Project:

'Selection of Contractor for execution of the Proposed Redevelopment of Indian Bank Executive's Quarters located in No.2, Ramachandra Road, Luz Avenue, Mylapore, Chennai – 600004'

Tender Date	**22.07.2023**	**Amended Last Date & time Of Tender Submission**	**24.08.2023** at 3.00 pm
Pre-bid Meeting Date & Time	**03.08.2023 at 11.30 AM**	**Amended Date & time of opening of Technical Bids through e-tender portal**	**24.08.2023** at 3.30 pm
Pre-Bid Clarification Date	**11.08.2023**		

Pre-bid meeting Through online mode

Attended by:

(A) From Employer – M/s.Indian Bank:

1) Sri Deepak Gupta : GM (Estate)
2) Sri Sunil Kumar Jha : DGM (Estate)
3) Sri S Mohanakumar : AGM (Estate)
4) Sri R.Venkateswaran : CM (Engineer)
5) Sri P.Bharathiraja : CM (Premises)
6) Sri Ramesh Sriram Gupta : CM (Estate)
7) Sri M.Bubesh Gupta : SM (Architect)
8) Sri S Mahendiran : SM (Electrical Eng.)
9) Sri Ravindra Pratap Singh : AM (Civil Eng.)

(B) From Architect – M/s.Shilpa Architects Planners Designers Pvt. Ltd.:

1) Sri Mohamed Sheik Rahamathullah : Project Coordinator
2) Smt Srinidhi : Project Architect
3) Sri N.Y.Sankar : Site Engineer
4) Sri Tamilarasan : Plumbing Consultant
5) Sri Binoy : Electrical Consultant

(C) From PMC – M/s.HLL Infra Tech Services Ltd (HITES):

1) Sri C Vijayanand : Project Manager
2) Sri Venkataramanan S : Project Manager

(D) From Bidders (M/s.) :

1) CMK Projects Pvt Ltd., Erode	10) Sakthi Constructions, Chennai
2) APT Infrastructure, Chennai	11) Gannon Dunkerley & co. ltd., Hyderabad
3) True Value Homes, Chennai	12) Kuppan Construction, Chennai
4) Priya Engineering Projects Pvt.Ltd., Erode	13) K.S. Venkatraman & Co. Pvt. Ltd, Chennai
5) RPP projects Pvt.Ltd., Chennai	14) Sabari Constructions Technologies Pvt Ltd., Coimbatore
6) S S Natarajan & Co, Erode	15) JLL India, Chennai
7) MFAR Constructions Pvt. Ltd., Bangalore	16) P.MANICKAM & Co., Chennai
8) Sri Ramana Building Constructions Pvt. Ltd.	17) Ocean
9) P.S.T. Engineering Construction, Namakkal	18) Southern
	19) Omega

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Clarifications for the queries raised in the pre-bid meeting held via Video Conferencing at Indian Bank Corporate Office:

S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
1	Page No. 4 of NIT (Volume 1), Point No. 3	**Earnest Money deposit** Rs. 104.50 Lakh The bidder shall remit 100% of EMD as online / DD / BG from Scheduled Bank in the format enclosed in this tender.	We request for BG format for EMD.	BG format for EMD is enclosed as Annexure 1.
			We kindly request you to consider EMD as 1% of Estimate value.	The Tender condition holds good.
			We request you to kindly waive off this requirement	No waive off this clause.
2	Page No. 4 of NIT (Volume I), Point No. 8	Last Date & time of Submission of Bids online (Bid due date) 18-08-2023 at 3:00 pm	Please extend the submission date till 28/Aug/2023.	Tender Submission date on **24/Aug/2023**
			To extended date of submission of bid by further 15 days.	
3	Page No. 4 of NIT (Volume I), Point No. 13	**Completion Period :** 15 Months (including Demolition of Existing Buildings) from the first date of handing over of the site or 15th day from the date of issue of issue of Letter of Acceptance (LOA), whichever is later	Can we have duration of the project increased to 24 months considering the below	No change in the project completion duration. The Tender condition holds good.
			a. Demolition work to be performed	
			b. piling work needs time for testing (initial & routine test) before commencement of pile	
			Monsoon period — Chennai gets most of its rainfall during the North east monsoon (October to December), the work most likely will be awarded or will be commenced during this period. Commencing the work during the monsoon period will make a huge impact in the progress of the work, hence additional time sorted.	

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
4	Page No. 4 of NIT (Volume I), Point No. 14	**Performance Guarantee :** 5% of tendered value Performance Guarantee to be submitted in form of DD or Bank Guarantee (On a bank other than the clientele) from Scheduled Bank based in India and shall be valid up to six months beyond the stipulated date of completion or the extended period, thereof.	We request you to kindly waive off this requirement OR The corporate guarantee may please be accepted in place of Bank guarantee	The Tender condition holds good.
			Performance Guarantee can be reduced to 2% of Tendered Value like State PWD's.	The Tender condition holds good.
			We had our BG sanction only with the INDIAN BANK, Namakkal Branch. Please relax the condition (or) Can we produce BG from Indian Bank of different branch other than the clientele. Please clarify	BG is accepted as EMD whereas for the performance guarantee the successful bidder can submit the fixed deposit original receipt of specified value from Indian Bank since they are having banking with Indian Bank.
5	Page No. 5 of NIT (Volume 1), Point No. 15	**Security Deposit / Retention Money**5% of tendered value to be deducted from Running Account Bills (will be released only after completion of DLP Period)	We request for retention 5% of bill value shall be withheld on every RA bills, 2.5% of retention amount shall be released along with final bill and balance 2.5% shall be released against BG for duration of DLP.	The Tender condition holds good.
			Our request; Maximum Limitation of retention @ 2.5% of contract value. There shall be no cash retention, in lieu of cash retention we shall submit progressive BG's, (quarterly) all valid till contract duration. Upon Virtual Completion we shall replace all the BG's with a Single BG for equivalent amount valid till DLP.	
			Security Deposit can be reduced to 2.5% for Every running bill.	

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
6	Page No. 7 of NIT (Volume I), SECTION 2 GENERAL TENDER TERMS & CONDITIONS FOR E-PROCUREMENT (i) INSTRUCTIONS FOR ONLINE BID SUBMISSION	This tender is an e-Tender and is being published online. The tender is invited in Two cover system from the eligible firms through e-tender portal. The Tenderers are required to submit soft copies of their bids electronically on the e-tender Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the Tenderers in registering on the e-tender Portal, prepare their bids in accordance with the requirements and submitting their bids online on the e-tender Portal.	Two Different Type of Documents (Technical and Financial BID) in Bank website and Tender wizard website.	Document is updated
7	Page No. 12 of NIT (Volume I), Point No. 1.5.d	**1.5 Eligibility Criteria** **Three** similar works each costing not less than amount equal to **Rs.21 Crore**. Or **Two** similar works each costing not less than amount equal to **Rs.26 Crore.** Or **One** similar work costing not less than amount equal to **Rs.42 Crore**. "Similar Works" shall mean one work of construction of a stilt and minimum three-story building comprising of RCC framed structure including finishing works, internal / external electrification and plumbing works all composite under one work order / agreement.	We request for relaxation in criteria. 3 similar buildings of Rs.11cr. Can industrial buildings be considered as similar ? if we become eligible under three similar works (Three similar works each costing not less than amount equal to Rs.21 Crore) we understand from the above similar work definition that at least 1 of the 3 works should be G+3 building, can you please confirm?	The Tender condition holds good.

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
8	Page No. 12 of NIT (Volume I), Point No. 1.5.1 d(iii)	iii) Bid submitted as Direct / indirect Joint Ventures (JV)/ Consortium/Special Purpose Vehicles of whatsoever kind are not accepted.	Please consider JV Clause?	There is no change in JV Clause. Tender condition holds good.
9	Page No 13 of NIT (Volume 1) Point No. 1.5 f	**Banker's Solvency certificates**. The tenderers should have a solvency of value not less than 100% of estimated cost of the work i.e., Rs. 52.25 Crore, certified by their bankers for this work. Banker's certificates (as prescribed in Form T-1 B) addressed to Tender inviting authority in the current financial year, should be on letter head of the Bank, issued after 01.04.2023	Solvency certificate 52.25Cr is seems to high We request for relaxation 100% of estimated cost of the work required or part (i.e. 50%) of estimated cost sufficient We kindly request you to consider Solvency as 20% of Estimated cost. Generally all the Central Government departments are considered 20% of estimated cost for Solvency criteria, IT Enclosed}	Considering the request of most of the bidders the solvency certificate value is reduced to 60% of the estimated cost put to tender. i.e., Rs.52.25 Crores X 60% = Rs.31.35 Crores.
10	Page No. 16 of NIT (Volume I), Point No. 1.14	**Power & Water** The bidder shall be responsible for arranging and maintaining at its **own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work** unless otherwise specifically provided for in the contract documents	We request you provide the power connection and water at point within the site premises as per the requirement worked out during the finalisation of contract including enhancement of power requirement on need basis according the agreed schedule. The Cost towards obtaining the power connection and water connection (including all the deposits) shall be borne by client and no deduction be made to the contractor. All other expenditures towards distribution of power to works, paying consumption charges - only electricity (water at free of cost) shall be borne by the Contractor.	The Tender condition holds good. It is in the Scope of Contractor

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
11	Page No. 23 of GCC (Volume II) CLAUSE 7 PAYMENT ON INTERMEDIATE CERTIFICATE TO BE REGARDED AS ADVANCES	The interim or running account bills (RAB) shall be submitted by the contractor with the minimum value of Rs.2.5 crores excluding GST for the work executed on the basis of such recorded measurements on the format of the CLIENT / PMC in triplicate on or before the date of every month fixed for the same by the Engineer-in-Charge. Payments will be released after receipt of bills along with all supporting documents in all respect as per directions of EIC in line with ● 70% payment within 10 working days of receipt of certification from PMC (Adhoc certificate) by the Client ● 30% within 15 working days of receipt of certification from PMC & Architect for final certificate on that particular bill. ● Payment will released by CLIENT based on certification of bills by PMC ● No compensation will be paid on account of any delayed payments.	We request you to kindly release 75% adhoc payment within 7 days from date of submission of RA bill and balance 25% payment within 21 days from DOS including certification without restricting to minimum bill value, Please confirm.	The Tender condition holds good.
12	Page No. 27 of GCC (Volume II), CLAUSE 10B (i)	CLAUSE 10B (i) SECURED ADVANCE ON NON-PERISHABLE MATERIAL – NOT APPLICABLE	Can this provision be applicable? As this will help drastically for the progress of the work.	The Tender condition holds good.

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
13	Page No. 27 of GCC (Volume II), CLAUSE 10B (ii)	(ii) MOBILISATION ADVANCE - NOT APPLICABLE	Request to provide **10%** interest free mobilization advance along with LOI. We shall submit bank guarantees in splits for the equivalent value to match the recovery schedule, GST shall be paid additionally. Recovery of the paid advance shall commence from 3rd RA bill to till final bill .	If requested by the contractor in writing within one month of the order to commence the work. Maximum of 5% of Contract value, as Interest (7% Simple interest + GST) bearing mobilisation advance will be paid against submission of Bank Guarantee (BG) for a period of 6 months or extended till such period until the advance is fully recovered. BG shall be of 110% of the mobilisation advance value. The same will be recovered equally from the first three RA bills. Utilisation report of the expenditure made on this site has to be submitted by the contractor once in fortnight.
14	Page No. 27 of GCC (Volume II), CLAUSE 10C & 10CA	**CLAUSE 10C :** PAYMENT ON ACCOUNT OF INCREASE IN PRICES/WAGES DUE TO STATUTORY ORDER(S)- NOT APPLICABLE**CLAUSE 10 CA :** PAYMENT DUE TO VARIATION IN PRICES OF MATERIALS AFTER RECEIPT OF TENDER - NOT APPLICABLE	Even though price escalation clause is not included, the cost for the same will be indirectly booked back to client. By having the clause applicable, it will cost the client only if there is an actual price escalation and it will be more beneficial for the client and we contractor can quote very competitive rates	No escalation. The Tender condition holds good.

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
15	Page No. 37 of GCC (Volume II), CLAUSE 19H	**CLAUSE 19H** The contractor(s) shall at his/their **own cost provide his/their labour with a sufficient number of huts (hereinafter referred to as the camp)** of the following specifications on a suitable plot of land to be approved by the Engineer-in- Charge.	Since the site is vacant, can we establish the labour camp inside the campus? Having the labour camp inside the campus will be beneficial for the progress of the work and also economical. To confirm whether the labour shed is allowed inside the campus.	No provision for Labour shed in the site. The Tender condition holds good.
16	Page No. 8 of Technical Specifications (Volume IV) Clause No. H. CONCRETE BATCHING PLANT (DESIGN MIX)	i. The Concrete Batching Plant of suitable capacity to be installed, as per requirement at site, within a period of 30 days from award of work. The contractor shall install batching plants (within 50 meters distance from the site of work) supplying Concrete at site. The batching plant proposed to be engaged by the contractor shall fulfil the following requirements.	Is land available for Batching Plant inside site. Please clarify	No land is available. However the contractor to ascertain the feasibility of having a batching plant at site at their risk and responsibility without affecting the overall progress of the project
17	BOQ Item No. 1.5 (NDSR)	Temporary Barricading at Site	70% payment shall be made for providing barricading. Please clarify. Item No: 1.5 its mentioned in the note "70% payment shall be made for providing barricading from start of work till completion of work i/c shifting" when will the balance 30% will be paid?	Balance 30% payment will be paid along with the final RA bill
			BOQ Item No: 1.5 — DSR Code 16.81 (Barricading at Site) Does not matches the item description should we follow the DSR code or the item description mentioned?	It is to be considered as NDSR item and description to be followed

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
18	BOQ Item No. 2.1 & 2.2	Demolition	Demolition of existing structures & UG sump are mentioned in lumpsum. Individual items can be quoted.	The Tender BOQ holds good.
			To confirm the scope of work for demolishing the building and handing over the Joineries and other building materials for to get the work site.	The building is handed over in "as is whereas" and "whatever there is condition", the contractor has to ascertain the conditions and quote the rates accordingly.
19	BOQ Item No. 3.1 (NDSR)	Pile Drawings	**piles of grade M-30 @ 400kg /cum** of specified diameter and length below the pile cap	Please refer 'Amended Tender Drawings' along with the pre-bid clarification.
			Please provide the piling drawing for depth of pile.	
20	BOQ Item No. 4	Dewatering	Any type of Dewatering for surface/ rain water shall be paid additionally under the separate BOQ item. Please confirm.	No separate item for Dewatering, it is included in the scope of contractor only.
21	BOQ Item No. 5	Shoring / Strutting	Any type of Shoring / strutting if required shall be paid additionally under separate BOQ item. Please confirm.	Shoring / Strutting item is already available in the BOQ item No. 5
			Please provide the drawing for shoring works	Contractor need to be provide required shoring shop drawings as per site conditions as and when required to PMC for approval.
22	BOQ Item No. 8.2	Backfilling of earth	Backfilling of Earth is available of Brought of earth. Please confirm.	The Tender BOQ holds good.

