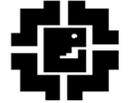




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MINUTES OF PRE-BID MEETING

Name of Work: Construction of Elevated Road From Sanganer flyover to near Malpura Gate via Choradiya Petrol Pump in Zone-8 JDA Jaipur”.

NIT for the work "Construction of Elevated Road From Sanganer flyover to near Malpura Gate via Choradiya Petrol Pump in Zone-8 JDA Jaipur” was issued on 26/05/2025 with pre-bid meeting to be held on 04.06.2025 at 03.00 PM in “MANTHAN” hall of JDA. The bid was uploaded on website (JDA/SPPP/EPROC) on 26.05.2025. The last date of submission of bid online is 27.06.2025 up to 6.00 PM with opening of bid on 03.07.2025 at 1.00 PM in Executive Engineer office.

Following are proceeding of pre-bid meeting.

- 1 Pre-bid meeting was held on 04.06.2024 in ‘MANTHAN” hall of JDA, which was attended by officers of JDA and prospective bidders as per attendance sheet attached as Annexure ‘A’.
- 2 With the permission of the chair, the pre-bid meeting was started with the welcome note by Director Engineering-II briefing about the project, scope of work, technical parameters, specifications etc.
- 3 After briefing about the project, the pre-bid queries were started to be made by the participants representing their organization/firm. The queries made and decisions taken are minutised and shall be come the part of bid document.

Following Agencies attended Pre-Bid Meeting:

Agency -1 - M/s D.R. Agrawal Infracon Pvt Ltd

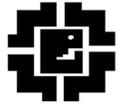
Agency -2 - M/s Transrail lighting Ltd.

Agency -3 - M/s Dayton Natural Resources Pvt Ltd



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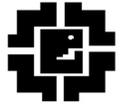
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S. NO.	ISSUE NO.	CLAUSE NO. CHAPTER NO.	AS PER TENDER DOCUMENT	PARTICIPANT'S QUERY	RESPONSE/CLARIFICATIONS
Agency-1					
Nil					
Agency-2					
1	1			We request the department to kindly reduce the performance bond from 10% of CV to 5% of CV in line with other NHAI tenders.	As per conditions of contract Clause 1: Security Deposit- it will be deducted @ 10 % of the gross amount of the running bill and shall be refunded during defect liability period as per special conditions of contract regarding Defect Liability Period (DLP) Annexure IV Clause 2 Subclause 2.2.2
2	2	Cl. 45 of Conditions of Contract pg no.102 - 108		We request you to kindly provide the breakup of percentage component for Labour , Material , Bitumen, Petroleum , Cement & Steel required for calculating the Price Variation.	Attached as Annexure A
3	3	Cl. 45 of Conditions of Contract pg no.102 - 108		We request you to kindly confirm that price variation of HT Strand shall be covered under percentage component for " Steel ".	Price variation of HT Strand has been covered under percentage component for " Steel ".

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4	4	Cl. 45 of Conditions of Contract pg no.102 - 108		The avg WPI of "Ordinary Portland Cement" shall be used for Cement and "MS - Long products " instead of "Steel Rods" for Steel as published by Economic Advisor of GOI. Please confirm.	The avg WPI of "Ordinary Portland Cement" shall be used for Cement and ""Steel Rods" for Steel. It shall be as per clause 45: Price variation clause of conditions of contract.
5	5	Special condition - schedule H - pt no. 32 and cl 3.12.2.2 of Section 3 on pg. 136 to 137 of O.C.C.	<p>The intermediate mile stones are identified as below. For Viaduct</p> <ol style="list-style-type: none"> 1. Foundations 2. Substructure. 3. Casting of PSC SEGMENTAL BOX GIRDER in Casting Yard. 4. RE wall panel casting. 5. Placing of PSC SEGMENTAL BOX GIRDER in position. 6. Bow String Girder •••• <ul style="list-style-type: none"> • Liquidated damages for not achieving key dates will be levied separately and it shall be Rs. 1,00,000.00 (Rupees One Lacs) per day for each key date. • Liquidated damages for not achieving key dates will be levied separately and it shall be Rs. 1,00,000.00 (Rupees One Lacs) per week for each key date. • Liquidated damages for not achieving less number of Piling Rig Machines as stipulated in Schedule will be levied to Rs. 60,00,000.00 (Rupees sixty Lacs) per piling. 	<p>We understand that Cl. 3.12.2.2 of O.C.C. is also applicable along with the Financial milestones as per Cl. 2 of COC pg 77 subject to total LD not exceed 10% of the Final Bill amount. We request you to kindly provide the " key dates "of intermediate milestones as per Cl. 3.12.2.2 of O.C.C. which are missing.</p>	<ul style="list-style-type: none"> • Yes, Section 3 Other Conditions of Contract, Clause 3.12.2.2. is applicable and read with clause 2 of Conditions of Contract. • Key Dates of the intermediate mile stones shall be decided after award of the work, in consultation with the successful Bidder as per the Work completion Programme provided by them. <p>It is further clarified that in Clause 3.12.2.2,</p> <p>➤ Liquidated damages</p>

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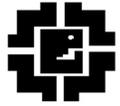
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			<p>mobilized less beyond the key date.</p> <ul style="list-style-type: none">• Liquidated damage for installing less number of casting beds for Segments in the casting yard @Rs.36,00,000.00 (Rupees thirty six lacs) per bed mobilized less beyond the key date.• These liquidated damages shall not relieve the contractor from his obligation to complete the works or from any other of his obligations and liabilities under this contract.• These liquidated damages levied shall be clubbed / included in liquidated damages as per clause 2 of GCC. However the total liquidated damages will not exceed 10 % of the final bill amount		<p>for not achieving key dates will to be levied separately and it shall be Rs. 1,00,000.00 (Rupees One Lacs) per day for each key date is applicable on foundation and substructure.</p> <p>➤ Liquidated damages for not achieving key dates will be levied separately and it shall be Rs. 1,00,000.00 (Rupees One Lacs) per week for each key date for casting of PSC Segmental Box Girder in casting yard, R.E. wall panel casting, placing of segmental box girder in position, bow string girder.</p> <ul style="list-style-type: none">• Rest as per Clause 3.12.2.2 will remain applicable.
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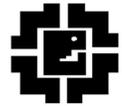
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6	6	Drawings - Section 8 on pg 214		We request you to kindly provide clear / readable copy of GAD / Other drawings	<ul style="list-style-type: none"> • Clear / Readable copy of GAD / Other drawings were made available to the participating Bidders in the pre-Bid meeting. The same are further attached (Annexure B). • However, it is clarified that the attached drawings shall be used for Reference purpose only. • Detailed Approved G.F.C. Drawings shall be made available to the successful Bidder before start of Construction work.
7	7	BOQ item no.18 on page 230	"Fabrication, Welding, Riveting, bolting by HSFG bolts wherever required, supply, transportation to site, Assembling, Launching, Erecting of steel girder spans as per drawings and specifications approved by Railway and department for composite construction (Steel +RCC) of superstructure of the project.	a) Please provide details of ROB span such as i) Span Length & width ii) Type of Super Structure i.e. Composite I girder or web girder. Kindly provide detailed drawings showing above details for the same.	<ul style="list-style-type: none"> • There is no ROB in the Project Length. • One Bow String Composite structure of

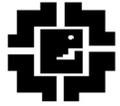
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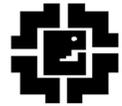
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		<p>Over Bridge with contractor's own mild steel confirming to IS: 2062 Grade 250(B) with all welds, rivets, nuts bolts rivet materials, weld materials, HSFG bolts, service bolts, with other ancillary steel structures fixed to the girder where necessary in proper level and alignment and as per where necessary in proper level and alignment and as per technical specifications etc. with contractor's own materials, fabrication, machinery, templates, fixtures, equipments tools and plants, transportation to site, skilled/ unskilled labour, excise duty., Octroi, sales tax and other taxes, all leads and lifts, descent, loading, unloading, crossing one or more Railway track if required etc. complete and as per technical specifications. The rate shall also be inclusive of cold straightening of deformed and bent girder parts before their assembly. The structural steel to be used should be manufactured by SAIL/ RINL/ TISCO/ ESSAR/ JINDAL only. For Painting prior approval for superior brand/ make of the paint should be taken from engineer in charge." "The rate shall be inclusive of supply, erection and dismantling of staging and scaffolding and other temporary arrangements required for the purpose of assembly, erection and launching of girders. The rate shall also be inclusive of cold straightening of deformed and bent girder parts before/after their assembly." Metalising girder/ girder component</p>		<p>approximate Length 76m c/c of expansion joint is proposed over Dravyawati river sections.</p> <ul style="list-style-type: none"> • Approved Good for Construction (G.F.C.) Drawings shall be made available to the successful Bidder before start of Construction work.
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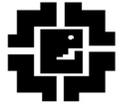
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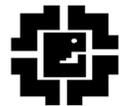
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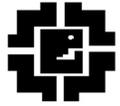
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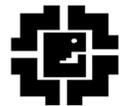
			such as cross girder, top chord channels, bracing etc of BG new steel girder as directed by engineer with epoxy paint spray not less than two layers after preparing surface by sand/grit blasting as per provision laid in Appendix VI of IRS B-1179 code (latest alteration) including one coat wash primer one coat epoxy zinc crome primer and two coat of epoxy paint with approved paint conforming to IS specification for fabrication & erection of steel girder bridge (RS B 1-79) as corrected up to date with contractor's own materials, tools, plants, labour, handling, re-handling if any including all lead, lifts descents, crossing of track/ obstruction etc. complete in all respectand as per direction of the engineer. Note:1. The fabrication of girders must be got done from RDSO approved firms only. 2. For Payment purpose, nominal weight of the girder as per drawing will only be considered.		
8	8	BOQ item no.18 on page 230	-do-	Please confirm / clarify that the weight of HSFG bolts shall be measured for payment.	The weight of HSFG bolts shall not be measured for payment.
9	9	BOQ item no. 7 - Bored CIS RCC piles & Schedule H - Special Condition - point no. 35	BOQ item no. 7:- Bored cast-in-situ R.C.C. pile with design mix concrete using batching plant, transit mixer and concrete pump, excluding reinforcement completely as per drawing and technical specifications.	Kindly confirm whether Initial & Final load testing is in Bidder's scope of work. In case if it is not in Bidder's scope of work, we request you kindly, separately incorporate	<ul style="list-style-type: none"> • Yes, it is within bidder's scope of work. • No extra Cost shall be paid to the

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			removal of excavated earth with all lifts and lead upto 1000 m. as per clause 1100, 1600 & 1700 of MoRT&H Specification including all material, labour and machinery. 1200 mm dia pile,RCC Grade M -35 (Design mix) H - Special Condition point no. 35 :- Pile Load Tests and Routine Load Tests shall be executed by doing anchor piles only. Routine & initial pile load tests shall not be measured for payment. Designs and Drawings of the anchor Piles shall be got done by the Contractor. Piling work shall exclusive by executed by hydraulic rig machine, no extra payment shall be made.	relevant items in BOQ. Kindly specify the number of tests , pile capacity & test load for Initial & Routine pile testing.	successful bidder . <ul style="list-style-type: none"> • Number of Initial Load tests shall be as per MoRTH specification Clause 1113.1 • Number of Routine Load tests shall be as per MoRTH specification Clause 1113.2 Table 1100-3. • Pile capacity determination & load test shall be done as per the designs approved by the Competent Authority.
10	10	Schedule H - special Condition - point no. 35	H - Special Condition point no. 35 :- Pile Load Tests and Routine Load Tests shall be executed by doing anchor piles only. Routine & initial pile load tests shall not be measured for payment. Designs and Drawings of the anchor Piles shall be got done by the Contractor. Piling work shall exclusive by executed by hydraulic rig machine, no extra payment shall be made.	a) Initial Pile load testing shall be permitted by either anchor or kentledge load method . Please confirm the same. b) Routine load pile testing shall be done by High Strain Dynamic Load pile test . Please confirm.	<ul style="list-style-type: none"> • Initial Pile Load tests shall be carried out by Anchor Pile Method only. • Routine Pile Load tests can be carried out by the methods recommended in the relevant I.S.Codes.

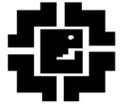
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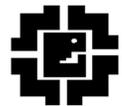
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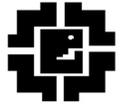
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11	11	Schedule H - special Condition - point no. 27	H - Special Condition point no. 27:- The steel strands, cement and reinforcement steel to be procured after approval of EIC.	We understand that procurement of Steel (Rebar & structural steel) shall be from Primary Steel manufactures only . Please confirm.	It is to be procured from Primary manufactures only.
12	12	Schedule H - special Condition - point no. 6	H - Special Condition point no. 06:- By submission of this bid the bidder agree to abide with all printed conditions provided in the PWD manual form 64 (Chapter 3-para 36) and subsequent modification.	We request the department to kindly provide PWD manual form 64 (Chapter 3 - para 36) and subsequent modification as applicable for subject tender for ready reference.	Attached as Annexure C
13	13	Schedule H - special Condition - point no. 39	H - Special Condition point no. 39:- All the applicable permits/NOC's/Traffic diversion permission and plan shall have to be arrange and borne by the bidder at their own cost. However JDA may assist in obtaining such permissions/NOC. Any delay in obtaining such permits/NOC shall not be considered for delay in works as per agreement.	We request the Employer to arrange all the necessary permits, licenses, clearances & approvals as required from the various Government bodies / Railways prior to award of work/ during execution as required. Any deposit / cost shall be borne by the Employer.	<ul style="list-style-type: none">• All the necessary permits, licenses, clearances & approvals as required from the various Government bodies / Railways shall be obtained by the successful Bidder at their own cost.• JDA shall only provide assistance in this regard.• Any delay in obtaining such permits/NOC shall not be considered for delay in works as per agreement.

