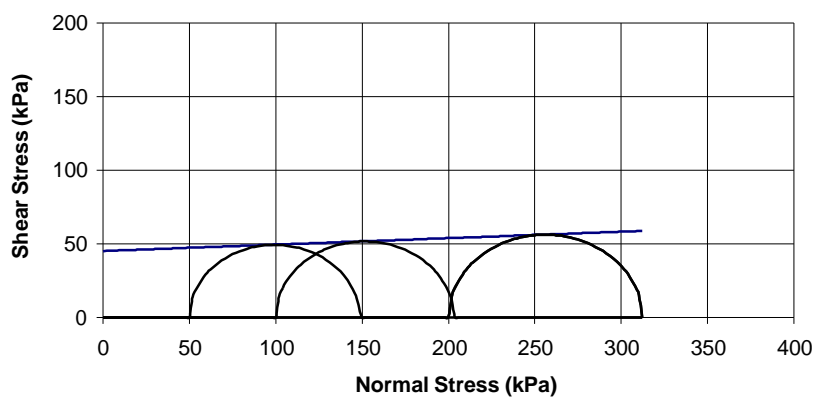
c : 10 kPa
 ϕ : 3.0°

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/14

Mohr-Diagram

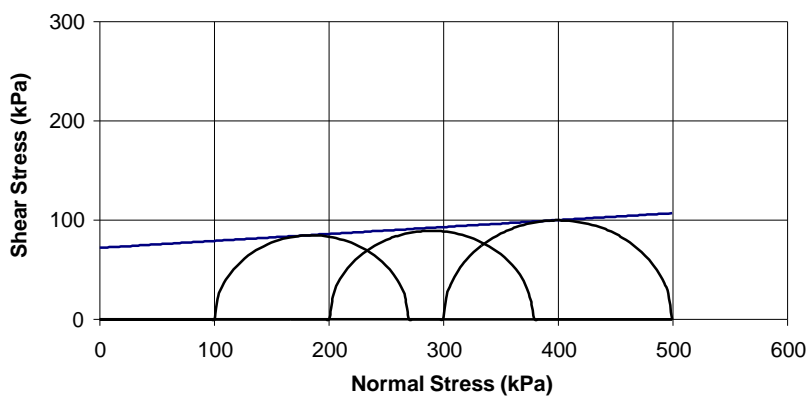


BH No.: MBH-8
Depth: 4.00 m

Test Type: UU

$c : 45 \text{ kPa}$
 $\phi : 2.5^\circ$

Mohr-Diagram

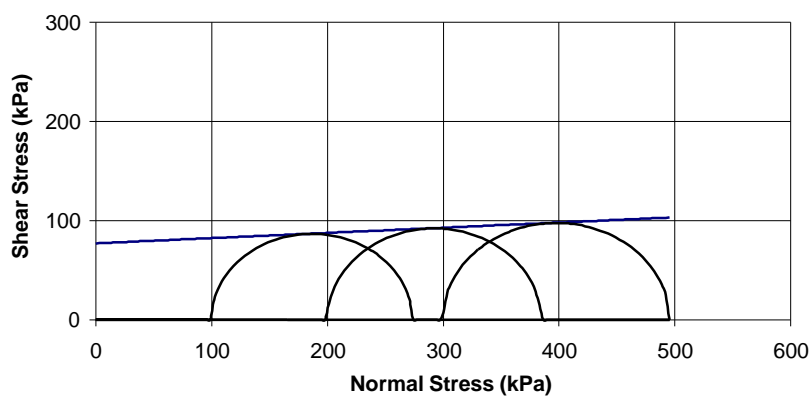


BH No.: MBH-8
Depth: 10.00 m

Test Type: UU

$c : 72 \text{ kPa}$
 $\phi : 4.0^\circ$

Mohr-Diagram



BH No.: MBH-8
Depth: 13.00 m

Test Type: UU

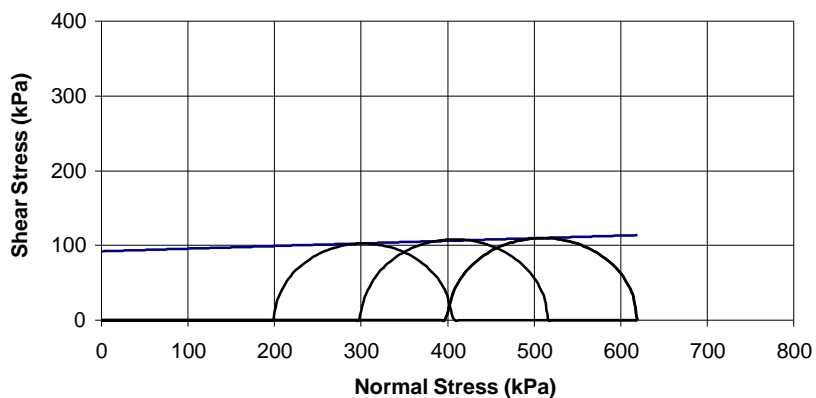
$c : 77 \text{ kPa}$
 $\phi : 3.0^\circ$

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

Fig. No.
F/15

Mohr-Diagram

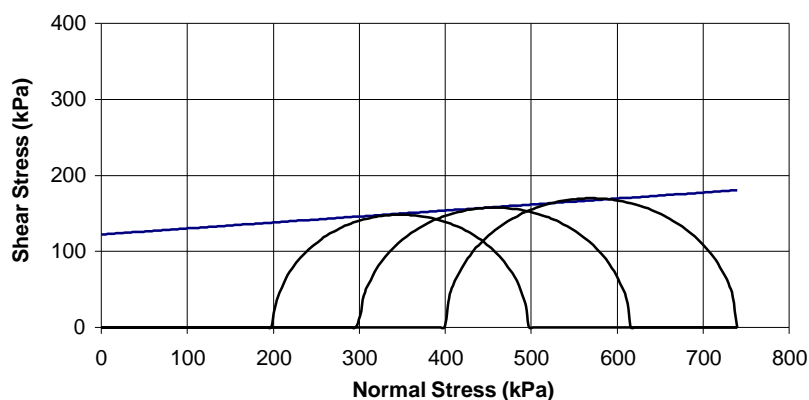


BH No.: MBH-8
Depth: 26.50 m

Test Type: UU

$c : 92 \text{ kPa}$
 $\phi : 2.0^\circ$

Mohr-Diagram



BH No.: MBH-8
Depth: 29.50 m

Test Type: UU

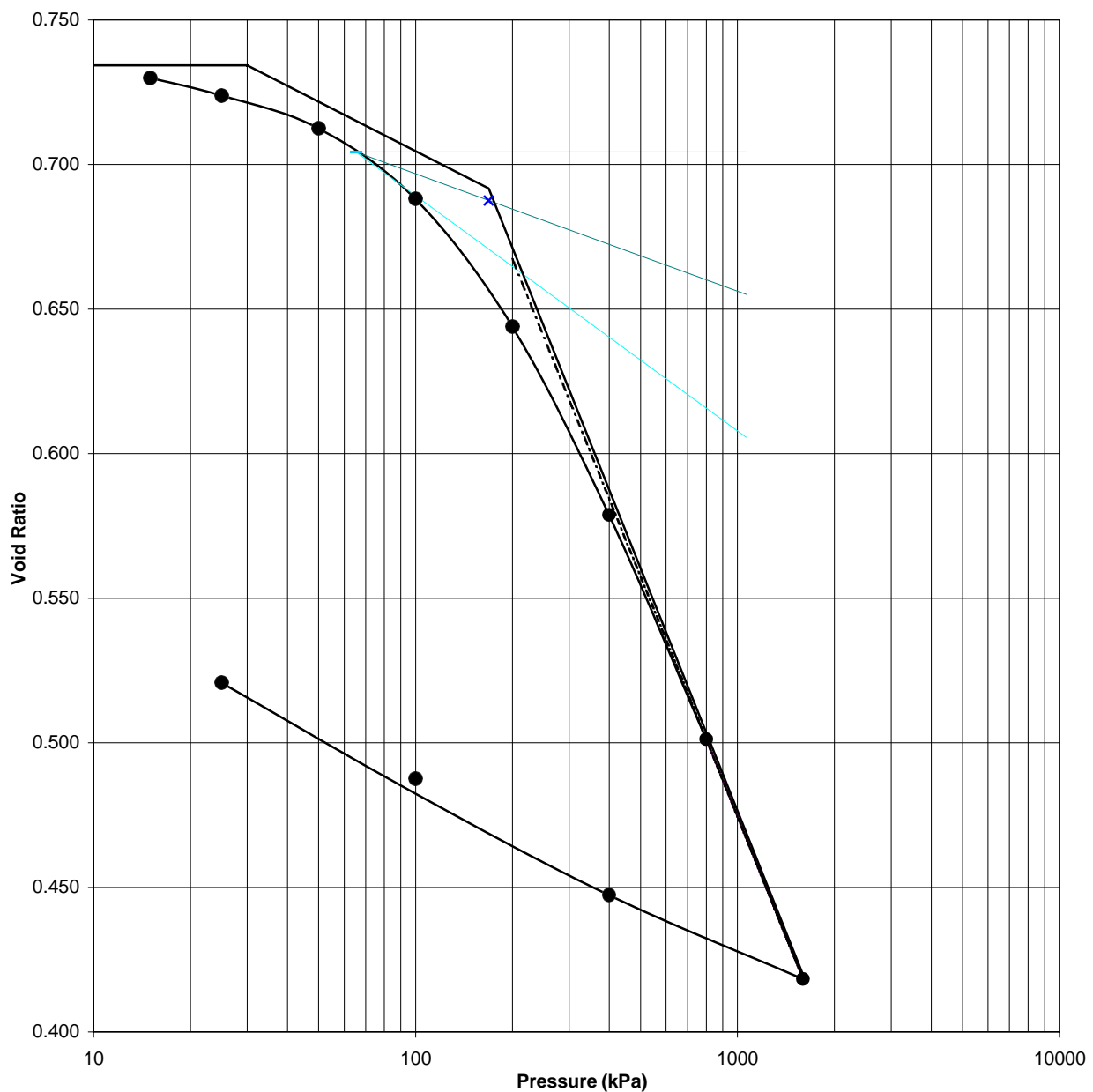
$c : 122 \text{ kPa}$
 $\phi : 4.5^\circ$

Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia

Job No.
CCPL/20111216

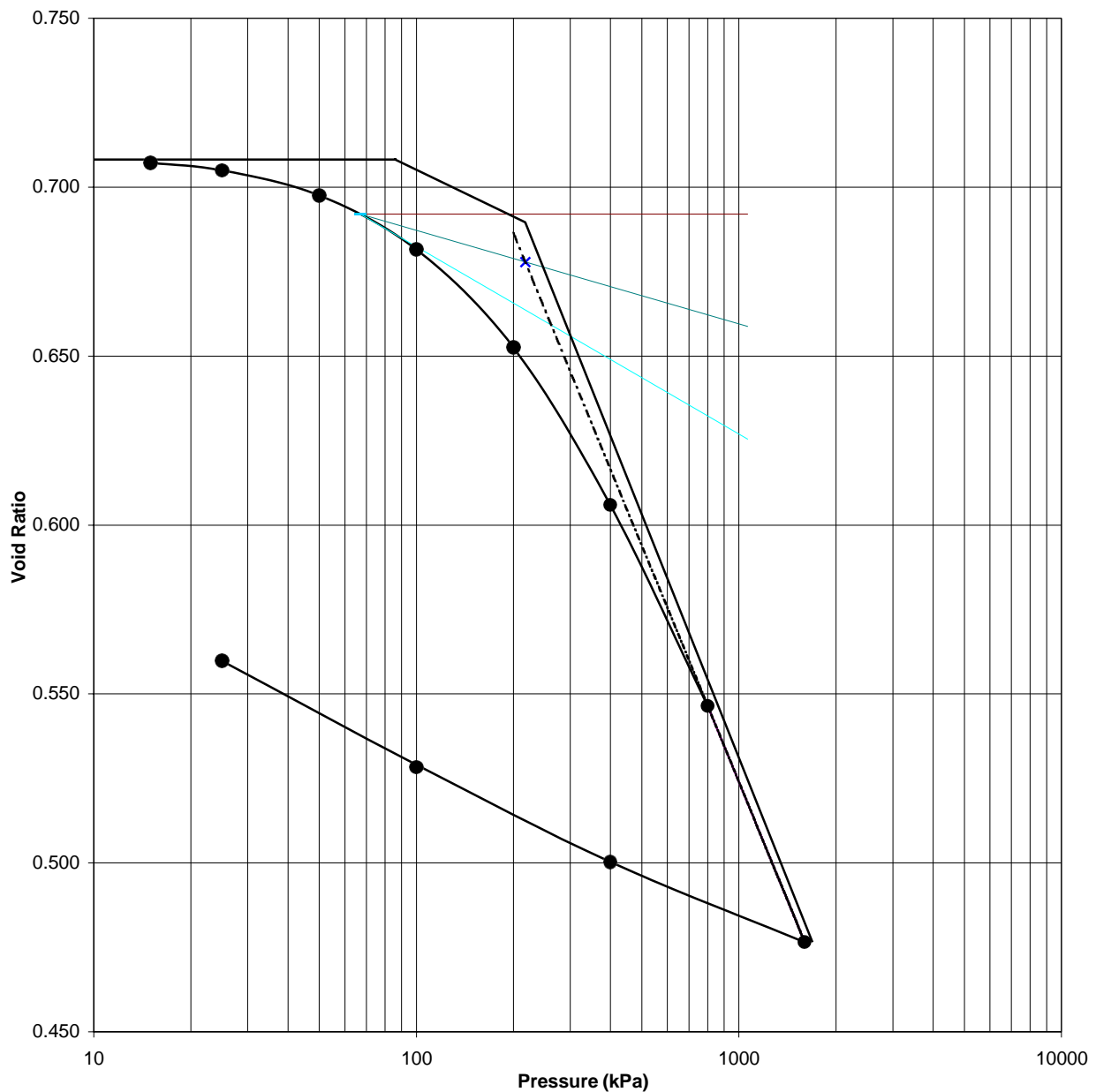
Fig. No.
F/16

e-logp curve



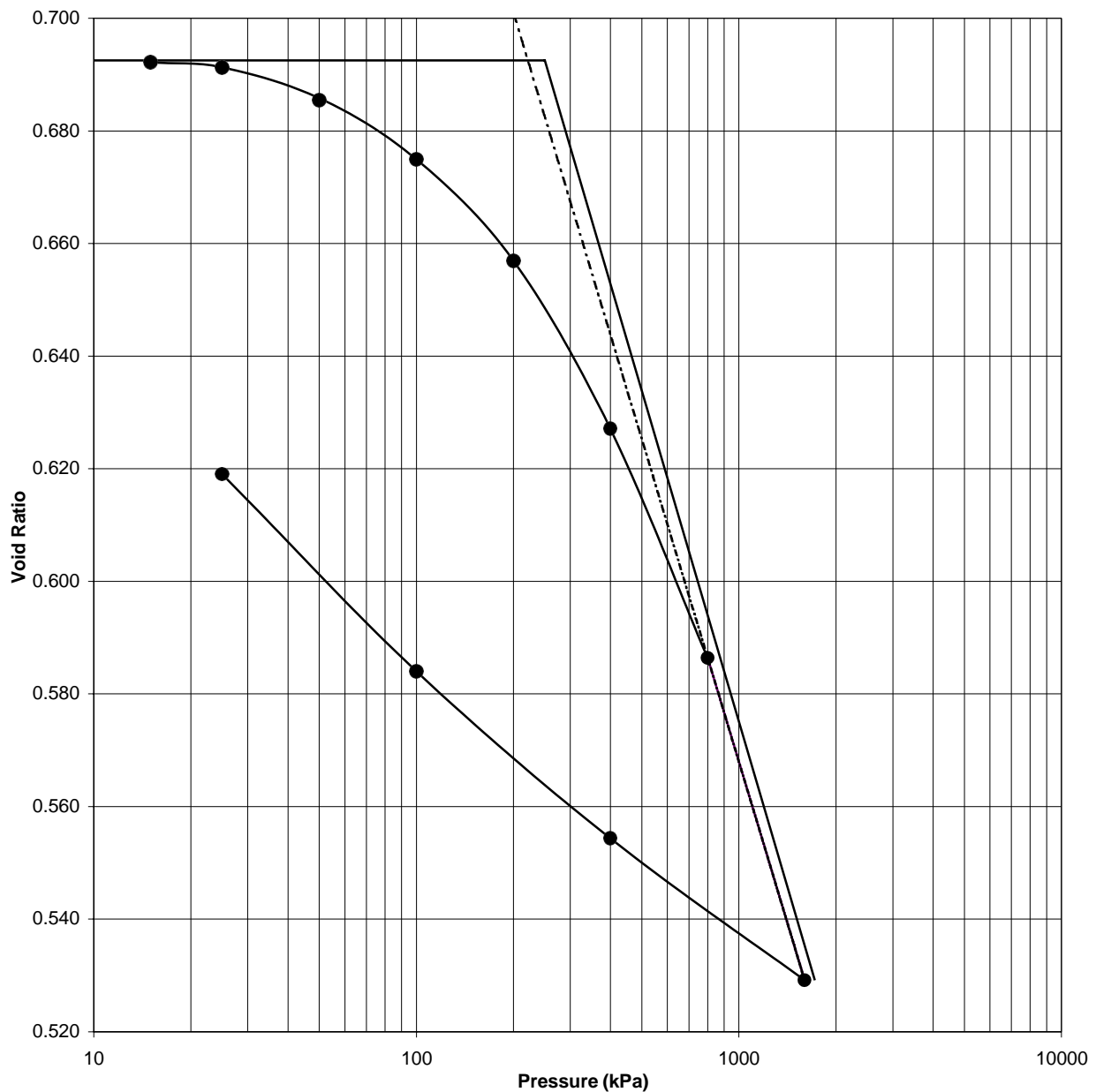
Bore hole No.: MBH-1		Depth : 4.00m	
Initial Void Ratio, e_0	=	0.7343	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	30 kPa	
Compression Index C_c	=	0.2786	25 - 50
$C_c/(1+e_0)$	=	0.1606	50 - 100
Pre-consolidation Pressure, p_c	=	169 kPa	100 - 200
Swelling Index, C_s	=	0.0567	200 - 400
Recompression Index, C_r	≈	0.0567	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/1

e-logp curve



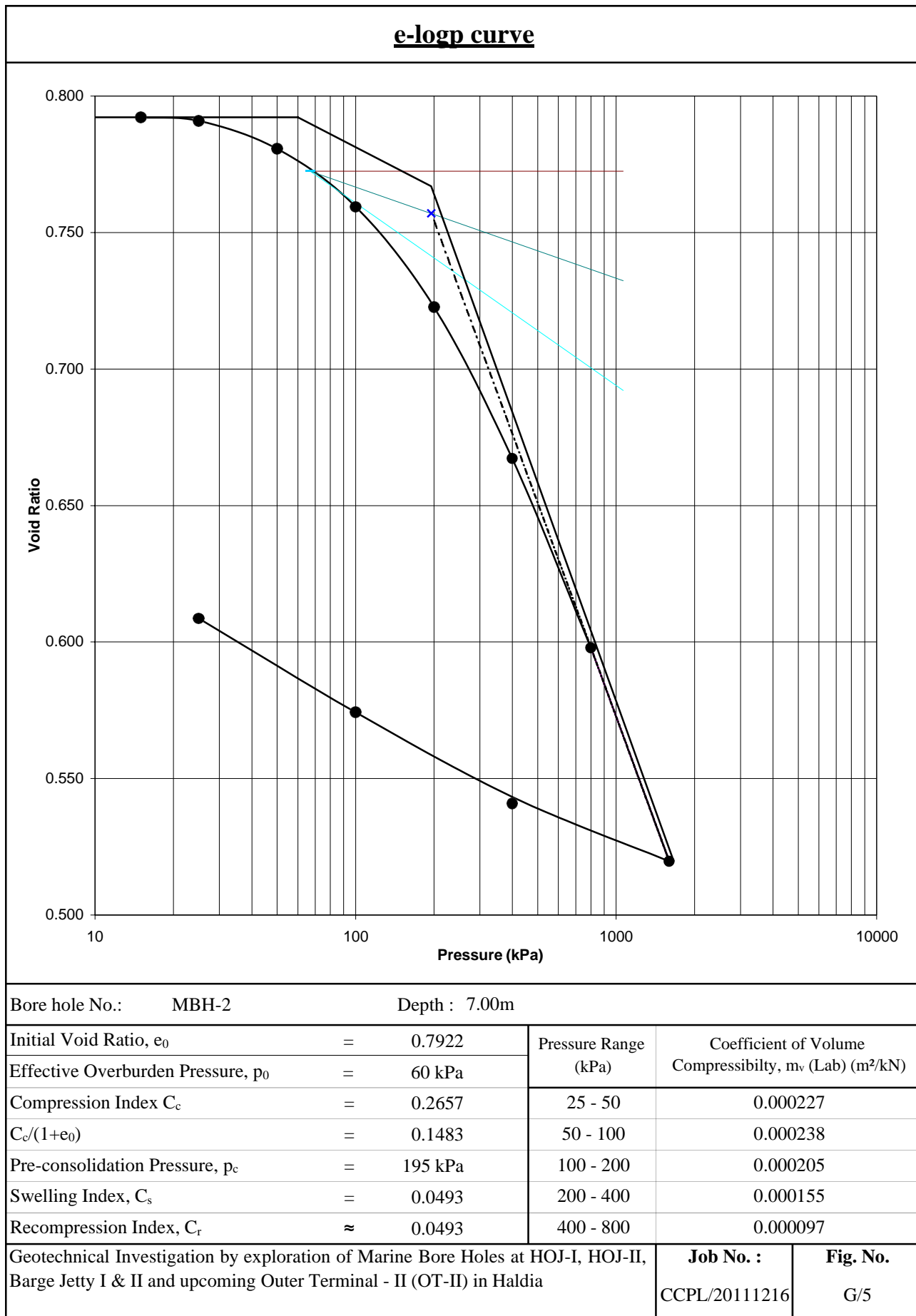
Bore hole No.: MBH-1		Depth : 10.00m	
Initial Void Ratio, e_0	=	0.7082	Coefficient of Volume Compressibility, m_v (Lab) (m^2/kN)
Effective Overburden Pressure, p_0	=	86 kPa	
Compression Index C_c	=	0.2393	25 - 50
$C_c/(1+e_0)$	=	0.1401	50 - 100
Pre-consolidation Pressure, p_c	=	218 kPa	100 - 200
Swelling Index, C_s	=	0.0461	200 - 400
Recompression Index, C_r	≈	0.0461	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. :
			CCPL/20111216
			Fig. No.
			G/2