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
23	BOQ Item No. 10.2 & 10.3	RMC Fly ash content	RMC fly ash content above 30% mentioned. Please elaborate.	30% fly ash needs to be included and design trial mix to be conducted to achieve M25 Grade & M35 Grade respectively
			RCC above plinth beam : RMC - M25 Grade - Minimum Cement Content Given 330 Kg / Cum	
			330 kg is Pure OPC or flyash 30% included	
			RMC - M35 Grade - Minimum Cement Content Given 370 Kg / Cum	
			370 kg is Pure OPC or flyash 30% included	
24	BOQ Item No. 10.5 (NDSR)	R.C.C Precast cover slab, for Shaft area using M25 concrete	Please provide the thickness of cover slab	Thickness of cover slab is 125mm (appx.).
25	BOQ item No. 12.1	Reinforcement Steel for Piling	Reinforcement steel payment for Piling works	Consider the tender BOQ item no. 12.1 (DSR Code 5.22) which includes the reinforcement work for Piles also.
26	BOQ Item No. 24.0	Buy back Materials	Buyback of existing items listing can't be ascertain at this stage. Please clarify.	The building is handed over in "as is whereas" and "whatever there is condition", the contractor has to ascertain the conditions and quote the rates accordingly.

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
27	-	-	Is CMDA approval and Environmental clearance obtained for demolition of Existing Structures and cutting of trees. Please clarify.	For Demolition of the existing building approval from the competent authority (Corporation of Chennai) is already obtained.
				For cutting of trees necessary statutory approval may obtained by the contractor, if any, required from local authorities
				For New building construction, planning permission is already obtained from CMDA
28	-	-	We request to share the soil report	Soil test report is enclosed as Annexure 2
			We request you to kindly furnish the soil test report of the site for our better understanding regarding earth work & other related works.	
			Can soil test report be shared?	
29	-	-	Please provide the floor wise Built Up Area Statement	Area Statement is enclosed as Annexure 3
30	-	-	Existing Foundation to be Demolished	Yes
			What type of foundation is used for the building that needs to be demolished?	Masonry foundation with RCC tie
			If the pile foundation was used in the building that needs to be demolished, is removal of pile is part of the demolition scope or should we leave the pile as it is?	No pile foundation

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
31	-	-	Please provide the AutoCAD drawings to workout the Logistics Plan.	Required drawings shall be provided to the successful bidder as and when required
			Please provide all the drawings In AutoCAD format for all floors.	
			To Provide schematic Proposed Layout Plan.	
			To Provide the sectional drawing of pile work.	
			Request to provide the Auto CAD drawings of uploaded pdf drawings	
			Not possible to read clearly. Clear Tender Drawings Required	Please refer Amended Tender Drawings
32	-	-	Please provide the drawing for 26.2, 26.3, 28.1, 28.2, 28.3, 28.4, 28.5, 28.6, 28.7, 28.8, 29.1, 29.2	Please refer Amended Tender Drawings & BOQ
33	-		Please provide the excel BOQ in editable format.	Not applicable
34	-	Approved Makes	Cement approved make: can Dalmia, Ramco, Chettinad, Bharathi cement included?	The Tender List of Approved make holds good.
35	-	Approved Makes	Can you specify the approved make for WPC (Wood polymer composite}? and can "Qute" and "Adopen" added to the list?	**Everwood / Hardy Plast / Alstone / Shubhwood**
36	-	Approved Makes	Can you specify the approved make for uPVC Window and ventilators? And can "Qute" and "Adopen" added to the list.	**Fenesta / Koemmerling / Dimex / NCL / Aparna**

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S. No.	Tender Reference	As Per Tender	Bidder Queries	Reply/ Clarification by Bank
37	-	Basic rates	Cement Basic Cost Required	Not applicable
			Steel Basic Cost Required	Not applicable
			Please provide the Basic rates for Cement, RMC, Steel, structural steel & Wooden & UPVC and aluminium Joinery works	Not applicable
			Please provide the Basic rate for Precast concrete tiles.	Not applicable
			Please provide the Basic rate for Ceramic Glazed Tiles.	Already in the Tender BOQ
			Whether the Basic rates of tile can be less than the basic price mentioned in the BOQ	No. The Basic price of the tile shall not be less than that mentioned in the Tender BOQ.
38			**Approved Makes**	
			From the approved makes, whether any one of the approved brands can be used during execution.	Yes. The sample for all the materials to be got approved from Architect/ PMC/ client before commencement of the project.
39			**Value of Similar works**	
			There is a sharp rise in building cost in the last few years, hence, please consider a proportionate value for 'similar works' calculation to bring is to present value.	Please refer page 13 clause, 1.5, d (IV) which gives clarification on this point.
40			**Concrete Design Mix**	
			Due to space constraints, can the contractor submit their design mix and get it approved or follow the cement content as given in tender.	Minimum Cement content as per BOQ to be followed and it should get vetted by NABL accredited Lab.

This Pre-Bid clarification shall be downloaded, signed, sealed and enclosed along with the Technical-Bid documents, Drawings and Corrigendum-2.

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Annexure- 1

EMD Bank Guarantee format

(Bank Guarantee in lieu of earnest money on non-judicial stamp paper of appropriate value)

Ref:
Bank Guarantee No. ……
Dated: …….

To:

Dear Sir,

1. WHEREAS Indian Bank, having its Corporate Office at 254-260, Avvai Shanmugam Salai, Royapettah, Chennai-14, has invited tender for "selection of Contractor for the Proposed Redevelopment of Indian Bank Executive's Quarters located in No.2, Ramachandra Road, Luz Avenue, Mylapore, Chennai – 600004" (name of Service) as are set out in the e-tender with ref. NO. IB/MYL/CONTR/001/2023-24 dated 22/07/2023.

2. It is one of the terms of said tender that the Bidder shall furnish a Bank Guarantee for a sum of Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only) as Earnest Money Deposit.

3. M/s. _____ (hereinafter called as Bidder, who are our constituents intends to submit their Bid for the said work and have requested us to furnish guarantee in respect of the said sum of Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only)

4. NOW THIS GUARANTEE WITNESSETH THAT

   We (Name of Bank), a company incorporated under the Companies Act, 1956 and also a banking company within the meaning of Section 5(c) of the Banking Regulation Act 1949, having its registered office at _____ and one of the branches at _____ (hereinafter referred to as the "BANK") do hereby agree with and undertake to the Indian Bank, that in the event of the Indian Bank coming to the conclusion that the Bidder has not performed their obligations under the said conditions of the RFP or have committed a breach thereof, which conclusion shall be binding on us as well as the said Bidder, we shall on demand by the Indian Bank, pay without demur to the Indian Bank, a sum of Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only) that may be demanded by Indian Bank. Our guarantee shall be treated as equivalent to the Earnest Money Deposit for the due performance of the obligations of the Bidder under the said conditions, provided, however, that our liability against such sum shall not exceed the sum of Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only) and claims if any should reach to us on or before 120 days from 24/08/2023.

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Signature & Seal of the Bidder

5. We also agree to undertake to and confirm that the sum not exceeding Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only) as aforesaid shall be paid by us without any demur or protest, merely on demand received during the validity period of the Bank Guarantee from the Indian Bank on receipt of a notice in writing stating the amount is due to them and we shall not ask for any further proof or evidence and the notice from the Indian Bank shall be conclusive and binding on us and shall not be questioned by us in any respect or manner whatsoever. We undertake to pay the amount claimed by the Indian Bank, without protest or demur or without reference to Bidder and not-withstanding any contestation or existence of any dispute whatsoever between Bidder and Indian Bank, pay Indian Bank forthwith from the date of receipt of the notice as aforesaid. We confirm that our obligation to the Indian Bank under this guarantee shall be independent of the agreement or agreements or other understandings between the Indian Bank and the Bidder. This guarantee shall not be revoked by us during its currency without prior consent in writing of the Indian Bank.

6. We hereby further agree that:

   a) Any forbearance or commission on the part of the Indian Bank in enforcing the conditions of the said agreement or in compliance with any of the terms and conditions stipulated in the said Bid and/or hereunder or granting of any time or showing of any indulgence by the Indian Bank to the Bidder or any other matter in connection therewith shall not discharge us in any way our obligation under this guarantee. This guarantee shall be discharged only by the performance of the Bidder of their obligations and in the event of their failure to do so, by payment by us of the sum not exceeding Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only).

   b) Our liability under these presents shall not exceed the sum of Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only).

   c) Our liability under this agreement shall not be affected by any infirmity or irregularity on the part of our said constituents in tendering for the said work or their obligations there under or by dissolution or change in the constitution of our said constituents.

   d) This guarantee shall remain in force upto 120 days from 24/08/2023as contained herein. If any further extension of this guarantee is required, the same may be extended at our sole discretion to such required period on receiving instruction from M/s. _____ whose behalf this guarantee is issued

   e) Our liability under this presents will terminate unless these presents are renewed as provided herein upto 120 days from 24/08/2023 or on the day when our said constituents comply with their obligations, as to which a certificate in writing by the Indian Bank alone is the conclusive proof, whichever date is earlier.

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Signature & Seal of the Bidder

f) Unless a claim or suit or action is filed against us on or before 120 days from 24/08/2023, all the rights of the Indian Bank against us under this guarantee shall be forfeited and we shall be released and discharged from all our obligations and liabilities hereunder.

g) This guarantee shall be governed by Indian Laws and the Courts in Chennai India alone shall have the jurisdiction to try & entertain any dispute arising out of this guarantee.

7. Notwithstanding anything contained hereinabove:

a) Our liability under this Bank Guarantee shall not exceed Rs.1,04,50,000/- (Rupees One Crore Four Lakh Fifty Thousand only).

b) This Bank Guarantee shall be valid upto 120 days from 24/08/2023.

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 120 days from 24/08/2023 at _____. All your rights as well as our liability under this bank guarantee shall stand extinguished unless a written claim or demand is made under this guarantee not later than 120 days from 24/08/2023.

Yours faithfully,

Bankers (EXECUTANT)

Witness:-

1.

2.

……

Signature & Seal of the Bidder

GEOTECHNICAL INVESTIGATION REPORT

for Proposed Bank Quarters at Mylapore, Chennai

EXECUTIVE SUMMARY

M/s. Indian Bank, Estates and Expenditure Department., Chennai are proposing to construct Bank Quarters at Luz, Ramachandra Road, Mylapore, Chennai - 600004.

The site for the proposed bank quarters is situated on the northern side of Ramachandra Road and southern side of Rama Rao road in Luz, Mylapore, Chennai - 600004. The site is almost rectangular in shape and measures approximately 4500m² in area. The site is bounded by boundary wall on all sides and is fairly level. Vegetation in the form of bushes and trees were grown with in the site during the period of field investigations. As per the information provided by the clients, the existing 6 Nos. of four storeyed buildings will be demolished prior to construction of the new bank quarters.

The proposed quarters consists of an open stilt floor at ground level and five upper floors.

Geotechnical investigations have been undertaken at the site as per the scope of investigations, stipulated by the client, which consisted of 4 boreholes down to refusal/rock strata (where N>100) and further drilling in refusal/rock strata by 3m depth.

The results of the investigations have shown the presence of filled up soil down to 0.9/1.3m depth below which virgin soil was encountered. The virgin soil was Brown sandy silty clay encountered down to 3.5/3.9/4.0/4.1m depth underlined by Brown/grey/brown with grey/green silty sand down to a depth of 15/17.5/18.5/20m below existing ground level.Below this strata, refusal strata in the form of green silty sand was encountered at 15/17.5/18.5/20m depth below existing ground level and continued till maximum termination depth of 18/21/21.5/23m below existing ground level.

The soil strata is in a stiff/medium dense state till refusal strata which was encountered between 15m to 20m depth below the existing ground level.

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Ground water table was encountered between 4.6m and 4.9m in the boreholes during the period of field investigations.

In view of the observed subsoil conditions, the proposed staff quarters can be supported on *Isolated/Strip Footings or Raft Foundations*. The foundations can be laid at a minimum depth of *2.5m* depth below existing ground level.

A *Net allowable bearing pressure of 10t/m²* can be adopted for *Isolated/Strip Footings* for widths of footings ≥ 1.5m.

A *Net allowable bearing pressure of 16t/m²* can be adopted for *Raft foundations*.

Alternatively, *Bored Pile Foundations can be adopted.* The piles may be terminated at *23m* below the existing ground level. The safe pile capacities of various diameter of piles are given below:

Diameter of Pile (mm)	Safe Pile Capacity (t)	Safe Uplift Capacity (t)
500	95	30
600	135	45
750	200	65

For Isolated/Strip Foundations

Excavated soil cannot be used for backfilling purposes.

After the excavation for the foundations, the top slush should be removed and the surface compacted heavily. If any loose pockets are observed, the same shall be filled with brickbats/ gravel and compacted well. Foundations can subsequently be placed over such a prepared surface. Stiff Tie-beams connecting the columns in both directions may be provided which will render additional rigidity to the structure.

For Raft Foundations

The raft should be adequately stiffened with sufficient reinforcement both at top and bottom so that the anticipated seasonal movement can be satisfactorily sustained without distress.

For Pile Foundations

Preferably, the capacities of pile can be confirmed by a load test.

After reaching the required depth in the pile bore, 15cm thick layer of gravel should be placed and compacted at the bottom so that the slush formed at the bottom is diminished.

The bentonite being used during piling should be as per IS 2911.

REPORT ON GEOTECHNICAL INVESTIGATION FOR

PROPOSED BANK QUARTERS AT MYLAPORE, CHENNAI

1.0 INTRODUCTION

1.1 Overview

1.1.1 M/s. Indian Bank, Estates and Expenditure Department., Chennai are proposing to construct Bank Quarters at Luz, Ramachandra Road, Mylapore, Chennai - 600004.

1.1.2 The geotechnical investigation has been done to ascertain the soil properties and to aid the design of viable foundations for the proposed Bank Quarters building.

1.2 Authority

A comprehensive soil investigation programme has been conducted as per the authorisation by M/s. Indian Bank, Estates and Expenditure Department., Chennai vide their WO No. CO:EST:BG:034:2022-23 dated 07.11.2022.

2.0 PROJECT DETAILS

2.1 Site Location

The site for the proposed bank quarters is situated on the northern side of Ramachandra Road and southern side of Rama Rao road in Luz, Mylapore, Chennai - 600004.

2.2 Site Layout and Topography

2.2.1 The site is almost rectangular in shape and measures approximately 4500m² in area. The site is bounded by compound wall on all sides and is fairly level. Vegetation in the form of bushes and trees were grown with in the site during the period of field investigations. As per the information provided by the clients, the existing 6 Nos. of four storeyed buildings will be demolished prior to construction of the new bank quarters.

2.2.2 The colour of the exposed soil surface is Brown.

2.3 The Structure

As per the information provided by the client, the proposed staff quarters consists of an open stilt floor at ground level and five upper floors.

2.4 Seismic Zone

Site for the proposed staff quarters is situated in Mylapore, Chennai which falls under Seismic Zone III as per IS 1893 (Part 1) - 2016.