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14	14	Schedule H - special Condition - point no. 40	<p>H - Special Condition point no. 40:- Any damages of the utilities and underground services, during execution of work caused by contractor/machinery/labour will have to be restored by the bidder at his own cost for which no extra payment shall be made.</p>	<p>We request the Employer to arrange to provide details of all the chartered / unchartered utilities & underground services envisaged to be encountered during execution of work.</p>	<ul style="list-style-type: none"> • Details of the chartered / unchartered utilities & underground services envisaged to be encountered during execution of work are available with the E.E. office and can be obtained by the participating Bidder. • The information so provided will be for reference purpose only. • It will be responsibility of the successful bidder to carry out additional surveys and no extra cost will be paid to the successful bidder.
15	15	Cl. No. 3.7.3	<p>Cl. No. 3.7.3 (d) :- The contractor shall construct and maintain the 2 lane diversion road with bituminous surface road for bridge work for smooth movement of all traffic during construction period. No cost will be payable for this diversion work.</p>	<p>Please confirm whether construction & maintenance of 2 lane diversion road shall be in bidder's scope of work. If yes, please confirm that the payment towards the same shall be paid under relevant BOQ</p>	<p>Construction & maintenance of 2 lane diversion roads in bidder's scope of work. No payment will be payable to the</p>

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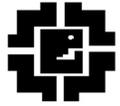
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				items.	Contractor.
16	16	BOQ item nos. 7, 8,9,12,13, 16, 17, 22,24,73,74, 75,77 & 79		We understand that Unit rate for RCC BOQ items nos. such as 7, 8, 9,12,13, 16, 17, 22, 24,73, 74, 77 & 79 are excluding cost of TMT bar reinf. and the same shall be payable seperately under relevant BOQ item no. 10,14 & 78 of TMT bar reinf. respectively. Please confirm.	Yes, as per relevant BOQ item.
17	17	BOQ item nos. 15	Supplying, fitting and fixing in position true to line and level POT-PTFE bearing consisting of a metal piston supported by a disc or unreinforced elastomer confined within a metal cylinder, sealing rings, dust seals, PTFE surface sliding against stainless steel mating surface, complete assembly to be of cast steel/fabricated structural steel, metal and elastomer elements to be as per IRC: 83 part-I & II respectively and other parts conforming to BS: 5400, section 9.1 & 9.2 and clause 2006 of MoRT&H Specifications complete as per drawing and approved technical specifications and as per clause 2000 & 2200 of MoRT&H Specification including all scaffolding, material, labour machinery etc.	Kindly provide the detailed drawing of Bearings showing details such as Nos/ span , Load capacity , movement , etc complete.	Detailed drawing of Bearings showing details such as Nos/ span , Load capacity , movement , etc complete along with the approved G.F.C. Drawings shall be made available to the successful bidder before start of the construction work.

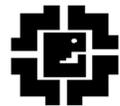
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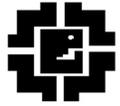


18	18	BOQ item no. 20 - Erecting/Launching of precast girders/Precast box girder on place by suitable method	Erection/Launching of precast Girders/precast box Girders on place by suitable method as per approved by Engineer Incharge. The detailed methodology to be submitted by agency including transportation of the girder from the casting / stacking yard, lifting of the girder. The rate includes the cost of operation of Launching equipments and its appurtenances, secondary cranes required, and TPS Beams etc complete.	Overall maximum width of superstructure for proposed project is not clear as the GAD drawing is not clear . Kindly specify the maximum weight of precast unit required to be erected. Further, whether it is permitted to cast & erect precast Spine unit & Wing units separately i.e. Spine unit shall be erected first , followed by erection of Wing units on either side ? Please confirm.	<ul style="list-style-type: none"> • Dimensions can be re verified from the GAD/ plan profile attached with Annexure B or with the drawings available at the EE office. • Approximate weight of one segment of Spine and Wing of 2 to 2.5m length will varies from 70 to 75 Tonnes • Complete segment shall be cast including spine and wing together and brought to site for launching.
19	19	BOQ item no. 21 - HT strands on page 230.	Providing and laying High tensile steel wires/strands at any level including all accessories for stressing, stressing operations and grouting complete as per drawing, technical specification and as per clause 1800 of MoRT&H Specification.	We request you to kindly provide the details of HT strands such as Type of cable system (such as 19K15, 12T13 , etc.,)	<ul style="list-style-type: none"> • In general, prestressing with 19K13 type of cables has been proposed. • Details shall be made available to the successful Bidder along with the approved G.F.C. Drawings

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					before start of the construction work.
20	20	BOQ item no. 21 - HT strands on page 230 - (Qty - 761.238 MT)	-do-	Kindly confirm whether there is any transverse cable in Superstructure. If yes , then kindly provide bifurcation of HT strand quantity i.e. Longitudinal cables & Transverse cables.	No
21	21	SCHEDULE - III - 3(d) on page no. 33		We understand that the minimum requirement to be deployed as per the list of Machinery & Equipment mentioned in Schedule- III is tentative & not mandatory . Hence, the Contractor can increase / decrease the same based on their methodology adopted during execution.Please confirm the same.	<ul style="list-style-type: none"> The list of Machinery & Equipment mentioned in Schedule- III is minimum. However, the successful bidder can increase the machinery and equipment based on methodology adopted for the work.
22	22	Right of Way (ROW)		Kindly provide the width of ROW of Construction Zone to be handed over to the Contractor along the project alignment. Also, we request you to kindly handover encroachment / hindrance free before issue of Award of Work to the Contractor.	<ul style="list-style-type: none"> Width required for construction of elevated road is available. If any encroachment /hindrance is exist at site, it shall be got removed &

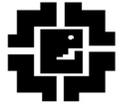
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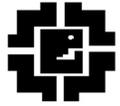


					encumbrance free site shall be made available for construction work.
23	23	Client Facilities as per clause no. 3.5.1.2 on page 125	The contractor shall provide and maintain at the work site, an air conditioned site office for Employer's engineering staff, of floor area not less than 45 Sq M with three rooms of adequate size reasonably well furnished with furniture, computer monitoring system with operating system software and latest (authenticated) working software like Auto Cad, Primavera / MS project MS word, MS Excel, etc, and coloured multi functional printer (MFP) A-3size printer. The site office shall also be equipped with 5G broadband connection (speed not less than 300 mbps), with attached toilet and watch and ward and one attendant. The contractor shall also arrange all necessary IRC codes, IS codes MoRTH Specifications and other technical literature, etc as directed by EIC of latest version in soft copies as well as hard copies, in the site office. The contractor shall bear the monthly cost of electricity, water consumption, broadband, stationary and other consumables of the site office. On the extra shall be payable on this account and the bided cost of contract shall be deemed to include in the cost for the main works, in case of any satisfaction of the services being provided.	In view of Item rate Tender, we request you to kindly include appropriate item in the BOQ towards the Site office for Employer's engineering staff.	No change. As per bid document.

Signature valid

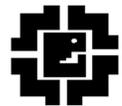
Digitally signed by Narendra Agrawal
Designation: Executive Engineer
Date: 2025.06.17 13:33:34 IST

Reason: Approved



JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

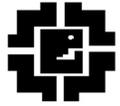
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			maintained a maximum deduction of Rs. 50,000.00 per month will be made by the EIC.		
24	24	Client Facilities as per clause no. 1.5.1.4 on page 126	The contractor shall provide and maintain, hard top passenger jeeps c.g. Mahindra Bolero or equivalent make for Employer's engineering staff for project related travelling in Jaipur in accordance with Clause 124 of MORTH Specifications, IV Revision. At least one such vehicle shall be provided at all times day and night as required by the Engineer-in-charge and/or their staff Nothing extra shall be paid for such provision of vehicle. In case of non-provided a maximum deduction of Rs. 50,000 per month will be made by EIC.	In view of Item rate Tender, we request you to kindly include appropriate item in BOQ toward the Vehicle for Employer's engineering staff.	No change. As per bid document.

Signature valid

Digitally signed by Narendra
Agrawal
Designation : Executive Engineer
Date: 2025.06.17 13:33:34 IST
Reason: Approved



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25	25	Width of Barricading permitted	TECHNICAL SPECIFICATIONS. Page no. 146 Barricading: The contractor shall have to provide temporary boundary wall/ barricading as per tender drawing at all the land to be used for Construction Subway, store, site office, casting yard etc. The barricading of same will be paid as per BOQ. Other requirements of Safety, Health & Environment as specified in condition of contract on SHE version is included in quoted price.	Kindly confirm the maximum width of ROW permitted to be barricaded along the alignment for construction work during the execution.	Contractor shall carry out Barricading as per site requirement in conformity with the Technical Specifications contained in the bid document.
26	26	General	TECHNICAL SPECIFICATIONS. Clause No. 2.2.2 page no. 147 Geotechnical Information More detailed information can be referred in the offices of Engineer/Employer	Bidder requests you to furnish the geotechnical report prepared during the DPR stage for correct assessment of foundation depth /strata.	Attached as Annexure D for reference purpose only.
27	27	General	TECHNICAL SPECIFICATIONS. Clause No. 2.4 page no. 148 The employer shall provide the right of way of the road works and other appurtenant works to the contractor. However, the contractor shall have to make his own arrangements for the land required by him for borrow areas, quarries, site offices, testing labs, labour camps, stores, plants and casting yards etc.	We request Department to provide us land nearby to site for site establishment, Installation of Batching plant, Casting yard, labour camp (approx. 7-8 acres) etc. free of cost nearby the site . Kindly provide the lead/distance of the same from site.	Land for site establishment including site office, installation of batching plant, casting yard, labour camp, etc. has to be identified by the successful bidder at his own cost.
28	28	General		Please provide the following documents for reference: 1. CAD file of alignment (Plan & Profile) 2. KMZ file 3. Traffic diversion Plan by Narendra	<ul style="list-style-type: none"> CAD file of alignment (Plan & Profile) shall be made available to the successful Bidder KMZ file shall be made available on

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Designation: Executive Engineer

Date: 2025.06.17 13:33:34 IST

Reason: Approved



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					<p>demand from Executive Engineer-8 office.</p> <ul style="list-style-type: none"> Traffic diversion plan will have to be submitted by the bidder as per the site condition after award of work.
Agency-3					
29	1			<p>Please confirm if the row of the project alignment is encroachment free as on today, or else provide the encroachment status as it becomes paramount important to plan the construction stages of the project before tender to arrive at an optimum cost.</p>	<ul style="list-style-type: none"> Width required for construction of elevated road is available. If any encroachment /hindrance is exist at site, it shall be got removed & encumbrance free site shall be made available for construction work.
30	2		<p>TECHNICAL SPECIFICATIONS. Clause No. 2.4 page no. 148 The employer shall provide the right of way of the road works and other appurtenant works to the contractor. However, the contractor shall have to make his own arrangements for the land required by him for borrow areas, quarries, site offices, testing labs, labour camps, stores, plants and casting etc.</p>	<p>It is requested to provide a govt owned land for casting yard maybe at a cost because finding a govt land is easier than to find a private land and any which way the same will be returned back to the land owner after completion of the project.</p>	<p>Land for site establishment including site office, installation of batching plant, casting yard, labour camp, etc. has to be identified by the successful bidder at his own cost.</p>

Signature valid

Digitally signed by Narendra Aggarwal

Designation : Executive Engineer

Date: 2025.06.17 13:33:34 IST

Reason: Approved





JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

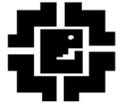
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31	3			Please provide the autocad file of GAD the current one is not readable.	CAD file of GAD shall be made available to the successful Bidder. PDF of GAD is attached as Annexure B
32	4			Although the RFP allows an extension of time in case of design approval delays it does not define the number of days after which if the design is not approved by the authority, then the contractor shall be eligible to submit the EOT application for the same.	Extension of time for the work will decided on merit and demerit of the case.
33	5			Please mention the total length of this elevated road, seems the same is not listed anywhere in the RFP document	GAD attached as Annexure B can be referred for approximate total length of this elevated road.
34	6			Please share all the plans and sections of GAD as prepared by the DPR consultant in AutoCAD formate. Please specify the resolution mechanism sherein 2 bidders quote same percentage rate for this tender.	Shall be got provided through consultant after award of work.