e-logp curve

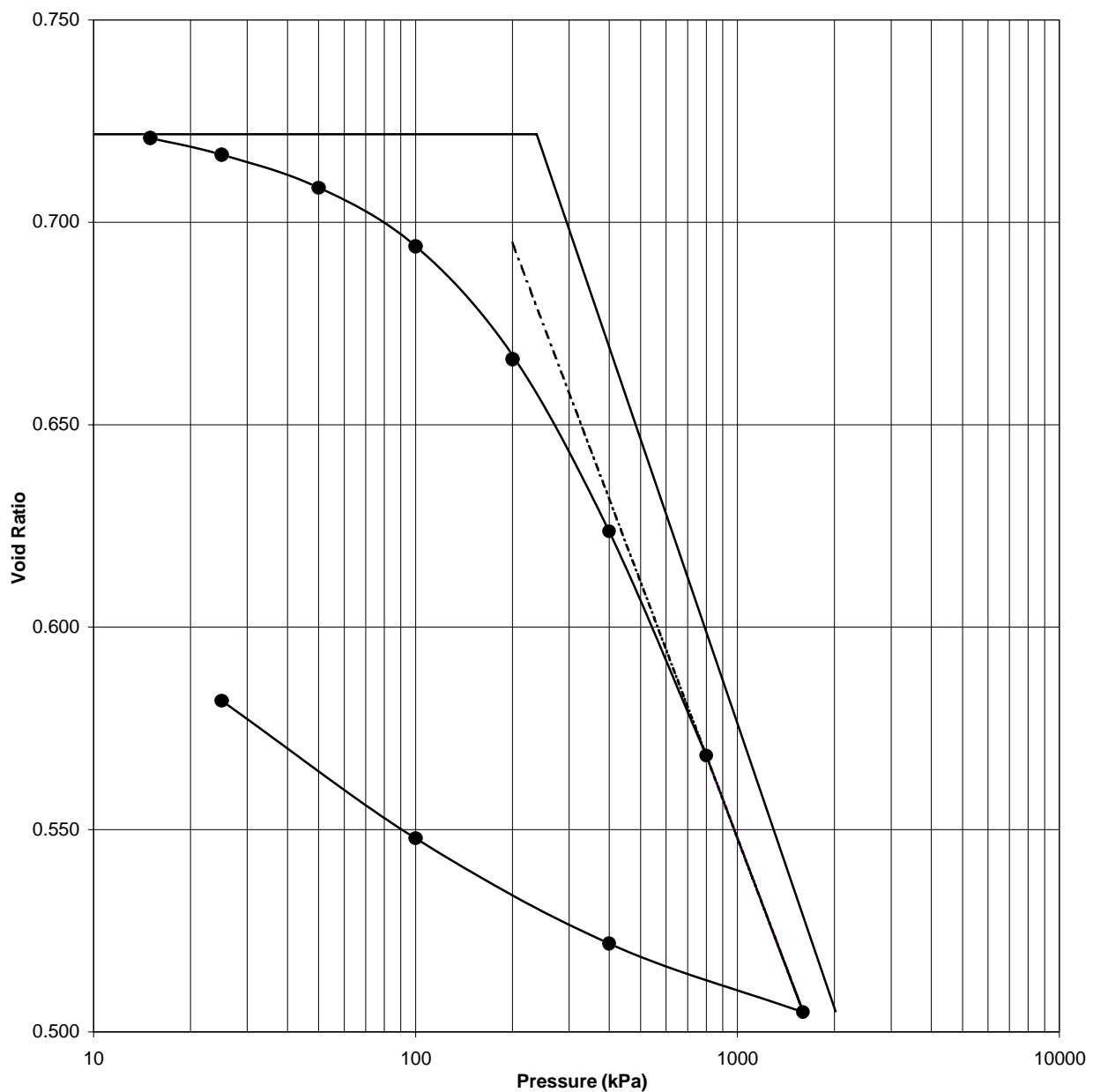


Bore hole No.: MBH-1		Depth : 26.50m	
Initial Void Ratio, e_0	=	0.6925	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	250 kPa	
Compression Index C_c	=	0.1950	25 - 50
$C_c/(1+e_0)$	=	0.1152	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0498	200 - 400
Recompression Index, C_r	≈	0.0498	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/3



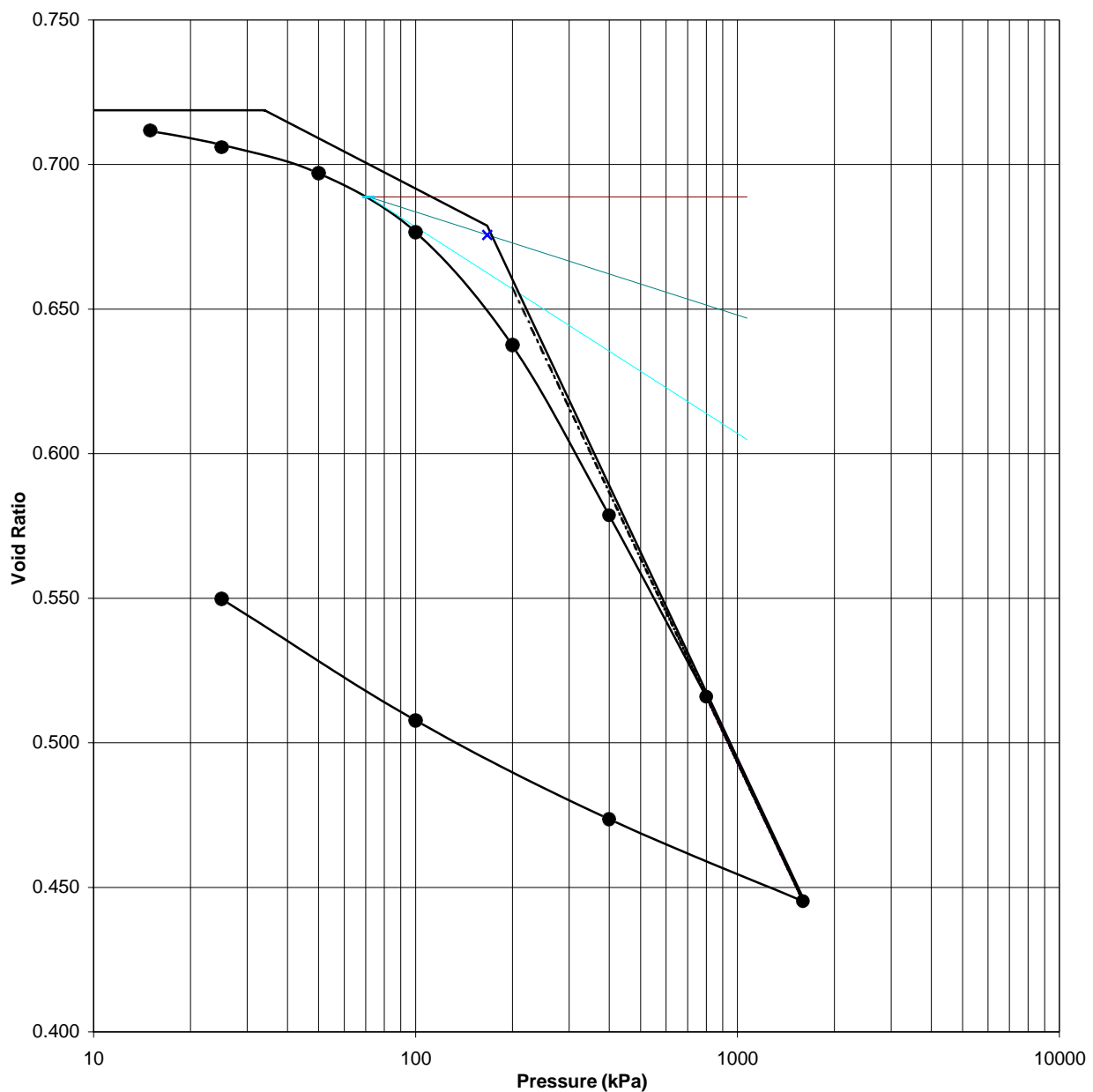


e-logp curve



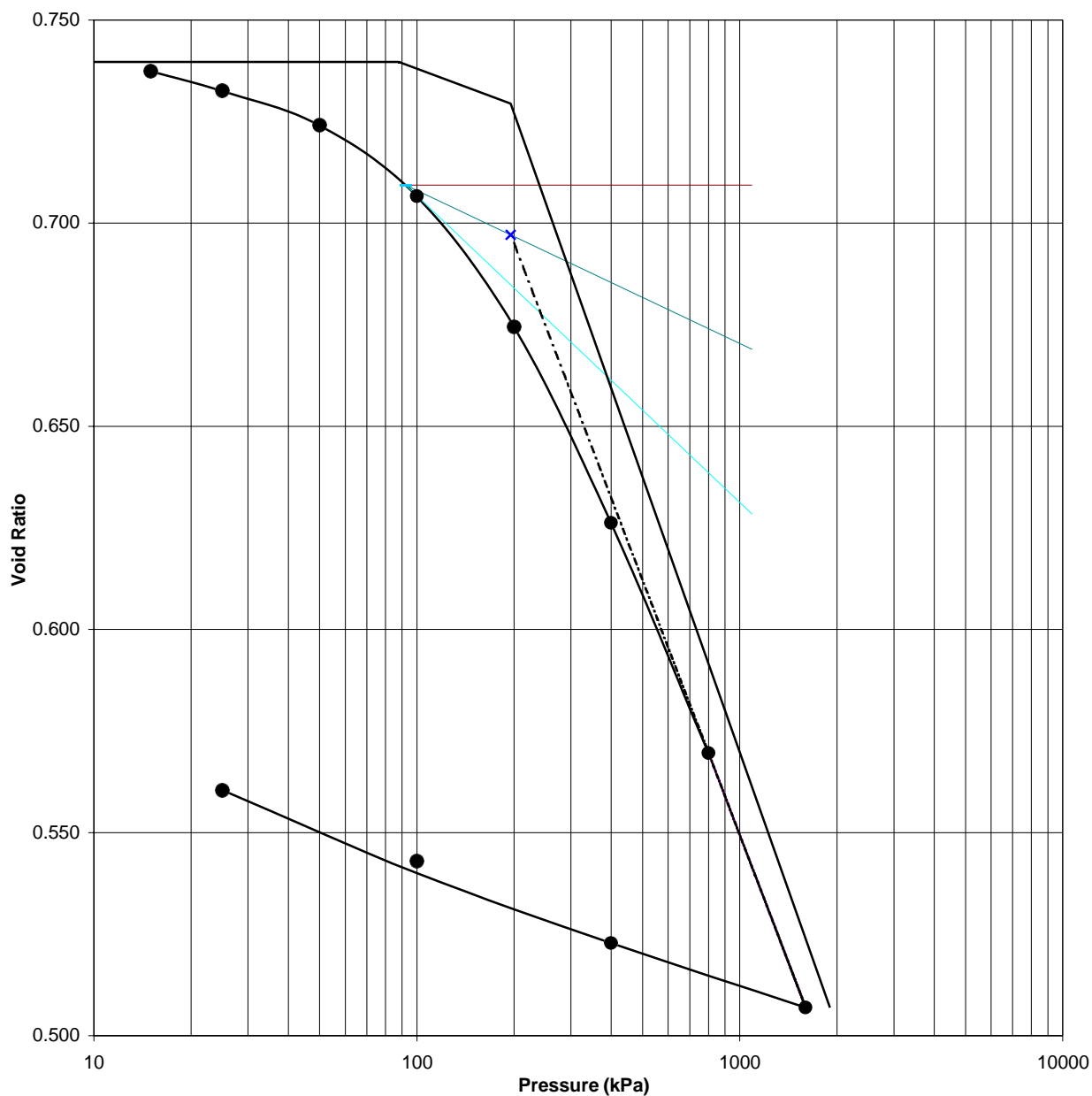
Bore hole No.: MBH-2		Depth : 25.00m	
Initial Void Ratio, e_0	=	0.7218	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	238 kPa	
Compression Index C_c	=	0.2334	25 - 50
$C_c/(1+e_0)$	=	0.1356	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0426	200 - 400
Recompression Index, C_r	≈	0.0426	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/6

e-logp curve



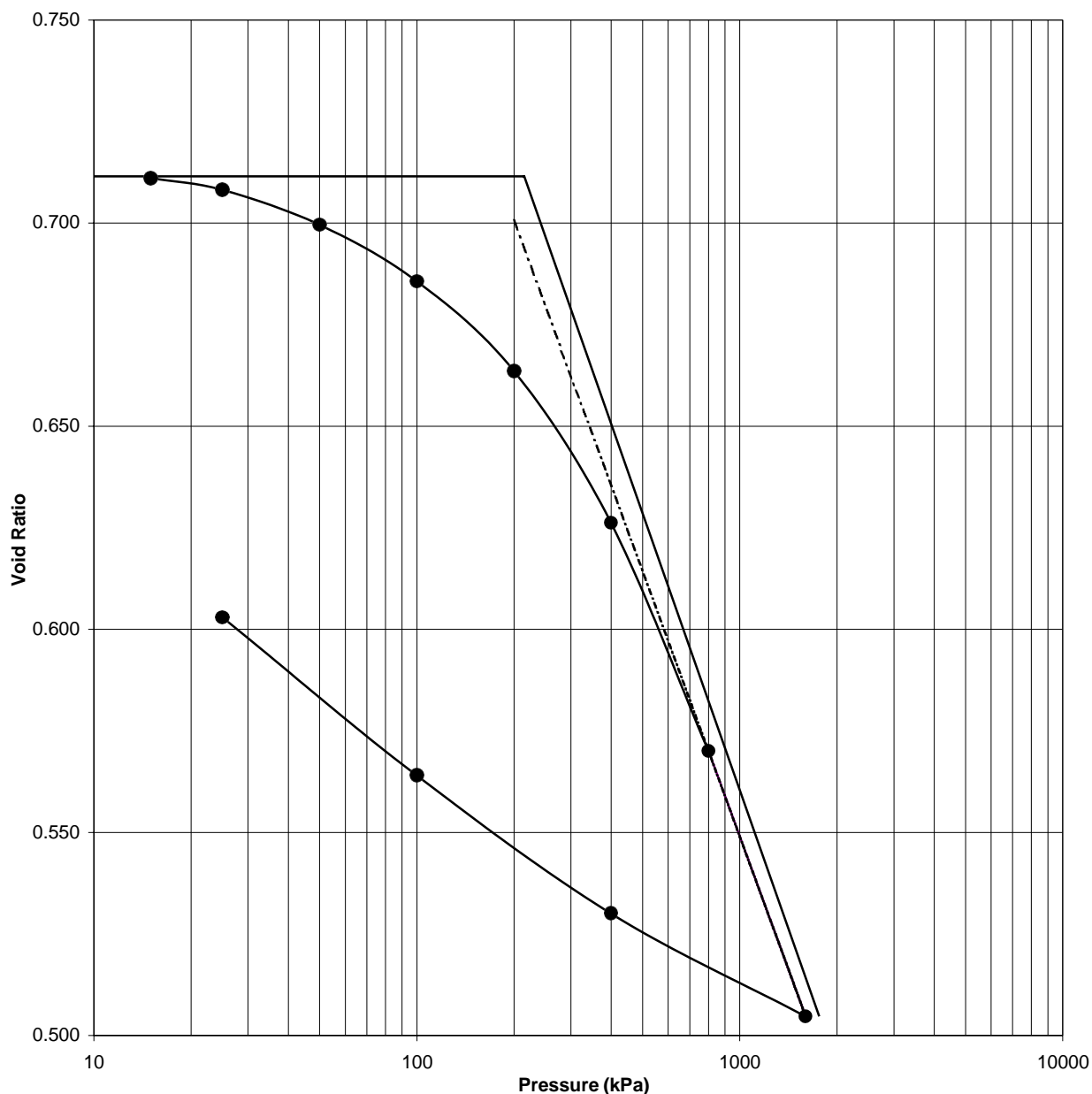
Bore hole No.: MBH-3		Depth : 4.00m	
Initial Void Ratio, e_0	=	0.7188	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	34 kPa	
Compression Index C_c	=	0.2367	25 - 50
$C_c/(1+e_0)$	=	0.1377	50 - 100
Pre-consolidation Pressure, p_c	=	167 kPa	100 - 200
Swelling Index, C_s	=	0.0578	200 - 400
Recompression Index, C_r	≈	0.0578	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/7

e-logp curve



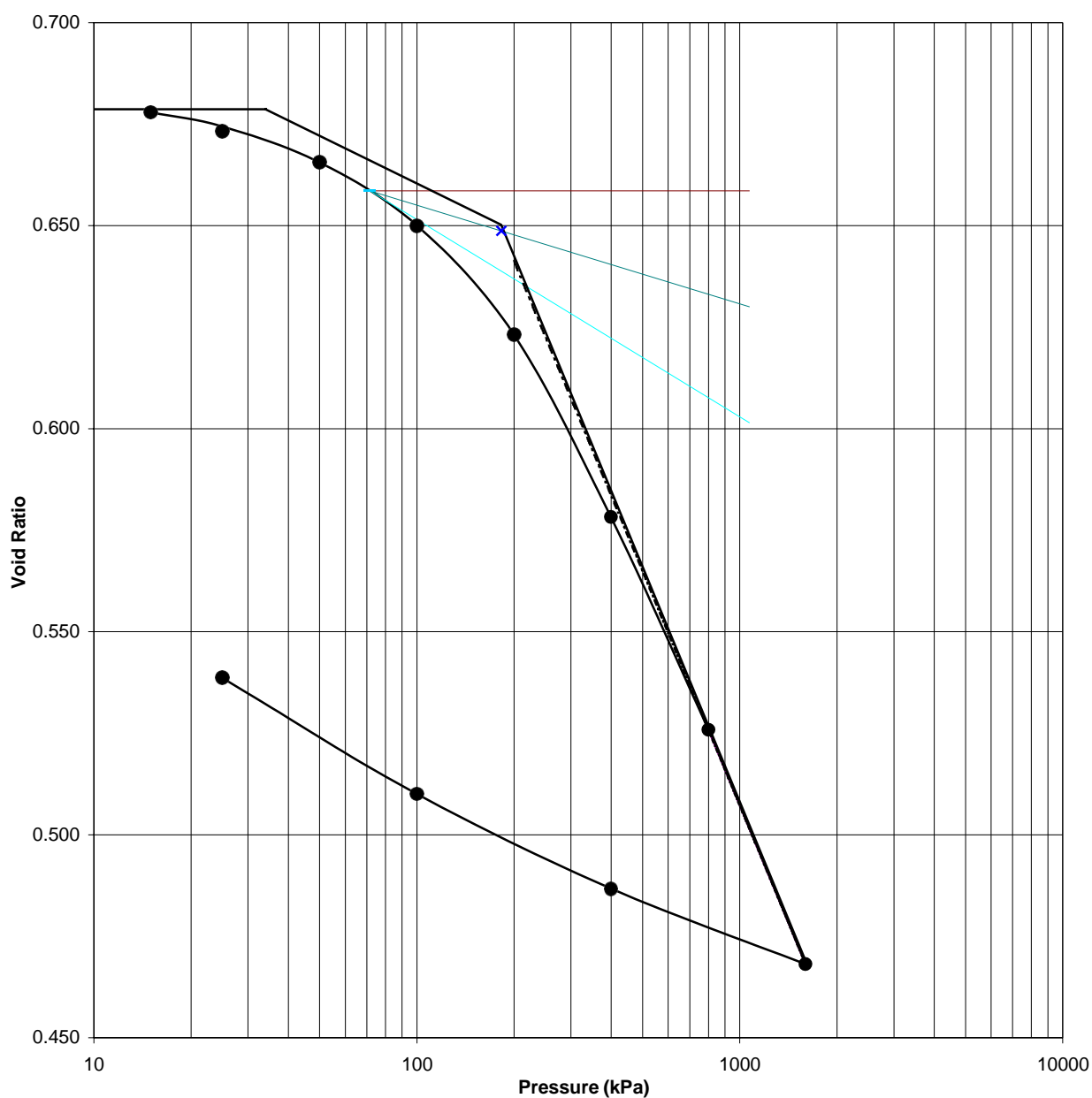
Bore hole No.: MBH-3		Depth : 10.00m	
Initial Void Ratio, e_0	=	0.7397	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	88 kPa	
Compression Index C_c	=	0.2251	25 - 50
$C_c/(1+e_0)$	=	0.1294	50 - 100
Pre-consolidation Pressure, p_c	=	195 kPa	100 - 200
Swelling Index, C_s	=	0.0296	200 - 400
Recompression Index, C_r	≈	0.0296	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/8