2.5 Geographical Information

2.5.1 Site for the proposed staff quarters is located at:

a) Latitude : 13°03'

b) Longitude : 80°26'

3.0 OBJECT OF INVESTIGATIONS

3.1 For designing the foundation system of the proposed structures, the following data are required:

a) Type of foundation system.

b) Depth below the ground level at which the foundation system is to be laid.

c) Allowable bearing pressure on the foundations levels.

3.2 To determine above factors, the following information would be required:

a) The sub soil profile indicating thickness of the various soil strata, to a depth down to the influence zone below the foundations.

b) Engineering properties of the soil strata at various levels.

c) Physical characteristics of the soil strata.

d) Variation of the strength of the strata with depth.

3.3 For evaluating the above parameters, field investigations and laboratory investigations on the soil samples collected during the field investigations, have been carried out.

3.4 The results from these investigations have been analysed to provide the recommendations for the design of foundations.

4.0 SCOPE OF INVESTIGATIONS

4.1 Scope of investigations as given in the work order consisted of:

a) Conducting 4 boreholes down to refusal/rock strata (where N>100); then further drilling in refusal strata by 3m, as required by the client.

b) Conducting standard penetration tests at 1.5m intervals.

c) Recovering undisturbed soil samples from various levels of the sub soil strata.

d) Recording ground water table levels, if met with.

e) Conducting relevant laboratory tests on soil samples recovered.

f) Preparation and submission of a technical report containing the details of the tests carried out, their analysis and recommendations regarding the foundation system to be adopted. Two copies of the report are to be submitted.

5.0 FIELD INVESTIGATIONS

5.1 General Details

5.1.1 The locations of the boreholes were shown at site by the client's representative. A Schematic site plan showing the boreholes locations marked by the client is given in fig.1.

5.1.2 Weather was clear during the period of field investigations which were carried out on first week of November 2022.

5.2 Boreholes

5.2.1 The boreholes were progressed by mechanically operated rotary core drill method.

5.2.2 Refusal strata (i.e. N-value > 100) in the form of silty sand was encountered between 15m to 20m depth below existing ground level.

5.2.3 The boreholes were terminated after drilling by minimum of 3m in the refusal strata.

5.2.4 The depths at which ground water table was encountered during the investigations and termination depths of the boreholes are given in the following table.

Borehole No.	Depth of Water Table Below EGL (m)	Termination Depth Below EGL (m)
1	4.6	18
2	4.9	21.5
3	4.8	23
4	4.9	21

5.2.5 Ground water table was encountered between 4.6m and 4.9m depth in the boreholes during the period of field investigations.

5.2.6 Standard Penetration Tests were conducted in soil strata at 1.5m depth intervals. Additionally, Standard Penetration Tests had also been conducted in refusal strata for the confirmation of the refusal strata.

5.2.7 Disturbed soil samples recovered from split spoon samples were packed in polythene bags, labelled and retained for identification purposes.

5.2.8 Undisturbed soil samples were recovered by thin walled tubes conforming to IS 2132. These tubes had an area ratio of less than 10%. The diameter of soil samples were 50mm and length 45cm.

6.0 LABORATORY INVESTIGATIONS

6.1 The soil samples brought to the laboratory were subjected to various tests to determine the following properties

a) Type of soil and its gradation

b) Consistency limits

c) Natural density

d) Natural water content

e) Shear strength properties

6.2 In order to determine the above properties listed in 6.2, the following tests were conducted.

a) Sieve analysis on the coarse grained soil fraction

b) Hydrometer analysis on the fine grained soil fraction

c) Liquid and plastic limits

d) Natural Density and Water Content tests

e) Triaxial compression test

f) Specific Gravity

g) Free Swell Index tests

7.0 RESULTS OF INVESTIGATION AND ANALYSIS

7.1 Presentation of Results

7.1.1 The results of borehole investigations and of the laboratory investigations conducted on the soil samples collected from the boreholes have been presented in the form of soil profile tables in Table Nos.1 to 8.

7.1.2 The soil profile tables indicate the following:

a) Standard Penetration Test Values (i.e. N- values observed) at various depths

b) Soil description identifying the type of soil

c) Grain size analysis indicating composition of sub soil

d) Atterberg limits

e) In-situ bulk density and Water content

f) Triaxial compression test results

7.2 Analysis of Soil Profile

7.2.1 A perusal of the data presented in the soil profile tables indicate the presence of the following strata.

a) Stratum - I : Filled up strata (soil with brickbats)

b) Stratum - II : Brown sandy silty clay

c) Stratum - III : Brown/grey/brown with grey/green silty sand

7.2.2 The thicknesses in each borehole of each strata described in 7.2.1 is given in the table below:

BH No.	Depth (m) : from - to		
	Stratum - I	**Stratum - II**	**Stratum - III**
1	0.0 - 1.3	1.3 - 4.1	4.1 - 18
2	0.0 - 0.9	0.9 - 3.5	3.5 - 21.5
3	0.0 - 0.9	0.9 - 3.9	3.9 - 23
4	0.0 - 0.9	0.9 - 4	4 - 21

7.2.3 The above results show that :

a) Stratum - I consisting of Filled up strata (soil with brick bats) has been encountered down to the depth of 0.9/1.3m below existing ground level.

b) Stratum - II consisting of Brown sandy silty clay consisting significant percentages of clay and varying percentages of sand and silt, has been encountered from 0.9/1.3 to 3.5/3.9/4/4.1m below existing ground level.

c) Stratum - III consisting of Brown/grey/brown with grey/green silty sand having significant percentages of sand and varying percentages of silt, has been encountered from 3.5/3.9/4/4.1 to 18/21/21.5/23m below the existing ground level.

7.3 Soil Composition

7.3.1 The grain size distribution of the soil samples at various depths, as determined in the laboratory have been presented in the form of grain size analysis curves in fig. 3a to 3h and in tables therein.

7.3.2 The variations in the grain size distribution - strata wise across the boreholes are as follows:

a) Stratum - II : Brown sandy silty clay

BH NO.	Gravel%	Sand %	Silt%	Clay%
1	0	18 - 32	33 - 34	35 - 48
2	0	20 - 31	33	36 - 47
3	0	19 - 29	31 - 34	37 - 50
4	0	18 - 28	31 - 35	37 - 51

b) Stratum - III : Brown/grey/brown with grey/green silty sand

BH NO.	Gravel%	Sand %	Silt%	Clay%
1	0	79 - 88	12 - 21	0
2	0	78 - 92	8 - 22	0
3	0	77 - 91	9 - 23	0
4	0	79 - 91	9 - 21	0

7.3.3 The above results indicate that :

a) Stratum - II consists of about 18 - 29% of sand 31 - 35% of silt and 35 - 51% of clay.

b) Stratum - III consists of about 8 - 23% of silt and 77 - 92% of sand.

7.4 In-situ Density and Water Content

7.4.1 The in-situ bulk densities, water contents and dry densities obtained from undisturbed soil samples are tabulated below.

BH No.	Depth (m)	In-situ Bulk Density (g/cm^3)	Water Content (%)	Dry Density (g/cm^3)
1	2	1.82	14.7	1.59
	3.5	1.86	16.2	1.6
2	1.5	1.79	11.9	1.6
	3	1.84	15.3	1.6
	4.5	1.89	6.3	1.78
3	2	1.78	12.1	1.59
	3.5	1.83	15.9	1.58
4	1.5	1.77	12.6	1.57
	3	1.84	15.2	1.6
	4.5	1.92	6.8	1.8

7.4.2 The undisturbed samples between 5m and 15/20m depth slipped as the samples were cohesionless and below ground water table level.

7.4.3 The dry densities down to 5m depth indicate that the soil is in a stiff/medium dense state.

7.5 Consistency Limits

7.5.1 The Consistency Limits of the soil in Stratum - II (Brown sandy silty clay) indicates that the liquid limit varies between 41% to 56%, plastic limit varies between 18% to 24% and plasticity index varies between 23% to 32%.

7.5.2 The soil in Stratum - III (Brown/grey/brown with grey/green silty sand) is non plastic in nature.

7.5.3 The Consistency Limits indicate that the soil in :

a) Stratum - II (Brown sandy silty clay) is high plastic in nature.

b) Stratum - III (Brown silty sand) is non plastic in nature.

7.6 Standard Penetration Tests

7.6.1 Standard Penetration Test values (N-values observed) are presented in the soil profile table nos.1 to 8.

7.6.2 Standard Penetration Test values (N-values observed) have also been presented in form of plots of N values vs depth in fig.4.

7.6.3 The N-values indicate that the soil down to 8-10.5m depth is in a stiff/medium dense state with observed N-values between 8 to 32 and below 10.5m depth is in a dense state with N-values varying between 26 to 71.

7.7 Triaxial Test Results

7.7.1 The cohesion 'c' obtained from consolidated drained triaxial compression test varies between negligible to 0.34kg/cm² and the angle of shearing resistance 'ϕ' of the soil varies between 12˚ and 31˚.

7.8 Free Swell Index

7.8.1 The free swell index of the soil samples collected at various depths are given below:

BH No.	Free Swell Index (%) at Depth (m)			
	1	1.5	2.5	3
1	-	47.2	-	40.3
2	49.8	-	41.1	-
3	-	53.2	-	42.1
4	53.9	-	42.3	-

7.8.2 The above results indicate that the subsoil strata is medium swelling in nature. Hence, the excavated soil cannot be used for backfilling purposes.

7.9 Compiled Soil Profile

7.9.1 An overview of the results and their analysis has been presented in the form of a compiled soil (fig. 2).

7.9.2 The above figure shows the various strata encountered and their thicknesses in each of the boreholes and also gives the soil composition and the observed N-values at various depths along with the depth at which undisturbed soil samples were collected.

8.0 DESIGN CRITERIA

8.1 Design Parameters

8.1.1 The parameters required for the design of foundation system for the proposed structure are:

a) Type of foundation to be adopted

b) Depth at which the foundations have to be laid/depths at which the piles can be founded.

c) Allowable bearing pressure on the soil at the foundation level/safe pile capacities

8.1.2 On the basis of the analysis of the results of investigations, the required design parameters have been arrived at and are given in the following sections.

8.2 Type of Foundations

8.2.1 The type of foundation depends on the following:

a) Subsoil conditions

b) Type of structure

c) Configuration at loading points

d) Loading intensity on each sub-structure/structural element.

8.2.2 As per information provided by the client, the proposed staff quarters consists of an open stilt floor at ground level and five upper floors.

8.2.3 The results of the investigations have shown that the subsoil is in a stiff/medium dense state.

8.2.4 In view of the above, *Isolated/Strip Footings or Raft Foundations can be adopted. Alternatively, Bored Pile Foundations* can be adopted.

8.3 Isolated/Strip Footings or Raft Foundations

8.3.1 Depth of Foundations

8.3.1.1 The depth at which foundations should be laid will be governed by the following criteria.

a) Top filled up strata/loose soil, if any

b) There should be sufficient thickness of soil above the footing/foundations so that the bearing capacity of the soil can be fully mobilised.

c) Soil below the level of footings/foundations should have the requisite strength to support the anticipated bearing pressures on the foundations without allowing the settlement of footings/foundations to exceed the acceptable limits.

d) Requirements of the type of structure (staff quarters consists of a ground floor and five upper floors).

8.3.2 In view of the above factors, foundations of the proposed structure can be laid at a minimum depth of *2.5m below the existing ground level*. The soil available at the founding level will be Brown sandy silty clay.

8.3.3 Allowable Bearing Pressure

8.3.3.1 Allowable bearing pressure has been evaluated by:

a) Shear failure criteria based on the average soil data

b) Settlement criteria based on the SPT values (N-values)

c) Settlement criteria based on deformation modulus

8.3.3.2 An allowable settlement of 50mm has been considered to evaluate the allowable bearing pressure for Isolated/Strip footings and an allowable settlement of 75mm has been considered to evaluate the allowable bearing pressure for Raft Foundations.

8.3.3.3 A water table correction factor of 0.5 has been considered.

8.3.3.4 On the basis of the above analysis, net allowable bearing pressure of *10t/m²* can be adopted for widths of foundations ≥1.5m. A net allowable bearing pressure of 16t/m² can be adopted for Raft Foundations.

8.3.3.5 The calculations for the allowable bearing pressure have been provided in Appendix A of this report.

8.4 Pile Foundations

8.4.1 Depth of Pile Foundations

The piles may be terminated at 23m below the existing ground level. Considering the cut off level of pile as 1m from the existing ground level, the effective length of pile will be 22m.

8.4.2 Safe Pile Capacities

The safe pile capacities for various diameters of pile are give below:

Diameter of Pile (mm)	Safe Pile Capacity (t)	Safe Uplift Capacity (t)
500	95	30
600	135	45
750	200	65

8.4.3 Sample calculation for capacities of pile are given in Appendix B of this report.

9.0 RECOMMENDATIONS

9.1 Type of Foundations

Isolated/Strip Footings or Raft Foundations. Alternatively, Bored Pile Foundations

9.2 Isolated/Strip Footings or Raft Foundations

9.2.1 Depth of Foundations

Minimum 2.5m below the existing ground level

9.2.2 Allowable Bearing Pressure

For Isolated/Strip Footings, a Net Allowable Bearing Pressure of 10t/m² can be adopted for widths of footings ≥1.5m for an allowable settlement for 50mm.

For Raft Foundations, a Net Allowable Bearing Pressure of 16t/m² can be adopted for an allowable settlement for 75mm.

9.3 Bored Pile Foundations

9.3.1 Termination Depth

The piles may be *terminated at 23m* below the existing ground level.

9.3.2 Safe Pile Capacities

The safe pile capacities for various diameters of pile are give below:

Diameter of Pile (mm)	***Safe Pile Capacity (t)***	***Safe Uplift Capacity (t)***
500	*95*	*30*
600	*135*	*45*
750	*200*	*65*

9.4 Note

9.4.1 The recommendations given in this report have been arrived at on the basis of design parameters which have been judiciously adopted by giving due consideration to the results

of field and laboratory investigations as well as NAGADI's experience of over four decades in working in various types of soil and rock conditions all over India.

9.4.2 The entire report should be studied before adopting the recommendations given in the report.

9.5 Construction Advisories

9.5.1 The soil of each strata has been described with name, colour etc. During excavation, any variations observed in the nature and condition of the soil from those given in this Report should be noted and appropriate action should be taken.

9.5.2 *For Isolated/Strip Foundations*

9.5.2.1 Excavated soil cannot be used for backfilling purposes.

9.5.2.2 After the excavation for the foundations, the top slush should be removed and the surface compacted heavily. If any loose pockets are observed, the same shall be filled with brickbats/ gravel and compacted well. Foundations can subsequently be placed over such a prepared surface.

9.5.2.3 Stiff Tie-beams connecting the columns in both directions may be provided which will render additional rigidity to the structure.

9.5.3 *For Raft Foundations*

The raft should be adequately stiffened with sufficient reinforcement both at top and bottom so that the anticipated seasonal movement can be satisfactorily sustained without distress.

9.5.4 *For Pile Foundations*

9.5.4.1 Preferably, the capacities of pile can be confirmed by a load test.

9.5.4.2 After reaching the required depth in the pile bore, 15cm thick layer of gravel should be placed and compacted at the bottom so that the slush formed at the bottom is diminished.