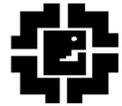
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Agrawal
Designation : Executive Engineer
Date: 2025.06.17 13:33:34 IST
Reason: Approved



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35	7			The tender specifies to start the work within 10 days after the award of contract however it puts te onus of identifying and acquiring land for casting yards to the contractor, it may please be noted that land arrangement needs more time hence this requirement may be relaxed upto 1 month.	No change. As per bid document.
----	---	--	--	---	------------------------------------

Narendra Agrawal
Executive Engineer-8

Copy to :-

1. PS to Commissioner, JDA, Jaipur
2. PS to Secretary, JDA, Jaipur
3. Director Engineering-II, JDA, Jaipur
4. Director Finance, JDA, Jaipur
5. Director Law, JDA, Jaipur
6. Additional Chief Engineer-III, JDA, Jaipur
7. Superintending Engineer-XVII, JDA, Jaipur
8. M/s Thought Consultants Pvt. Ltd, Jaipur
9. Perspective Bidders
10. Guard File

Signature valid

Digitally signed by Narendra
Agrawal
Designation : Executive Engineer
Date: 2025.06.17 13:33:34 IST
Reason: Approved

Narendra Agrawal
Executive Engineer-8

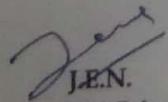
Annexure A

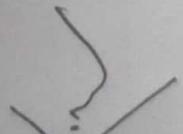
JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

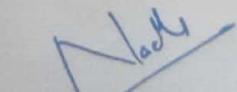
Name of work :-Construction of Elevated Road From Sanganer flyover to near Malpura Gate
via Choradiya Petrol Pump in Zone-8 JDA Jaipur

Factor for Price Escalation

Labour (P ₁)	16.39%
Cement (P _c)	11.13%
Steel (P _s)	49.47%
Bitumen - (P _b)	2.50%
POL-P	8.91%
Other materials (P _m)	11.60%
<u>Total</u>	<u>100.00%</u>


J.E.N.
JDA,Jaipur

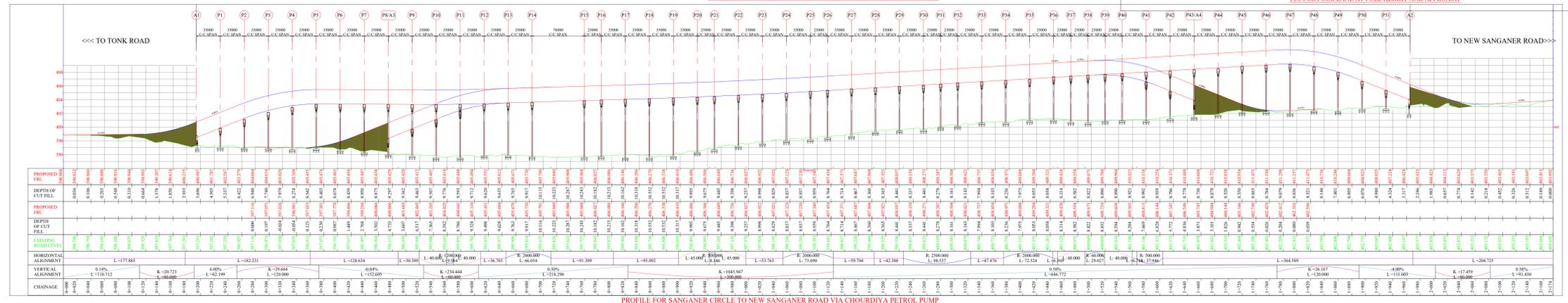
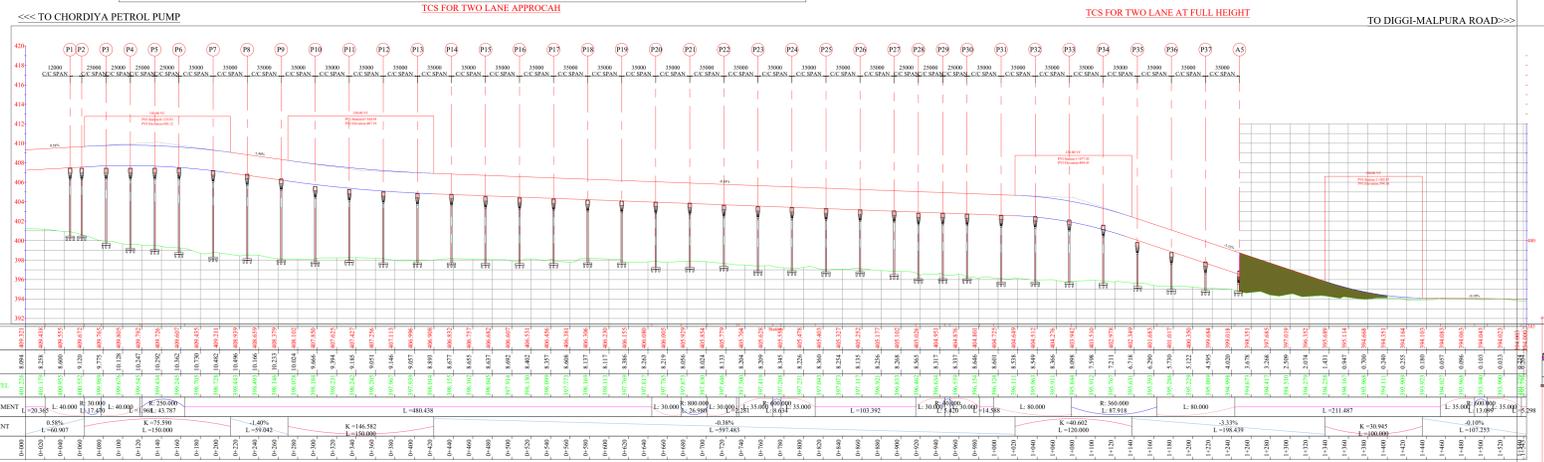
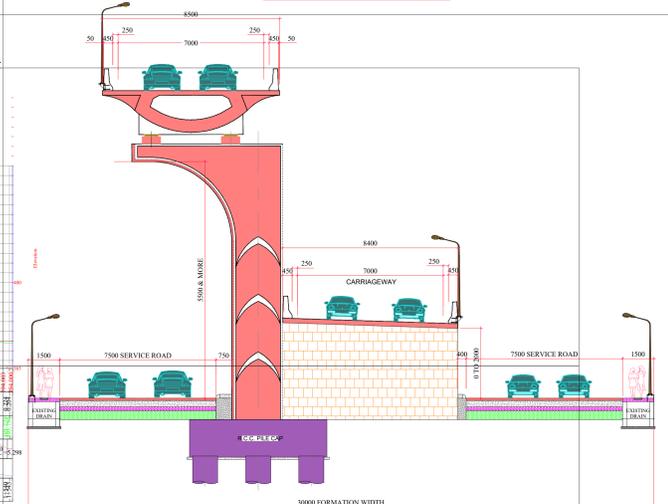
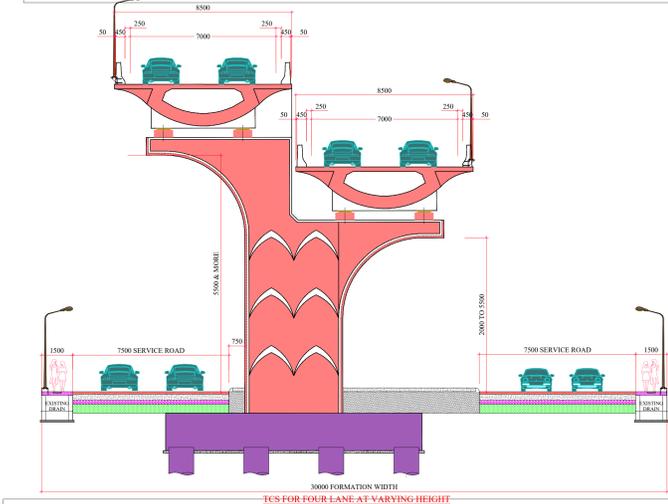
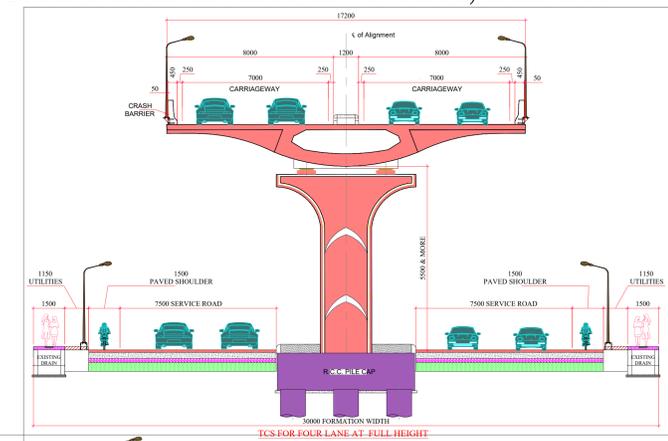
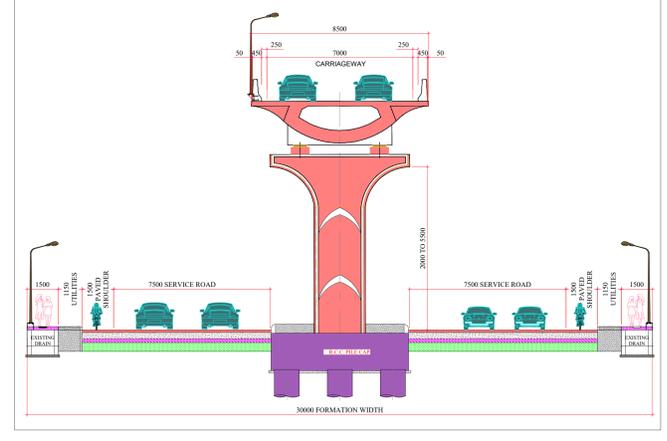
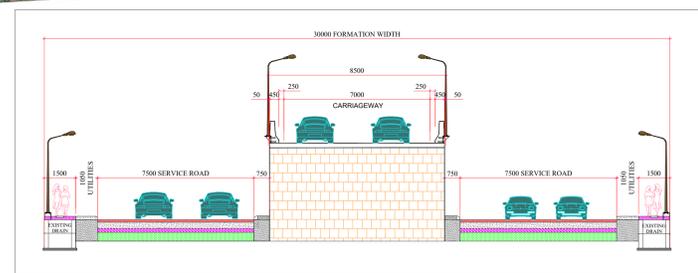
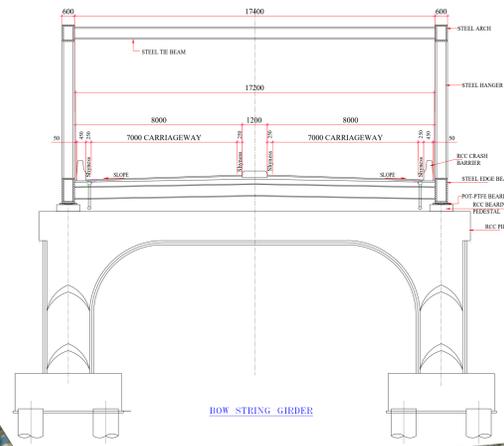

~~A.E.N.~~
~~JDA,Jaipur~~


Executive Engineer
JDA,Jaipur


Supdt. Engineer
JDA,Jaipur

CONSTRUCTION OF ELEVATED ROAD FROM SANGANER FLYOVER TO NEAR MALPURA GATE VIA CHORADIYA PETROL PUMP IN ZONE - 8 JDA, JAIPUR

ANNEXURE B



DATE	R	MKD.

CLIENT :-
JAIPUR DEVELOPMENT AUTHORITY

DESIGN CONSULTANT:-
THOUGHTS CONSULTANTS JAIPUR PVT. LTD.
 D 13 SHANTI PATH TILAK NAGAR, JAIPUR
 TEL : +91-9829055330
 E MAIL : thoughts.jaipur@gmail.com

PROJECT:-
CONSTRUCTION OF ELEVATED ROAD FROM SANGANER FLYOVER TO NEAR MALPURA GATE VIA CHORADIYA PETROL PUMP IN ZONE - 8 JDA, JAIPUR

DATE	APR.-2025
DRAWN BY	KAILASH
DESIGNED BY	SUDHIR JANGIR
CHECKED BY	DEEPAK SHARMA
APPROVED BY	ASHISH GUPTA

DRAWING TITLE :-		
PLAN PROFILE		
DRAWING NO. :- THOUGHTS/STRUCTURE/ELEVATED/JDA/PLAN PROFILE		
SCALE :- AS SHOWN	SHEET NO. :- 01 OF 01	SHEET SIZE :- A0

ANNEXURE C

P.W.D.M.F. 64
(Para 28.23.5, Chapter 28)

Monthly Progress Report of Road works from Junior Engineer to Assistant Engineer

Part-A

SECTION
ENDING

MONTH

S.No.	Name of Road	Job No.	Adm. Sanction				Tech. Sanction		
			Length	Type	Ref.	Amt.	Length	Date	Amount
1	2	3	4a	4b	4c	4d	5a	5b	5c

Expenditure up to March of preceding year	Length Completed in all respects up to end of March of preceding year (Km.)	Equivalent length completed up to end of March of Preceding year (Km.)	Date of completion Zone wise		Physical Tragets up to end of quarter during the year (Km.)	Physical Achievements up to the end of month during the year	
			Stipulated	Likely		Equivalent length (Km.)	Completed length in all respect (Km.)
6	7	8	9a	9b	10	11a	11b

Financial Progress		Town/Villages Panchayat HQ. Connected during the month	Wether progress is slow or satisfactory	Bottlenecks & reasons for delay & slow progress (Give code Nos.)	Progress for removal of bottle necks slow progress	Remarks
Target upto the end of month BE/Fist Reviewed/R.E.	Expenditure upto the end of month during the year					
12a	12b	13	14	15	16	17

Note : 1. See on reverse for codes of bottlenecks fomula for equivalent length.