e-logp curve



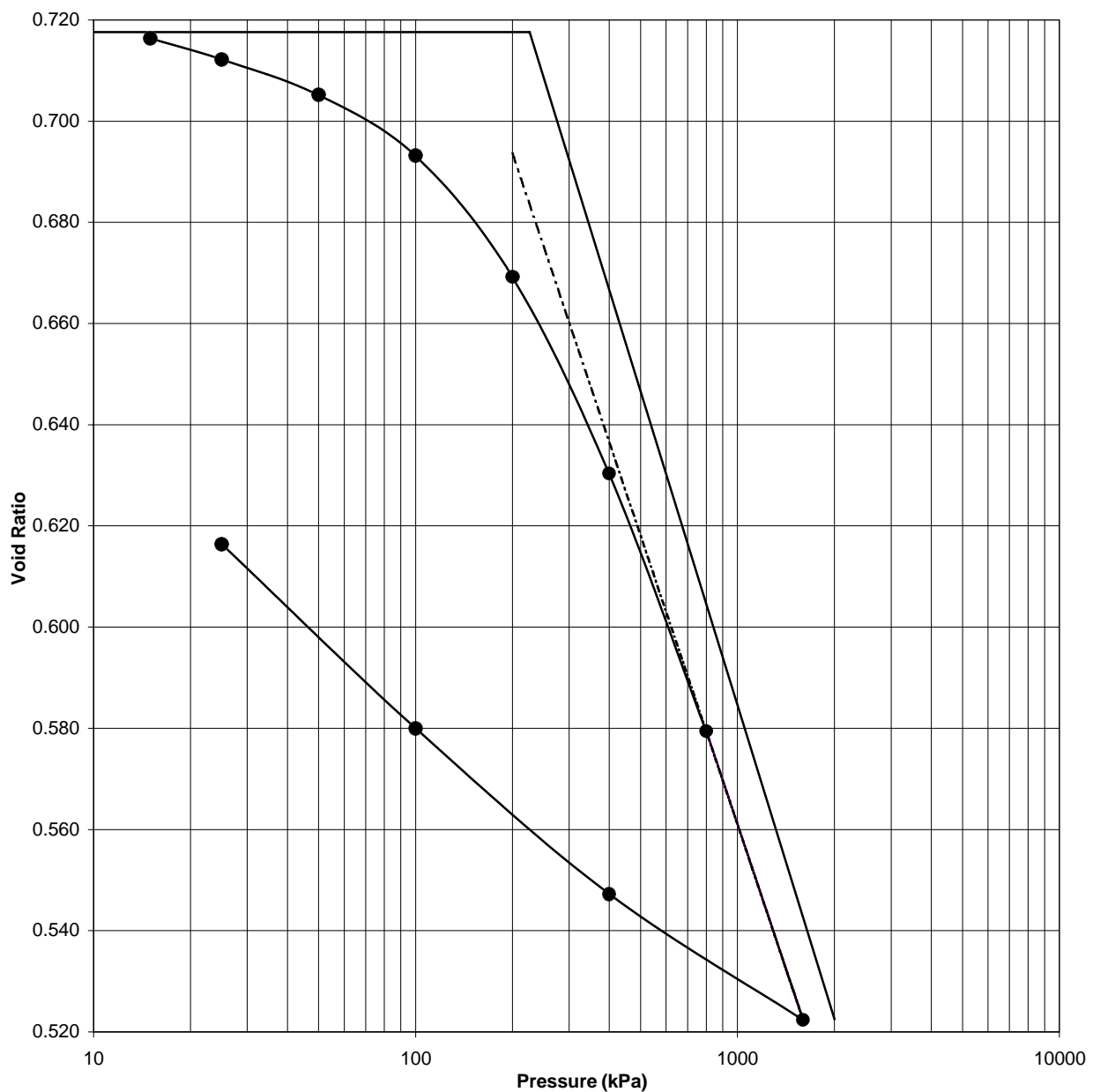
Bore hole No.: MBH-3		Depth : 23.50m	
Initial Void Ratio, e_0	=	0.7115	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	215 kPa	
Compression Index C_c	=	0.2264	25 - 50
$C_c/(1+e_0)$	=	0.1323	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0544	200 - 400
Recompression Index, C_r	≈	0.0544	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. :
			CCPL/20111216
			Fig. No.
			G/9

e-logp curve



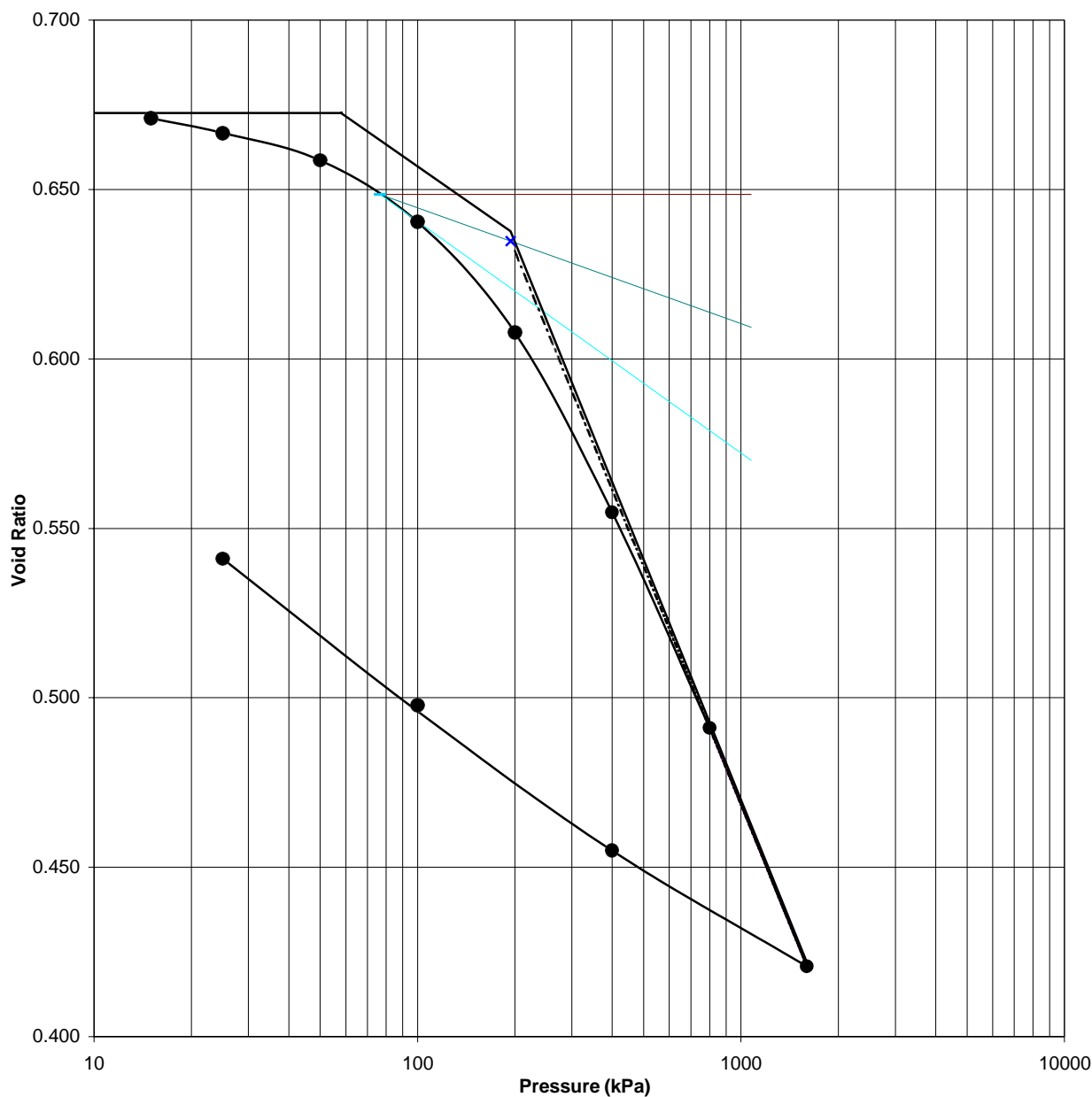
Bore hole No.: MBH-4		Depth : 4.00m	
Initial Void Ratio, e_0	=	0.6787	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	34 kPa	
Compression Index C_c	=	0.1923	25 - 50
$C_c/(1+e_0)$	=	0.1146	50 - 100
Pre-consolidation Pressure, p_c	=	183 kPa	100 - 200
Swelling Index, C_s	=	0.0390	200 - 400
Recompression Index, C_r	≈	0.0390	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/10

e-logp curve

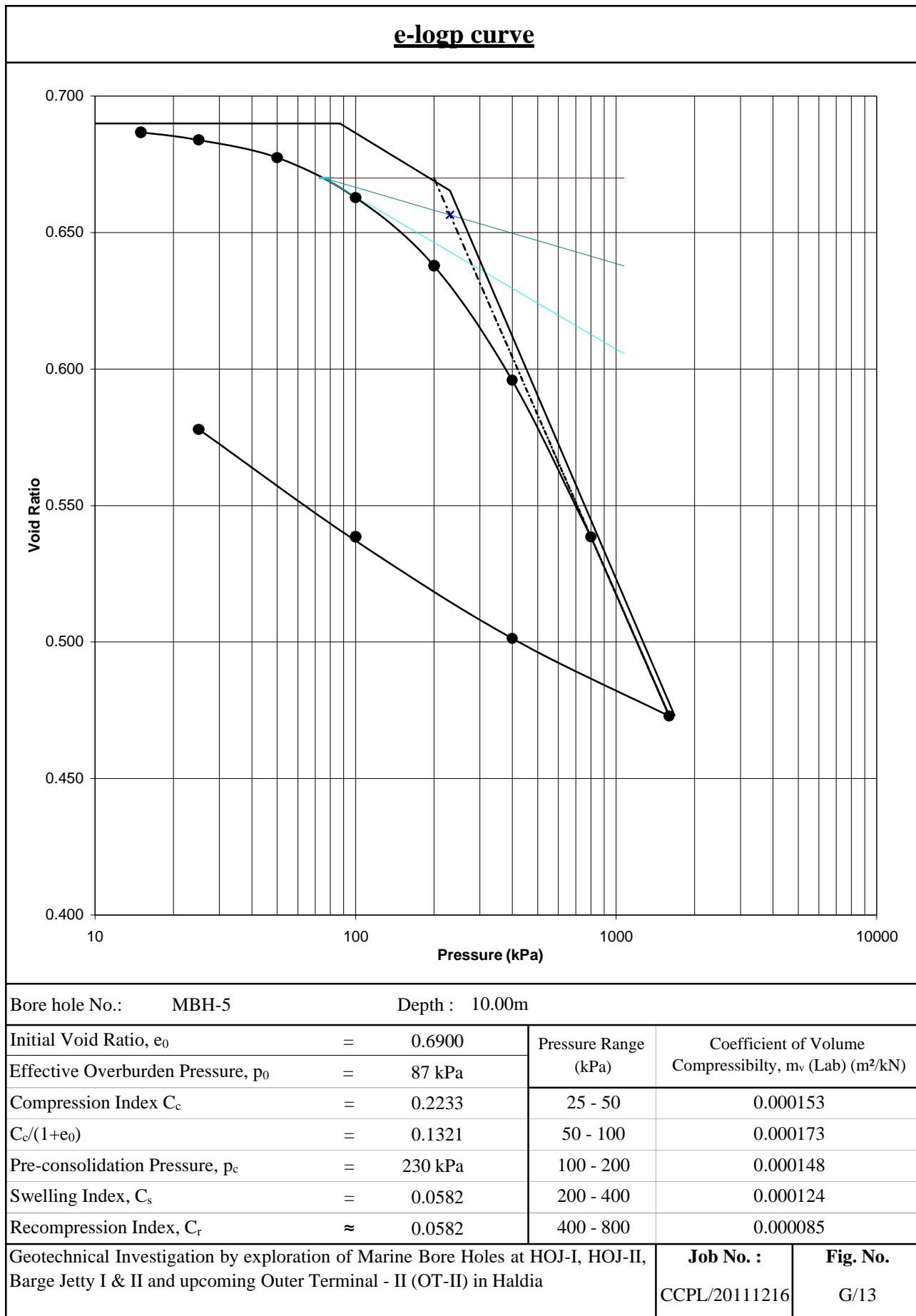


Bore hole No.: MBH-4		Depth : 23.50m	
Initial Void Ratio, e_0	=	0.7176	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	226 kPa	
Compression Index C_c	=	0.2059	25 - 50
$C_c/(1+e_0)$	=	0.1199	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0521	200 - 400
Recompression Index, C_r	≈	0.0521	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/11

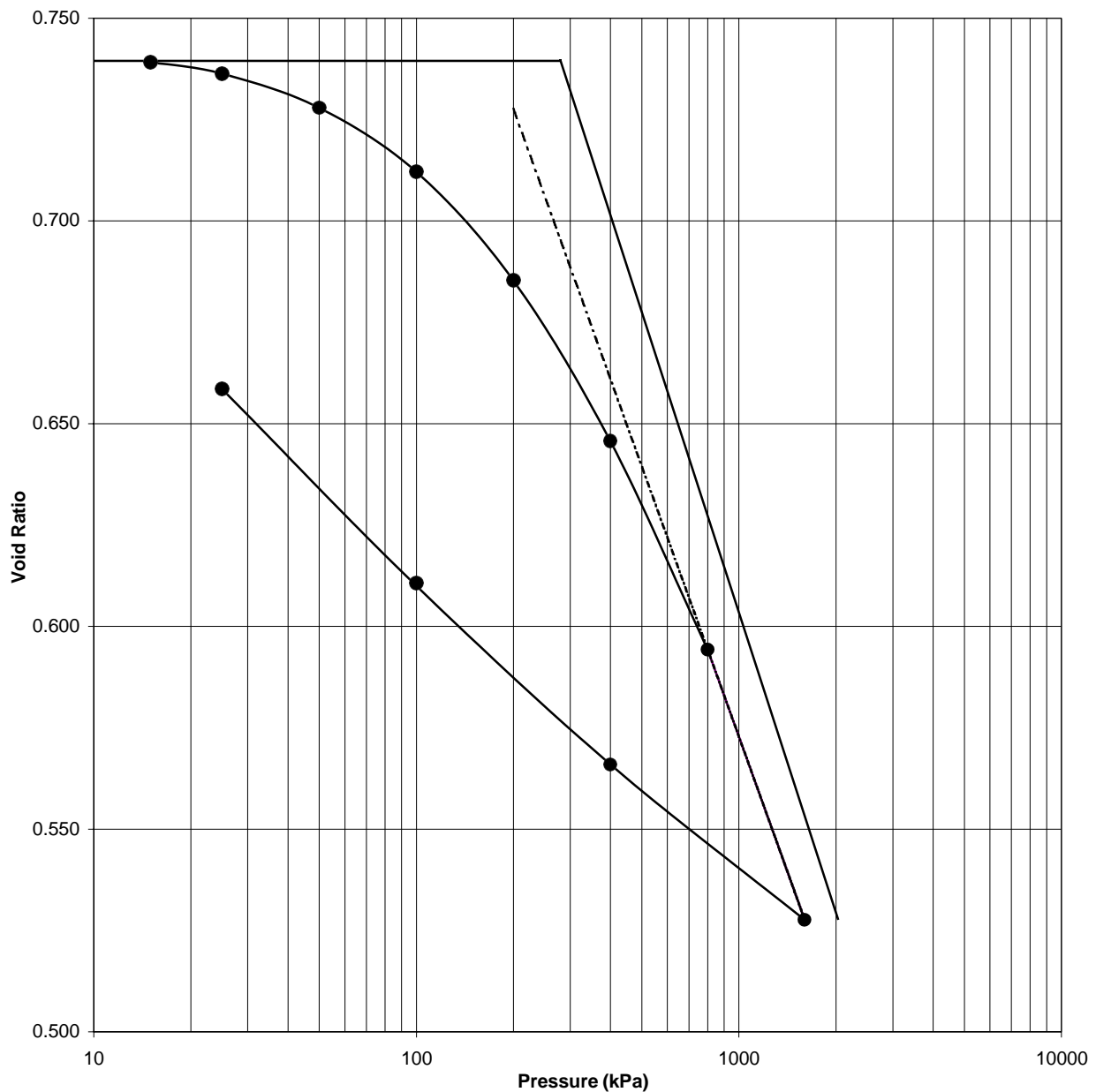
e-logp curve



Bore hole No.: MBH-5		Depth : 7.00m	
Initial Void Ratio, e_0	=	0.6726	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	58 kPa	
Compression Index C_c	=	0.2354	25 - 50
$C_c/(1+e_0)$	=	0.1407	50 - 100
Pre-consolidation Pressure, p_c	=	194 kPa	100 - 200
Swelling Index, C_s	=	0.0666	200 - 400
Recompression Index, C_r	≈	0.0666	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/12

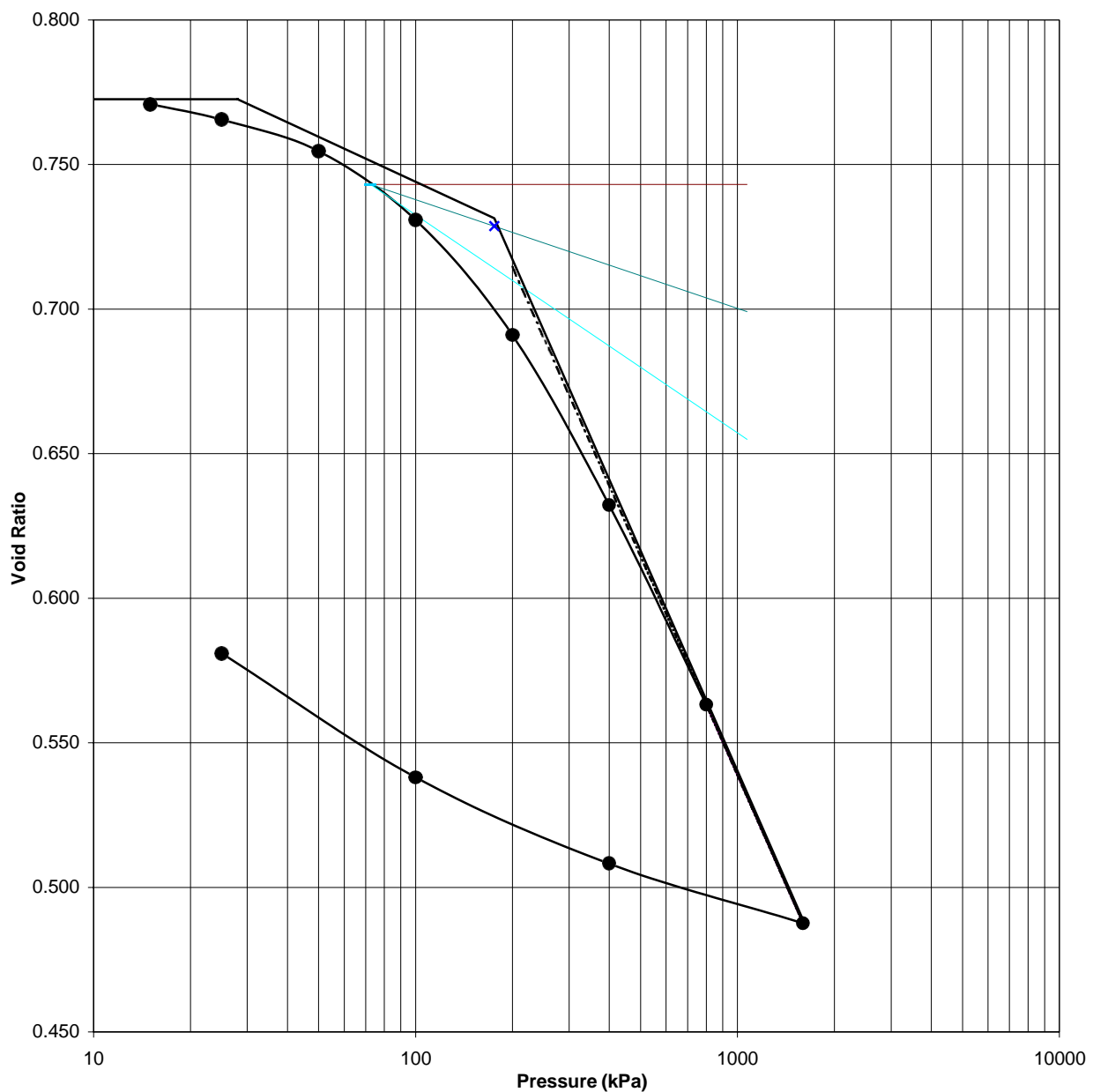


e-logp curve

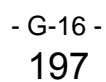


Bore hole No.: MBH-5		Depth : 29.50m	
Initial Void Ratio, e_0	=	0.7395	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	280 kPa	
Compression Index C_c	=	0.2460	25 - 50
$C_c/(1+e_0)$	=	0.1414	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0725	200 - 400
Recompression Index, C_r	≈	0.0725	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/14