9.5.4.3 The bentonite being used during piling should be as per IS 2911.

9.6 References

A list of IS codes referred for providing the recommendations and that which might be required to implement the same has been given in Appendix C.

10.0 LIMITATIONS

10.1 This Geotechnical investigation has been carried out at locations in the site chosen by the client as representing the entire site. The recommendations provided in this Report are hence valid only for those test locations. However, if there is any change in sub-soil conditions and properties at places between or beyond the chosen test locations, Nagadi may be contacted for further actions. Fresh investigations will have to be carried out at such locations.

Dr. N. Santosh Rao
Technical Director
For ***NAGADI CONSULTANTS PVT. LTD.***

ANALYSIS FOR ALLOWABLE BEARING PRESSURE

Data

(i) Soil Properties :

c (kg/cm^2) = 0.34 $\phi = 12^\circ$ γ (g/cm^3) = 1.78

(ii) Depth of Foundation, D (m) = 2.5

(iii) Allowable Settlement, s (mm) = 50

Shear Failure Criterion (Ref. IS : 6403)

$N_c = 8.70$ $N_q = 2.67$ $N_\gamma = 1.41$ $R_w = 0.50$ $R_w' = 0.50$

$$q_s = \frac{1}{3}\left(c \cdot N_c + \gamma D \cdot N_q \cdot R_w + 0.5 \cdot \gamma \cdot B \cdot N_\gamma \cdot R'_w\right) - \gamma D.R_w$$

B (m)	1.5	3	≥4.5
q_s (t/m^2)	9.9	10.3	10.6

Settlement Criterion

(i) From N Values

B (m)	1.5	3	≥4.5
H (m)	3	6	10
N_{av}	12	13	14
q_a (t/m^2)	11.2	10.5	10.8

(ii) From Triaxial Compression Tests : $q_a = \dfrac{s \cdot E}{0.7 \cdot H}$

B (m)	1.5	3	≥4.5
H (m)	3	6	10
E (kg/cm^2)	80	110	145
q_a (t/m^2)	19.05	13.1	10.36

ADOPT	**B (m)**	**1.5**	**3**	**≥4.5**
	q (t/m^2)	**10**	**10**	**10**

Note : q_s and q_a are NET VALUES, Weight of backfill etc. need not be added to the loading except in case of filling above original G.L.

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CALCULATIONS FOR PILE CAPACITY

A.1 Methodology

A.1.1 A typical calculation for the pile capacity has been given hereunder for a pile of diameter 'D' = 500mm and for a length of pile 'L' = 23m.

A.1.2 The pile is designed primarily as an end bearing cum friction pile.

A.1.3 The end bearing capacity has been determined based on observed N-values while the friction capacity has been determined as per the relevant provisions of the BIS code IS:2911(part1/sec2).

A.1.4 For determining the end bearing capacity, the N- value at the level of the pile tip has been taken as 75 (corrected).

A.1.5 For determining the friction capacity, the average angle of shearing resistance ϕ has been taken as 30°.

A.2 DETERMINATION OF PILE CAPACITY

A.2.1 Pile end bearing capacity based on N-values

A.2.1.1 The ultimate end bearing capacity of the *Bored pile foundation* is determined as given below:

$$Q_{bu} = 1.3 \cdot N \cdot A_p$$

where N = observed N-value at the level of the pile tip

A_p = $\frac{\pi \cdot D^2}{4}$ = cross - sectional area of pile toe = 1963.5cm^2

D = stem diameter of pile = 500mm

A.2.1.2 Therefore, the ultimate end bearing capacity of the bored pile foundation is :

Q_{bu} = 191.44tons

A.2.2 Pile friction capacity based on IS:2911 (Part 1/Sec 4)

A.2.2.1 The ultimate friction capacity of the pile is :

$$Q_{fu} = \pi \cdot D \cdot (L - L_1) \cdot \alpha \cdot c + \sum_1^n K \cdot P_{Di} \cdot \tan\delta \cdot A_{si}$$

Where c = cohesion of the soil along the pile shaft = Nil

α = adhesion factor = 0.7

K	=	coefficient of earth pressure	=	1
P_{Di}	=	effective overburden pressure at for the i^{th} layer	=	$\gamma.d_i$
γ	=	submerged unit weight of soil below water table	=	$0.85g/cm^3$
d_i	=	depth of the i^{th} layer from ground level		
A_{si}	=	surface area of the pile stem in the i^{th} layer		
δ	=	angle of wall friction between pile and soil		
	=	ϕ = angle of shearing resistance of the soil	=	30^o

A.2.2.2 For calculation purposes, the submerged unit weight of the soil has been taken as the effective unit weight of the soil. The submerged unit weight considered is 0.85 g/cm^3.

A.2.2.3 As per the IS provisions, the effective overburden pressure P_{Di} is limited to a value equivalent to a depth of overburden equal to 15 times the diameter of the pile.

A.2.2.4 The skin friction capacity 'Q_{fu}' is determined as :

$$Q_{fu} = \pi \cdot d \cdot L \cdot \alpha \cdot c + K \cdot \tan\delta \cdot \left[\begin{array}{l} \frac{1}{2} \cdot (\gamma \cdot 15 \cdot D) \cdot (15 \cdot D) \cdot (\pi \cdot D) + \\ (\gamma \cdot 15 \cdot D) \cdot (L - 15 \cdot D) \cdot (\pi \cdot D) \end{array} \right]$$

A.2.2.5 The skin friction capacity 'Q_{fu}' of the *Bored pile foundation* is :

Q_{fu} = 93.95tons

A.3 SAFE PILE CAPACITY

A.3.1 The safe pile capacity is determined by applying appropriate factors of safety to the ultimate values determined above. A factor of safety of 3 has been adopted for determination of the safe pile capacity.

A.3.2 Therefore, the safe pile capacity of *Bored pile foundation* is :

$$Q_s = \frac{Q_{bu} + Q_{fu}}{3}$$

Hence,

Q_s = 95.1tons say 95 tons

UPLIFT CAPACITY

Uplift capacity is given by skin friction with a factor of safety

Taking a factor of safety as 3; we get Q_u= 93.95/3= **31.3tons say 30tons**

adopt uplift capacity = 30t

Appendix C

LIST OF IS CODES

Field Investigation

1. IS : 1498 - 1970 : Classification and identification of soils for general engineering purposes (First Revision) (Amendment 2)
2. IS : 1892 - 1979 : Code of practice for sub surface investigations for foundations (First revision)
3. IS : 2131 - 1981 : Method of Standard Penetration Tests for soils (First revision)
4. IS : 2132 - 1986 : Code of practice for thin walled tube sampling of soils (Second revision)

Laboratory Tests

1. IS : 2720 - 1983 (Part 1) : Methods of test for soils: Preparation of dry soil samples for various tests (Second revision)
2. IS : 2720 - 1980 (Part 2) : Method of test for soils: Determination of water content (Second revision) Amendment 1
3. IS : 2720 - 1980 (Part 3/Sec 1) : Method of test for soils : Determination of Specific Gravity : Fine grained soils. (First revision)
4. IS : 2720 - 1980 (Part 3/Sec 2) : Method of test for soils : Determination of Specific Gravity : Fine, Medium & Coarse grained soils. (First revision).
5. IS : 2720 - 1985 (Part 4) : Method of test for soils : Grain size analysis (Second revision)
6. IS : 2720 - 1985 (Part 5) : Method of test for soils : Determination of liquid and plastic limit (Second revision)
7. IS : 2720 - 1977 (Part 40) : Methods of tests for soils: Determination of free swell index of soils.

Foundation Construction

1. IS : 1080 - 1986 : Code of practice for design and construction of shallow foundations on soils (other than raft, ring and shell) (Second revision)
2. IS : 1904 - 1986 : Code of practice for design and construction of foundation in soils: General requirements (Third revision)
3. IS 6403 - 1981 : Code of practice for determination of bearing capacity of shallow foundations : First revision (Amendment 1)
4. IS 8009 - 1976 (Part 1) : Code of practice for calculation of settlements of foundations : Shallow foundations subject to symmetrical static vertical loads (Amendment 2)
5. IS 2911 (Part I to IV) : Design and Construction of Pile Foundations.

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.6m | Term. Depth : 18m | B.H. No. : 1

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density* (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (^{o})
	0.0	Ground level											
		Filled up strata (Soil with brickbats)											
	1.3	Change of strata											
10	1.5	Brown sandy silty clay	0	18	34	48	56	24					
	2.0	Brown sandy silty clay							1.82	14.7	CD	0.33	13
11	3.0	Brown sandy silty clay	0	32	33	35	41	18					
	3.5	Brown sandy silty clay							1.86	16.2	CD	0.30	15
	4.1	Change of strata											
13	4.5	Brown silty sand	0	79	21	0	-	NP					
	5.0	Brown silty sand							Sample slipped				
19	6.0	Brown silty sand	0	84	16	0	-	NP					
	6.5	Brown silty sand							Sample slipped				
22	7.5	Brown silty sand	0	85	15	0	-	NP					
	8.0	Brown silty sand							Sample slipped				
19	9.0	Brown silty sand	0	88	12	0	-	NP					

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.6m | Term. Depth : 18m | B.H. No. : 1

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density * (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	ϕ (°)
	9.5	Brown silty sand							Sample slipped				
20	10.5	Grey silty sand	0	83	17	0	-	NP					
	11.0	Grey silty sand							Sample slipped				
30	12.0	Grey silty sand	0	79	21	0	-	NP					
	12.5	Grey silty sand							Sample slipped				
42	13.5	Grey silty sand	0	85	15	0	-	NP					
	14.0	Grey silty sand							Sample slipped				
>100 (102)	15.0	Green silty sand	0	82	18	0	-	NP					
>100 (105)	16.5	Green silty sand	0	86	14	0	-	NP					
>100 (88/25cm)	18.0	Green silty sand	0	84	16	0	-	NP					

*-Natural Bulk Density # -N Values (Observed)

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.9m | Term. Depth : 21.5m | B.H. No. : 2

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density* (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (°)
	0.0	Ground level											
		Filled up strata (Soil with brickbats)											
	0.9	Change of strata											
9	1.0	Brown sandy silty clay	0	20	33	47	52	23					
	1.5	Brown sandy silty clay							1.79	11.9	CD	0.32	13
10	2.5	Brown sandy silty clay	0	31	33	36	42	18					
	3.0	Brown sandy silty clay							1.84	15.3	CD	0.28	16
	3.5	Change of strata											
12	4.0	Brown silty sand	0	78	22	0	-	NP					
	4.5	Brown silty sand							1.89	6.3	DS	-	30
16	5.5	Brown silty sand	0	82	18	0	-	NP					
	6.0	Brown silty sand							Sample slipped				
20	7.0	Brown silty sand	0	82	18	0	-	NP					
	7.5	Brown silty sand							Sample slipped				
23	8.5	Brown silty sand	0	86	14	0	-	NP					

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.9m | Term. Depth : 21.5m | B.H. No. : 2

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density * (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	ϕ (°)
	9.0	Grey silty sand							Sample slipped				
32	10.0	Grey silty sand	0	84	16	0	-	NP					
	10.5	Grey silty sand							Sample slipped				
33	11.5	Grey silty sand	0	82	18	0	-	NP					
	12.0	Grey silty sand							Sample slipped				
26	13.0	Grey silty sand	0	85	15	0	-	NP					
	13.5	Grey silty sand							Sample slipped				
34	14.5	Grey silty sand	0	87	13	0	-	NP					
	15.0	Grey silty sand							Sample slipped				
42	16.0	Grey silty sand	0	88	12	0	-	NP					
	16.5	Grey silty sand							Sample slipped				
58	17.5	Grey silty sand	0	84	16	0	-	NP					
>100 (104)	18.5	Green silty sand	0	90	10	0	-	NP					
>100 (126)	20.0	Green silty sand	0	92	8	0	-	NP					
>100 (111/32cm)	21.5	Green silty sand	0	88	12	0	-	NP					

*-Natural Bulk Density # -N Values (Observed)

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.8m | Term. Depth : 23m | B.H. No. : 3

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density* (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (^{o})
	0.0	Ground level											
		Filled up strata (Soil with brickbats)											
	0.9	Change of strata											
9	1.5	Brown sandy silty clay	0	19	31	50	57	25					
	2.0	Brown sandy silty clay							1.78	12.1	CD	0.34	12
9	3.0	Brown sandy silty clay	0	29	34	37	42	18					
	3.5	Brown sandy silty clay							1.83	15.9	CD	0.29	16
	3.9	Change of strata											
14	4.5	Brown silty sand	0	77	23	0	-	NP					
	5.0	Brown silty sand							Sample slipped				
18	6.0	Grey silty sand	0	84	16	0	-	NP					
	6.5	Grey silty sand							Sample slipped				
25	7.5	Grey silty sand	0	82	18	0	-	NP					
	8.0	Grey silty sand							Sample slipped				
31	9.0	Grey silty sand	0	86	14	0	-	NP					

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.8m | Term. Depth : 23m | B.H. No. : 3

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density* (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (°)
	9.5	Grey silty sand							Sample slipped				
26	10.5	Grey silty sand	0	85	15	0	-	NP					
	11.0	Grey silty sand							Sample slipped				
30	12.0	Grey silty sand	0	82	18	0	-	NP					
	12.5	Grey silty sand							Sample slipped				
28	13.5	Grey silty sand	0	85	15	0	-	NP					
	14.0	Grey silty sand							Sample slipped				
32	15.0	Grey silty sand	0	86	14	0	-	NP					
	15.5	Grey silty sand							Sample slipped				
56	16.5	Grey silty sand	0	88	12	0	-	NP					
71	18.0	Grey silty sand	0	91	9	0	-	NP					
>100 (109)	20.0	Green silty sand	0	88	12	0	-	NP					
>100 (162/28cm)	21.5	Green silty sand	0	87	13	0	-	NP					
>100 (137/40cm)	23.0	Green silty sand	0	90	10	0	-	NP					

*-Natural Bulk Density # -N Values (Observed)

SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.9m | Term. Depth : 21m | B.H. No. : 4

N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density* (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (^{o})
	0.0	Ground level											
		Filled up strata (Soil with brickbats)											
	0.9	Change of strata											
8	1.0	Brown sandy silty clay	0	18	31	51	57	25					
	1.5	Brown sandy silty clay							1.77	12.6	CD	0.30	13
9	2.5	Brown sandy silty clay	0	28	35	37	43	18					
	3.0	Brown sandy silty clay							1.84	15.2	CD	0.28	15
	4.0	Change of strata											
16	4.2	Brown silty sand	0	84	16	0	-	NP					
	4.5	Brown silty sand							1.92	6.8	DS	-	31
24	5.5	Brown silty sand	0	83	17	0	-	NP					
	6.0	Brown silty sand							Sample slipped				
31	7.0	Brown silty sand	0	85	15	0	-	NP					
	7.5	Brown silty sand							Sample slipped				
32	8.5	Grey silty sand	0	81	19	0	-	NP					