No.
.....

Dated

Copy submitted to the Assistant Engineer, P.W.D., Sub-Division
for information and necessary action.

Junior Engineer,
P.W.D., Section

Code of Bottlenecks	
1 Land not aviable	01
2 Survey not done	02
3 Estimate not prepared	03
4 Estimate not sanction	04
5 Tenders not approved	05
6 Funds not available	06
7 Inadequate Aministrative sanction	07
8 Revised estimate not prepared	08
9 Revised estimate not sanctioned	09
10 Alignment dispute	10
11 Inadequate supply of bitument cement coal etc.	11
12 Contractor's laxity	12
13 Seasonal delay	13
14 Shortage of manpower construction agency	14
15 Machinery Problems	15
16 Any other reasons	16
(a)	
(b)	
.....	

Formula to Calculate Equivalent Length		
1 Earth work including compaction		0.20
2 Culverts cause ways or drainage		0.10
3 Material collection		
(a) Loer layer		0.15
(b) Top layer		0.15
4 Consolidations		0.20
5 Wearing Cost		
(a) Material Collection		0.10
(b) Consolidation		0.10
	Total	<hr/> 1.00 <hr/>

Note : Where shoulders are to be provided the above tables may be suitably rephrased



JAIPUR DEVELOPMENT AUTHORITY

ANNEXURE D

PROJECT

Engineering and Architectural Consultancy for Design of Flyover and Elevated road in Jaipur :

A. Construction of Elevated road from Sanganer circle to Choradiya petrol pump



GEO TECH-INVESTIGATION REPORT



THOUGHTS CONSULTANTS JAIPUR PVT. LTD. D-13,
SHANTI PATH, TILAK NAGAR, JAIPUR TEL : +91-9829055330
E MAIL : thoughts.jaipur@gmail.com

E.T.T.L.
ENGINEERING TRAINING TESTING AND CALIBRATION LABORATORY

Report No. JP/ETTL/24-25/TE-85060310914-1 L2



Geotechnical Investigation Report



E.T.T.L.

ENGINEERING TRAINING TESTING AND CALIBRATION LABORATORY
(AN ISO 9001:2015 CERTIFIED CO.)

NABL ACCREDITED LABORATORY

Report No. JP/ETTL/24-25/TE-85060310914-1 L2			
ULR No.: - TC127432400006031F			
Issued To:	M/s Thoughts Consultants Jaipur Pvt. Ltd.	Sample ID:	6031-1
		Date of Booking:	14.09.2024
		Date of Report:	07.10.2024
Name of Work:	Construction of Elevated Road from Sanganer circle to Choradiya petrol pump.		
Location	Sanganer, BH 01, BH 02, BH 03 & BH 04		
Client:	Jaipur Development Authority Zone 08		



E.T.T.L.
ENGINEERING TRAINING TESTING AND CALIBRATION LABORATORY

Report No. JP/ETTL/24-25/TE-85060310914-1 L2

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2. FIELD INVESTIGATION:.....	4
3. CLASSIFICATION CRITERIA OF ROCK MASSES:	7
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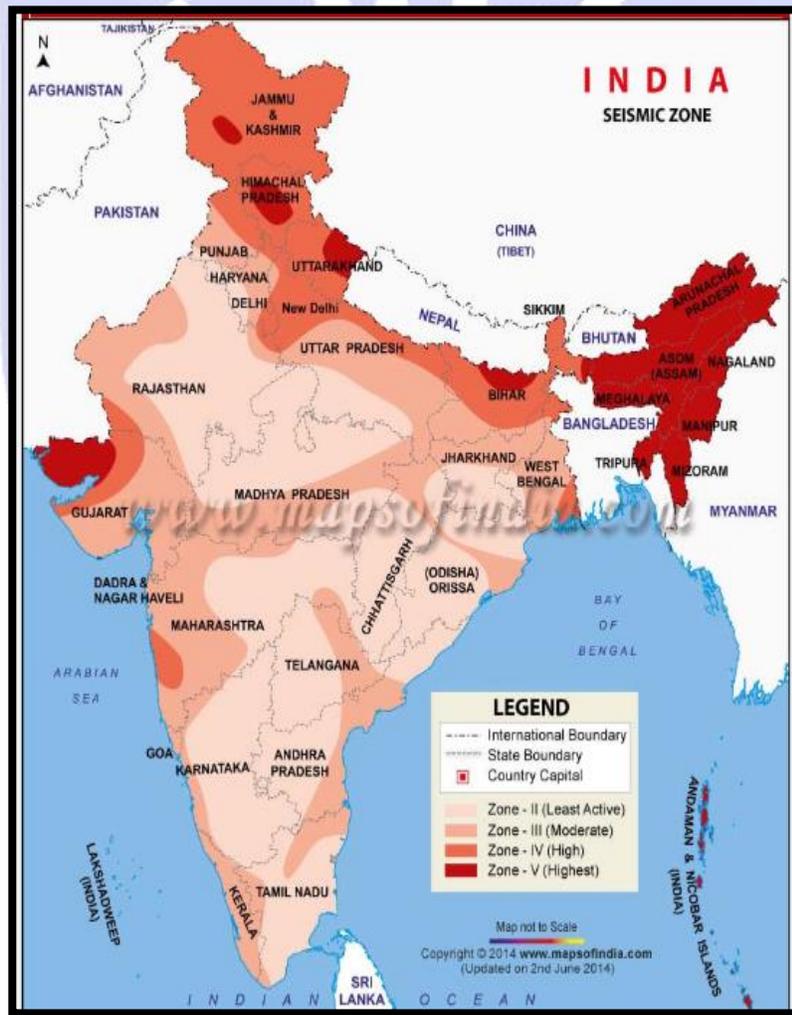
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Report No. JP/ETTL/24-25/TE-85060310914-1 L2

1. INTRODUCTION:

The work of conducting the detailed Geotechnical Investigation has been awarded to us who includes investigation in field, laboratory testing of bulk samples collected from the site and submission of the test report.

This report includes the detail of Methodology of investigation, collection of samples, field and laboratory test result including their interpretation/ analysis, recommendations on the properties of soils required for design of foundation and suggesting suitable type of foundation and safe allowable bearing capacity for safe and strong foundation for various structures.



Seismic Map of India

Source: National Disaster Management Authority



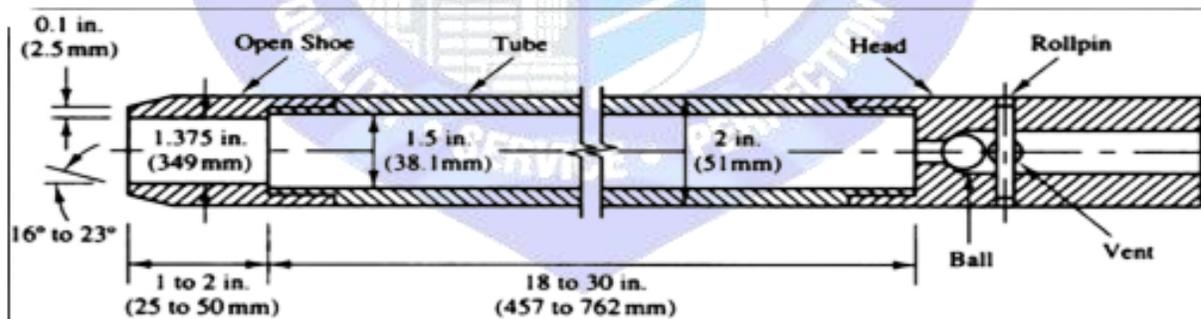
E.T.T.L.
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Report No. JP/ETTL/24-25/TE-85060310914-1 L2

2. FIELD INVESTIGATION:

The field investigation work at the sites under consideration of this part of the report was carried out, boreholes of diameter 150 mm, the boreholes were progressed by using power driven rotary drilling machines. In disintegrated and hard rock strata boreholes were progressed using NX size (75 mm diameter) double tube barrel with diamond bit. As the core recovery was from top the rock drilling was done. Standard Penetration Tests were conducted at 1.50 meter interval up to the depth as per the procedure laid in IS: 2131-1981 in all the bore holes whereas possible. For conducting the test, the bottom of the borehole was properly cleaned and split spoon sampler was properly seated in position in the borehole. The split spoon sampler resting on the bottom of borehole was allowed to sink under its own weight; then the sampler was allowed to penetrate 15 cm with the blows of the hammer 63.50 kg weight falling free through 75 cm, thereafter the split spoon sampler was further driven by another 15 cm. For the 3rd and final drive, the sampler was further allowed to penetrate 15 cm. The number of blows required to affect each 15 cm of penetration was recorded. The first 15 cm of drive is considered to be seating drive.

Structure of SPT Sampler



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The total blows of penetration for the second and third 15 cm of penetration is termed the penetration resistance N. The N' values are indicative of the compactness/ relative density of cohesion less soils and consistency of cohesive soils.

In case the blows count of SPT in soil (including the number of blows of seating) exceeds 100, the corresponding penetration was recorded and this particular test at that depth stopped. If the total penetration is more than the seating penetration of 15 cm, then breakup of blows count for 15 cm seating penetration and for remaining portion of penetration is also given.

SPT 'N' values are correlated with relative of non-cohesive stratum as per BS: 5930 (1999) - for sandy strata and with consistency of cohesive stratum.

CORRELATION FOR CLAY/PLASTIC SILT		CORRELATION FOR SAND/NON-PLASTIC SILT	
Consistency of clays	Penetration Value	Relative Density of sand	Penetration Value
Very Soft	0 to 2 Blows	Very loose	0 to 4 Blows
Soft	3 to 4 Blows	Loose	5 to 10 Blows
Medium Stiff	5 to 8 Blows	Medium	11 to 30 Blows
Stiff	9 to 16 Blows	Dense	31 to 50 Blows
Very Stiff	17 to 32 Blows	Very Dense	Above 50
Hard	Above 32		

In this method, the sampler acts as a probe and the driving energy is supplied by the fall of the drop weight. The values of 'N' depend on the compactness or relative density of the materiel. In hard formations, the testing is discontinued if 'N' value is found to be more than 100. It is termed as refusal.



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ENGINEERING TRAINING TESTING AND CALIBRATION LABORATORY

Report No. JP/ETTL/24-25/TE-85060310914-1 L2

'N' value depends upon degree of saturation and over burden pressure of the formation. Silty fine sand and fine sand below the water table develop pore water pressure. Depending on the in-situ void ratio which in turn affects the effective stress. This change in effective stress influences the 'N' value considerably. Soil sample obtained from standard spoon sampler for all above standard penetration tests were collected in the polythene bags of suitable size. These samples were property seal, labelled, record and carefully transported to the laboratory for testing.

Disturbed soil samples were tried to be collected at 1.50-meter interval and at significant change of stratum. Soil from cutting edge of SPT samplers and retained in split spoon sampler, used for Standard Penetration Tests was taken as disturbed samples. These samples were placed without delay in adequately sealed polythene bags. The laboratory tests were conducted on the collected soil samples and reported

2.1 Undisturbed soil samples were tried to be collected in accordance with IS: 2132-1986. Undisturbed soil samples (UDS) was obtained in 100 mm diameter MS tubes of length 450 mm at 3.00 meter interval in all the bore holes.

Undisturbed samples were collected using 75 mm dia. and 450 mm long MS tubes provided with sampler head with ball check arrangement in power operated rotary drilling for deep bore holes. Collection of Undisturbed samples in very hard cohesive soils/ dense granular soils/gravels/ cobbles/ pebbles/ boulders, refusal strata is practically not possible and such collected samples will not truly represent the undisturbed conditions.

Immediately after taking undisturbed sample in a tube, the adopter head was removed along with the disturbed material. The visible ends of the samples shall each be trimmed off any wet disturbed soil. The ends will then be coated alternately with four layers of just molten wax. More molten wax will then be added to give a total thickness of not less than 25mm. The laboratory test results have been reported

E.T.T.L.
ENGINEERING TRAINING TESTING AND CALIBRATION LABORATORY

Report No. JP/ETTL/24-25/TE-85060310914-1 L2

2.2 IF the **water table** at this site was encountered during the boring operation. Depth of water table was recorded as per IS 6935-1973. Recorded depth of water table in different bore holes are reported below.