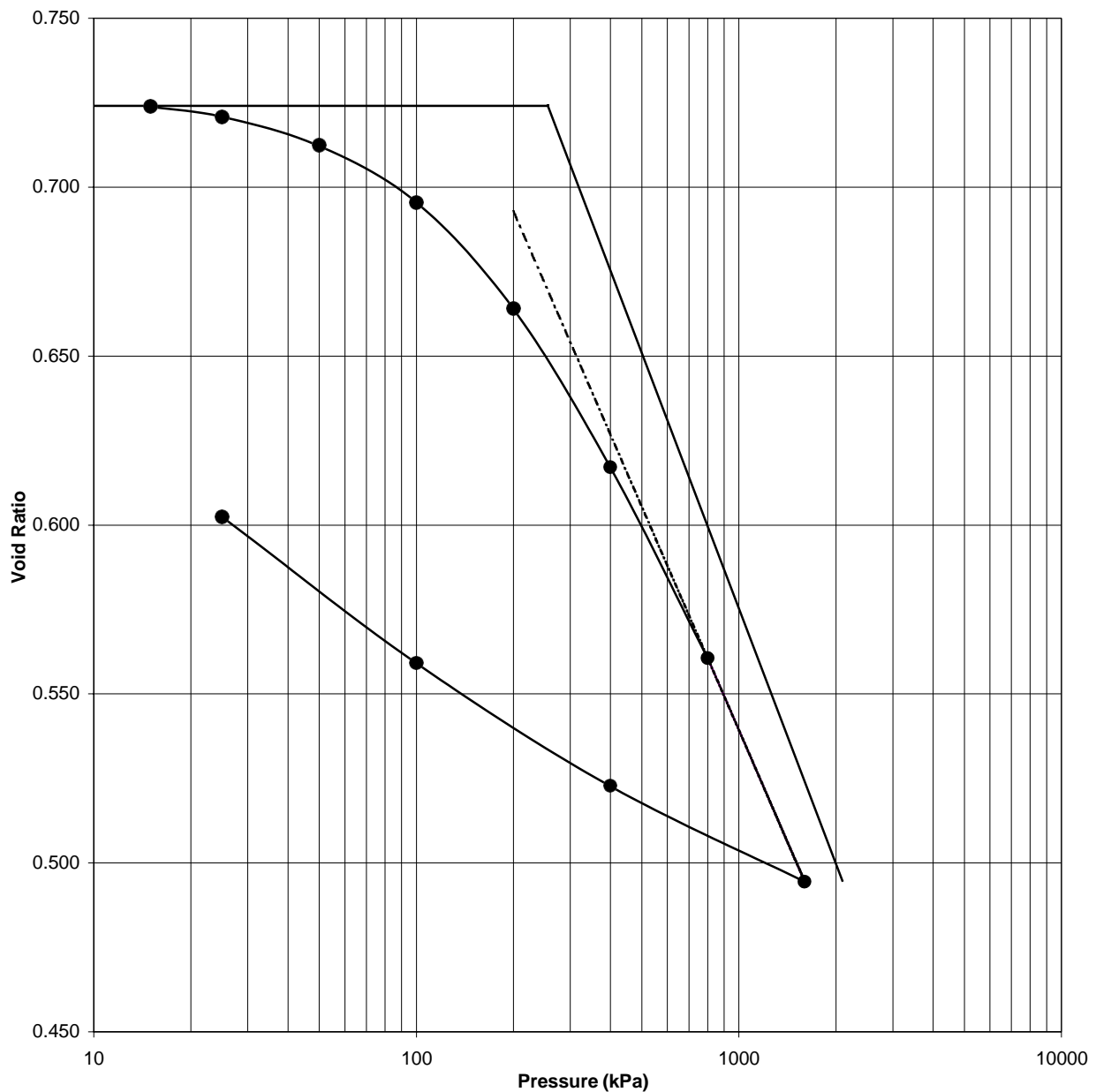
e-logp curve



Bore hole No.: MBH-6		Depth : 4.00m	
Initial Void Ratio, e_0	=	0.7726	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	28 kPa	
Compression Index C_c	=	0.2529	25 - 50
$C_c/(1+e_0)$	=	0.1427	50 - 100
Pre-consolidation Pressure, p_c	=	176 kPa	100 - 200
Swelling Index, C_s	=	0.0517	200 - 400
Recompression Index, C_r	≈	0.0517	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/15

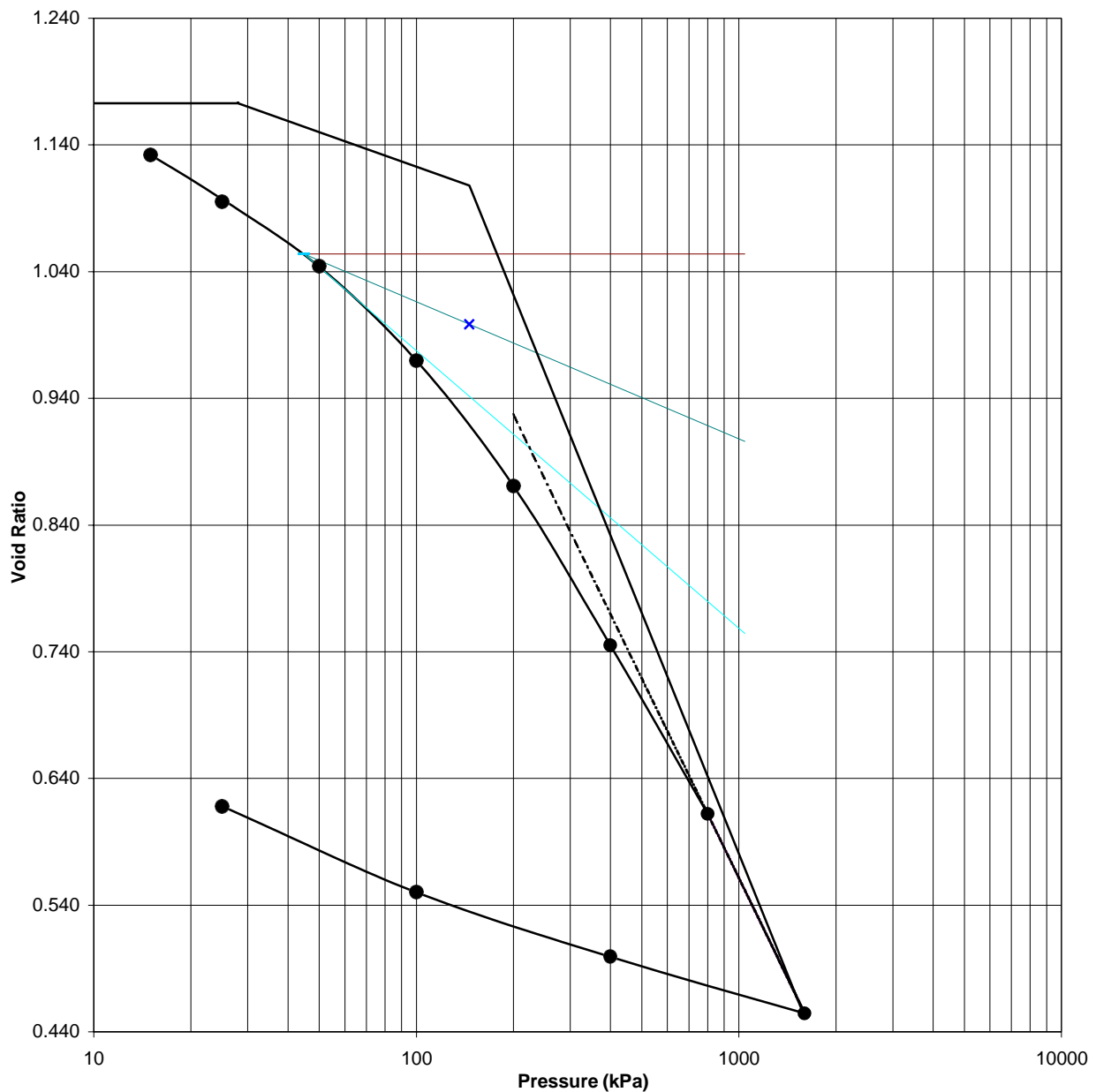


e-logp curve



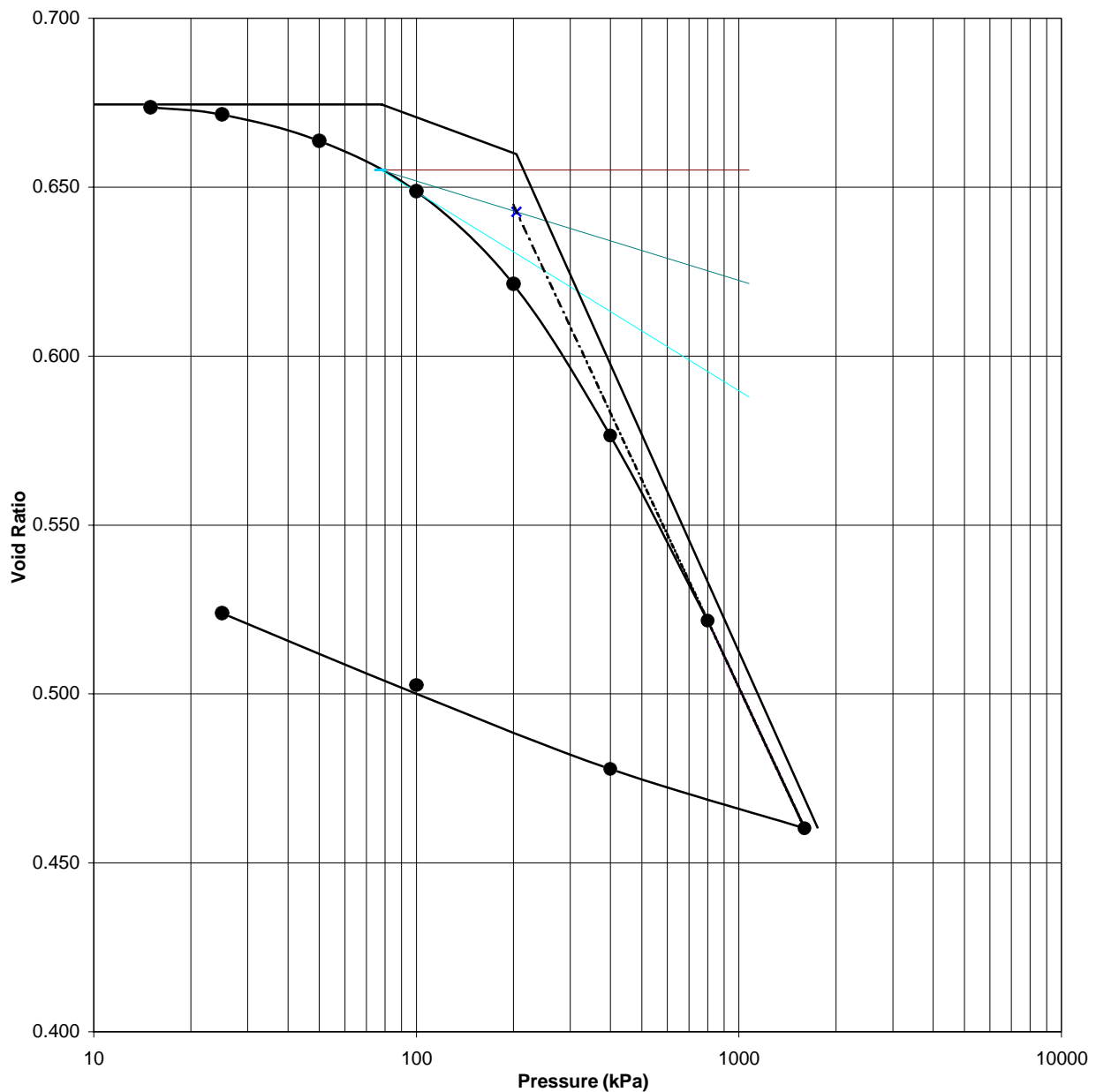
Bore hole No.: MBH-6		Depth : 28.00m	
Initial Void Ratio, e_0	=	0.7241	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	256 kPa	
Compression Index C_c	=	0.2514	25 - 50
$C_c/(1+e_0)$	=	0.1458	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0598	200 - 400
Recompression Index, C_r	≈	0.0598	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/17

e-logp curve



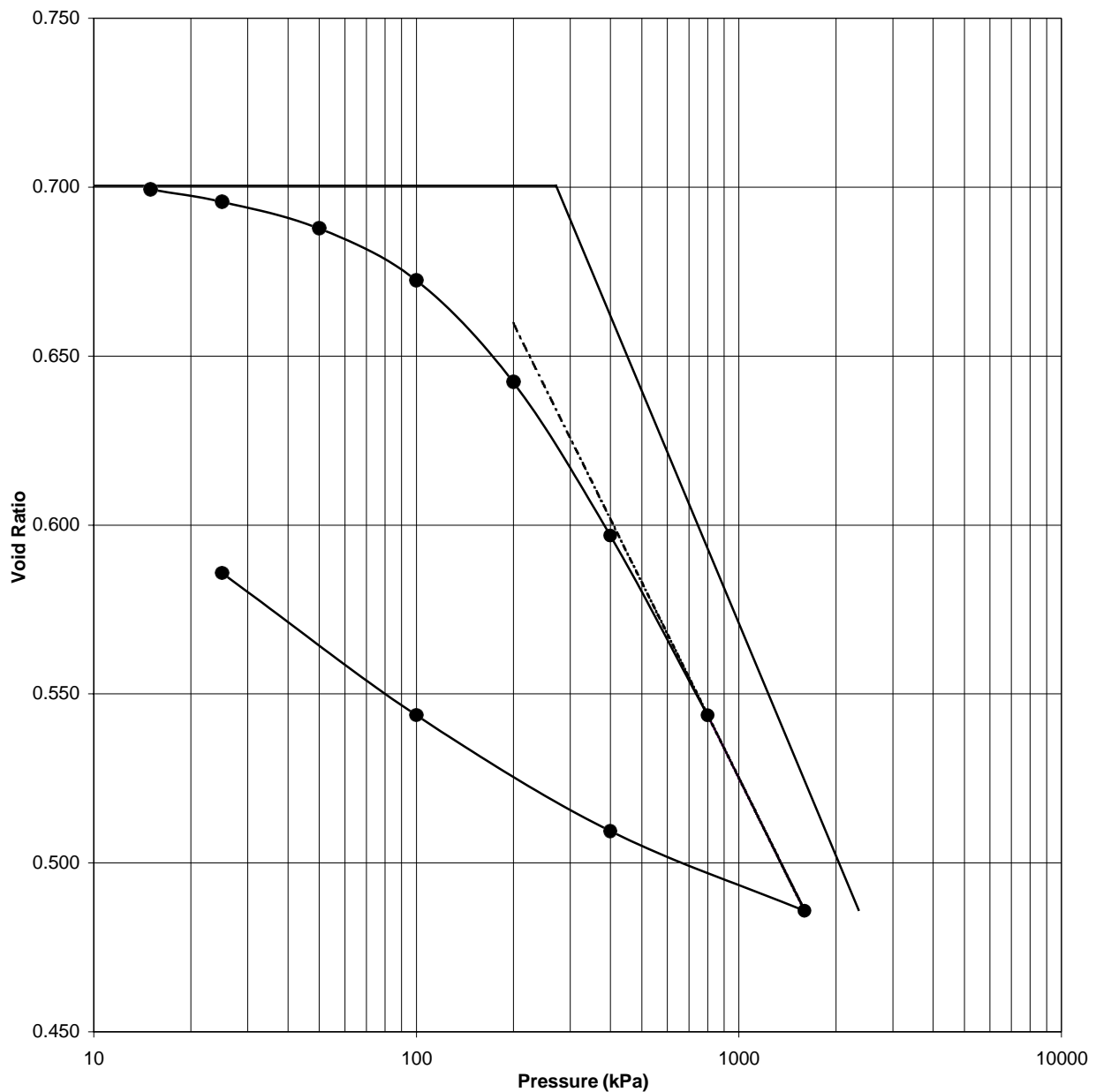
Bore hole No.: MBH-7		Depth : 4.00m	
Initial Void Ratio, e_0	=	1.1728	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	28 kPa	
Compression Index C_c	=	0.6311	25 - 50
$C_c/(1+e_0)$	=	0.2905	50 - 100
Pre-consolidation Pressure, p_c	=	146 kPa	100 - 200
Swelling Index, C_s	=	0.0905	200 - 400
Recompression Index, C_r	≈	0.0905	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/18

e-logp curve



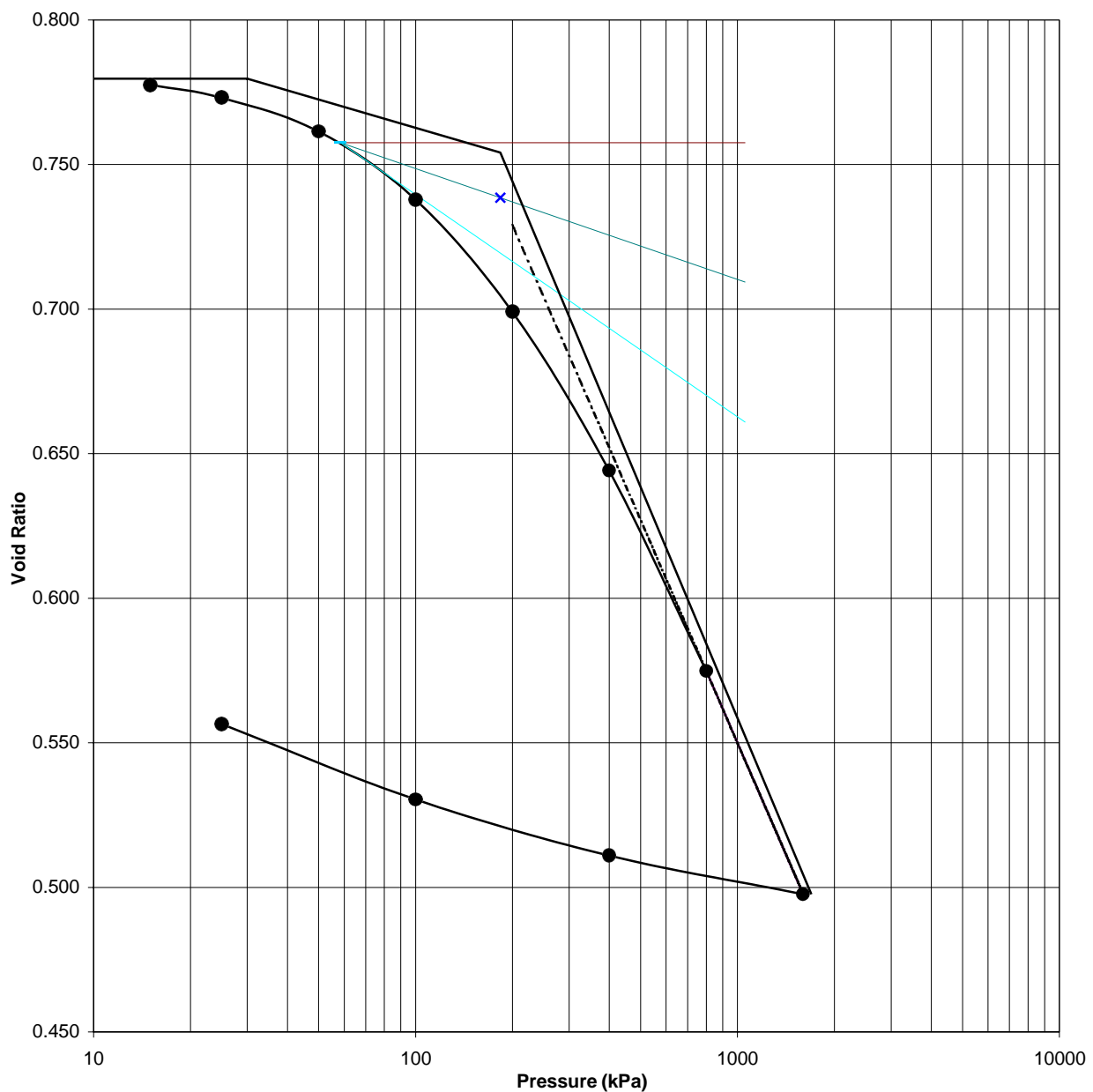
Bore hole No.: MBH-7		Depth : 10.00m	
Initial Void Ratio, e_0	=	0.6745	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	78 kPa	
Compression Index C_c	=	0.2136	25 - 50
$C_c/(1+e_0)$	=	0.1275	50 - 100
Pre-consolidation Pressure, p_c	=	204 kPa	100 - 200
Swelling Index, C_s	=	0.0353	200 - 400
Recompression Index, C_r	≈	0.0353	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. :
			CCPL/20111216
			Fig. No.
			G/19