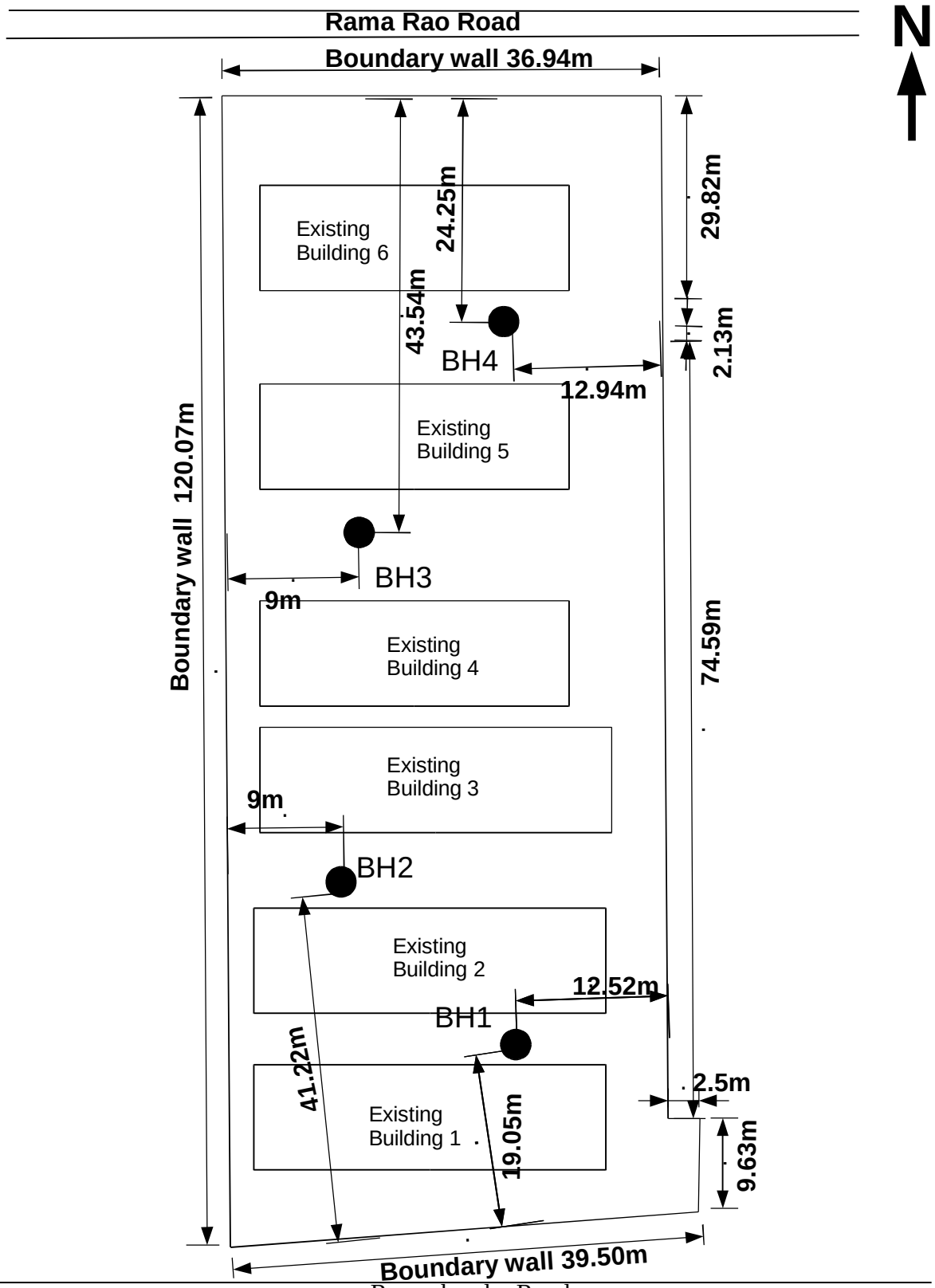
SOIL PROFILE

Project: Proposed Residential Building at Luz, Ramachandra Road, Mylapore, Chennai - 600004

B.H. Location: | Water Table: 4.9m | Term. Depth : 21m | B.H. No. : 4

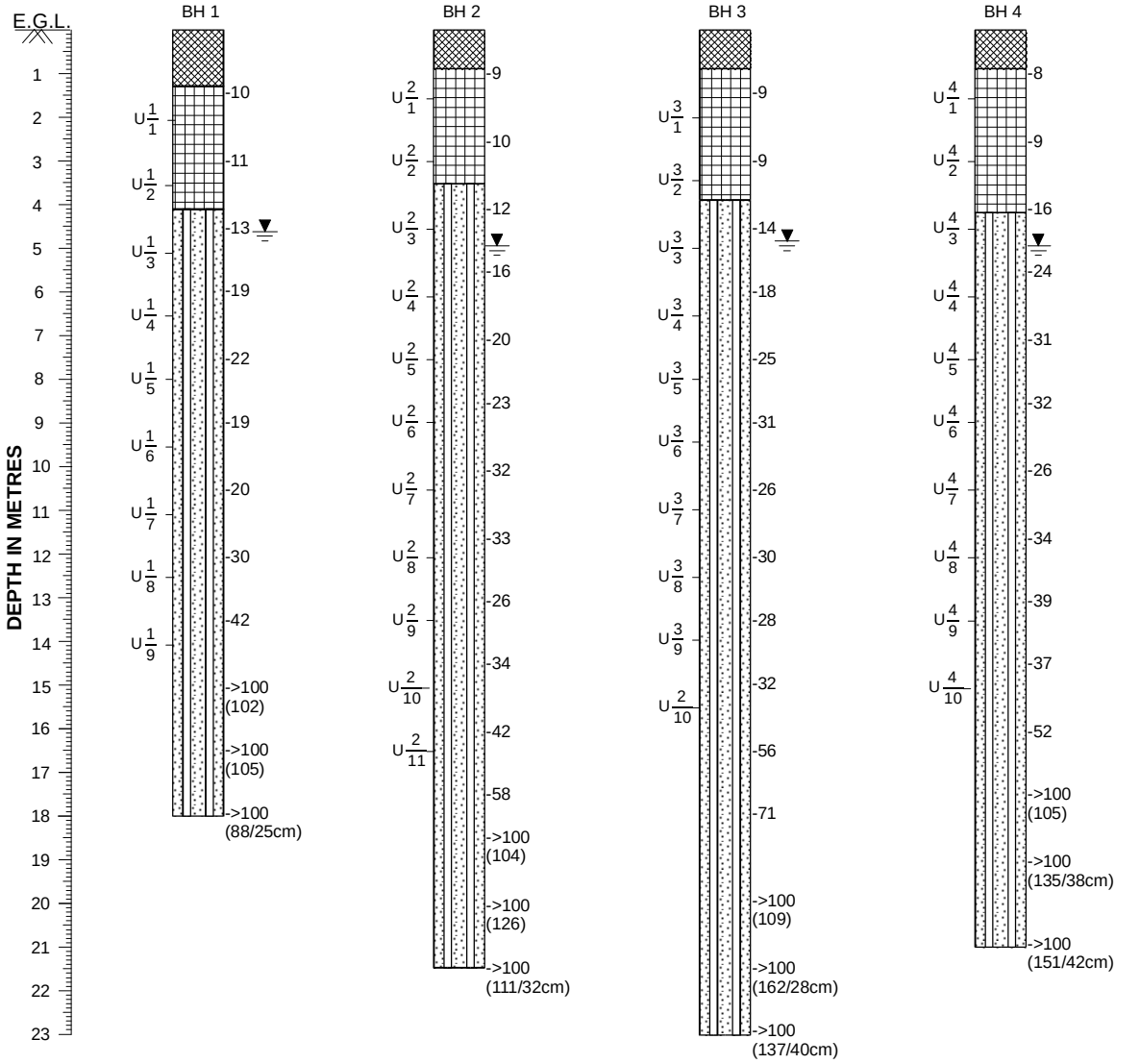
N - Value#	Depth (m)	Soil Description	Grain Size Analysis				Atterberg Limits		In-situ properties		Triaxial Test		
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Density * (g/cm^3)	Water Cont (%)	Type	c (kg/cm^2)	Φ (^{o})
	9.0	Grey silty sand							Sample slipped				
26	10.0	Grey silty sand	0	87	13	0	-	NP					
	10.5	Grey silty sand							Sample slipped				
34	11.5	Grey silty sand	0	79	21	0	-	NP					
	12.0	Grey silty sand							Sample slipped				
39	13.0	Grey silty sand	0	82	18	0	-	NP					
	13.5	Grey silty sand							Sample slipped				
37	14.5	Grey silty sand	0	84	16	0	-	NP					
	15.0	Grey silty sand							Sample slipped				
52	16.0	Grey silty sand	0	89	11	0	-	NP					
	16.5	Grey silty sand											
>100 (105)	17.5	Green silty sand	0	87	13	0	-	NP					
>100 (135/38cm)	19.0	Green silty sand	0	85	15	0	-	NP					
>100 (151/42cm)	21.0	Green silty sand	0	91	9	0	-	NP					

*-Natural Bulk Density # -N Values (Observed)



SCHEMATIC SITE PLAN
(Not to Scale)

G(C)9745



LEGEND

Filled up strata (soil with brick bats)

Brown
Sandy (18-29%)
Silty (31-35%)
Clay (35-51%)

Brown/grey/brown with grey/green
Silty (8-23%)
Sand (77-92%)

10 'N' Value (Observed)

E.G.L : Existing Ground level

$U\frac{2}{1}$ – 1st undisturbed soil sample at borehole no.2

Water table observed

COMPILED SOIL PROFILE

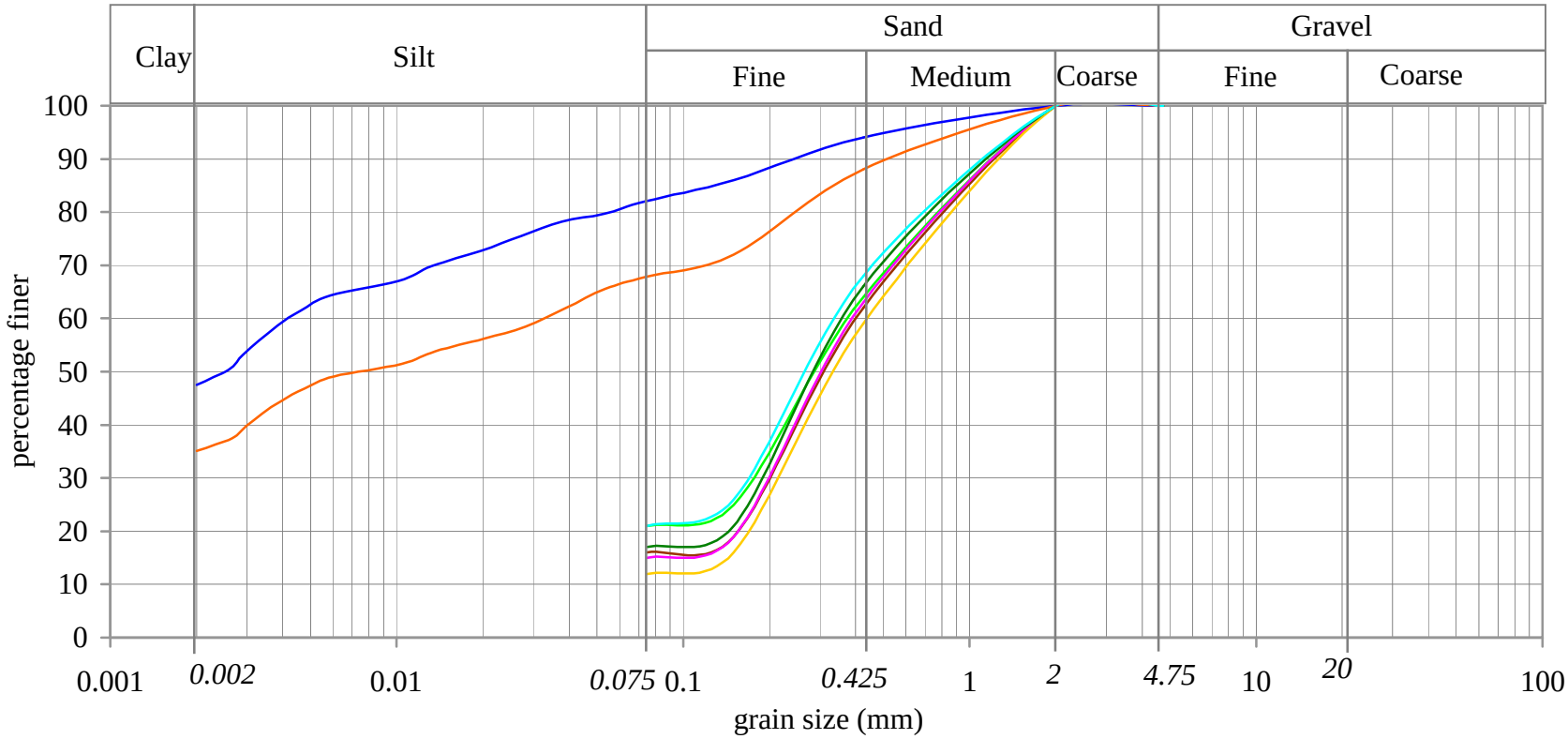
NAGADI CONSULTANTS PRIVATE LIMITED
GEOTECHNICAL CONSULTANTS

Delhi	:	011 (T) 26891980	(F) 26897403	delhi@nagadi.co.in
Bangalore	:	080 (T) 23156076	(F) 23303007	bangalore@nagadi.co.in
Chennai	:	044 (T) 24487870	(F) 24488957	chennai@nagadi.co.in
Secunderabad	:	040 (T) 27754446	(F) 27751194	secunderabad@nagadi.co.in