Location	Depth of Bore (m)	Water table (m)	Coordinate	
			Northing	Easting
BH-01	40.0	Not found	NA	NA
BH-02	40.0	Not found	NA	NA
BH-03	40.0	Not found	NA	NA
BH-04	40.0	Not found	NA	NA

3. CLASSIFICATION CRITERIA OF ROCK MASSES:

Rock classification in terms of weathering and state of fractures and strength is carried out in the following manner. Tabulations given in below explain it briefly.

TERMS	DESCRIPTION	GRADE	GEOLOGIST INTERPRETATION
Fresh	No visible sign of rock material weathering; perhaps slight coloration on major discontinuity surfaces	I	CR > 91 %
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discoloured by weathering.	II	CR between 71 % to 90 %
Moderately Weathered	Less than half of the rock material is decomposed or disintegrated to a soil. Fresh or discoloured rock is present either as a continuous framework or as core-stones.	III	CR between 51 % to 70 %
Highly Weathered	More than half of the rock material is decomposed or disintegrated to a soil. Fresh or discoloured rock is present either as a discontinuous framework or as core-stones.	IV	CR between 11 % to 50 %
Completely weathered	All rock material is decomposed and / or disintegrated to soil. The original mass structure is still largely intact.	V	CR between zero to 10 %
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI	CR = Zero % But N > 50

E.T.T.L.
ENGINEERING TRAINING TESTING AND CALIBRATION LABORATORY

Report No. JP/ETTL/24-25/TE-85060310914-1 L2

As per IS: 4464, It should be understood that all grades of weathering may not be seen in a given rock mass and that in some cases a particular grade may be present to a very small extent. Distribution of the various weathering grades of rock material in the rock mass may be related to the porosity of the rock material and the presence of open discontinuities of all types in the rock mass.

- 3.1 **Relation between RQD and In-situ Rock quality** is further measured by frequency of natural joints in rock mass. Rock Quality Designation (RQD) is used to define state of fractures or massiveness of rock. Following table defines the quality of rock mass.

RQD classification	RQD %
Excellent	91 to 100
Good	76 to 90
Fair	51-75
Poor	25-50
Very Poor	0-25

- 3.2 **Classification of Rock by Compressive Strength**

Rock type	Unconfined compressive strength in MPa
Extremely strong	>200
Very Strong	100 to 200
Strong	50 to 100
Moderately Strong	12.5 to 50
Moderately Weak	5 to 12.5
Weak	1.25 to 5
Very weak	<1.25

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4. LABORATORY INVESTIGATION:

- 4.1 Field moisture contents** were determined by oven drying method as per IS 2720 (part II)-1997. The results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.2 Bulk density** of soil strata were obtained using density ring method. The results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.3 Mechanical sieve analysis** test were performed in accordance with IS 2720 (Part IV) - 1985, for the purpose of identification by grain size analysis, on coarse part of the soil
- 4.4** Samples and the results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.5 Particle size** analysis test by **hydrometer** method were performed in accordance with IS 2720 (Part IV) - 1995 on the part of soil samples obtained after the sieve analysis. The results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.6 Atterbergs limits** tests were performed in accordance with IS 2720 (part V)-1985 and results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.7 Specific gravity** tests were performed in accordance with IS 2720 (part III-sec. 1) -1980 and the results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.8 Direct shear tests** were performed as per IS 2720 (part XII)-1971, on the undisturbed soil samples obtained during the field investigation. The results have been reported in Table 1 to table 3 of Appendix A under the title “Laboratory Test Result”.
- 4.9 Point load tests** were performed as per **IS 8764:1998** on the rock samples obtained during field investigation. The results have been reported in Table 1 of under the title “Laboratory Test Result”.
- 4.10 Unconfined compressive strength tests** were performed as per **IS 9143:1979** on the rock samples obtained during field investigation. The results have been reported in Table 1 of under the title “Laboratory Test Result”.

5. COMPUTATION OF BEARING CAPACITY:

The safe allowable bearing capacity of the foundation for the proposed structure has been calculated on the shear failure criteria suggested as per IS 6403-1981 and settlement criteria as per IS: 8009 (part-I)-1976. Looking at the site condition, sub soil stratification and type of proposed structure, calculations have been done for isolated footing.

5.1 ISOLATED FOOTING:

IS: 6403-1981

(a) In case of general shear failure –

$$q_d = cN_c s_c d_c i_c + q(N_q - 1) s_q d_q i_q + 0.5 B \gamma N_\gamma S_\gamma d_\gamma i_\gamma W'$$

(b) In case of local shear failure –

$$q'_d = 0.67 c N'_c s_c d_c i_c + q(N'_q - 1) s_q d_q i_q + 0.5 B \gamma N'_\gamma S_\gamma d_\gamma i_\gamma W'$$

Where,

$N_c, N'_c, N_q, N'_q, N_\gamma, N'_\gamma$ = Bearing capacity factors

C = Unit Cohesion

B = Width of Footing

γ = Bulk Density

$$q = \gamma d$$

S_c, S_q, S_γ = Shape factors

d_c, d_q, d_γ = Depth factors

i_c, i_q, i_γ = Inclination factors

W' = Correction factor for location for location of water table

Φ = Angle of internal resistance of soil

$$\Phi' = \tan^{-1}(0.67 \tan \phi)$$

Note: - If the void ratio is less than 0.55, the shear failure is considered as General shear failure. On the other hand, if the relative density is smaller than 20% and the void ratio is greater than 0.75, the failure is local shear failure. For relative density between 20% and 70% and the void ratio 0.55 to 0.75, the bearing capacity factors are obtained by interpolation between the general shear failure and local shear failure.

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5.2 SETTLEMENT CRITERIA:

IS : 8009 (Part I)

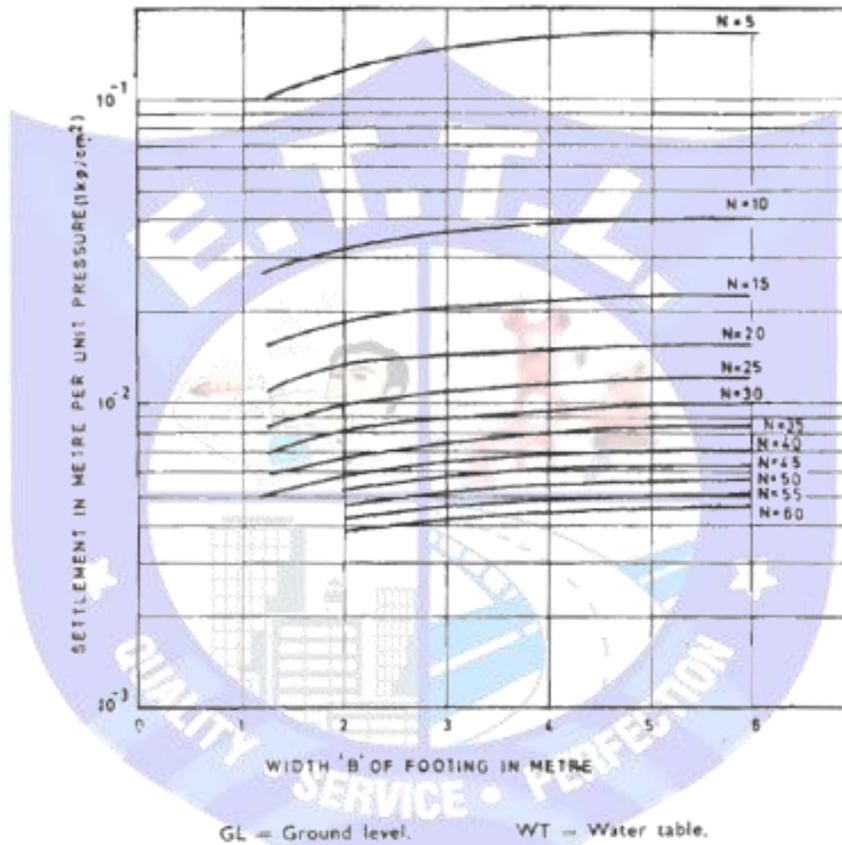
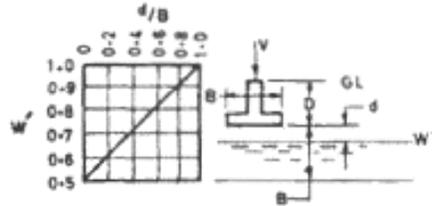


FIG. 9 SETTLEMENT PER UNIT PRESSURE FROM STANDARD PENETRATION RESISTANCE

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6. RECOMMENDATIONS:

Keeping in mind, the field conditions, field test results, laboratory test results and IS codes of practice; the following recommendations are hereby made:

6.1 Isolated footing:

Isolated **footings** shall be provided for the foundation of the proposed structures.

The depth and corresponding safe allowable bearing capacity shall be as follows:

The field investigation and laboratory tests conducted over the soil revealed the following Conclusions:

- ❖ The soil stratum consists as per **Stratigraphy Drawings**.
- ❖ The specimen found gets disintegrated into gravels during the process of soaking core in water.
- ❖ The SPT 'N' value indicates that soil stratum is **mostly dense to hard strata**.
- ❖ Depth of ground water is encountered as per clause No.-2.2.
- ❖ Plastic index as per laboratory test result as per clause no. - 9.

BH-1

Depth of footing (m)	Type of footing	Width of foundation (M)	General Shear Failure Criteria (T / m ²)	Local Shear Failure Criteria (T / m ²)	Interpolated Value from Column 4&5 (As per IS 6403-1981) (T / m ²)	Settlement Criteria (Safe Bearing Capacity (t/m ²))	Recommended Safe Bearing Capacity (T / m ²) (Lower of columns 6 & 7 & rounded down)	Settlement (mm)
1	2	3	4	5	6	7	8	9
3.00	Isolated Footing	6.00	51.02	17.99	22.94	42.37	22.94	25
4.50		6.00	74.53	25.93	33.22	43.85	33.22	
6.00		6.00	90.64	31.93	40.74	45.45	40.74	

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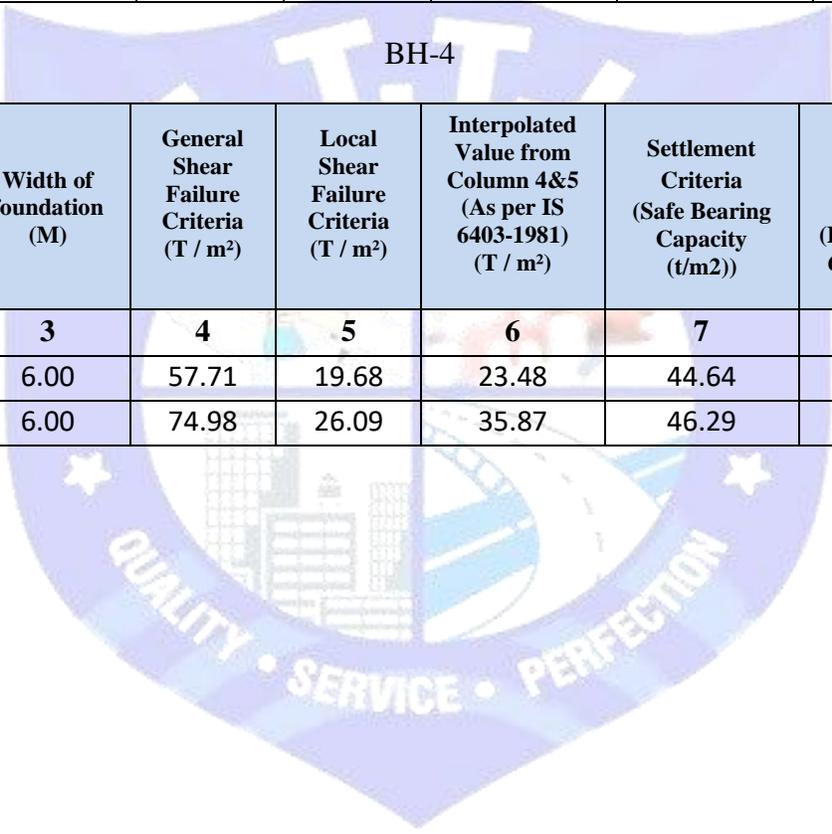
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BH-3

Depth of footing (m)	Type of footing	Width of foundation (M)	General Shear Failure Criteria (T / m ²)	Local Shear Failure Criteria (T / m ²)	Interpolated Value from Column 4&5 (As per IS 6403-1981) (T / m ²)	Settlement Criteria (Safe Bearing Capacity (t/m ²))	Recommended Safe Bearing Capacity (T / m ²) (Lower of columns 6 & 7 & rounded down)	Settlement (mm)
1	2	3	4	5	6	7	8	9
3.00	Isolated Footing	6.00	51.34	18.10	23.08	44.64	23.08	25
4.50		6.00	75.44	26.25	38.54	45.45	38.54	
6.00		6.00	91.75	32.32	47.18	47.16	47.16	