e-logp curve



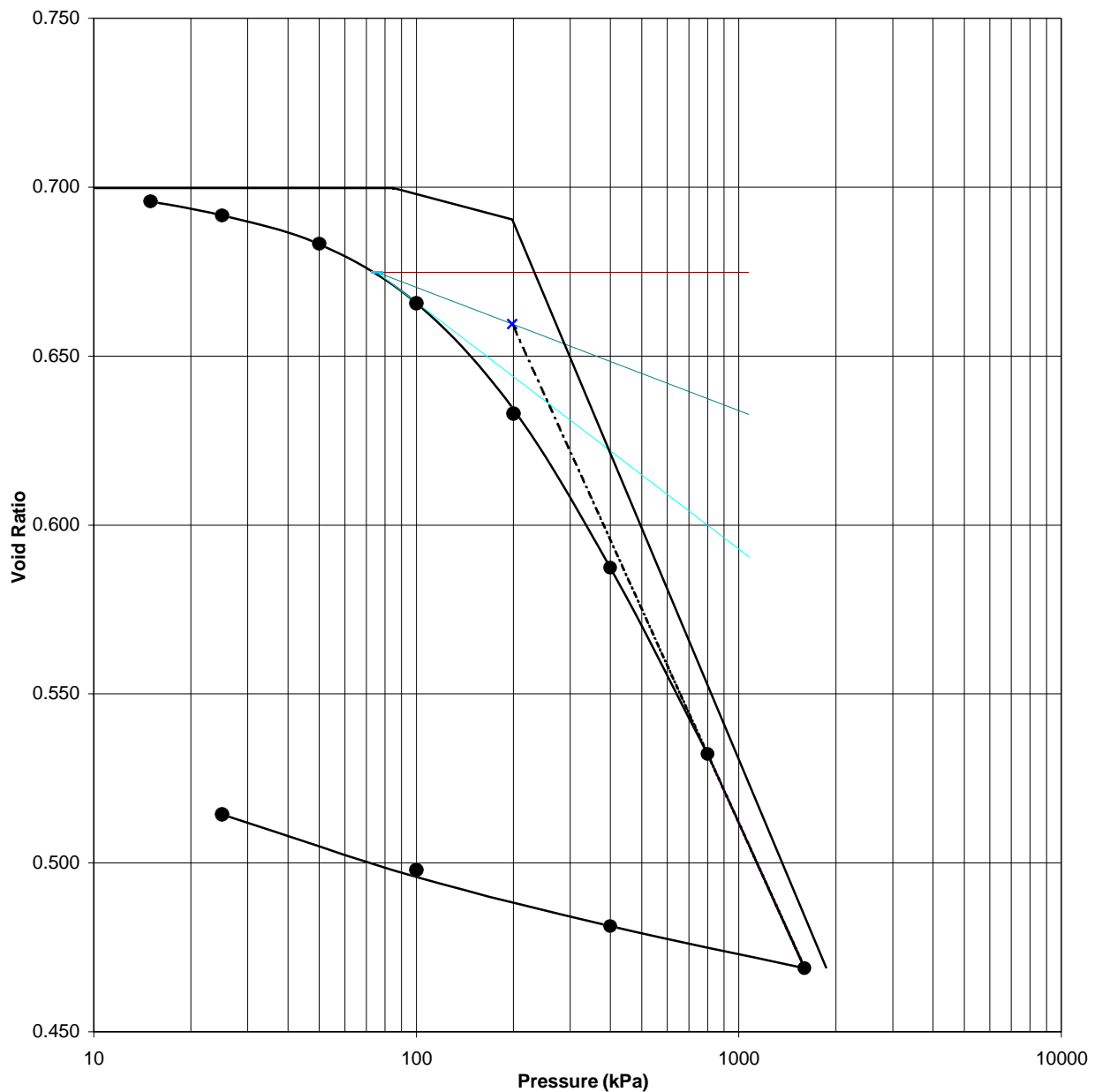
Bore hole No.: MBH-7		Depth : 29.50m	
Initial Void Ratio, e_0	=	0.7004	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	271 kPa	
Compression Index C_c	=	0.2284	25 - 50
$C_c/(1+e_0)$	=	0.1343	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0553	200 - 400
Recompression Index, C_r	≈	0.0553	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. :
			CCPL/20111216
			Fig. No.
			G/20

e-logp curve



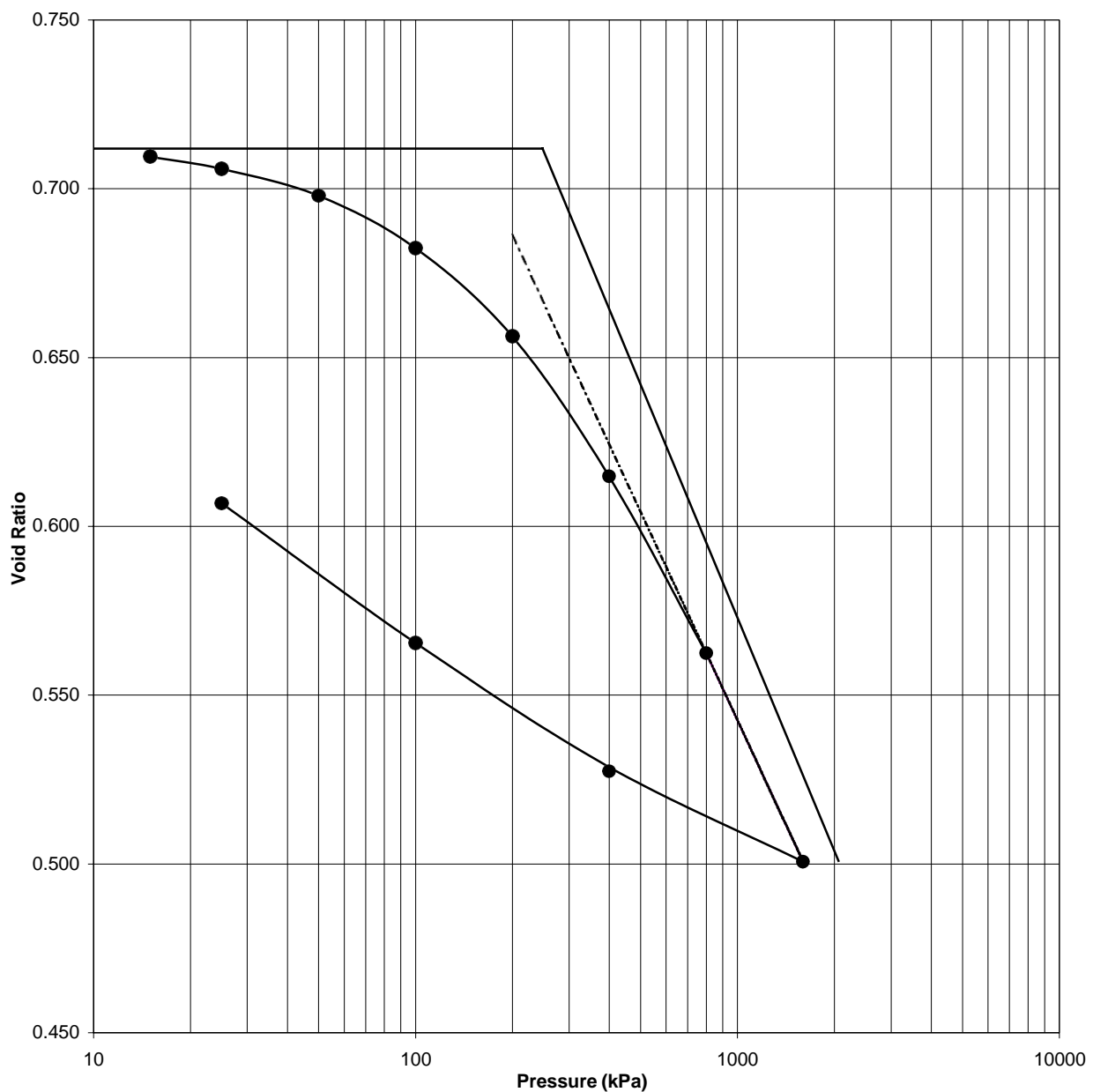
Bore hole No.: MBH-8		Depth : 4.00m	
Initial Void Ratio, e_0	=	0.7797	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	30 kPa	
Compression Index C_c	=	0.2655	25 - 50
$C_c/(1+e_0)$	=	0.1492	50 - 100
Pre-consolidation Pressure, p_c	=	184 kPa	100 - 200
Swelling Index, C_s	=	0.0326	200 - 400
Recompression Index, C_r	≈	0.0326	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/21

e-logp curve



Bore hole No.: MBH-8		Depth : 10.00m	
Initial Void Ratio, e_0	=	0.6997	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	85 kPa	
Compression Index C_c	=	0.2275	25 - 50
$C_c/(1+e_0)$	=	0.1338	50 - 100
Pre-consolidation Pressure, p_c	=	198 kPa	100 - 200
Swelling Index, C_s	=	0.0252	200 - 400
Recompression Index, C_r	≈	0.0252	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/22

e-logp curve



Bore hole No.: MBH-8		Depth : 26.50m	
Initial Void Ratio, e_0	=	0.7119	Pressure Range (kPa)
Effective Overburden Pressure, p_0	=	248 kPa	
Compression Index C_c	=	0.2296	25 - 50
$C_c/(1+e_0)$	=	0.1341	50 - 100
Pre-consolidation Pressure, p_c	=	--	100 - 200
Swelling Index, C_s	=	0.0588	200 - 400
Recompression Index, C_r	≈	0.0588	400 - 800
Geotechnical Investigation by exploration of Marine Bore Holes at HOJ-I, HOJ-II, Barge Jetty I & II and upcoming Outer Terminal - II (OT-II) in Haldia			Job No. : CCPL/20111216
			Fig. No. G/23

**GEOTECHNICAL INVESTIGATION BY EXPLORATION OF MARINE BORE HOLES
AT HQ-I, HQ-II, BARGE JETTY I & II AND UPCOMING
OUTER TERMINAL - II (OT-II) IN HALDIA**



MBH – 1



MBH – 2

FIELD WORK IN PROGRESS

**GEOTECHNICAL INVESTIGATION BY EXPLORATION OF MARINE BORE HOLES
AT HO.I-I, HO.I-II, BARGE JETTY I & II AND UPCOMING
OUTER TERMINAL - II (OT-II) IN HALDIA**



MBH – 3

MBH – 4



FIELD WORK IN PROGRESS

**GEOTECHNICAL INVESTIGATION BY EXPLORATION OF MARINE BORE HOLES
AT HO-I, HO-II, BARGE JETTY I & II AND UPCOMING
OUTER TERMINAL - II (OT-II) IN HALDIA**



MBH – 5



MBH – 6

FIELD WORK IN PROGRESS

**GEOTECHNICAL INVESTIGATION BY EXPLORATION OF MARINE BORE HOLES
AT HO.I-I, HO.I-II, BARGE JETTY I & II AND UPCOMING
OUTER TERMINAL - II (OT-II) IN HALDIA**



MBH – 7



MBH – 8

FIELD WORK IN PROGRESS

General Conditions of Contract Forms and Agreements

**Sanctioned by the Trustees under Resolution No. 92 of the
6th Meeting held on 27th May, 1993**

**Including Addendum Sanctioned by the Trustees Meeting
held on July, 2014**

KOLKATA PORT TRUST

**KOLKATA DOCK SYSTEM
& HALDIA DOCK COMPLEX**

JULY , 2014

GENERAL CONDITIONS OF CONTRACT

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5.	THE CONTRACT & GENERAL OBLIGATIONS OF CONTRACTOR	...	GC 9 – GC 14
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AMENDMENT

TO

GENERAL CONDITIONS OF CONTRACT

❖ CI-3.4 THE TENDER /OFFER & ITS PRE-REQUISITES

Table under sub-clause (a)

PREVIOUS			AS AMENDED			
			For Works Contract		For Contract of Supplying Materials or Equipment only	
	For Works Contract	For Contract of Supplying Materials or Equipment only	Estimated Value of Work	Amount of Earnest Money	Estimated Value of Work	Amount of Earnest Money
Up to Rs. 1,00,000.00	5% of the estimated value of work	1% of the estimated value of work	Up to Rs. 10 Crore	2% of the estimated value of work	Up to Rs. 1,00,000.00	1% of the estimated value of work
Over Rs. 1,00,000.00	2% of the estimated value of work subject to a maximum of Rs. 20,000/- and minimum of Rs. 5,000/-	½% of the estimated value of work subject to a maximum of Rs. 10,000/- and minimum of Rs. 1,000/-	Over Rs. 10 Crore	2% on first Rs. 10 Crore + 1% on the balance	Over Rs. 1,00,000.00	½% of the estimated value of work subject to a maximum of Rs. 10,000/- and minimum of Rs. 1,000/-

[AMENDMENT SANCTIONED BY THE BOARD OF TRUSTEES VIDE RESOLUTION NO 210 OF THE TRUSTEES' MEETING HELD ON 26.02.2013]

Table under sub-clause (d)

PREVIOUS			AS AMENDED		
Class of Registration	Amount Of Fixed Security	Financial Limit Of Each Tender	Class of Registration	Amount Of Fixed Security	Financial Limit Of Each Tender
A	Rs 10,000/-	Any tender priced upto Rs 2,00,000/-	A	Rs 50,000/-	Any tender priced up to Rs 10,00,000/-
B	Rs 5,000/-	Any tender priced upto Rs 1,00,000/-	B	Rs 25,000/-	Any tender priced upto Rs 5,00,000/-
C	Rs 2,500/-	Any tender priced upto Rs 50,000/-	C	Rs 15,000/-	Any tender priced upto Rs 3,00,000/-

[AMENDMENT SANCTIONED BY THE BOARD OF TRUSTEES VIDE RESOLUTION NO 82 OF THE TRUSTEES' MEETING HELD ON 12.10.2012]

1. DEFINITIONS

- 1.0 In the contract, as here in after defined, the following words and expressions shall have the meaning herein assigned to them, except where the context otherwise required.
- 1.1 “Employer” or “Board” or “Trustees” means of the Board of Trustees for the Port of Calcutta, a body corporate under Section 3 of the Major Port Trusts Act, 1963, including their successors, representatives and assigns. Employer
- 1.2 “Chairman” means the Chairman of the Board and includes the person appointed to act in his place under Sections 14 and 14A of the Major Port Trusts Act, 1963 Chairman
- 1.3 “Contractor” means the person or persons, Firm or Company whose tender/offer has been accepted by the Trustees and includes the Contractor’s representatives, heirs, successor and assigns, if any, permitted by the Board/Chairman. Contractor
- 1.4 “Engineer” means the Board’s official who has invited the tender on its behalf and includes the Manager (Infrastructure & Civic Facilities) or other official as may be appointed from time to time by the Employer, with written notification to the Contractor, to act as Engineer for the purpose of the Contract, in place of the “Engineer” so designated. Engineer
- 1.5 “Engineer’s Representative” means any subordinate or Assistant to the Engineer or any other official appointed from time to time by the Engineer to perform the duties set forth in Clauses 2.4 to 2.6 hereof. Engineer’s Representative
- 1.6 “Work” means the work to be executed in accordance with the Contract and includes authorised “Extra Works” and ‘Excess Works” and “Temporary Works”. Works
- 1.7 “Temporary Works” means all temporary works of every kind required in or about the execution, completion or maintenance of the works and includes (without thereby limiting the foregoing definitions) all temporary erections, scaffolding, ladders, timbering, soaking vats, site offices, cement and other godowns, platforms and bins for stacking building materials, gantries, temporary tracks and roads, temporary culverts and mixing platforms. Temporary works
- 1.8 “Extra Works” means those works required by the Engineer for completion of the Contract which were not specifically and separately included in the schedule of items of the works i.e. (Bill of Quantities) of the tender. “Excess Works” means the required quantities of work in excess of the provision made against any item of the bill of Quantities. Extra works and Excess works
- 1.9 “Specifications” means the relevant and appropriate Bureau of Indian Standard’s specifications / International Standard’s Specifications (latest revisions) for materials and workmanship unless stated otherwise in the Tender. Specification

1.10	“Drawings” means the drawings referred to in the Tender and specification and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time be furnished or approved in writing by the Engineer.	Drawings
1.11	“Contract” means and includes the General and Special Conditions of Contract, Specifications, Drawings, priced Bill of Quantities, the Tender / Offer, the letter of acceptance of the Tender/Offer, the Contract Agreement, if separately entered into and the Schedule of Rates and Price, if any, adopted by the Trustees at their discretion.	Contract
1.12	“Constructional Plant” means all appliances or things of whatsoever nature required or about the execution, completion or maintenance of the works or temporary works and includes (without thereby limiting the foregoing definition) all machinery and tools but does not include materials or other things intended to form or forming part of the permanent works.	Constructional Plant
1.13	“Site” means the land, waterways and other places, on, under, in or THOROUGH which the works are to be executed by the Trustees for the purpose of the Contract.	Site
1.14	“Contract Price” means the sum named in the letter of acceptance of the Tender/Offer of the Contractor, subject to such additions thereto and deductions therefrom as may be made by the Engineer under the provisions here in after contained.	Contract Price
1.15	“Month” means English Calendar Month.	Month
1.16	“Excepted Risks” are riot in so far as it is uninsurable, war, invasion, act of foreign enemies, hostilities) whether war be declared or not), Civil War, rebellion, revolution, insurrection or military or usurped power or use or occupation by the Trustees of any portion of the works in respect of which a certificate of completion has been issued (all of which are herein collectively referred to as the excepted risks).	Excepted Risks
1.17	Word importing the singular only, also includes the plural and vice-versa where the context so requires.	Singular/ Plural
1.18	The heading and marginal notes in these General Conditions of Contract shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.	Headings/ Marginal Notes.
1.19	Unless otherwise stipulated the work “Cost” shall be deemed to include overhead costs of the Contractor, whether on or off the site.	Cost
2.0	DUTIES & POWERS OF ENGINEER & ENGINEER’S REPRESENTATIVE.	
2.1	The Contractor shall execute, compete and maintain the works in terms of the contract to the entire satisfaction of the Engineer and Shall comply with the Engineer’s direction on any matter whatsoever.	Engineer’s Authority

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| 2.2 | The Contractor shall take instructions from the Engineer and subject to limitation of Clause 2.5 hereof, from the Engineer's Representative. | Authority of
Engineer's
Representative |
| 2.3 | <p><i>The Engineer shall have full power and authority :</i></p> <p>(a) to supply to the contractor from time to time during the progress of the works such further drawings and instructions as shall be necessary for the purpose of proper and adequate execution and maintenance of the works and the contractor shall carry out and be bound by the same.</p> <p>(b) to alter or modify the specification of any material and workmanship and to inspect the work at any time.</p> <p>(c) to order for any variation, alteration and modification of the work and for extra works.</p> <p>(d) to issue certificates as per contract.</p> <p>(e) to settle the claims & disputes of the Contractor and Trustees, as the first referee.</p> <p>(f) To grant extension of completion time.</p> | Engineer's
Power |
| 2.4 | <p><i>The Engineer's Representative shall :</i></p> <p>(i) watch and supervise the works.</p> <p>(ii) test and examine any material to be used or workmanship employed in connection with the work.</p> <p>(iii) have power to disapprove any material and workmanship not in accordance with the contract and the contractor shall comply with his direction in this regard.</p> <p>(iv) take measurements of work done by the contractor for the purpose of payment or otherwise.</p> <p>(v) order demolition of defectively done work for its reconstruction all by the Contractor at his own expense.</p> <p>(vi) have powers to issue alteration order not implying modification of design and extension of completion time of the work and</p> <p>(vii) have such other powers and authorities vested in the Engineer, which have been delegated to him in writing by the Engineer under intimation to the Contractor.</p> | Power of
Engineer's
Representative. |

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| 2.5 | <p><i>Provided always that the Engineer's Representative shall have no power :</i></p> <p>(a) to order any work involving delay or any extra payment by the Trustees,</p> <p>(b) to make variation of or in the works; and</p> | Limitation of
Engineer's
Representative's Power |
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- (c) to relieve the Contractor of any of his duties or obligations under the Contract.

2.6 Provided also as follows :

Engineer's
Overriding
Power

- (a) Failure of Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal, breaking-up thereof and re-constructing at the contractor's cost and the contractor shall have no claim to compensation for the loss if any sustained by him.
- (b) If the contractor shall be dissatisfied by reason of any decision of the Engineer's Representative, he shall be entitled to refer the matter to the Engineer who shall thereupon confirm, reverse or vary such decision.
- (c) Any written instructions or written approval given by the Engineer's Representative to the contractor, within the terms of delegation of power and authority vested in the Engineer to his Representative in writing, shall bind the contractor and the Trustees as though it had been given by the Engineer, who may from time to time make such delegation.

3.0 THE TENDER/OFFER AND ITS PRE-REQUISITES

- 3.1 The Contractor shall, before making out and submitting his tender/offer, be deemed to have inspected and examined the site, fully considered all factors, risks and contingencies, which will have direct and indirect impact on his expenses and profit from the work and shall be specifically deemed to have taken the following aspects into consideration :

The tender must encompass all relevant aspects/issues.