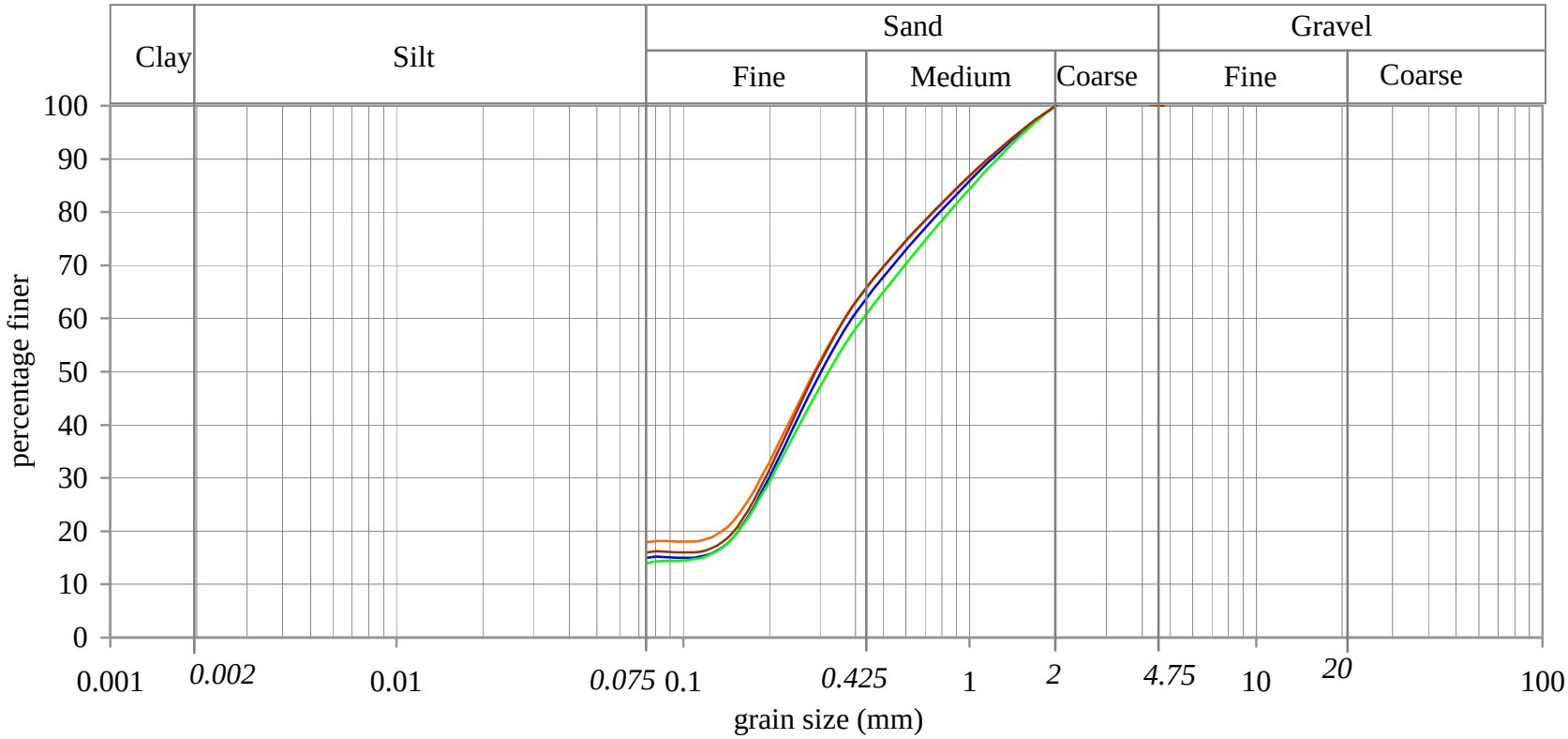
GEOTECHNICAL INVESTIGATION FOR THE PROPOSED BANK QUARTERS AT MYLAPORE, CHENNAI - 600004

Job No. : G(C)9745

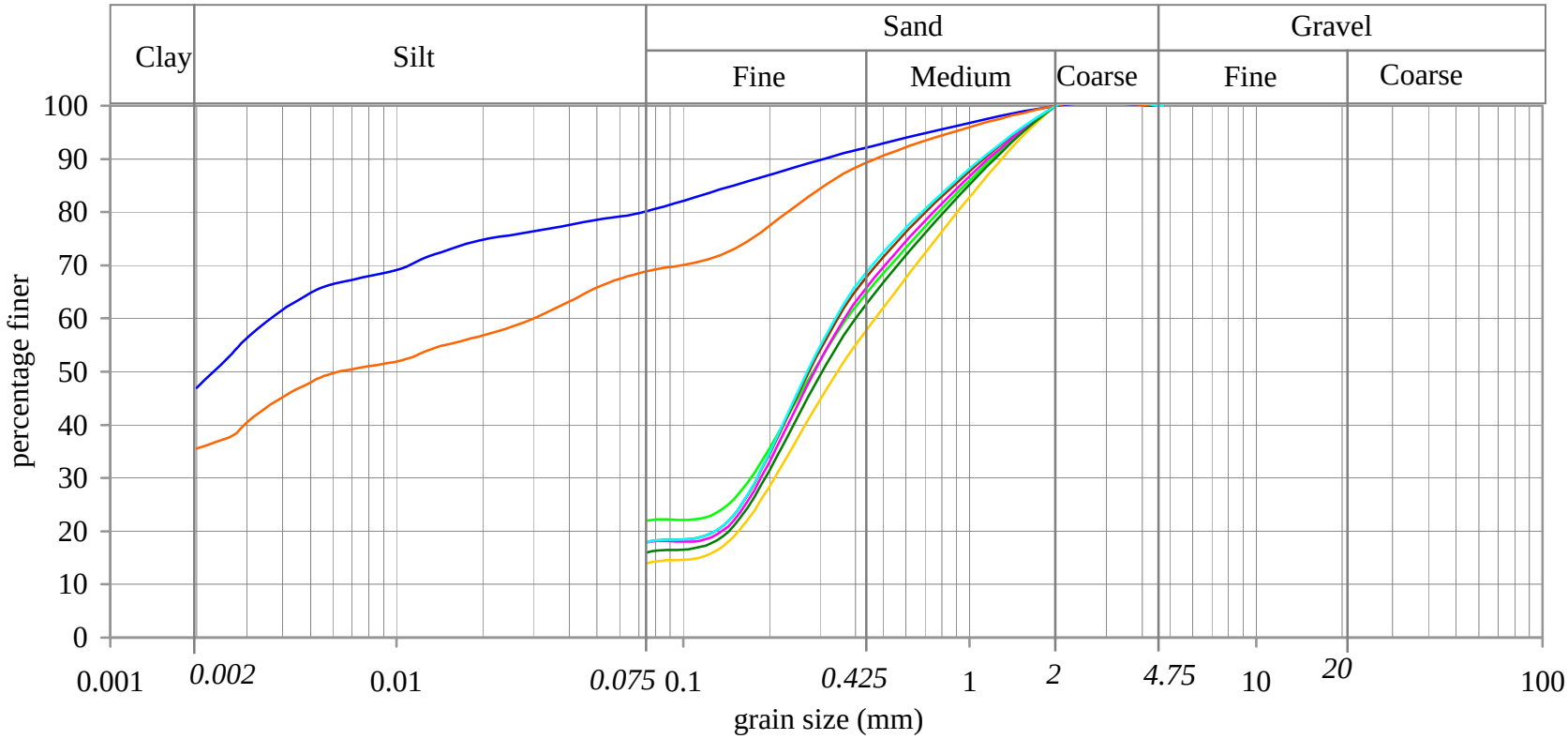
Sheet No. : 2



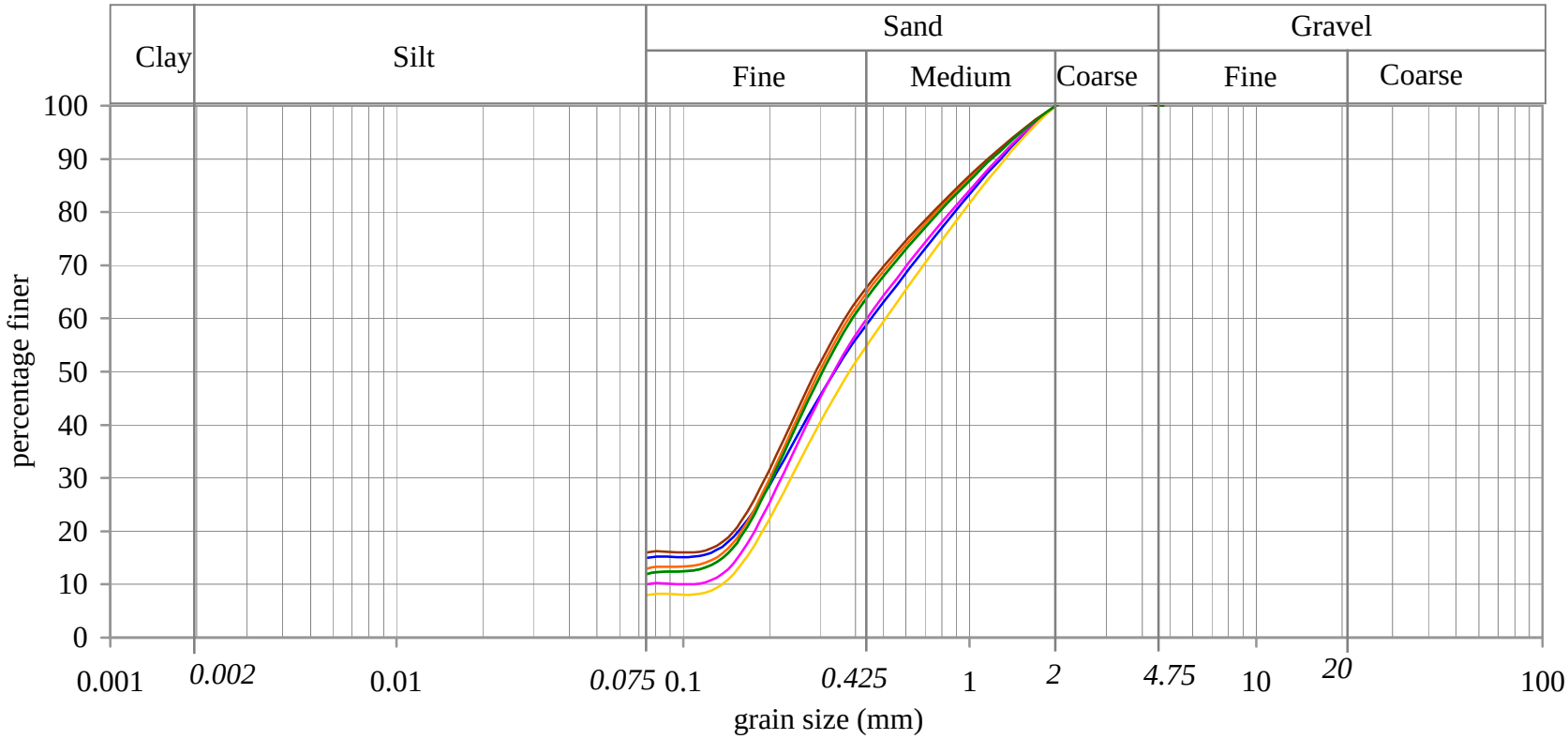
Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	1	1.5	Sandy silty clay	0	18	34	48	0.004	-	-
	1	3.0	Sandy silty clay	0	32	33	35	0.031	-	-
	1	4.5	Silty sand	0	79	21	0	0.360	-	-
	1	6.0	Silty sand	0	84	16	0	0.400	-	-
	1	7.5	Silty sand	0	85	15	0	0.400	-	-
	1	9.0	Silty sand	0	88	12	0	0.425	-	-
	1	10.5	Silty sand	0	83	17	0	0.350	-	-
	1	12.0	Silty sand	0	79	21	0	0.350	-	-



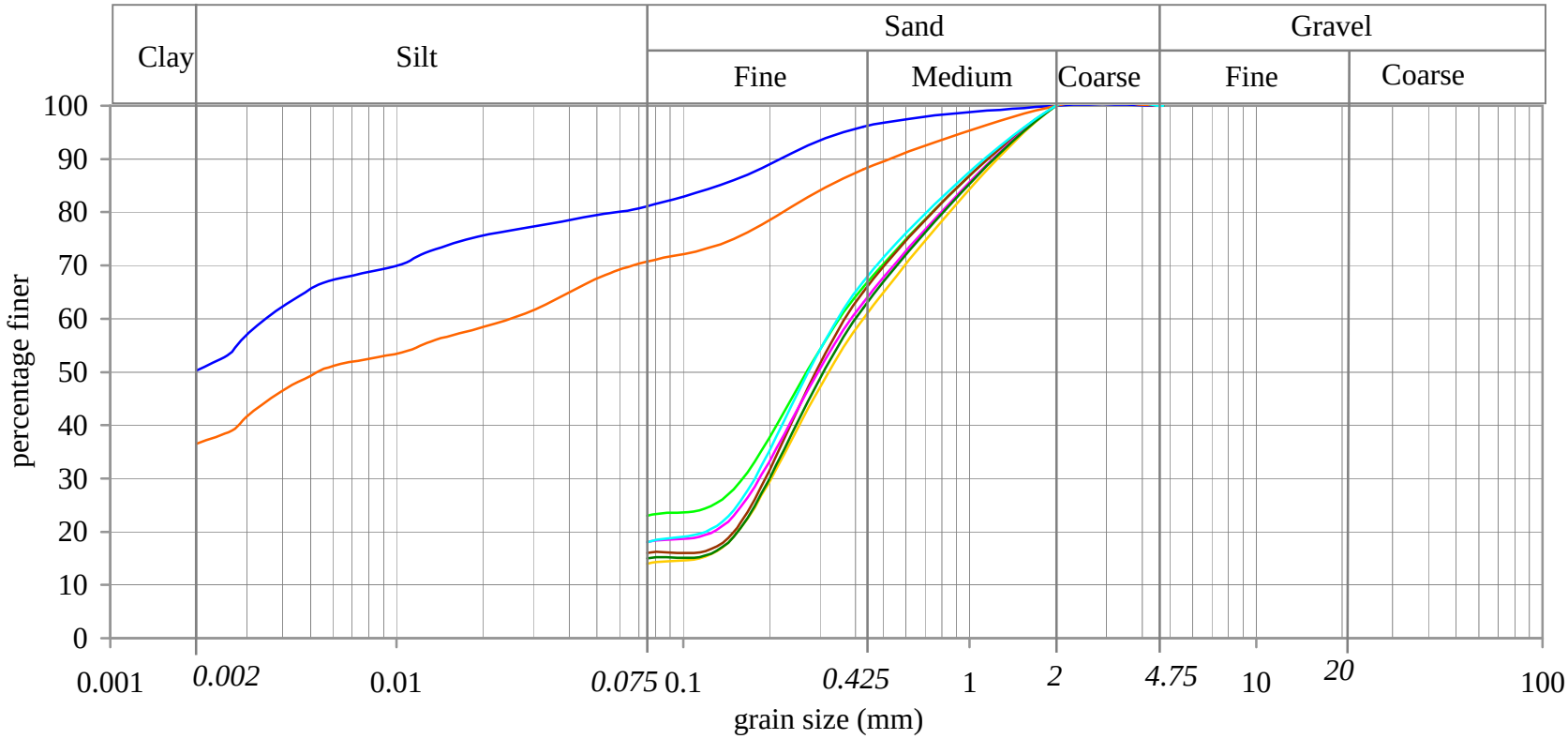
Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	1	13.5	Silty sand	0	85	15	0	0.400	-	-
	1	15.0	Silty sand	0	82	18	0	0.390	-	-
	1	16.5	Silty sand	0	86	14	0	0.425	-	-
	1	18.0	Silty sand	0	84	16	0	0.390	-	-