BH-4

Depth of footing (m)	Type of footing	Width of foundation (M)	General Shear Failure Criteria (T / m ²)	Local Shear Failure Criteria (T / m ²)	Interpolated Value from Column 4&5 (As per IS 6403-1981) (T / m ²)	Settlement Criteria (Safe Bearing Capacity (t/m ²))	Recommended Safe Bearing Capacity (T / m ²) (Lower of columns 6 & 7 & rounded down)	Settlement (mm)
1	2	3	4	5	6	7	8	9
4.50	Isolated Footing	6.00	57.71	19.68	23.48	44.64	23.48	25
6.00		6.00	74.98	26.09	35.87	46.29	35.87	



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Dia. of the pile (m)	Axial load carrying capacity	Lateral Load carrying capacity of pile (Tons)	Uplift Capacity (Tons)	Depth of pile
1.0	223.5	12.9	117.2	20
1.0	251.9		139.4	22
1.0	282.9		163.5	24
1.0	299.5		176.3	25
1.2	315.6	18.7	146.3	20
1.2	349.6		173.5	22
1.2	386.9		203.0	24
1.2	406.7		218.6	25

CALCULATION OF LATERAL LOAD CAPACITY

Sr. No.	Diameter, D (cm)	Mix (N/mm ²)	Young's Modulus of Pile Material, E (Kg/Sq.cm)	Young's Modulus of Subgrade Reaction, K (Kg/Sq.cm)	Moment of Inertia, I (CMS ⁴)	Stiffness Factor, T (M)	L1 / T	Depth of Fixity, L1 (cms)	(Fixed head) Lateral Load Capacity, QL (T.)
1	100.00	35	295804	0.14	4908739	401.02	2.19	878	12.872
2	120.00	35	295804	0.16	10178760	451.77	2.19	989	18.675



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As Per IS 2911-1_sec 2 : 2010											
BH No	Minimum of Four			Depth of GWT, m	not found			No of layer	3		
Pile length, m	20			Pile Dia, m	1			Factor of Safety	2.5		
Skin Friction Resistance (Granular)					$Q_s = \sum k_i * P_{di} * \tan \delta * A_{si}$						
End Bearing Resistance (Granular)					$Q_b = A_p(0.5 * D * \gamma * N_\gamma + P_d * N_q)$						
Layer No.	Start Depth, m	End Depth, m	Layer Thickness, m	Cohesion, C, T/m2	Reduction Factor, α	Angle of Internal Friction $\phi = \delta$	Earth Pressure Coefficient, K	Bulk Density, of I layer γ_i T/m3	Over Burden at mid depth of layer P_{di}	Qs	
1	2.5	5.00	2.50	0	0	27	1	0.97	1.213	4.86	
2	5.0	11.5	6.50	0	0	28	1	0.970	5.58	60.56	
3	11.5	22.5	11.00	0	0	29	1	0.970	14.07	269.14	
Total Skin friction resistance Qs , T										334.6	
Soil Parameters at Pile Tip				Cohesion, C , T/m2	0	ϕ	29	18.4	End Bearing Resistance Qb, T		224.3
				Q'	7.5	pd	15.0	19.34			
Ultimate Pile Carrying Capacity T				558.8	Safe Pile Carrying Capacity T					223.5	
UPLIFT LOAD CAPACITY											
Volume of Pile m3	15.70			Unit Weight of Concrete, T/m3	1.5			Weight of Pile, T	23.55		
Total Uplift Capacity, T	234.19			Factor of Safety	2.5			Safe Uplift Capacity, T	117.2		



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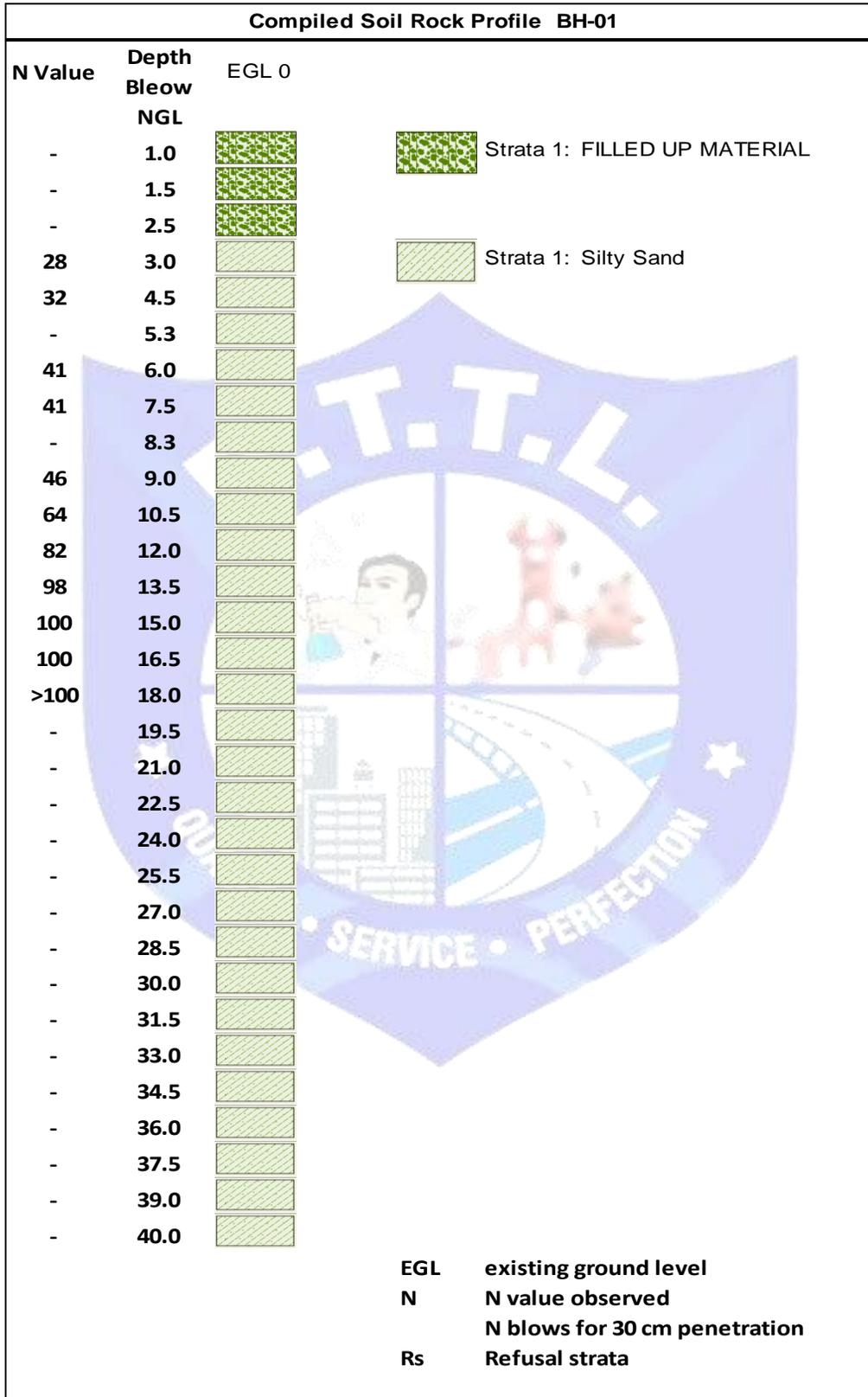
As Per IS 2911-1_sec 2 : 2010										
BH No	Minimum of Four			Depth of GWT,m	not found			No of layer	3	
Pile length, m	20			Pile Dia,m	1.2			Factor of Safety	2.5	
Skin Friction Resistance (Granular)					$Q_s = \sum k_i * P_{di} * \tan \delta * A_{si}$					
End Bearing Resistance (Granular)					$Q_b = A_p(0.5 * D * \gamma * N_\gamma + P_d * N_q)$					
Layer No.	Start Depth, m	End Depth, m	Layer Thickness, m	Cohesion, C, T/m ²	Reduction Factor, α	Angle of Internal Friction $\phi = \delta$	Earth Pressure Coefficient, K	Bulk Density, of 1 layer γ_i T/m ³	Over Burden at mid depth of layer P_{di}	Q_s
1	2.5	5.00	2.50	0	0	27	1	0.97	1.213	5.83
2	5.0	11.5	6.50	0	0	28	1	0.970	5.58	72.67
3	11.5	22.5	11.00	0	0	29	1	0.970	14.07	322.96
Total Skin friction resistance Q_s , T										401.5
Soil Parameters at Pile Tip				Cohesion, C, T/m ²	0	ϕ	29	18.4	End Bearing Resistance Q_b , T	387.5
				Q'	7.5	pd	18.0	19.34		
Ultimate Pile Carrying Capacity T				789.0	Safe Pile Carrying Capacity T					315.6
UPLIFT LOAD CAPACITY										
Volume of Pile m ³	22.61			Unit Weight of Concrete, T/m ³	1.5			Weight of Pile, T	33.91	
Total Uplift Capacity, T	281.02			Factor of Safety	2.5			Safe Uplift Capacity, T	146.3	



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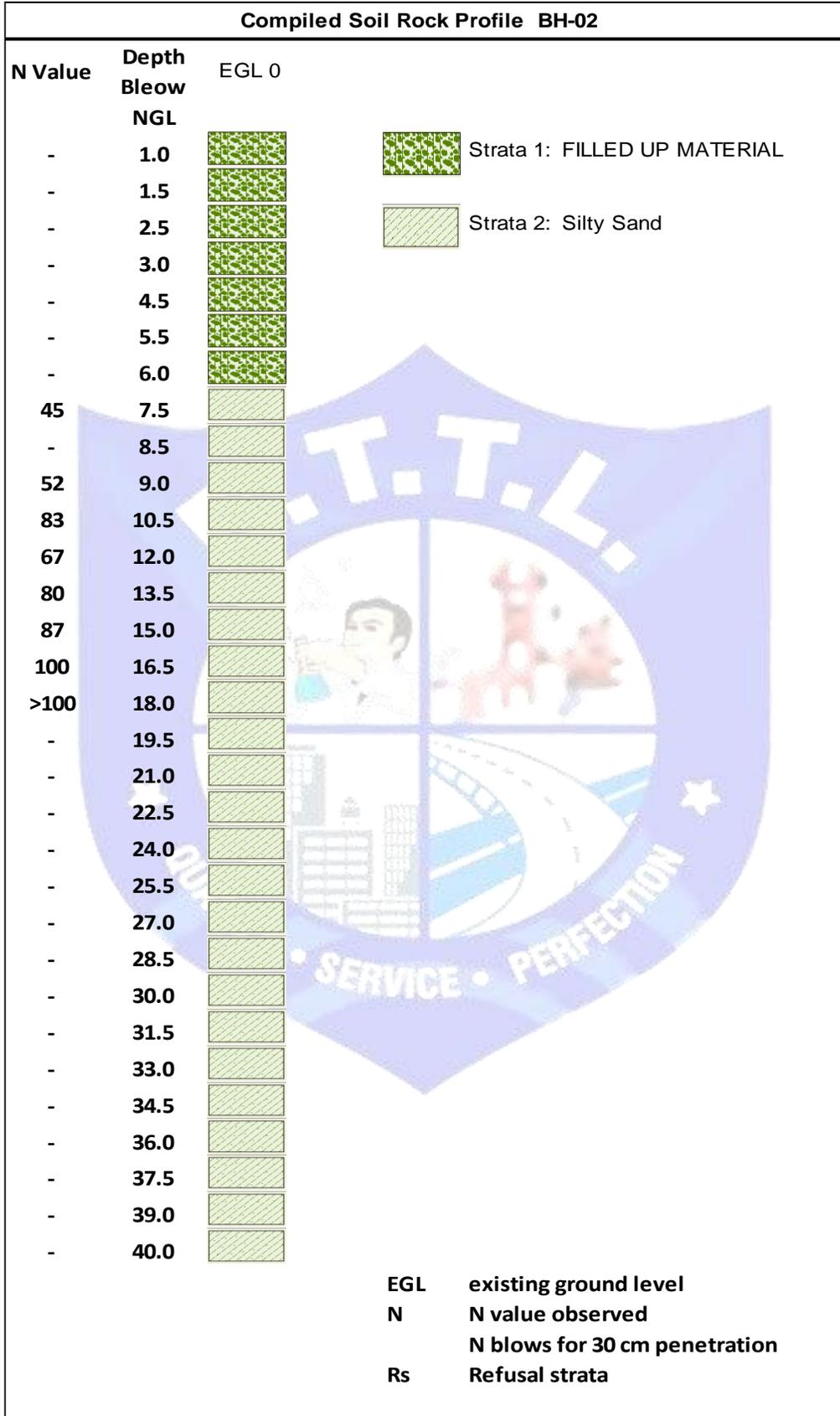
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7. STRATIGRAPHY DRAWINGS