- (a) The form and nature of the site and its surroundings including their sub-surface, hydrological, tidal and climatic conditions, the means of access to the site and all other local conditions, including the likely charges and costs for temporary way-leave, if any, required for the work.

Site & Local condition.

- (b) The drawings, specifications, the nature and extent of work to be executed and the quality, quantity and availability of the required materials and labour for the work and the need to execute the work to the entire satisfaction of the Engineer, and also by complying with the General and Special Conditions of Contract.

Drawing/ Specification/ Nature & extent of work to be done.

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- (c) The accommodation required for the workmen and site office, mobilisation/demobilisation and storage of all plant, equipment and Construction materials.
- (d) The sources and means of procurement of water for drinking, washing and execution of work, and source and availability of electrical power, all at Contractor's cost.
- (e) Payment of taxes and duties and compliance of all applicable statutes, ordinances and law together with the rules made

Accommodation for Contractor's men/materials.

Water for drinking etc. /Electrical power.

Payment of Taxes/duties

thereunder, the rules, regulations and bye-laws of public bodies or any local or other authority by the Contractor, keeping the Trustees indemnified against penalties and liabilities of every kind arising from the Contractor's failure in such compliance. and observance of all statutes.

- (f) Payment of all kinds of stamp-duty for executing the agreement or for any legal instrument including Bank Guarantees and Indemnity Bonds. Payment of Stamp Duty by the Contractor.

3.2 The Contractor's tender shall be in ink on the Tender Forms supplied by the Trustees, unless stipulated otherwise in the Notice Inviting the Tender and shall be faultless in figures and free from erasing. Corrections, if any, shall only be made by scoring out and initialling of the revised figure.

3.3 If required by the Engineer or the Trustees, the Contractors in their tender or subsequently, shall disclose the names of their owners/partners/share holders at the required points of time. The failure in this regard shall be treated as a breach and a contract, if entered into, shall be liable to be cancelled. Disclosure of Owner's name.

- 3.4 (a) Unless otherwise stipulated in the Notice Inviting Tender / Offer, every tender must be submitted with Earnest Money of the amount calculated as per the following scale. Earnest Money and Security Deposit.

Estimated Value of Work	Amount of Earnest Money	
	For Works Contract	For Contract of Supplying Materials or Equipment only
Up to Rs. 1,00,000=00	5% of the estimated value of work	1% of the estimated value of work
Over Rs. 1,00,000=00	2% of the estimated value of work subject to a maximum of Rs. 20,000/- and minimum of Rs. 5,000/-.	½% of the estimated value of work subject to a maximum of Rs. 10,000/- and minimum of Rs. 1,000/-.

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- (b) Earnest Money shall be deposited with the Trustees' treasurer in cash or by Banker's Cheque of any Calcutta Branch of a Nationalised Bank of India drawn in favour of Calcutta Port Trust or in the form of any "Account Payee" Draft of any Nationalised Bank of India drawn in favour of "Calcutta Port Trust" and payable at Calcutta/Haldia, as the case may be, and the receipt granted therefor be kept attached to the Tender/Offer in the Sealed Cover. Method of Paying E.M.

- (c) Earnest Money of unaccepted tender shall be refunded without any interest THOROUGH A/c. Payee Cheque drawn on a Nationalised Bank of Calcutta / Haldia. Refund of E.M.

- (d) The enlisted (registered) Contractors of the Trustees who have deposited fixed Security with the Trustees' FA & CAO / Manager (Finance) according to his Class of Registration, shall be exempt from depositing the Earnest Money, as per the following scale :

Class of Registration	Amount of Fixed Security	Financial Limit of Each Tender
A	Rs. 25,000/-	Any tender priced up to Rs.5,00,000/-
B	Rs. 10,000/-	Any tender priced up to Rs.2,00,000/-
C	Rs. 5,000/-	Any tender priced up to Rs.1,00,000/-

- (e) (i) Tender submitted without requisite Earnest Money may be liable to rejection. Tender without EM liable to rejection.
- (ii) If before expiry of the validity period of his Tender/Offer, the tenderer amends his quoted rates or tender/offer making them unacceptable to the Trustees and/or withdraws his tender/offer, the Earnest Money deposited shall be liable to forfeiture at the option of the Trustees. Forfeiture of E.M. before Acceptance of offer.
- (f) The Earnest Money of accepted tender/offer shall be retained by the Trustees as part of the Security Deposit, for which a separate Treasury Receipt shall be issued to the Contractor after cancellation of the previous Receipt of Earnest Money. E.M. to be converted to part S.D.
- (g) Balance security for works contract shall be recovered by deduction from all progressive Bill (including final Bill, if necessary) @ 10% of the gross value of work in each such bill, so that the total recovery may not exceed the quantum computed as per the under noted percentages of the total value of work actually done up to the stage of completion. Mode of recovery of balance S.D.

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Value of Work	% of Security Deposit for works contract.	% of Security Deposit For contract of supply-ing materials & equipment only.	Scale of S.D. recovery.
For works up to Rs.10,00,000/-.	10% (Ten percent)	1% (One percent)	
For works costing more than Rs.10,00,000/- and up to Rs.20,00,000/-	10% on first Rs.10,00,000/- + 7½% on the balance.	1% on first Rs.10,00,000/- + ½% on the balance.	

For works costing more than Rs.20,00,000/-	10% on first Rs.10,00,000/- + 7 ½% on the next Rs.10,00,000/- + 5% on the balance.	1% on first Rs.10,00,000/- + ½% on the next Rs.10,00,000/- + ¼% on the balance.
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(h) Balance Security for Contract of supplying materials and equipment computed in terms of the percentages given above, shall have to be deposited with the Trustees' Treasurer in advance and within 30 days from the date of placement of supply order, either in cash or by A/c. Payee Draft of a Nationalised Bank of India drawn in favour of Calcutta Port Trust and payable at Calcutta/Haldia, as the case may be. S.D. for supply contracts to be deposited in advance.

(i) No interest shall be paid by the Trustees to the Tenderer/Contractor on the amount of Earnest Money/Security Deposit held by the Trustees, at any stage. No interest payable on E.M. /S.D

3.5 (i) The Security Deposit shall refunded to the Contractor in terms of Clause 9.3 hereinafter and subject to deduction, if any, under the provision of Sub-clause 3.5 (ii) herein below. Id, however, the Contract provides for any maintenance period. 50% of the Security Deposit may be refunded against any of the treasury Receipt for that amount on expiry of half of the maintenance period and the balance deposit on the expiry of the said maintenance period and after the Engineer has certified the final completion of work in Form G.C.2 and the Contractor has submitted his "No Claim" Certificate in Form G.C.3. Mode of refund of S.D.

(ii) The Security Deposit/Earnest Money may be liable to forfeiture at the option of the Trustees, if the Contractor fails to carry out the work or to perform/observe any of the conditions of the Contract. The Trustees shall also be at liberty to deduct any of their dues from the Security Deposit, fixed Security, Earnest Money or from any sum due or to become due to the Contractor under any other contract. Forfeiture of S.D.

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3.6 If stipulated in the contract as a Special Condition, the contractor shall have to submit to the Engineer a performance Bond in the form of an irrevocable guarantee from Calcutta/Haldia Branch, as the case may be, of any Nationalised Bank of India in the proforma annexed hereto and for the sum and period as mentioned in the letter of acceptance of the Tender/Offer, within 15 days from the date of such letter, failing which the Contract shall be liable to be terminated and the earnest money shall be liable to forfeiture; all at the discretion of the Engineer. The cost of obtaining this or any other Bank Guarantee and/or the revalidation thereof, wherever required, has to be borne by the Contractor and it shall be his sole responsibility to arrange for timely revalidation of such Bank Guarantee, failing which and for non-fulfilment of any contractual obligation by the Contractor, the Engineer and/or the Trustees shall be at liberty to raise claim against the Guarantee and/or enforce the same unilaterally. Bank Guarantee in lieu of Cash S.D. in certain cases

3.7 "Every Tenderer/ Bidder shall submit, in respect of a tender value of more than Rs 5 Crore, along with their tender comprising Special Conditions of Contract, General Conditions of Contract, BOQ, Earnest Money, etc. a document called Integrity Pact Agreement duly signed by their authorized representative. The Proforma of the Integrity

Pact Agreement shall as specified in the GCC. In case of tender value more than Rs 5 Crore, the Integrity Pact Agreement is an essential part and parcel of bid document to be submitted by each tenderer, without which the tender shall not be considered.”

4.0 THE CONTRACT & GENERAL OBLIGATIONS OF CONTRACTOR

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| 4.1 | (a) The contract documents shall be drawn-up in English language. | English language to be used |
| | (b) The contract shall be governed by all relevant Indian Acts. As applicable only within the jurisdiction of the High Court at Calcutta, India, including the following Acts : | Applicability of laws on the contract |
| | <ol style="list-style-type: none"> 1. The Contract Act (India), 1872. 2. The Major Port Trusts Act, 1963. 3. The Workmen’s Compensation Act, 1923. 4. The Minimum Wages Act, 1948. 5. The Contract Labour (Regulation & Abolition) Act, 1970. 6. The Dock Workers’ Act, 1948. 7. The Arbitration and Conciliation Act (1996) (in the case of a definite Arbitration Agreement only). | |
| 4.2 | After acceptance of his Tender/Offer and when called on to do so by the engineer or his representative, the contractor shall, at his own expense, enter into and execute a Contract Agreement to be prepared by him in the form annexed hereto. Until such Contract Agreement is executed, the other documents referred to in the definition of the term ‘Contract’ here-in-before, shall collectively be the Contract. | Contractor to Execute Contract Agreement. |
| 4.3 | Several documents forming the contract are to be taken as mutually explanatory of one another. Should there be any discrepancy, ambiguity, omission or error in the various contract documents, the Engineer shall have the power to correct the same and his decision shall be final and binding on the parties to the Contract. | Interpretation of contract documents –Engineers’ Power |

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| 4.4 | Two copies of the Drawings referred to in the general and special Conditions of Contract and in the Bill of Quantities, shall be furnished by the Engineer to the Contractors free of cost for his use on the work, but these shall remain the property of the Trustees and hence, the Contractor shall return them to the Engineer or his Representative on completion of the work, if not torn or mutilated on being regularly used at site. | All Drawings are Trustees’ property. |
| 4.5 | The Contractor shall prove and make at his own expense any working or progress drawings required by him or necessary for the proper execution of the works and shall, when required, furnish copies of the same free of cost to the Engineer for his information and/or approval, without meaning thereby the shifting of Contractor’s responsibility on the Engineer in any way whatsoever. | Contractor to prepare working / progress drawings |
| 4.6 | The Contractor shall not directly or indirectly transfer, assign or sublet the Contract or any part thereof without the written permission of the Engineer. Even if such permission be granted, the Contractor shall remain responsible (a) for the acts, defaults and neglect of any sub-contractor, his agents, servants or workmen as fully as if these were the acts, defaults or neglects of the Contractor himself or his agents, servants or workmen and (b) for his full and entire responsibility of the contract and for active superintendence of the works by him despite being sublet, provided always that the provision of labourers on a “piece rate” basis shall not be deemed to be sub-letting under this clause. | Contractor cannot sub-let the work |

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| 4.7 | Unless otherwise specified, the Contractor shall be deemed to have included in his Tender/Offer all his cost for supplying and providing all constructional plant, temporary work. Materials both for temporary and permanent works, labour including supervision thereof, transporting to and from the site and in and about the work, including loading, unloading, fencing, watching, lighting, payment of fees, taxes and duties to the appropriate authorities and other things of every kind required for the construction, erection, completion and maintenance of the work. | Contractors' price is inclusive of all costs |
| 4.8 | The Contractor shall be solely responsible for the adequacy, stability and safety of all site operations and methods of construction, even if any prior approval thereto has been taken from the Engineer or his Representative. The Contractor shall not be responsible for the correctness of the design or specification of the Temporary and Permanent works formulated by the Engineer; but the Contractor shall be fully responsible for the correct implementation thereof, as also for any design and specification prepared/proposed/used by the Contractor. | Contractor is responsible for all construction process, except for correctness of design and specification formulated by the Engineer |
| 4.9 | Whenever required by the Engineer or his representative, the Contractor shall submit to him the details of his (a) programme for execution of the work, (b) proposed procedure and methods of work, (c) proposed deployment of plant, equipment, labour, materials and temporary works. The submission to and/or any approval by the Engineer or his Representative to any such programme or particulars shall not relieve the Contractor of any of his obligations under the contract. | Contractor to submit his programme of work |

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If for any reason the contractor be unable to adhere to his earlier programme, he shall submit his revised programme for completion of work within the stipulated time whenever asked to do so.

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| 4.10 | Necessary and adequate supervision shall be provided by the Contractor during execution of the works and as long thereafter as the Engineer or his representative shall consider necessary during the maintenance period. The Contractor or his competent and authorised agent or representative shall be constantly at site and instructions given to him by the Engineer or his representative in writing shall be binding upon the Contractor subject to limitation in Clause 2.5 hereof. The Contractor shall inform the Engineer or his representative in writing about such representative/agent of him at site. | Contractor to supervise the works |
| 4.11 | The Contractor shall employ in execution of the Contract only qualified careful and experienced persons and the Engineer shall be at liberty to direct the Contractor to stop deployment of any of is staff, workmen or official at site and the Contractor shall within 48 hours comply with such instruction without any demur whenever the Engineer shall feel that the deployment of the person concerned will not be conducive to the proper and timely completion of the work. | Contractor to deploy qualified men and Engineer's power to remove Contractor's men |
| 4.12 | The Contractor shall be responsible for the true and proper setting out of the works in relation to reference points/lines/levels given by the Engineer in writing. The checking of any setting-out or of any alignment or level by the Engineer or his Representative shall not in any way relieve the contractor of his | Contractor is responsible for line, level, setting out etc. |

responsibility for the correctness thereof and he shall fully provide protect and preserve all stakes, templates, bench marks, sight rails, pegs, level marks, profile marks and other things used in setting out the works.

- 4.13 From the commencement of the works till issue of the completion certificate in Form G.C.1, vide Clause 5.12 hereof, the contractor shall take full responsibility for the care thereof. Save for the excepted risks, any damage, loss or injury to the work or any part thereof shall be made good by the Contractor at his own cost as per instruction and to the satisfaction of the engineer, failing which the Engineer or his Representative may cause the same to be made good by any other agency and the expenses incurred and certified by the Engineer shall deem proper. This Clause will not apply to that part of the work, which might have been taken over by the Trustees on partial completion of the work and in such case the Contractor's obligation will be limited to repairs and replacement for manufacturing or construction defects during the Maintenance period (Guarantee Period) as per the directions of the Engineer as also for defects/damages if any caused to the work by the Contractor during such repairs and replacement in the maintenance period.
- Contractor is responsible to protect the work

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- 4.14 The Contractor shall at his own cost protect support and take all precautions in regard to the personnel or structure or services or properties belonging to the Trustees or not which may be interfered with or affected or disturbed or endangered and shall indemnify and keep indemnified the Trustees against claim for injury, loss or damage caused by the Contractor in connection with the execution and maintenance of the work to the aforesaid properties, structures and services and/or to any person including the Contractor's workmen. Cost of Insurance Cover, if any, taken by the Contractor shall not be reimbursed by the Trustees, unless otherwise stipulated in the Contract.
- Contractor is responsible for all damages to other structures / persons caused by him in executing the work.
- 4.15 The Contractor shall immediately inform the Engineer's Representatives if any fossil, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological importance be discovered at site which shall remain the property of the Trustees and protect them from being damaged by his workmen and arrange for disposal of them at the Trustees' expense as per the instruction of the Engineer's Representative.
- Fossils, Treasure travois, etc. are Trustees' property
- 4.16 The Contractor shall be deemed to have indemnified and shall indemnify the Trustees against all claims, demands, actions and proceedings and all costs arising therefrom on account of :
- Contractor to Indemnify the Trustees against all claims for loss, damage, etc.
- (a) Infringement of any patent right, design, trademark or name or other protected right in connection with the works or temporary work.
 - (b) Payment of all royalties, rent, toll charges, local taxes, other payments or compensation, if any, for getting all materials and equipment required for the work.
 - (c) Unauthorised obstruction or nuisance caused by the contractor in respect of Public or Private or Private road, railway tracks, footpaths, crane tracks,

waterways, quays and other properties belonging to the Trustees or any other person.

- (d) Damage/injury caused to any highway and bridge on account of the movement of Contractor's plants and materials in connection with the work.
- (e) Pollution of waterway and damage caused to river, lock, sea-wall or other structure related to waterway, in transporting contractor's plants and materials.
- (f) The Contractor's default in affording all reasonable facilities and accommodation as per the direction of the Engineer or his Representative to the workmen of the Trustees and other agencies employed by or with the permission and/or knowledge of the Trustees on or near the site of work.

- 4.17 Debris and materials, if obtained by demolishing any property, building or structure in terms of the Contract shall remain the property of the Trustees. Dismantled materials Trustees' property

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- 4.18 The Contractor's quoted rates shall be deemed to have been inclusive of the following : Contractor's quoted rates/price must be all inclusive
- (a) Keeping the site free of unnecessary obstruction and removal from site of constructional plant wreckage, rubbish, surplus earth or temporary works no longer required.
 - (b) Cleaning and removal from site all the surplus materials of every kind to leave the site clean and tidy after completion of the work, without which payment against final bill may be liable to be withheld.
 - (c) Precautionary measures to secure efficient protection of Docks, the River Hooghly and other waterways against pollution of whatever nature during execution and maintenance of the works and to prevent rubbish, refuse and other materials from being thrown into the water by the Contractor's men or those of his agency.
 - (d) Making arrangements for deployment of all labourer and workers, local or otherwise including payment for their wages, transport, accommodation, medical and all other statutory benefits and entry permits, wherever necessary.
 - (e) Making arrangements in or around the site, as per the requirements of local authority or the Engineer or his Representative for preventing (i) spread of any infectious disease like smallpox, cholera, plague or malaria by taking effective actions for destruction of rats, mice, vermin, mosquitoes, etc. and by maintaining healthy and sanitary condition, (ii) illegal storage and distribution of Drugs, Narcotics, Alcoholic liquor, Arms and Ammunitions, (iii) unlawful, riotous or disorderly conduct of the Contractor's or

his Sub-Contractor's workmen, (iv) deployment of workmen of age less than 16 years.

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| 4.19 | Every direction or notice to be given to the Contractor shall be deemed to have been duly served on or received by the Contractor, if the same is posted or sent by hand to the address given in the tender or to the Contractor's Site Office or to the Registered Office of the Contractor. The time mentioned in these conditions for doing any act after direction or notice shall be reckoned from the time of such posting or despatch. | Notice to Contractor. |
| 4.20 | The Contractor and his Sub-contractor or their agents and men and any firm supplying plant, materials and equipment shall not publish or caused to be published any photographs or description of the works without the prior authority of the Engineer in writing. | Contractor not to publish photograph or particulars of work |

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| 4.21 | The Contractor shall at the Trustees' cost to be decided by the Engineer render all reasonable facilities and Co-operation as per direction of the Engineer or his representative to any other Contractor engaged by the Trustees and their workmen to the Trustees' own staff and to the men of other Public Body on or near the site of work and in default the Contractor shall be liable to the Trustees for any delay or expense incurred by reason of such default. | Contractor to provide facilities to outsiders |
| 4.22 | The work has to be carried out by the Contractor causing the minimum of hindrance for any maritime traffic or surface traffic. | Work to cause minimum possible hindrance to traffic movement |
| 4.23 | All constructional plants, temporary works and materials when brought to the site by the Contractor shall be deemed to be the property of the Trustees who will have lien on the same until the satisfactory completion of the work and shall only be removed from the site in part or in full with the written permission of the Engineer or his Representative. | Trustees' lien on Contractor's Plant & Equipment. |
| 5.0 COMMENCEMENT, EXECUTION AND COMPLETION OF WORK. | | |
| 5.1 | The Contractor shall commence the work within 7 days of the receipt of Engineer's letter informing acceptance of the Contractor's tender/offer by the Trustees or within such preliminary time as mentioned by the Contractor in the Form of Tender or the time accepted by the Trustees. The Contractor shall then proceed with the work with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer or his Representatives, time being deemed the essence of the contract on the part of the contractor. | Preliminary time to commence work an maintenance of steady rate of progress |
| 5.2 | The Contractor shall provide and maintain a suitable office at or near the site to which the Engineer's Representative may send communications and instructions for use of the Contractor. | Contractor's site office |
| 5.3 | Unless specified otherwise in the contract or prior permission of the Engineer has been taken, the contractor shall not execute the work beyond the working hours observed by the Engineer's Representative and on Sundays and Holidays observed in the Trustees' system, except | Contractor to observe Trustees' working hours |

in so far as it becomes essential on account of tidal work or for safety of the work. If the progress of the work lags behind schedule or the work has been endangered by any act or neglect on the part of the contractor, then the Engineer or his Representative shall order and the contractor at his own expense shall work by day and by night and on Sundays and Public Holidays. Any failure of the Engineer or his Representative to pass such an order shall not relieve the contractor from any of his obligations. The Engineer's decision in this regard shall be final binding and conclusive.