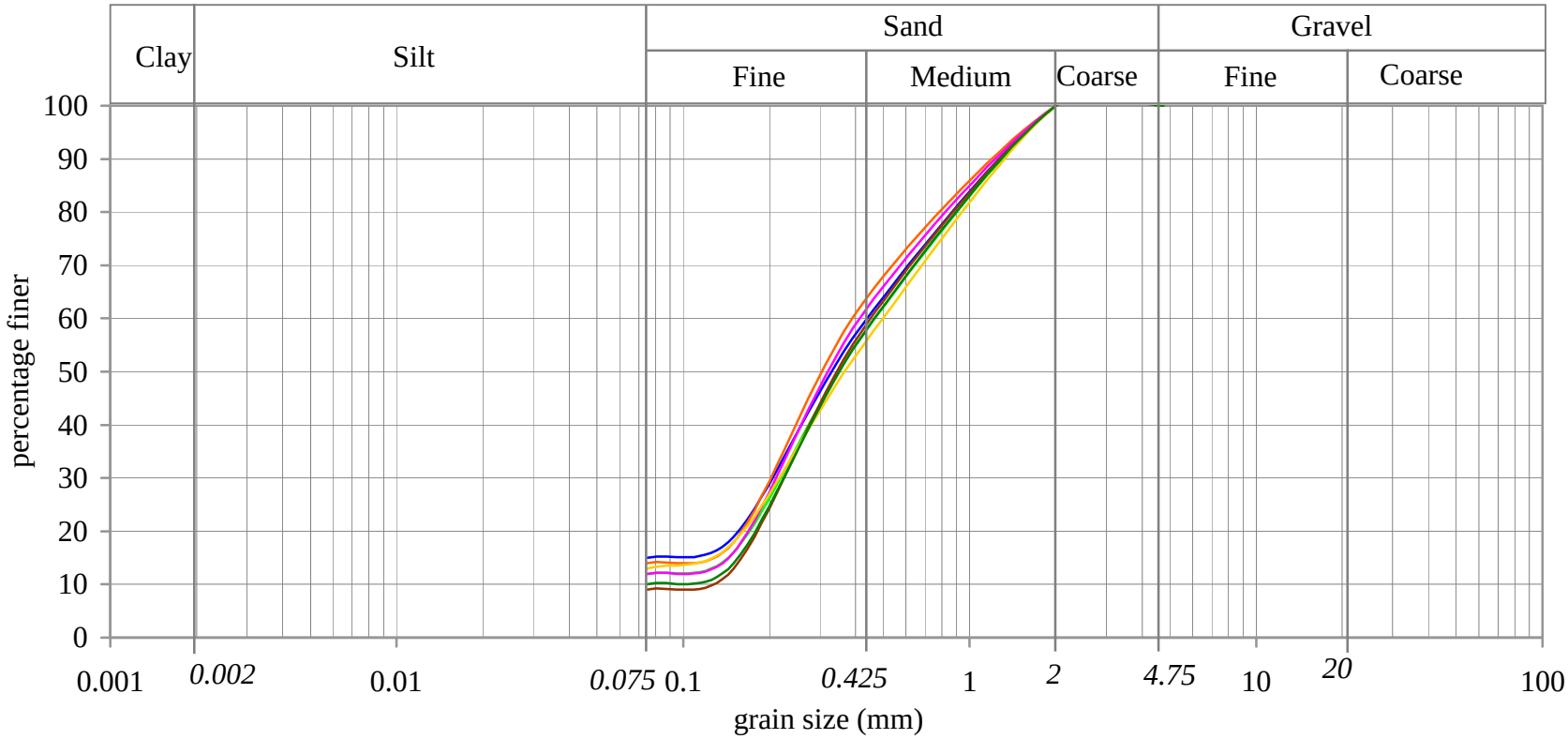
Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	2	1.0	Sandy silty clay	0	20	33	47	0.004	-	-
	2	2.5	Sandy silty clay	0	31	33	36	0.030	-	-
	2	4.0	Silty sand	0	78	22	0	0.400	-	-
	2	5.5	Silty sand	0	82	18	0	0.350	-	-
	2	7.0	Silty sand	0	82	18	0	0.350	-	-
	2	8.5	Silty sand	0	86	14	0	0.525	-	-
	2	10.0	Silty sand	0	84	16	0	0.400	-	-
	2	11.5	Silty sand	0	82	18	0	0.350	-	-



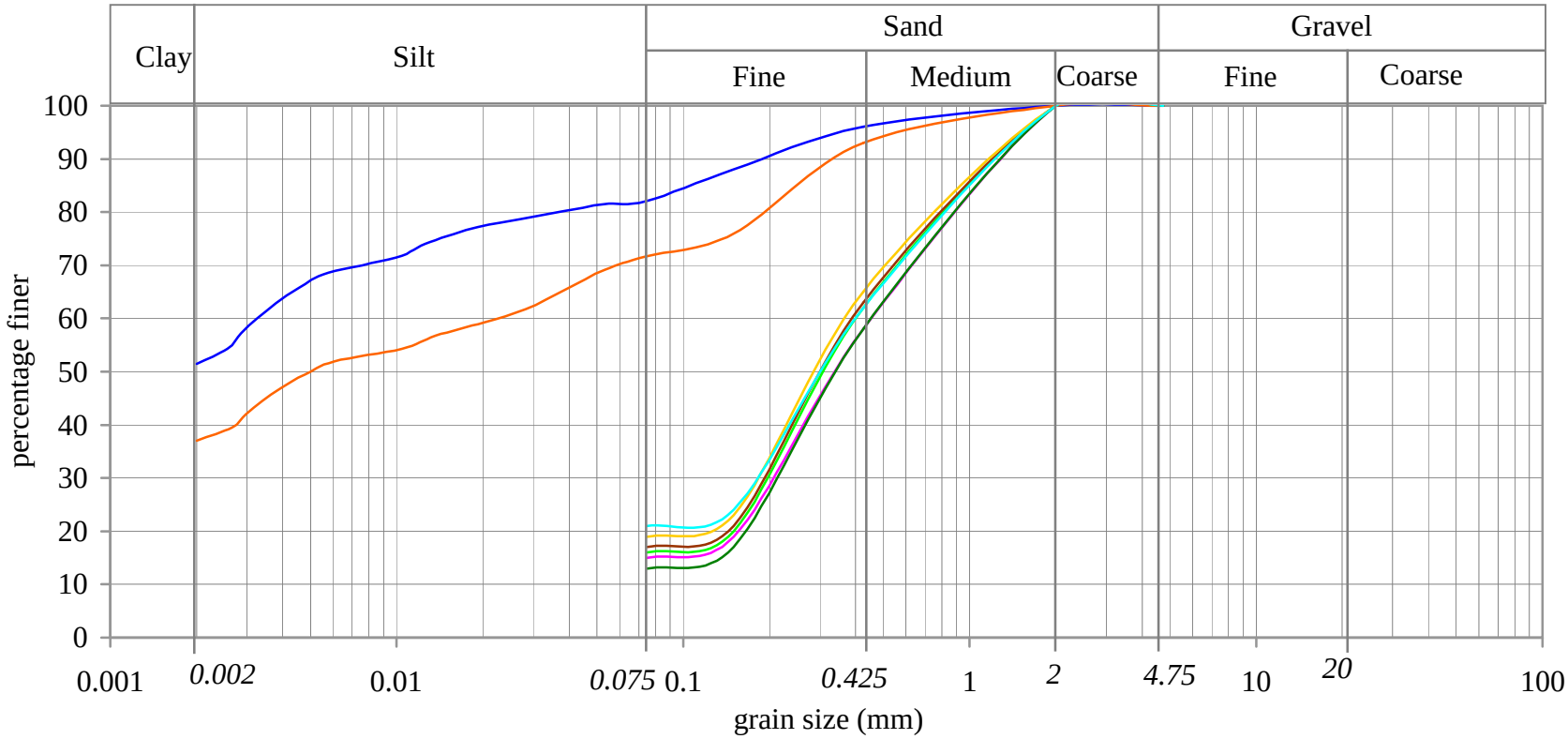
Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	2	13.0	Silty sand	0	85	15	0	0.425	-	-
	2	14.5	Silty sand	0	87	13	0	0.380	-	-
	2	16.0	Silty sand	0	88	12	0	0.400	-	-
	2	17.5	Silty sand	0	84	16	0	0.390	-	-
	2	18.5	Silty sand	0	90	10	0	0.425	-	-
	2	20.0	Silty sand	0	92	8	0	0.525	0.15	3.5
	2	21.5	Silty sand	0	88	12	0	0.425	-	-



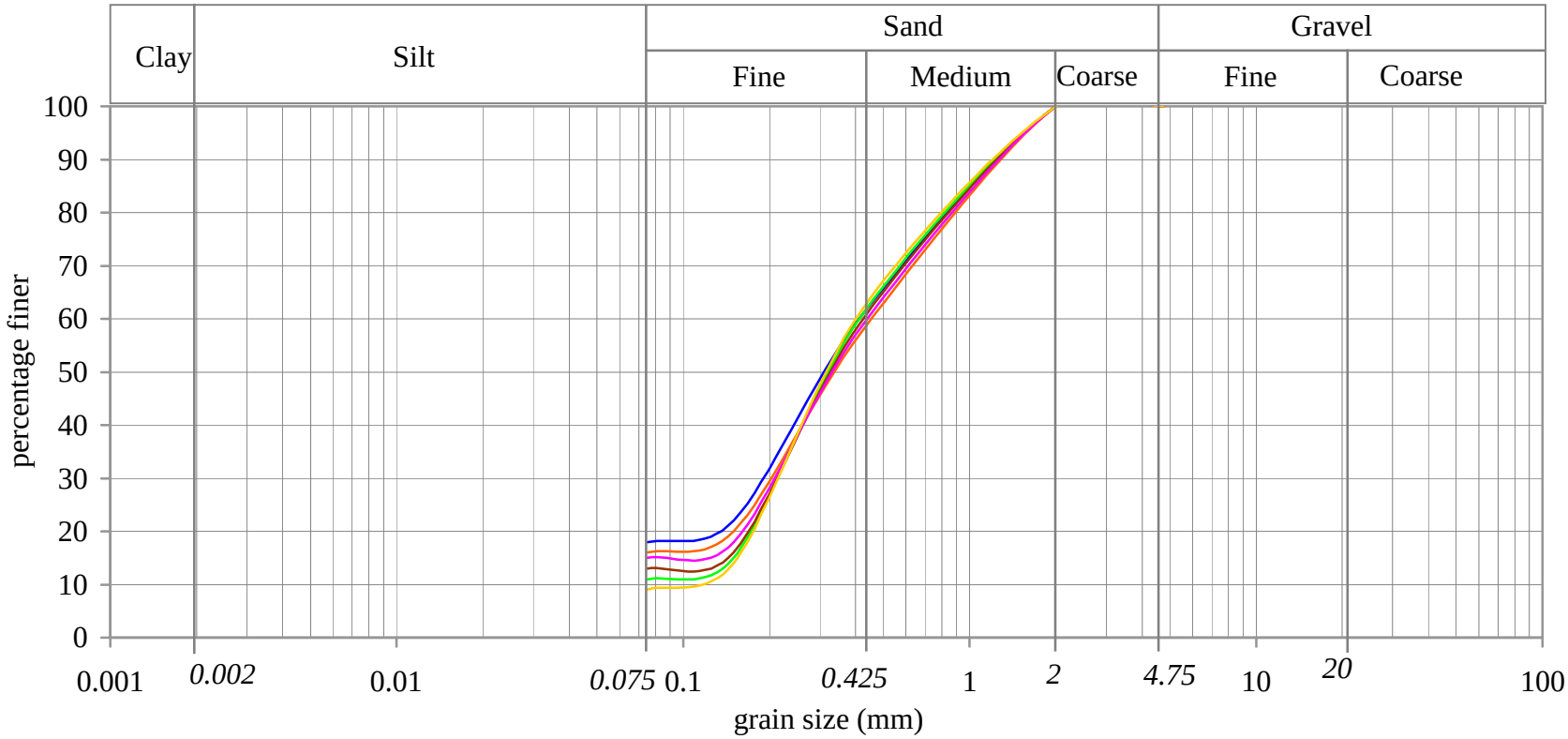
Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	3	1.5	Sandy silty clay	0	19	31	50	0.390	-	-
	3	3.0	Sandy silty clay	0	29	34	37	0.140	-	-
	3	4.5	Silty sand	0	77	23	0	0.170	-	-
	3	6.0	Silty sand	0	84	16	0	0.005	-	-
	3	7.5	Silty sand	0	82	18	0	0.008	-	-
	3	9.0	Silty sand	0	86	14	0	0.525	-	-
	3	10.5	Silty sand	0	85	15	0	0.004	-	-
	3	12.0	Silty sand	0	82	18	0	0.006	-	-



Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	3	13.5	Silty sand	0	85	15	0	0.525	-	-
	3	15.0	Silty sand	0	86	14	0	0.400	-	-
	3	16.5	Silty sand	0	88	12	0	0.425	-	-
	3	18.0	Silty sand	0	91	9	0	0.425	0.14	3.0
	3	20.0	Silty sand	0	88	12	0	0.400	-	-
	3	21.5	Silty sand	0	87	13	0	0.525	-	-
	3	23.0	Silty sand	0	90	10	0	0.425	-	-



Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	4	1.0	Sandy silty clay	0	18	31	51	0.003	-	-
	4	2.5	Sandy silty clay	0	28	35	37	0.012	-	-
	4	4.0	Silty sand	0	84	16	0	0.400	-	-
	4	5.5	Silty sand	0	83	17	0	0.400	-	-
	4	7.0	Silty sand	0	85	15	0	0.425	-	-
	4	8.5	Silty sand	0	81	19	0	0.400	-	-
	4	10.0	Silty sand	0	87	13	0	0.425	-	-
	4	11.5	Silty sand	0	79	21	0	0.400	-	-



Line Style	Bore hole	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	d_{60}	d_{10}	U
	4	13.0	Silty sand	0	82	18	0	0.300	-	-
	4	14.5	Silty sand	0	84	16	0	0.425	-	-
	4	16.0	Silty sand	0	89	11	0	0.400	-	-
	4	17.5	Silty sand	0	87	13	0	0.425	-	-
	4	19.0	Silty sand	0	85	15	0	0.425	-	-
	4	21.0	Silty sand	0	91	9	0	0.425	0.1	4.3