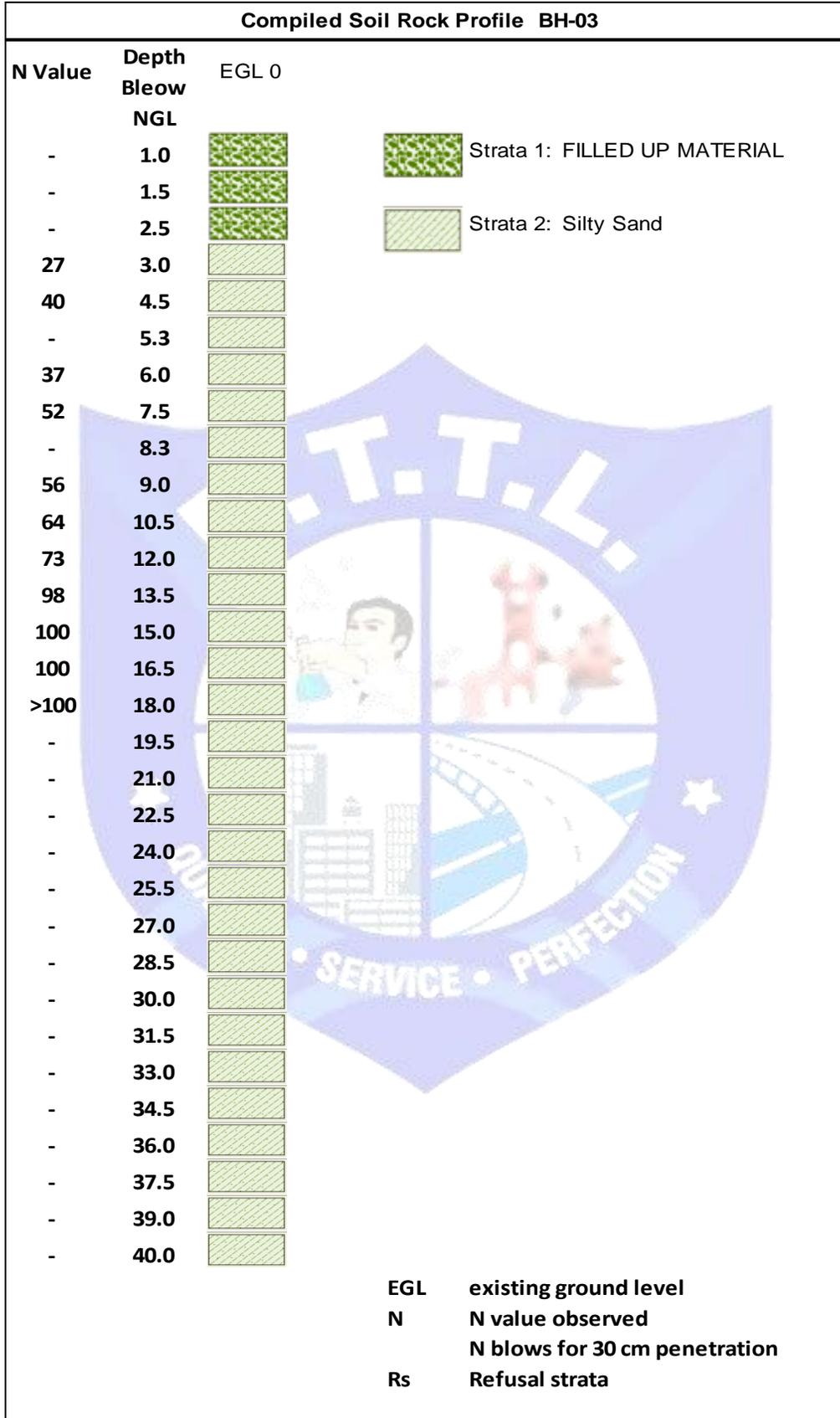
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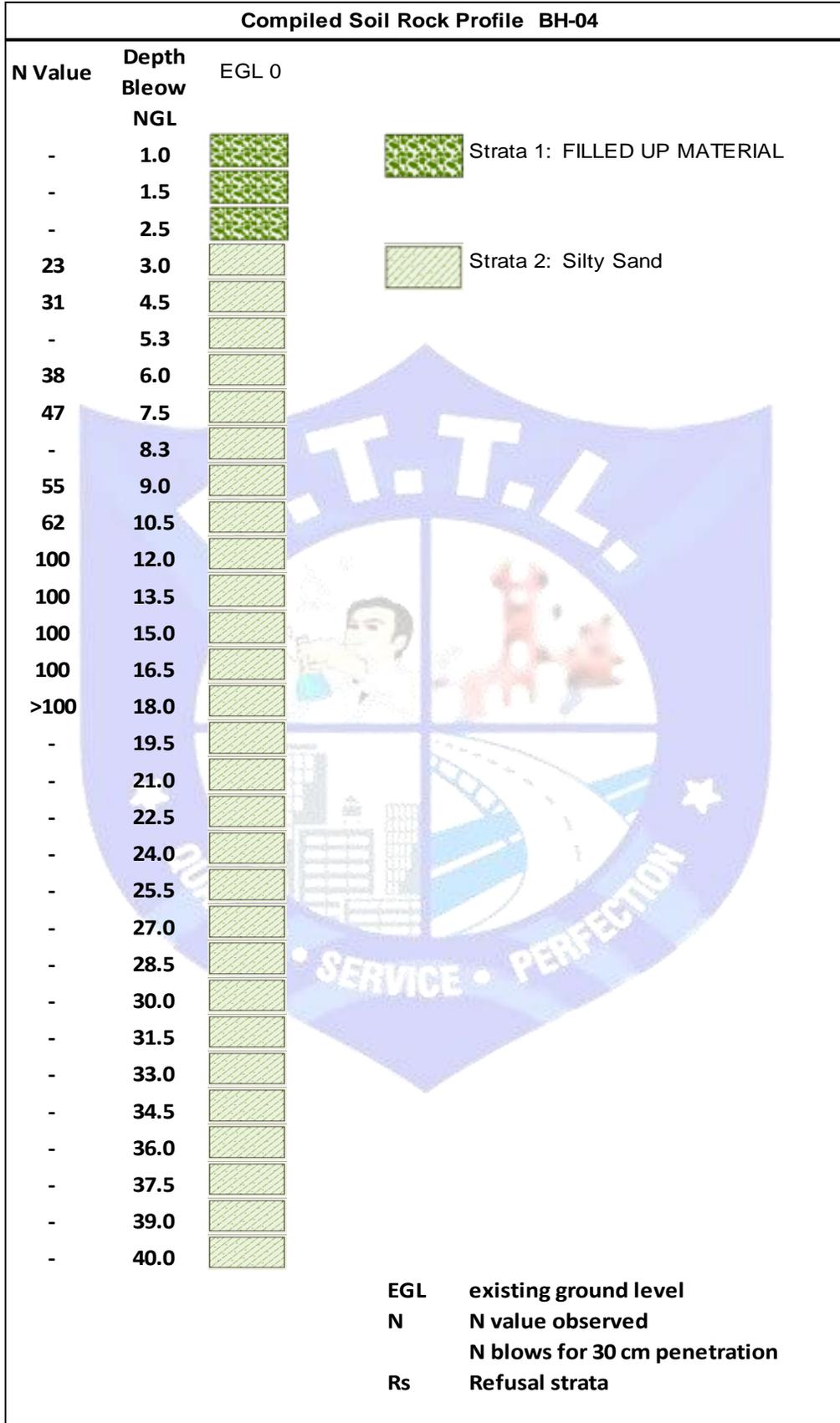
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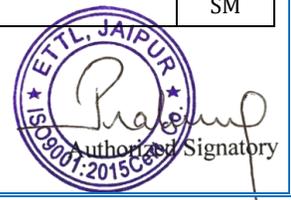


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8. FIELD TEST RESULT

location /Chainage: BH-01			Method of drilling: Rotary											
Diameter of Bore hole: 100 mm			Starting Date:- 20/09/2024											
FIELD TEST RESULT			Ending Date:- 21/09/2024											
Depth Below NGL (Meter)	Nature of Sample	Sample Reference No.	SPT Test Result					Description of soil	Soil Classification					
			N1 (Seating Drive)	N2 (First Drive)	N3 (Second Drive)	Observed SPT N(N2+N3)	N' (Correct N)							
1.0	DS	1	FILLED UP MATERIAL											
1.5	DS	2												
2.5	DS	3												
3.0	SPT/DS	4	10	13	15	28	35	Silty Sand	SM					
4.5	SPT	5	12	14	18	32	35	Silty Sand	SM					
5.3	UDS	6	-	-	-	-	-	Silty Sand	SM					
6.0	SPT	7	15	19	22	41	41	Silty Sand	SM					
7.5	SPT	8	14	18	23	41	38	Silty Sand	SM					
8.3	UDS	9	-	-	-	-	-	Silty Sand	SM					
9.0	SPT	10	17	21	25	46	40	Silty Sand	SM					
10.5	SPT	11	19	29	35	64	51	Silty Sand	SM					
12.0	SPT	12	25	34	48	82	62	Silty Sand	SM					
13.5	SPT	13	32	48	50	98	70	Silty Sand	SM					
15.0	SPT	14	40	50	50	100	68	Silty Sand	SM					
16.5	SPT	15	43	50	50	100	64	Silty Sand	SM					
18.0	DS	16	-	-	-	>100	60	Silty Sand	SM					
19.5	DS	17	-	-	-	-	60	Silty Sand	SM					
21.0	DS	18	-	-	-	-	-	Silty Sand	SM					
22.5	DS	19	-	-	-	-	-	Silty Sand	SM					
24.0	DS	20	-	-	-	-	-	Silty Sand	SM					
25.5	DS	21	-	-	-	-	-	Silty Sand	SM					
27.0	DS	22	-	-	-	-	-	Silty Sand	SM					
28.5	DS	23	-	-	-	-	-	Silty Sand	SM					
30.0	DS	24	-	-	-	-	-	Silty Sand	SM					
31.5	DS	25	-	-	-	-	-	Silty Sand	SM					
33.0	DS	26	-	-	-	-	-	Silty Sand	SM					
34.5	DS	27	-	-	-	-	-	Silty Sand	SM					
36.0	DS	28	-	-	-	-	-	Silty Sand	SM					
37.5	DS	29	-	-	-	-	-	Silty Sand	SM					
39.0	DS	30	-	-	-	-	-	Silty Sand	SM					
40.0	DS	31	-	-	-	-	-	Silty Sand	SM					



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location /Chainage: BH-02			Method of drilling: Rotary							
Diameter of Bore hole: 100 mm			Starting Date:- 14/09/2024							
FIELD TEST RESULT			Ending Date:- 14/09/2024							
Depth Below NGL (Meter)	Nature of Sample	Sample Reference No.	SPT Test Result					Description of soil	Soil Classification	
			N1 (Seating Drive)	N2 (First Drive)	N3 (Second Drive)	Observed SPT N(N2+N3)	N' (Correct N)			
1.0	DS	1	FILLED UP MATERIAL							
1.5	DS	2								
2.5	DS	3								
3.0	DS	4								
4.5	DS	5								
5.5	DS	6								
6.0	DS	7								
7.5	SPT	8	16	20	25	45	42	Silty Sand	SM	
8.5	UDS	9	-	-	-	-	-	Silty Sand	SM	
9.0	SPT	10	20	23	29	52	45	Silty Sand	SM	
10.5	SPT	11	28	35	48	83	68	Silty Sand	SM	
12.0	SPT	12	30	33	34	67	51	Silty Sand	SM	
13.5	SPT	13	27	37	43	80	58	Silty Sand	SM	
15.0	SPT	14	32	40	47	87	60	Silty Sand	SM	
16.5	SPT	15	45	50	50	100	65	Silty Sand	SM	
18.0	DS	16	-	-	-	>100	60	Silty Sand	SM	
19.5	DS	17	-	-	-	-	60	Silty Sand	SM	
21.0	DS	18	-	-	-	-	-	Silty Sand	SM	
22.5	DS	19	-	-	-	-	-	Silty Sand	SM	
24.0	DS	20	-	-	-	-	-	Silty Sand	SM	
25.5	DS	21	-	-	-	-	-	Silty Sand	SM	
27.0	DS	22	-	-	-	-	-	Silty Sand	SM	
28.5	DS	23	-	-	-	-	-	Silty Sand	SM	
30.0	DS	24	-	-	-	-	-	Silty Sand	SM	
31.5	DS	25	-	-	-	-	-	Silty Sand	SM	
33.0	DS	26	-	-	-	-	-	Silty Sand	SM	
34.5	DS	27	-	-	-	-	-	Silty Sand	SM	
36.0	DS	28	-	-	-	-	-	Silty Sand	SM	
37.5	DS	29	-	-	-	-	-	Silty Sand	SM	
39.0	DS	30	-	-	-	-	-	Silty Sand	SM	
40.0	DS	31	-	-	-	-	-	Silty Sand	SM	