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| 5.4 | Unless stipulated otherwise in the contract all materials required for the work shall be procured and supplied by the contractor with the approval of the Engineer or his Representative and subject to subsequent testing as may be required by the Engineer or his Representative. The Engineer shall exercise his sole discretion to accept any such materials. | Contractor to supply all materials as per requirement of the Engineer or his representative |
| 5.5 | Unless stipulated otherwise in the contract all materials, workmanship and method of measurement shall be in accordance with the relevant Codes (Latest Revision) of the Bureau of Indian Standards and the written instructions of the Engineer or his Representative. Where no specific reference is available in the contract, the material and workmanship shall be of the best of their respective kinds to the satisfaction of the Engineer. | Materials & Works |
| 5.6 | Samples shall be prepared and submitted for approval of the Engineer or his representative, whenever required to do so, all at the Contractor's cost. | Contractor to submit samples for approval |
| | Unless stipulated otherwise in the contract, the cost of any test required by the Engineer or his representative in respect of materials and workmanship deployed on the work, shall be borne by the Contractor. | Contractor to arrange all testing at his own cost. |
| 5.8 | Regarding the supply of any materials by the Trustees to the contractor in accordance with the contract, the following conditions shall apply : | |
| | (a) The Contractor shall, at his own expense, arrange for transporting the materials from the Trustees' Stores, watching, storing and keeping them in his safe custody, furnishing of statement of consumption thereof in the manner required by the Engineer or his representative, return of surplus and empty container to the Trustees' Stores as per the direction of the Engineer or his Representative. | The Contractor shall account for and look after the Trustees' materials |
| | (b) Being the custodian of the Trustees' materials, the contractor shall remain solely responsible for any such materials issued to him and for any loss or damage thereof for any reason other than "Excepted Risks", the Contractor shall compensate the Trustees' in the manner decided by the Engineer and shall at no stage remove or cause to be removed any such material from the site without his permission in writing. | Contractor to compensate for loss and damage to Trustees' materials |
| | (c) The Trustees' materials will generally be supplied in stages and in accordance with the rate of progress of work but except for grant of suitable extension of completion time of work as decided by the Engineer. The Contractor shall not be entitled to any other compensation, monetary or otherwise, for any delay in the supply of | Delay in supply of Trustees' materials will only entitle the Contractor for |

Trustees' materials to him. The Contractor shall, however, extension of completion time of work communicate his requirement of such materials to the Engineer from time to time.

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(d) Unless stipulated otherwise in the contract, the value of the Trustees' materials issued to the contractor shall be recovered from the contractor's bills and/or any of his other dues, progressively according to the consumption thereof on the work and/or in the manner decided by the Engineer or his representative and at the rate/s stipulated in the contract. These rates shall only be considered by the contractor in the preparation of his tender/offer and these will form the basis of escalation/variation, if in future the contractor is required to procure and provide any such material on the written order of the Engineer consequent on the Trustees' failure to effect timely supply thereof. Recovery from Contractor for Trustees' materials under normal circumstances

(e) If the Engineer decides that due to the contractor's negligence, any of the Trustees' materials issued to the contractor has been – (i) lost or damaged, (ii) consumed in excess of requirement and (iii) wasted by the contractor in excess of normal wastage, then the value thereof shall be recovered from the contractor's bills or from any of his other dues, after adding 19 ¼% extra over the higher one of the followings - Recovery from Contractor for Trustees' materials under other circumstances.

(1) The issue rate of the materials at the Trustees' Stores and

(2) The market price of the material on the date of issue as would be determined by the Engineer.

5.9 The Engineer or his Representative shall have the power to inspect any material and work at any time and to order at any time – (I) for removal from the site of any material which in his opinion is not in accordance with the contract or the instruction of the engineer or his representative, (ii) for the substitution of the proper and suitable materials, or (iii) the removal and proper re-execution of any work which in respect of material and workmanship is not in accordance with the contract or the instructions of the Engineer. The Contractor shall comply with such order at his own expense and within the time specified in the order. If the contractor fails to comply, the Engineer shall be at liberty to dispose any such materials and re-do any work in the manner convenient to the Trustees by engaging any outside agency at the risk and expense of the contractor and after giving him a written prior notice of 7 days. Contractor to replace materials/work not acceptable to the Engineer or his Representative

5.10 No work shall be covered up and put out of view by the contractor without approval of the Engineer or his Representative and whenever required by him, the contractor shall uncover any part or parts of the work or make openings in or THOROUGH the same as may be directed by the Engineer or his representative from time to time and shall reinstate or make good those part of works thus affected to the satisfaction of the Engineer, all at the cost of the contractor. Contractor to seek approval of Engineer or his Representative before covering up any portion of work

The Trustees shall reimburse such cost as determined by the Engineer, if the initial covering up was with prior written order of the Engineer or his Representative.

- 5.11 On a written order of the Engineer or his Representative, the contractor shall delay or suspend the progress of the work till such time the written order to resume the execution is received by him. During such suspension the contractor shall protect and secure the work to the satisfaction of the Engineer or his Representative. All extra expenses in giving effect to such order shall be considered by the Trustees, unless such suspension is –
- Contractor to suspend work on Order from Engineer or his Representative
- (a) otherwise provided for in the contract, or
 - (b) necessary by reason of some default on the part of the contractor, or
 - (c) necessary by reason of climatic conditions on the site, or
 - (d) necessary for proper execution of the works or for the safety of the works or any part thereof.

The Engineer shall settle and determine such extra payment and/or Extension of completion time to be allowed to the contractor, as shall, in the opinion of the Engineer be fair and reasonable, and the same shall be final and binding on the Contractor.

- 5.11.1 If at any time before or after commencement of the work the Trustees do not require the whole of the work tendered for the Engineer shall notify the same to the contractor in writing and the contractor shall stop further works in compliance of the same. The Contractor shall not be entitled to any claim for compensation for underived profit or for such premature stoppage of work or on account of curtailment of the originally intended work by reason of alteration made by the Engineer in the original specifications, drawings, designs and instructions.

- 5.12 When the whole of the work has been completed to the satisfaction of the Engineer and has passed any final test prescribed in the contract, the contractor shall, within 21 days of submission of his application to the Engineer, be entitled to receive from him a certificate for completion of work in Form G.C.1, annexed hereto. If any part of the total work having been completed to the satisfaction of the Engineer, be taken over and/or used by the Trustees, the Contractor shall on application be entitled to partial completion certificate in the Form G.C.1 indicating the portion of the work covered by it, so that the Contractor's liability during maintenance period of the contract, if any, shall commence from the date mentioned in such certificate so far as the completed portion of the work is concerned.
- Completion Certificate G.C.1.

6.0 TERMS OF PAYMENT :

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| 6.1 | No sum shall be considered as earned by or due to the Contractor in respect of the work till final and satisfactory completion thereof and until a certificate of final completion in Form G.C.2 has been given by the Engineer. | All interim payments are advances till issue of Certificate in Form G.C.2 |
| | On account payments, if any, made prior to issue of the certificate in Form G.C.2, shall all be treated as mere advance, which shall stand recoverable in full or in part, if the Engineer so decides in the context of Contractor's unfulfilled contract condition, if any. | |
| 6.2 | All payments shall be made to the Contractor only on the basis of measurements of actual work done, as recorded in the Trustees' measurement books and at accepted tendered or at agreed rates, as the case may be, except as otherwise provided in the contract and when the Engineer decides any other rate for change in the scope of work or omission, if any, on the part of the Contractor. | Payment on the basis of measurements at agreed rates. |
| 6.3 | For work of sanctioned tender value more than Rs.50,000/- or having an initially stipulated completion period of 4 months or more, on account payments may be made at the discretion of the Engineer or his Representative at intervals deemed suitable and justified by him. Provided always that subject to execution of work of substantial value in the context of the contract price, the interval of such on account payments shall be decided by the Engineer or his Representative, which shall ordinarily not be less than 1 month in between two payments for on account bill and/or advance. | Limitation for on account payment |
| 6.4 | Measurement for works done shall be progressively taken by the Engineer's Representative and entered in the Trustees' Measurement Book, at intervals deemed suitable and proper by him and/or the Engineer. The Contractor or his duly accredited Representative or Agent shall remain present at the time of such measurement and assist the engineer's Representative in every manner required by him. After the measurements taken have been entered in the Measurement Book, the Contractor or his Agent shall sign the Measurement Book at the end of such Measurements over the Contractor's Rubber Stamp as a token of acceptance of all such measurements, recorded above and prior to such signature. If the Contractor or his Agent fails to participate even after 3 days written notice from the Engineer's Representative, the measurement shall be taken ex-parte by the Engineer's Representative and those shall be accepted by the Contractor. | Recording of measurements |
| 6.5 | Based on the quantum of work and the value thereof computed in the Measurement Book, the Contractor shall type out his bill in the proforma approved by the Engineer and submit the same to the Engineer's Representative in quadruplicate, duly signed by him or his accredited Agent over his Rubber Stamp. The Engineer or his Representative may in his absolute discretion, allow advance payment against such bill to the | Contractor to prepare and submit his bills |

extent of an amount not exceeding 75% of the “net payable” sum of the said bill, subject to adjustment thereof against the bill at the time of checking and auditing the bill at the Trustees’ end. The measurement Book will not be handed over to the Contractor; but he will obtain the abstracts of quantities, amounts and recoveries to type out the bill.

- 6.6 At the discretion of the Engineer or his Representative and only in respect of accepted offers/where estimated amount put to tender would be Rs.2,00,000/- or more, advance payment may be made to the extent of 75% of the value of any material purchased and brought to the site by the Contractor. Provided always that –

- (i) the materials shall, in the opinion of the Engineer or his Representative be of imperishable nature,
- (ii) the value of such materials shall be assessed by the engineer or his Representative at their own discretion,
- (iii) a formal agreement has been drawn up with the contractor, under which the Trustees secure a lien on the contractor’s materials,
- (iv) the materials are safe-guarded by the contractor against losses, shortage and misuse due to the contractor postponing the execution of the work or otherwise,
- (v) in the event of storage of such materials within the Trustees’ protected areas in the Docks, the contractor shall submit an Indemnity Bond in the proforma and manner acceptable to Trustees’ whereby the contractor shall indemnify the Trustees against all financial loss/damage, on account of loss/damage to such materials for whatever reasons,

Advance payment
against Non-
perishable
materials

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- (vi) in the event of storage of such materials outside the Trustees’ protected areas the Contractor shall submit to the Engineer an irrevocable Bank Guarantee favouring the Trustees and for the same sum as is being advance, in the proforma and manner acceptable to the Trustees. The Guarantee shall be of a Calcutta/Haldia Branch of any Nationalised Bank or a Schedule Commercial Bank, as the case may be, acceptable to the Trustees and shall remain valid till the anticipated period of consumption of such materials in the work. The Bank Guarantee must bear an undertaking by the issuing Bank guaranteeing automatic payment of the guaranteed sum to the Trustees by the Bank on

the date of expiry of the validity of the Guarantee, unless with the prior written approval of the Engineer on behalf of the Trustees, the Bank has extended the validity of the Guarantee.

(vii) The amount of advance shall be recoverable from the contractor's bills or any other dues, progressively with the consumption of the materials on the basis of quantity consumed. Consequent on full recovery of the advance the Indemnity Bond/Bank Guarantee, vide Sub-clause (v) & (vi) above, shall be returned to the Contractor duly discharged by the Engineer on behalf of the Trustees.

6.7	No certificate of the Engineer or his representative shall protect the Contractor against or prevent the Trustees from obtaining repayment from the Contractor, in case the Engineer or his representative should overcertify for payment or the Trustees should over-pay the Contractor on any account.	Recovery for wrong and over payment
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6.8	No claim for interest shall be admissible or payable to the Contractor at any stage and in respect of any money or balance or Bank Guarantee, which may be due to the Contractor from the Trustees, owing to dispute or otherwise or for any delay on the part of the Trustees in making interim or final payment or otherwise.	Interest not admissible to Contractor
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7.0 VARIATION AND ITS VALUATION :

7.1	The Quantities set out in the Bill of Quantities of the tender shall be treated as estimated quantities of the work and shall never be deemed as actual or correct quantities of the works to be executed by the contractor in fulfilment of his obligation under the contract.	Quantities in Bill of Quantities of Tender
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7.2	The Engineer shall have the power to order the Contractor in writing to make any variation of the quantity, quality or form of the works or any part thereof that may, in his opinion, be necessary and the Contractor upon receipt of such an order shall act as follows :	Engineer's power to vary the works
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- 7.2 (a) Increase or decrease the quantity of any work included in the contract.
- (b) Omit any work included in the contract.
- (c) Change the Character or quality or kind of any work included in the contract.
- (d) Change the levels, lines, position and dimensions of any part of the work, and
- (e) Execute extra and additional work of any kind necessary for completion of the works

7.3	No such variation shall in any way vitiate or invalidate the contract or be treated as revocation of the contract, but the value (if any) of all such variations evaluated in accordance with the Engineer's sole decision shall be taken into account and the contract price shall be varied accordingly.	Variation by engineer do not vitiate the contract
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- 7.4 Provided always that written order of the Engineer shall not be required for increase or decrease in the quantity of any work upto 15% where such increase or decrease is not the result of any variation order given under this clause but is the result of the quantities exceeding or being less than those stated in the bill of quantities. Provided also that verbal order of variation from the Engineer shall be complied with by the Contractor and the Engineer'' subsequent written confirmation of such verbal order shall be deemed to be an order in writing within the meaning of this clause. Where written order for variation is not needed
- 7.5 (a) The Contractor shall not be entitled to any claim of extra or additional work unless they have been carried out under the written orders of the Engineer. Payment for extra or additional, or omitted work or substituted work, Engineer's powers
- (b) The Engineer shall solely determine the amount (if any) to be added to or deducted from the sum named in the tender in respect of any extra work done or work omitted by his order.
- (c) All extra, additional or substituted work done or work omitted by order of the Engineer shall be valued on the basis of the rates and prices set out in the contract, if in the opinion of the Engineer, the same shall be applicable. If the contract does not contain any rates or prices directly applicable to the extra, additional or substituted work, then the Engineer may decide the suitable rates on the basis of Schedule of Rates (including surcharge in force at the time of acceptance of tender), if any, adopted by the Trustees with due regard to the accepted contractual percentage, if any thereon. In all other cases the Engineer shall solely determine suitable rates in the manner deemed by him as fair and reasonable, and his decision shall be final, binding and conclusive.
- (d) If the nature or amount of any omission or addition relative to the nature or amount of the whole of the contract work or to any part thereof shall be such that, in the opinion of the Engineer, the rate of prices contained in the contract for any item of the works or the rate as evaluated under sub-clauses (b) and (c) of this clause, is by reason of such omission or addition rendered unreasonable or in-applicable, the Engineer shall fix such other rate or price as he deems proper and the Engineer's decision shall be final, binding and conclusive.
- 8.0 DELAY / EXTENSION OF COMPLETION TIME / LIQUIDATED DAMAGE / TERMINATION OF CONTRACT
- 8.1 Should the quantum of extra or additional work of any kind or delayed availability of the Trustees' materials to be supplied as per contract or exceptionally adverse climatic conditions and natural phenomenon or strikes, lock-outs, civil commotion or other special circumstances of any kind beyond the control of the Contractor, cause delay in completing the work, the contractor shall apply to the Engineer in writing for suitable extension of completion time within 7 days from the date of occurrence of the reason and the Engineer shall thereupon consider the stated reasons in the manner deemed necessary and shall either reject the application or determine and allow in writing the extension period as he would deem proper for completion of the work with or without the imposition of Extension of completion time

“Liquidated Damage” Clause (No.8.3 hereof) on the Contractor and his decision shall be final and binding on the Contractor. If an extension of completion time is granted by the Engineer without imposition of liquidated damage, from the Clause No.8.3 of the Liquidated damage shall apply from its date of expiry, if the work be not completed within the extended time, unless stated otherwise in the decision communicated by the Engineer, as aforesaid.

- 8.2 (a) If the Contractor fails to complete the work within the stipulated dates or such extension thereof as communicated by the Engineer in writing, the Contractor shall pay as compensation (Liquidated Damage) to the Trustees and not as a penalty, ½% (half percent) of the total value of work (contract piece) as mentioned in the letter of acceptance of the tender/offer, for every week or part thereof the work remains unfinished. Provided always that the amount of such compensation shall not exceed 10% of the said value of work. The amount of Liquidated damages shall be determined by the Engineer, which shall be final and binding.
- ‘Liquidated
Damage’ and
other
compensation due
to Trustees

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- (b) Without prejudice to any of their legal rights, the Trustees shall have the power to recover the said amount of compensation/damage in Sub-clause (a) of this clause, from any money due or likely to become due to the Contractor. The payment or deduction of such compensation/damage shall not relieve the Contractor from his obligation to complete the work or from any of his other obligations/liabilities under the contract and in case of the Contractor’s failure and at the absolute discretion of the Engineer, the work may be ordered to be completed by some other agency at the risk and expense of the Contractor, after a minimum three days notice in writing has been given to the Contractor by the Engineer or his Representative.

- 8.3 Without being liable for any compensation to the Contractor, the Trustees may, in their absolute discretion, terminate the contract and enter upon the site and works and expel the Contractor there from after giving him a minimum 3 days’ notice in writing, due to occurrence of any of the following reasons and decision of the Trustees in this respect, as communicated by the Engineer shall be final and conclusive :
- Default of the
Contractors
remedies &
powers/Termi
nation of
Contract.
- (i) The Contractor has abandoned the contract.
- (ii) In the opinion of the Engineer, either the progress of work is not satisfactory or the work is not likely to be completed within the agreed period on account of Contractor’s lapses.
- (iii) The Contractor has failed to commence the works or has without any lawful excuse under these conditions has kept the work suspended

for at least 15 days despite receiving the Engineer" or his Representative" written notice to proceed with the work.

- (iv) The Contractor has failed to remove materials from site or to dismantle or demolish and replace work for 7 days after receiving from the Engineer or his representative the written notice stating that the said materials or work were condemned and rejected by him under these conditions.
- (v) The Contractor is not executing the works in accordance with the contract or is persistently or flagrantly neglecting to carry out his obligations under the contract.
- (vi) Any bribe, commission, gift or advantage is given, promised or offered by or on behalf of the contractor to any officer, servant or representative of the Trustees or to any person on his or their behalf in relation to the obtaining or to the execution of the contract.
- (vii) The Contractor is adjusted insolvent or enters into composition with his creditors or being a company goes into liquidation either compulsory or voluntary.

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- 8.3.1 Upon receipt of the letter of termination of work, which may be issued by the Engineer on behalf of the Trustees, the Contractor shall hand over all the Trustees' tools, plant and materials issued to him at the place to be ascertained from the Engineer, within 7 days of receipt of such letter.
- 8.3.2 In all such cases of Termination of work, the Trustees shall have the power to complete the work THOROUGH any other agency at the Contractor's risk and expense and the Contractor shall be debited any sum or sums that may be expended in completing the work beyond the amount that would have been due to the Contractor, had he duly completed the work of the work in accordance with the contract.
- 8.3.3 Upon termination of contract, the Contractor shall be entitled to receipt payment of only 90% of the value of work actually done or materials actually supplied by him and subject to recoveries as per contract, provided the work done and materials conform to specifications at the time of taking over by the Trustees. The payment for work shall be based on measurements of actual work done and priced at approved contract rates or other rates, as decided by the Engineer. The payment for materials supplied shall be at the rates as decided by the Engineer, which shall in no case be more than market rates prevailing at the time of taking over by the Trustees. The Engineer's decision in all such case shall be final, binding and conclusive.
- 8.3.4 The Trustees shall have the power to retain all moneys due to the Contractor until the work is completed by other agency and the Contractor's liabilities to the Trustees are known in all respect.

9.0 MAINTENANCE AND REFUND OF SECURITY DEPOSIT

- 9.1 On completion of execution of the work the Contractor shall maintain the same for a period, as may be specified in the form of a Special Condition of the Contract, from the date mentioned in the Initial Completion Contractor's obligation for

Certificate in Form G.C.1. Any defect/fault, which may appear in the work during aforesaid maintenance period, arising, in the sole opinion of the Engineer or his representative, from materials or workmanship not in accordance with the contract or the instruction of the Engineer or his representative, shall, upon the written notice of the Engineer or his representative, be amended and made good by the Contractor at his own cost within seven days of the date of such notice, to the satisfaction of the Engineer or his representative, failing which the Engineer or his representative shall have the defects amended and made good THOROUGH other agency at the Contractor's risk and cost and all expenses, consequent thereon or incidental thereto, shall be recoverable from the Contractor in any manner deemed suitable by the Engineer.