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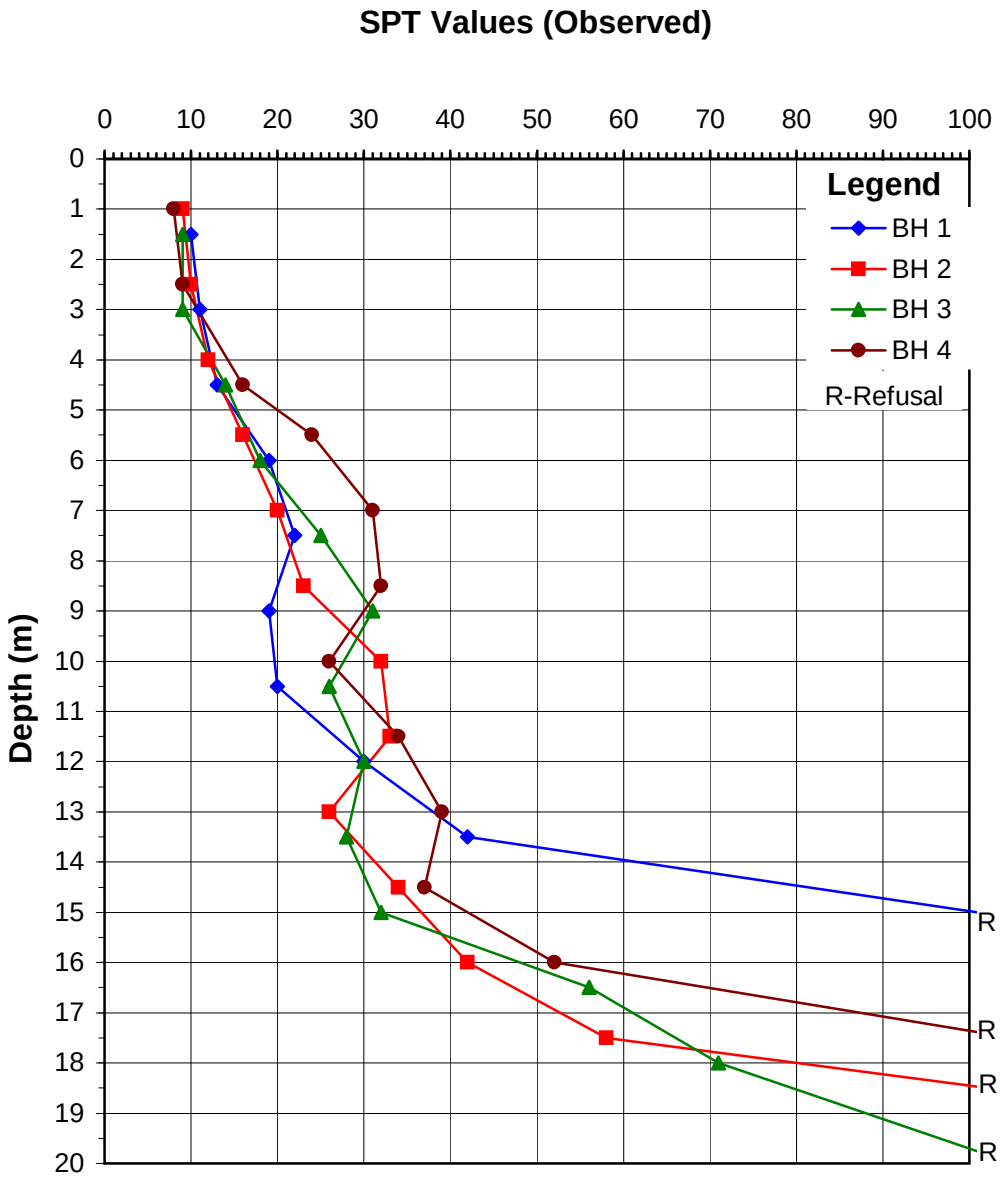
3h



SPT Values (Observed) Vs Depth Curves

G(C)9745

Annexure-3

INDIAN BANK - BUILT UP AREA STATEMENT

S.NO	DESCIRPTION	AREA (IN SQFT)
1	STILT FLOOR	36,308.40
2	FIRST FLOOR	23,278.60
3	SECOND FLOOR	23,278.60
4	THIRD FLOOR	23,278.60
5	FOURTH FLOOR	23,278.60
6	FIFTH FLOOR	23,278.60
7	TERRACE FLOOR	2,269.40
	TOTAL BUILTUP AREA OF BLOCK A & B	**1,54,970.81**

INDIAN BANK Chennai-14. CO.: ESTATE DEPT.

AMENDMENT NO.1 Dated 11-08-2023

Ref- Tender ID: IB/MYL/CONTR/001/2023-24 Dated 22.07.2023

The following amendment has been incorporated in the above-mentioned Tender ID for Selection of Contractor for the Proposed Construction of Residential Building (Stilt + 5 Floors) @ No. 2, Ramachandra Road, Luz Avenue, Mylapore, Chennai – 600 004 for Indian Bank, Corporate Office, No. 254 – 260, Avvai Shanmugam Salai, Royapettah, Chennai – 600 014

S.No	Page No / Clause No / BOQ No	As per Tender	To be read as
1	Page No. 4 of NIT (Volume I), Point No. 8	Last Date & time of Submission of Bids online (Bid due date) 18-08-2023 at 3:00 pm	Last Date & time of Submission of Bids online (Bid due date) **24-08-2023 at 3:00 pm**
2	Page No. 13 of NIT (Volume 1) Point No. 1.5 f	**Banker's Solvency certificates** f.the tenderers should have a solvency of value not less than 100% of estimated cost of the work i.e., Rs. 52.25 Crore, cetified by their bankers for this work. Banker's certificates (as prescribed in Form T-1 B) addressed to Tender inviting authority in the current financial year, should be on letter head of the Bank, issued after 01.04.2023	**Banker's Solvency certificates** **f.** the tenderers should have a solvency of value not less than 60% of estimated cost of the work ie., **Rs. 52.25 Crores X 60% = 31.35 Crores,** certified by their bankers for this work. Banker's certificates (as prescribed in Form T-1 B) addressed to Tender inviting authority in the current financial year, should be on letter head of the Bank, issued after 01.04.2023
3	Page No. 27 of GCC (Volume II), CLAUSE 10B (ii)	In General Contract Conditions (GCC) **CLAUSE 10B (ii) MOBILISATION ADVANCE - NOT APPLICABLE**	**MOBILISATION ADVANCE -** If requested by the contractor in writing within one month of the order to commence the work. Maximum of 5% of Contract value, as Interest (7% Simple interest + GST) bearing mobilisation advance will be paid against submission of Bank Guarantee (BG) for a period of 6 months or extended till such period until the advance is fully recovered. BG shall be of 110% of the mobilisation advance value. The same will be recovered equally from the first three RA bills. Utilisation report of the expenditure made on this site has to be submitted by the contractor once in fortnight
4	BOQ Item No. 1.5	Providing and erecting high temporary barricading at site as per drawing/ direction of Engineer-in-Charge which includes writingand painting, arrangement for traffic diversion such as traffic signalsduring construction at site for day and night, glow lamps, reflectivesigns, marking, flags, caution tape as directed by the Engineer-in Charge. The barricading provided shall be retained in position at sitecontinuously i/c shifting of barricading from one location to anotherlocation as many times as required during the execution of the entirework till its completion. Rate include its maintenance for damages, painting, all incidentals, labour materials, equipments and worksrequired to execute the job. The barricading shall not be removed with out prior approval of Engineer-in-Charge.	**Its to be considered as NDSR item and description to be followed.**

S.No	Page No / Clause No / BOQ No	As per Tender	To be read as
5	BOQ Item No. 10.4	Providing, and fixing of R.C.C Precast cover slab for Shaft area using M25 concrete including reinforcement Fe500 Grade, OPC 53 Grade Cement. The surface finish shall be smooth finish, at appropriate location as specified in drawing for fixing, lifting including mechanical means, loading, transportation at site including all leads, liftt at levels	Providing, and fixing of R.C.C Precast cover slab **of 125mm thick (approx.)**, for Shaft area using M25 concrete including reinforcement Fe500 Grade, OPC 53 Grade Cement. The surface finish shall be smooth finish, at appropriate location as specified in drawing for fixing, lifting including mechanical means, loading, transportation at site including all leads, liftt at levels
6	Page No. 15 - Technical Specifications (Volume IV)	Max. Unsupported length 120 cm (200 cm)	Max. Unsupported length Consider as **"200 cm"**
7	Page No. 20 of Technical Specifications (Volume IV)	**DGU (GRIHA)** **Option 1 : Guardian Glass (Neutral 70)** U- Value = 1.87 W/Sqm. K SHGC = 0.52 VLT = 69% **Option 2 : SKN 144 II (Envision)** U- Value = 1.6 W/Sqm. K SHGC = 0.24 VLT = 40%	**Consider as Glass - SKN 176 DG 6-12-6**
		Electrical	
8	Page No. 77 of Technical Specifications (Volume IV)	In Volume IV - Technical Specifications - Transformer – heading shown as - 11/0.433 KV OIL TYPE DISTRIBUTION TRANSFORMER WITH ON LOAD TAP CHANGER MECHANISM WITH AUTOMATIC VOLTAGE REGULATOR	**11/0.433 KV OIL TYPE DISTRIBUTION TRANSFORMER WITH Off Circuit Tap Switch with Locking Device**
9	Page No. 138 of Technical Specifications (Volume IV)	In Volume IV - Technical Specification - 32 NVR, 8TB Hard disk	**32 CH NVR Capacity for 30 days**
10	Page No. 138 of Technical Specifications (Volume IV)	In Volume IV - Technical Specification - 32 inch LED Monitor	**55 inch HD LED Monitor**

S.No	Page No / Clause No / BOQ No	As per Tender	To be read as
		Fire fighting	
11	Page No. 162 of Technical Specifications (Volume IV)	In Volume IV - Technical Specification - The yard hydrants will be fixed on the stand post at 30 m intervals around the building	**The yard hydrants will be fixed on the stand post at 36 m intervals around the buildings**
12	Page No. 183 of Technical Specifications (Volume IV)	In Volume IV - Technical Specification - 1.5.1 The control system shall be of microprocessor controller type, incorporating variable voltage variable frequency drive for elevators of 1.0 m/s speed."	1.5.1 The control system shall be of microprocessor controller type, incorporating variable voltage variable frequency drive for elevators of **1.2 m/s speed for 8 Passengers Lift and 1.0m/s 15 Passengers Service Lift**
		Volume V – Bill of Quantities	
13	BOQ Item No. 3.4b	Routine test (Test Load 1.5 times the Safe capacity) - 450mm dia	Routine test (Test Load 1.5 times the Safe capacity) - **"400mm dia"**
14	BOQ Item No. 10.3c	Extra for RCC/BMC/RMC work above floor V levels not required to be deleted	Item deleted
15	BOQ Item No. 10.3d (DSR Code 5.35)	Add for using extra cement in the items of design mix over and above the specified cement content therein.	New Item included
16	Page No. 7 of BOQ. New Item No. 16.3a	Supply and laying of 16mm thick extruded terracotta tiles keral tiles of grey colour of size 300 X 300mm in CM 1:4 and slope etc., complete as directed by EIC.	**Supply and laying of 16mm thick extruded terracotta tiles kerala tiles of grey colour of size 300 X 300mm in CM 1:4 and slope etc., complete as directed by EIC. Consider this item as 16.3a**
17	BOQ Item No. 29.5	Unit - Nos	Unit - **Meter**

S.No	Page No / Clause No / BOQ No	As per Tender	To be read as
		Plumbing Pumps	
18	BOQ Item No. 79	Supplying, installing, testing and commissioning of flushing water transfer Pump for flushing OHT	Supplying, installing, testing and commissioning of domestic water transfer Pump for domestic OHT
19	BOQ Item No. 86	Supply & installation of Grease separator Easy Clean free Basic under ground type, NS 1, Direct, Insp. window The separator for grease wastewater is suitable for free-standing set-up in frost-protected rooms and comes without metallic components in the tank. The collecting tank made of permanently resistant polymer (PE) is equipped with an integrated sludge trap. Manhole cover opening 610mm dia tight covers with quick-release closures allow for easy access for cleaning and maintenance work. Version: Type of disposal: manual Inlet nominal size (OD): 110 mm Outlet nominal size (OD): 110 mm Connection inlet/outlet sockets: PE-HD pipes in accordance with DIN 19537, HT pipes in accordance with DIN 19560, PP or AS Wastewater contents: Water & sludge trap - 140 L Water & sludge : 230 L Storage quantity of grease: 70 L	Supply & installation of Grease separator Easy Clean free Basic under ground type, NS 1, Direct, Insp. window The separator for grease wastewater is suitable for free-standing set-up in frost-protected rooms and comes without metallic components in the tank. The collecting tank made of permanently resistant polymer (PE) is equipped with an integrated sludge trap. Manhole cover opening 610mm dia tight covers with quick-release closures allow for easy access for cleaning and maintenance work. Version: Type of disposal: manual Inlet nominal size (OD): 110 mm Outlet nominal size (OD): 110 mm Connection inlet/outlet sockets: PE-HD pipes in accordance with DIN 19537, HT pipes in accordance with DIN 19560, PP or AS Wastewater contents: Water & sludge trap - 140 L Water & sludge : 230 L Storage quantity of grease: 70 L **Total weight - 111 KG**
		Electrical	
20	BOQ Item No. 120	Supply & Installation of 8mm dia Aluminium alloy Solid Round Conductor of material AlMgSi used in Down conductor system . Cross sectional area of conductor should be 50 mm² . Conductor is tested for Lightning Impulse current of 100 kA for 10/350 µs,Electrical Resisitivity ,Tensile strength & COrrosion test as per IEC 62561-2. Parapet Conductor Holder for fixing on the Side wall for clamping 8 mm dia Aluminium alloy round Conductor in RCC building. Metal Roof Conductor Holder is	Supply & Installation of 8mm dia Aluminium alloy Solid Round Conductor of material AlMgSi used in Down conductor system . Cross sectional area of conductor should be 50 mm² . Conductor is tested for Lightning Impulse current of 100 kA for 10/350 µs,Electrical Resisitivity ,Tensile strength & COrrosion test as per IEC 62561-2. Parapet Conductor Holder for fixing on the Side wall for clamping 8 mm dia Aluminium alloy round Conductor in RCC building. Metal Roof Conductor Holder is **considered on the metal wall .Lightning counter is required in the building and it will record number of lightning Strike in the building with date and time.Test joint with& without Enclosure is fixed in the building .All the Lightning Protection components are tested as per IEC 62561-1& 2**

S.No	Page No / Clause No / BOQ No	As per Tender	To be read as
21	BOQ Item No. 124	Supply erection testing and commissioning of Maintenance Free Earthing system comprising of Earth Electrode Cu Bonded Steel Rod 14.2mm dia x 3000mm-	Supply erection testing and commissioning of Maintenance Free Earthing system comprising of Earth Electrode Cu Bonded Steel Rod 14.2mm dia x 3000mm- **(250Microns);Eco Friendly rust proof heavy duty weather proof Polyethylene Earth Pit Chamber with following dimensions :254 mm dia (top), 330 mm dia (bottom) & 260 mm (height). ;14.2 / OD SS Clamp Both Side;Eco Safe carbon based backfill compound - 50 Pounds;and suitable clamp, as per IS 3043. CPRI test report should be produced at the time of supply including the inspection chamber, : 5Nos.**
22	BOQ Item No. 125	160 KW/200 KVA Prime Power Rated Radiator cooled Type Diesel generating Set at 1500 RPM Coupled with Alternator Rated at 160 KW/200 KVA, 415 V,	160 KW/200 KVA Prime Power Rated Radiator cooled Type Diesel generating Set at 1500 RPM Coupled with Alternator Rated at 160 KW/200 KVA, 415 V, **Mounted on a Channel Iron Base Frame, Residential Silencers Flexible Bellows First Fill of Lube Oil Radiator Coolant Pulselite Batteries Set of Foot Mounted AVM Pads Engine Controller Radiator Control Panel along with Acoustic Enclosure for outdoor application along with built in fuel tank etc., The DG set will be with AMF Panel for auto start and stop of DG set. (Including the control wiring between DG Set and common Area Panel. Approximate length between DG set and Common Area panel will be 20Mtrs.) - For detailed specification, please refer techncial specification**
		Fire fighting system	
23	BOQ Item No. 162.1	ABC type fire extinguisher	**capacity of fire extinguisher as 4Kg**
		Elevators / LIFTS	
24	BOQ Item No. 164	travel height – 16 mtr	travel height as **"18m"**
25	BOQ Item No. 165	travel height – 16 mtr	travel height as **"18m"**

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