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- 9.2 The Contractor shall not be considered completed and the work shall not be treated as finally accepted by the Trustees, until a Final Completion Certificate in Form G.C.2 annexed hereto shall have been signed and issued by the Engineer to the contractor after all obligations under the Contract including that in the maintenance period, if any, have been fulfilled by the Contractor. Previous entry on the works or taking possession, working or using thereof by the Trustees shall not relieve the Contractor of his obligations under the contract for full and final completion of the work. Certificate of final completion
- 9.3 On completion of the contract in the manner aforesaid, the Contractor may apply for the refund of his Security Deposit by submitting to the Engineer (i) The Treasury Receipts granted for the amount of Security held by the Trustees, and (ii) his "No further claim" Certificate in Form G.C.3 annexed hereto (in original), where upon the Engineer shall issue Certificate in Form G.C.2 and within two months of the Engineer's recommendation, the Trustees shall refund the balance due against the Security Deposit to the Contractor, after making deduction therefrom in respect of any sum due to the Trustees from the Contractor. Refund of Security Deposit
- 10.0 INTERPRETATION OF CONTRACT DOCUMENTS, DISPUTES AND ARBITRATION
- 10.1 In all disputes, matters, claims, demands or questions arising out of or connected with the interpretation of the Contract including the meaning of Specifications, drawings, designs and instructions or as to the quality of workmanship or as to the materials used in the work or the execution of the work whether during the progress of the works or after the completion and whether before or after the determination, abandonment or breach of the contract the decision of the Engineer shall be final and binding on all parties to the contract and shall forthwith be given effect to by the Contractor. Engineer's decision
- 10.2 If the Contractor be dissatisfied with any such decision of the Engineer, he shall within 15 days after receiving notice of such decision require that the matter shall be referred to Chairman, who shall thereupon consider and give a decision. Chairman's award.

- 10.3 If, however, the Contractor be still dissatisfied with the decision of the Chairman, he shall within 15 days after receiving notice of such decision require that within 60 days from his written notice, the Chairman shall refer the matter to an Arbitrator of the panel of Arbitrators to be maintained by the Trustees for the purpose and any such reference shall be deemed to be a submission to arbitration within the meaning of Indian Arbitration Act, 1940 or any statutory modification thereof. Arbitration.
- 10.3.1. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever, another person from panel shall be appointed as Sole Arbitrator and he shall proceed from the stage at which his predecessor left it.

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- 10.3.2 The Arbitrator shall be deemed to have entered on reference on the date he issues notice to both the parties fixing the date of first hearing.
- 10.3.3 The time limit within which the Arbitrator shall submit his award shall normally be 4 months as provided in Indian Arbitration Act, 1940 or any amendment thereof. The Arbitrator may, if found necessary, enlarge the time for making and publishing the award, with the consent of the parties..
- 10.3.4 The venue of the arbitration shall be either Calcutta or Haldia as may be fixed by the Arbitrator in his sole discretion. Upon every or any such reference the cost of any incidental to the reference and award respectively shall be in the discretion of the Arbitrator who may determine, the amount thereof or by whom and to whom and in what manner the same shall be borne and paid.
- 10.3.5 The Award of the Arbitrator shall be final and binding on all parties subject to the provisions of the Indian Arbitration Act 1940 or any amendment thereof. The Arbitrator shall give a separate award in respect of each item of disputes and respective claim referred to him by each party and give reason for the award.
- 10.3.6 The Arbitrator shall consider the claims of all the parties to the contract – within only the parameters of scope and conditions of the contract in question.
- 10.3.7 Save as otherwise provided in the contract the provisions of the Arbitration Act, 1940 and rules made thereunder, for the time being in force, shall apply to the arbitration proceedings under this Clause.
- 10.4 The Contractor shall not suspend or delay the work and proceed with the work with due diligence in accordance with Engineer's decision. The Engineer also shall not withhold any payment, which, according to him, is due or payable to the Contractor, on the ground that certain disputes have cropped up and are likely to be referred to arbitration.
- 10.5 Provided always as follows:
- [a] Nothing of the provisions in paragraphs 10.3 to 10.3.7 hereinabove would apply in the cases of contracts, where tendered amount appearing in the letter of acceptance of the tender / offer is less than Rs.40,00,000/-

- [b] The Contractor shall have to raise disputes or differences of any kind whatsoever in relation to the execution of the work to the Engineer within 30 days from the date of occurrence of the cause of dispute and before the preparation of the final bill, giving detailed justifications, in the context of contract conditions.

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- [c] Contractor's dispute if any arising only during the maintenance period, if any, stipulated in the contract, must be submitted to the Engineer, with detailed justification in the context of contract conditions, before the issuance of final completion certificate in Form G.C.-2 *ibid*.
No dispute or difference on any matters whatsoever, the Contractor can raise pertaining to the Contract after submission of certificate in form G.C.3 by him.
- [d] Contractor's claim / dispute raised beyond the time limits prescribed in sub-clauses 10.5[b] and 10.5 [c] hereinabove, shall not be entertained by the Engineer and / or by any Arbitrator subsequently.
- [e] The Chairman / Trustees shall have the right to alter the panel of Arbitrators, vide Clause 10.3 hereinabove, on their sole discretion, by adding the names of new Arbitrators and / or by deleting the names of existing Arbitrators, without making any reference to the Contractor.

(TO BE SUBMITTED WITH COVER- I OFFER)
THE BOARD OF TRUSTEES FOR THE PORT OF KOLKATA
FORM OF TENDER (UNPRICED)

To
The Manager (I&CF),
Haldia Dock Complex.

I/We _____

having examined the site of work, inspected the Drawings and read the specifications, General & Special Conditions of Contract and Conditions of the Tender, hereby tender and undertake to execute and complete all the works required to be performed in accordance with the Specification, Bill of Quantities, General & Special Conditions of Contract and Drawings prepared by or on behalf of the Trustees and at the rates & prices set out in the annexed Bill of Quantities within _____ months / weeks from the date of order to commence the work and in the event of our tender being accepted in full or in part. I / We also undertake to enter into a Contract Agreement in the form hereto annexed with such alterations or additions thereto which may be necessary to give effect to the acceptance of the Tender and incorporating such Specification, Bill of Quantities, Drawing and Special & General Conditions of Contract and I / We hereby agree that until such Contract Agreement is executed the said Specification, Bill of Quantities, Conditions of Contract and the Tender, together with the acceptance thereof in writing by or on behalf of the Trustees shall be the Contract.

THE TOTAL AMOUNT OF TENDER Rs. **NOT TO BE QUOTED IN COVER I OFFER**

(Repeat in words) **NOT TO BE QUOTED IN COVER I OFFER**

I / We require _____ days / months preliminary time to arrange and procure the materials required by the work from the date of acceptance of tender before I We could commence the work.

I / We have deposited with the Trustees' General Manager (Finance), HDC, vide Receipt No. _____ of _____ as Bid Document Fee.

I / We agree that the period for which the tender shall remain open for acceptance shall not be less than four months.

Dated :

(Signature of Bidder with Seal)

WITNESS :

Name of the Bidder :

Signature :

Name : (In
Block Letters)

Address :

Address :

Occupation
:

**Syama Prasad Mookerjee Port, Kolkata
HALDIA DOCK COMPLEX**

FORM G.C.1

Contractor _____

Address -----

Date of completion :

Dear sir(s),

This is to certify that the following work viz :-

Name of work :

.....

.....

Estimate No. E.E.0.....Dt.....

C.E.O.....Dt.....

Work Order No.....

Allocation.....

Contract No.

which was carried out by you is in the opinion of the undersigned complete in every respect on the _____ day of _____ 2000 in accordance with terms of the Contract and you are required to maintain the work as per Clause 62 of the General Conditions of Contract and under provisions of the Contract for a period of _____ weeks / months / years

from the _____ day of _____
_____ 2000 to _____ day of _____ 2000 .

Yours faithfully,

Signature.....
(ENGINEER/ENGINEER'S REPRESENTATIVE)

Name.....

Designation.....

OFFICE SEAL

**Syama Prasad Mookerjee Port, Kolkata
HALDIA DOCK COMPLEX**

FORM G.C.2.

Certificate of Final Completion.

The Financial Adviser & Chief Accounts Officer
The Manager (Finance), Haldia Dock Complex.

This is to certify that the following work viz:-

Name of work :

Estimate No. E.E.O.....dt.....
C.E.O.....dt.....

Work Order No.....

Contract No.

Resolution & Meeting No.

Allocation :

which was carried out by Shri/Messrs..... is now complete in every respect in accordance with the terms of the Contract and that all obligations under the Contract have been fulfilled by the Contractor.

Signature.....
(ENGINEER/ENGINEER'S REPRESENTATIVE)
NAME.....
DESIGNATION.....
OFFICE SEAL

**Syama Prasad Mookerjee Port, Kolkata
HALDIA DOCK COMPLEX**

FORM G.C.3

(‘NO CLAIM ‘ CERTIFICATE FROM CONTRACTOR)

The Manager (I&CF)
Haldia Dock Complex
Calcutta Port Trust
Haldia.

(Atten:.....)

Dear Sir,

I / We do hereby declare that I / we have received full and final payment from the Calcutta Port Trust for the execution of the following work viz:-

Name of work : _____

Work Order No :- _____

Contract No. _____

Agreement No.....Dt.....

and I / we have no further claim against the Calcutta Port Trust in respect of the above-mentioned job.

Yours faithfully,

(Signature of the

Contractor)

Dated _____

Name of Contractor.....

Address:.....

(OFFICIAL SEAL OF THE CONTRACTOR)

Syama Prasad Mookerjee Port, Kolkata
PROFORMA OF FORM OF AGREEMENT

THIS AGREEMENT made _____ day of

_____20_____ between the "Board Of Trustees for the Port Of Calcutta , a statutory body constituted under Major Port Trust Act ,1963 under the rules there under and statutory modification thereto having Registered Office at 15, Strand Road , Calcutta -700001 (hereinafter called "EMPLOYER" which expression unless excluded by or repugnant to the context be deemed to include his successor/s in office) on the one part and _____ (hereinafter called the "CONTRACTOR" which expression shall unless excluded by or repugnant to the context he deemed to include his heirs, executors, administrators, representative, successor in officer and permitted assigns) of the other part.

WHEREAS The TRUSTEES are desirous that certain works should be executed viz _____ and have accepted a Tender/Offer by the contractor for the execution, completion and maintenance of such works .

NOW THIS CONTRACT AGREEMENT WITNESSETH as follows :-

1. In this agreement words expressions shall have the same meanings as are respectively assigned to them in General Conditions Of Contract, hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement , viz :-
 - i.The said Tender/Offer & the acceptance of Tender/ Offer.
 - ii.The Drawings.
 - iii.The General Conditions Of Contract.
 - iv.Special Conditions Of Contract (If any).
 - v.The Conditions Of Tender.
 - vi.The Specifications.
 - vii.The Bill Of Quantities.
 - viii.All correspondences by which the contract is added, amended, varied or modified in any way by mutual consent.
3. In consideration of the payments to be made by the Trustees to the Contractor as hereinafter mentioned the contractor hereby covenant with the Trustees to execute ,complete and maintain the work in conformity in all respects with the provisions of Contract.
4. The Trustees hereby covenants to pay to the contractor in consideration of such execution ,completion and maintenance of the works the Contract Prices at the times and in the manner prescribed by the contractor .

IN WITNESS whereof the parties hereto have caused their respective Common Seals to be hereunto as fixed (or have set their respective hands and seals) the day and year first above written.
have executed these presents on the day and year first above written.

The Seal of _____

Was hereunto affixed in the presence of :

Name :- _____

Address :- _____

OR

SIGNED SEALED AND DELIVERED

By the said _____

In the presence of :

Name :- _____

Address :- _____

The Common Seal of the Trustees was hereunto affixed in he presence of :

Name :- _____

Address :- _____

Proforma Of Irrevocable Bank Guarantee (PERFORMANCE BOND) in lieu of cash Security Deposit, to be issued by the Kolkata/ Haldia Branch, as the case may be, of any nationalised Bank of India on Non-Judicial Stamp Paper worth Rs 50/- or as decided by the Engineer/ Legal Adviser of the Trustees.

Ref. _____

Bank Guarantee No. _____

Date _____

To

The Board of Trustees for the Port of Kolkata,
15, Strand Road
Kolkata – 700 001

Dear Sirs,

In consideration of the Board of Trustees For the Port of Kolkata, - (hereinafter referred to as the “EMPLOYER” which expression shall unless repugnant to the context or meaning thereof include its successors administrators and assigns) having awarded to _____, with registered office at _____ (hereinafter referred to as the “CONTRACTOR “ which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) a CONTRACT by issue of EMPLOYER’S work order dated _____ the same having been unequivocally accepted by the Contractor resulting in a ‘CONTRACT’ bearing Letter Of Award No _____ dated _____ Valued at Rs _____ for “_____” and the contractor having agreed to prove a Contract performance Guarantee for the faithful performance of the entire Contract equivalent to Rs. _____ (rupees only) to the EMPLOYER.

We, the _____ Bank, _____, Kolkata/ Haldia having its Head Office at _____ (hereinafter referred to as the “Bank”, which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Employer on demand any and all monies payable by the Contractor to the extent of Rs. -(only) as aforesaid at any time upto _____ without any demur, reservation, contest, recourse or protest an/or without any reference to the CONTRACTOR, Any such demand made by Employer on the Bank shall be conclusive and binding notwithstanding any difference between EMPLOYEEER and CONTRACTOR or any dispute pending before any Court, tribunal, Arbitrator or any other Authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of employer and further agrees that the guarantee herein contained shall continue to be enforceable till the Employer discharges his guarantee.

EMPLOYER shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee from time to time to extend the time for performance of the CONTRACT by CONTRACTOR. Employer shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or any right which they might have against Contractor, and to exercise the same at any time in any manner, and other to enforce or to forebear to enforce any covenants, contained or implied, in the CONTRACT between EMPLOYER and CONTRACTOR or any other course of remedy or security available to EMPLOYER . The Bank shall not be released of its obligations under these presents by any exercise by EMPLOYER of its liberty with reference to the matters aforesaid or any of them or by reason or any other acts of omission or commission on the part of employer or any other indulgence shown by EMPLOYER or by any other matter or thing whatsoever which under Law would, but for this provision, have the effect of reliving the bank. The Bank also agreed that EMPLOYER at its option shall be entitled to enforce this Guarantee against the Bank as principal debtor, in the first instance without proceeding against CONTRACTOR and notwithstanding any security or other guarantee that EMPLOYER may have in relation to the CONTRACTOR’S liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to Rs _____ (rupees _____ only) and it shall remain in force up to and including _____ and shall be extended from time to time for such period , on whose behalf this guarantee has been given.

Dated, this day of2010
..... at

WITNESSES

(Signature)

(Signature)

(Name)

(Name)

(Official address)

(Designation with Bank Stamp)
+ Attorney as per power of Attorney No.

Dated

Integrity Pact

Between

Syama Prasad Mookerjee Port, Kolkata (KoPT) hereinafter referred to as “**The Principal/ Employer**”.

And

..... hereinafter referred to as “**The Bidder/Contractor**”

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for The Principal values full compliances with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, an Independent External Monitor (IEM) appointed by the principal, will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the PRINCIPAL/EMPLOYER to get the contractual work executed and/or to obtain/dispose the desired said stores/ equipment at a competitive price in conformity with the defined specifications/ scope of work by avoiding the high cost and the distortionary impact of corruption on such work /procurement/ disposal and Enabling BIDDERS/ CONTRACTORS to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the PRINCIPAL/EMPLOYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

Section 1 – Commitments of the Principal/ Employer.

- (1) The Principal commits itself to take measures necessary to prevent corruption and to observe the following principles:
 - a. No employee of the Principal, personally or THOROUGH family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - b. The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will, in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information THOROUGH which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - c. The Principal will exclude from the process all known prejudiced persons.
- (2). If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal Code (IPC)/Prevention of Corruption (PC) Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section-2 –Commitments of the Bidder(s) / Contractor(s)

- (1) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
 - a. The Bidder(s) /Contractor(s) will not directly or THOROUGH any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - b. The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contract, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - c. The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidder(s)/Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principles, if any. Further details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines, all the payments made to the Indian agent/representative have to be in Indian Rupees only. Copy of the "Guidelines on Indian Agents of Foreign Suppliers" is annexed and marked as Annex-A.

- e. The Bidder(s)/Contractor(s) will when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2). The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section-3-Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/Contractor(s) before award or during execution has committed a transgression THOROUGH a violation of Section 2 above, or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as considered appropriate.

Section 4-Compensation for damages

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/Bid Security.
- (2) If the Principal has terminated the contract according to Section 3 or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section 5-Previous transgression

- (1) The Bidder declares that no previous transgressions occurred in the last 3 years from the date of signing the Integrity pact with any other Company in any country conforming to the anti corruption approach or with any other Public Sector Undertaking / Enterprise in India, Major Ports/ Govt. Departments of India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as considered appropriate.

Section 6- Equal treatment of all Bidders/Contractors/Sub-Contractors

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal, will enter into agreements with identical conditions as this one with all Bidders, Contractors and Sub-contractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7- Other Legal actions against violating Bidder(s)/ Contractor(s)/ Sub Contractor(s)

The actions stipulated in this Integrity pact are without prejudice to any other legal action that may follow in accordance with provisions of the extant law in force relating to any civil or criminal proceedings. .

Section 8 – Role of Independent External Monitor(IEM):

- (a) The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this pact.
- (b) The Monitors shall not be subject to instructions by the representatives of the parties and shall perform their functions neutrally and independently.
- (c) Both the parties accept that the Monitors have the right to access all the documents relating to the contract.

(d) As soon as the Monitor notices, or has reason to believe, a violation of this pact, he will so inform the authority designated by the Principal and the Chief Vigilance Officer of Kolkata Prot Trust.

(e) The BIDDER/ CONTRACTOR(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the PRINCIPAL including that provided by the BIDDER/ CONTRACTOR. The BIDDER/ CONTRACTOR will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation, if any. The same is applicable to sub-contractors. The Monitor shall be under contractual obligation to treat the information and documents of the Bidder/Contractor/ Sub-contractor(s) with confidentiality.

(f) The Principal/ Employer will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor, the option to participate in such meetings.

(g) The Monitor will submit a written report to the designated Authority of Principal/ Employer/ Chief Vigilance Officer of Syama Prasad Mookerjee Port, Kolkata within 8 to 10 weeks from the date of reference or intimation to him by the Principal/ Employer/ Bidder/ Contractor and should the occasion arise, submit proposals for correcting problematic situation. BIDDER/ CONTRACTOR can approach the Independent External Monitor (s) appointed for the purposes of this Pact.

(h) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or to take corrective action, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

(i) If the Monitor has reported to the Principal substantiated suspicion of an offence under the relevant IPC/PCA, and the Principal/ Employer has not, within reasonable time, taken visible action to proceed against such offence or reported to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

(j) The word 'Monitor' would include both singular and plural.

Section 9 – Facilitation of Investigation:

In case of any allegation of violation of any provisions of this Pact or payment of commission, the PRINCIPAL/EMPLOYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER/CONTRACTORS and the BIDDER/CONTRACTOR shall provide necessary information and documents **in English** and shall extend all possible help for the purpose of such examination.

Section 10 – Pact Duration:

The pact beings with when both parties have legally signed it and will extend upto 2 years or the complete execution of the contract including warranty period whichever is later. In case bidder/contractor is unsuccessful this Integrity Pact shall expire after 6 months from the date of signing of the contract.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chairman, KoPT.

Section 11 – Other Provisions:

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal in Kolkata.
- (2) Changes and supplements as well as termination notices need to be made in writing in English.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(For & on behalf of the Principal)

(For & on behalf of Bidder/Contractor).

(Office Seal)

(Office Seal)

Place :

Date :

Witness 1:

(Name & Address)

.....

.....

Witness 2:

(Name & Address)

.....

.....

ANNEXURE-A

GUIDELINES FOR INDIAN AGENTS OF FOREIGN SUPPLIERS

- 1.1 There shall be compulsory registration of Indian agents of Foreign suppliers for all Tenders. An agent who is not registered with KoPT shall apply for registration in the prescribed Application-Form.
 - 1.2 Registered agents will file an authenticated Photostat copy (duly attested by a Notary Public)/Original certificate of the principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/ remuneration/salary/retainer ship being paid by the principal to the agent before the placement of order by KoPT.
 - 1.3 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.
- 2.0 DISCLOSURE OF PARTICULARS OF AGENTS/REPRESENTATIVES IN INDIA. IF ANY.**
- 2.1 Tenderers of Foreign nationality shall furnish the following details in their offer:
 - 2.1.1 The name and address of the agents/representatives in India, if any and the extent of authorization and authority given to commit the Principals. In case the agent/representative be a foreign Company, it is to be conformed whether it is real substantial Company and details of the same shall be furnished.
 - 2.1.2 The amount of commission/ remuneration included in the quoted price(s) for such agents/ representatives in India.
 - 2.1.3 Confirmation of the Tenderer that the commission/remuneration if any, payable to his agents/ representatives in India, is to be paid by KoPT in Indian Rupees only.

2.2 Tenderers of Indian Nationality shall furnish the following details in their offers:

- 2.2.1 The name and address of the foreign principals indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or THOROUGH the agents /representatives.
- 2.2.2 The amount of commission/remuneration included in the price(s) quoted by the Tenderer for himself.
- 2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/remunerations, if any, reserved for the Tenderer in the quoted price(s), is to be paid by KoPT in India in equivalent Indian Rupees.
- 2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission/remuneration, if any payable to the agents/representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
- 2.4 Failure to furnish correct and detailed information as called for in paragraph-2.0 above will render the concerned tender liable for rejection or in the event of a contract materializing, the same liable to termination by KoPT. Besides this there would be a penalty of banning business dealings with KoPT or damage or payment of a named sum.