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location /Chainage: BH-03			Method of drilling: Rotary											
Diameter of Bore hole: 100 mm			Starting Date:- 21/09/2024											
FIELD TEST RESULT			Ending Date:- 21/09/2024											
Depth Below NGL (Meter)	Nature of Sample	Sample Reference No.	SPT Test Result					Description of soil	Soil Classification					
			N1 (Seating Drive)	N2 (First Drive)	N3 (Second Drive)	Observed SPT N(N2+N3)	N' (Correct N)							
1.0	DS	1	FILLED UP MATERIAL											
1.5	DS	2												
2.5	DS	3												
3.0	SPT/DS	4	8	13	14	27	33	Silty Sand	SM					
4.5	SPT	5	12	18	22	40	44	Silty Sand	SM					
5.3	UDS	6	-	-	-	-	-	Silty Sand	SM					
6.0	SPT	7	16	17	20	37	37	Silty Sand	SM					
7.5	SPT	8	20	25	27	52	48	Silty Sand	SM					
8.3	UDS	9	-	-	-	-	-	Silty Sand	SM					
9.0	SPT	10	24	26	30	56	48	Silty Sand	SM					
10.5	SPT	11	25	30	34	64	52	Silty Sand	SM					
12.0	SPT	12	28	33	40	73	55	Silty Sand	SM					
13.5	SPT	13	35	48	50	98	70	Silty Sand	SM					
15.0	SPT	14	41	50	50	100	68	Silty Sand	SM					
16.5	SPT	15	48	50	50	100	65	Silty Sand	SM					
18.0	DS	16	-	-	-	>100	60	Silty Sand	SM					
19.5	DS	17	-	-	-	-	60	Silty Sand	SM					
21.0	DS	18	-	-	-	-	-	Silty Sand	SM					
22.5	DS	19	-	-	-	-	-	Silty Sand	SM					
24.0	DS	20	-	-	-	-	-	Silty Sand	SM					
25.5	DS	21	-	-	-	-	-	Silty Sand	SM					
27.0	DS	22	-	-	-	-	-	Silty Sand	SM					
28.5	DS	23	-	-	-	-	-	Silty Sand	SM					
30.0	DS	24	-	-	-	-	-	Silty Sand	SM					
31.5	DS	25	-	-	-	-	-	Silty Sand	SM					
33.0	DS	26	-	-	-	-	-	Silty Sand	SM					
34.5	DS	27	-	-	-	-	-	Silty Sand	SM					
36.0	DS	28	-	-	-	-	-	Silty Sand	SM					
37.5	DS	29	-	-	-	-	-	Silty Sand	SM					
39.0	DS	30	-	-	-	-	-	Silty Sand	SM					
40.0	DS	31	-	-	-	-	-	Silty Sand	SM					



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location /Chainage: BH-04			Method of drilling: Rotary											
Diameter of Bore hole: 100 mm			Starting Date:- 22/09/2024											
FIELD TEST RESULT			Ending Date:- 22/09/2024											
Depth Below NGL (Meter)	Nature of Sample	Sample Reference No.	SPT Test Result					Description of soil	Soil Classification					
			N1 (Seating Drive)	N2 (First Drive)	N3 (Second Drive)	Observed SPT N(N2+N3)	N' (Correct N)							
1.0	DS	1	FILLED UP MATERIAL											
1.5	DS	2												
2.5	DS	3												
3.0	SPT/DS	4	9	10	13	23	29	Silty Sand	SM					
4.5	SPT	5	12	14	17	31	34	Silty Sand	SM					
5.3	UDS	6	-	-	-	-	-	Silty Sand	SM					
6.0	SPT	7	15	18	20	38	38	Silty Sand	SM					
7.5	SPT	8	18	21	26	47	43	Silty Sand	SM					
8.3	UDS	9	-	-	-	-	-	Silty Sand	SM					
9.0	SPT	10	20	25	30	55	47	Silty Sand	SM					
10.5	SPT	11	19	30	32	62	50	Silty Sand	SM					
12.0	SPT	12	31	50	50	100	76	Silty Sand	SM					
13.5	SPT	13	35	50	50	100	71	Silty Sand	SM					
15.0	SPT	14	42	50	50	100	68	Silty Sand	SM					
16.5	SPT	15	48	50	50	100	64	Silty Sand	SM					
18.0	DS	16	-	-	-	>100	60	Silty Sand	SM					
19.5	DS	17	-	-	-	-	60	Silty Sand	SM					
21.0	DS	18	-	-	-	-	-	Silty Sand	SM					
22.5	DS	19	-	-	-	-	-	Silty Sand	SM					
24.0	DS	20	-	-	-	-	-	Silty Sand	SM					
25.5	DS	21	-	-	-	-	-	Silty Sand	SM					
27.0	DS	22	-	-	-	-	-	Silty Sand	SM					
28.5	DS	23	-	-	-	-	-	Silty Sand	SM					
30.0	DS	24	-	-	-	-	-	Silty Sand	SM					
31.5	DS	25	-	-	-	-	-	Silty Sand	SM					
33.0	DS	26	-	-	-	-	-	Silty Sand	SM					
34.5	DS	27	-	-	-	-	-	Silty Sand	SM					
36.0	DS	28	-	-	-	-	-	Silty Sand	SM					
37.5	DS	29	-	-	-	-	-	Silty Sand	SM					
39.0	DS	30	-	-	-	-	-	Silty Sand	SM					
40.0	DS	31	-	-	-	-	-	Silty Sand	SM					



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9. LABORATORY TEST RESULT

Depth of bore hole: 40.00 mtr										Water Table: Not Found									
LABORATORY TEST RESULT BH-01																			
Depth Below NGL (Meter)	Index Property				Grain Size Analysis					Grain Size Analysis by Hydrometer		Index Property			Shear Strength Parameters			Soil Classification	
	Bulk Density (gm/cc)	Moisture Content (%)	Void Ratio	Specific Gravity (Gs)	Gravel (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Type of Test	Cohesion C (kg/cm ²)	Angle of Friction (Degree) ϕ		
1.0	FILLED UP MATERIAL																		
1.5	FILLED UP MATERIAL																		
2.5	FILLED UP MATERIAL																		
3.0	1.63	4.25	0.72	2.694	0.56	1.41	2.16	70.02	25.85	25.85	0.00	23.5	Nil	NP	DST	0.00	27	SM	
4.5	1.63	4.32	0.72	2.689	0.02	1.65	3.25	69.32	25.76	25.76	0.00	-	-	-	-	-	-	SM	
5.5	1.64	4.67	0.72	2.694	0.62	1.95	4.02	66.41	27.00	27.00	0.00	23.6	Nil	NP	DST	0.00	28	SM	
6.0	1.66	4.82	0.70	2.688	0.31	2.64	1.25	76.32	19.48	19.48	0.00	-	-	-	-	-	-	SM	
7.5	1.67	5.49	0.69	2.678	0.25	3.26	3.26	72.31	20.92	20.92	0.00	-	-	-	-	-	-	SM	
8.5	1.68	5.82	0.69	2.686	0.41	1.20	3.28	71.02	24.09	24.09	0.00	23.8	Nil	NP	DST	0.00	28	SM	
9.0	1.70	6.24	0.67	2.678	0.65	2.84	2.54	74.00	19.97	19.97	0.00	-	-	-	-	-	-	SM	
10.5	1.72	6.77	0.67	2.685	0.95	2.46	4.15	74.52	17.92	17.92	0.00	-	-	-	-	-	-	SM	
12.0	1.73	7.09	0.66	2.679	0.52	3.82	2.64	76.32	16.70	16.70	0.00	-	-	-	-	-	-	SM	
13.5	1.74	7.51	0.65	2.665	0.44	4.26	4.02	70.02	21.26	21.26	0.00	23.1	Nil	NP	DST	0.00	29	SM	
15.0	1.76	7.97	0.64	2.674	0.63	1.26	3.65	65.35	29.11	29.11	0.00	-	-	-	-	-	-	SM	
16.5	1.77	8.24	0.64	2.685	0.25	4.12	2.03	69.52	24.08	24.08	0.00	22.2	Nil	NP	DST	0.00	29	SM	
18.0	1.79	8.65	0.62	2.670	0.85	1.03	5.32	67.16	25.64	25.64	0.00	-	-	-	-	-	-	SM	
19.5	1.80	8.93	0.62	2.679	0.16	2.30	2.65	69.52	25.37	25.37	0.00	-	-	-	-	-	-	SM	
21.0	1.80	9.24	0.62	2.671	0.34	2.47	6.32	67.52	23.35	23.35	0.00	-	-	-	-	-	-	SM	
22.5	1.81	9.74	0.62	2.665	0.85	2.02	4.51	73.26	19.36	19.36	0.00	-	-	-	-	-	-	SM	
24.0	1.82	10.08	0.62	2.674	0.52	1.64	3.26	68.52	26.06	26.06	0.00	-	-	-	-	-	-	SM	
25.5	1.83	10.25	0.61	2.668	0.16	2.03	5.25	64.51	28.05	28.05	0.00	-	-	-	-	-	-	SM	
27.0	1.84	10.85	0.60	2.659	0.98	4.25	2.65	58.52	33.60	33.60	0.00	-	-	-	-	-	-	SM	
28.5	1.85	11.46	0.60	2.663	0.85	1.98	6.25	59.62	31.30	31.30	0.00	-	-	-	-	-	-	SM	
30.0	1.85	11.82	0.60	2.648	0.25	4.02	6.13	65.41	24.19	24.19	0.00	-	-	-	-	-	-	SM	
31.5	1.86	12.25	0.60	2.651	0.74	5.22	4.82	72.01	17.21	17.21	0.00	-	-	-	-	-	-	SM	
33.0	1.87	12.78	0.60	2.649	0.66	8.34	4.12	67.66	19.22	19.22	0.00	-	-	-	-	-	-	SM	
34.5	1.88	13.36	0.60	2.652	0.35	4.19	6.45	76.32	12.69	12.69	0.00	-	-	-	-	-	-	SM	
36.0	1.90	13.86	0.60	2.674	0.25	7.76	2.36	67.41	22.22	22.22	0.00	-	-	-	-	-	-	SM	
37.5	1.90	14.29	0.60	2.652	0.46	6.98	4.77	65.02	22.77	22.77	0.00	-	-	-	-	-	-	SM	
39.0	1.91	14.63	0.60	2.659	0.82	1.63	5.02	69.52	23.01	23.01	0.00	-	-	-	-	-	-	SM	
40.0	1.92	15.01	0.60	2.665	0.98	4.32	6.32	67.41	20.97	20.97	0.00	-	-	-	-	-	-	SM	



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Depth of bore hole: 40.00 mtr										Water Table: Not Found								
LABORATORY TEST RESULT BH-02																		
Depth Below NGL (Meter)	Index Property				Grain Size Analysis					Grain Size Analysis by Hydrometer		Index Property			Shear Strength Parameters			Soil Classification
	Bulk Density (gm/cc)	Moisture Content (%)	Void Ratio	Specific Gravity (Gs)	Gravel (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Type of Test	Cohesion C (kg/cm ²)	Angle of Friction (Degree) ϕ	
1.0	FILLED UP MATERIAL																	
1.5																		
2.5																		
3.0																		
4.5																		
5.5																		
6.0																		
7.5	1.64	6.14	0.73	2.678	0.25	1.06	2.51	70.01	26.17	26.17	0.00	-	-	-	-	-	-	SM
8.5	1.65	6.52	0.73	2.682	0.61	2.01	3.48	68.32	25.58	25.58	0.00	23.6	Nil	NP	DST	0.00	25	SM
9.0	1.66	6.85	0.73	2.694	0.43	1.63	2.55	65.29	30.10	30.10	0.00	-	-	-	-	-	-	SM
10.5	1.67	7.12	0.71	2.671	0.25	1.84	3.62	69.41	24.88	24.88	0.00	-	-	-	-	-	-	SM
12.0	1.69	7.41	0.71	2.685	0.52	2.33	4.12	64.50	28.53	28.53	0.00	-	-	-	-	-	-	SM
13.5	1.70	7.62	0.69	2.667	0.94	3.14	2.96	62.02	30.94	30.94	0.00	23.0	Nil	NP	DST	0.00	26	SM
15.0	1.72	7.85	0.68	2.678	1.45	2.74	3.41	67.36	25.04	25.04	0.00	-	-	-	-	-	-	SM
16.5	1.74	8.01	0.67	2.685	0.32	2.00	2.46	70.02	25.20	25.20	0.00	22.7	Nil	NP	DST	0.00	29	SM
18.0	1.75	8.32	0.65	2.671	0.95	3.26	3.98	62.35	29.46	29.46	0.00	-	-	-	-	-	-	SM
19.5	1.76	8.52	0.64	2.659	1.02	1.02	4.02	68.51	25.43	25.43	0.00	-	-	-	-	-	-	SM
21.0	1.77	8.95	0.64	2.668	1.84	2.54	5.24	67.16	23.22	23.22	0.00	-	-	-	-	-	-	SM
22.5	1.79	9.21	0.62	2.651	1.33	1.02	1.64	69.52	26.49	26.49	0.00	-	-	-	-	-	-	SM
24.0	1.80	9.52	0.61	2.647	1.75	3.46	2.69	55.26	36.84	36.84	0.00	-	-	-	-	-	-	SM
25.5	1.81	9.74	0.61	2.663	2.02	2.95	6.32	59.64	29.07	29.07	0.00	-	-	-	-	-	-	SM
27.0	1.81	10.02	0.61	2.650	1.54	1.47	5.84	63.25	27.90	27.90	0.00	-	-	-	-	-	-	SM
28.5	1.82	10.52	0.61	2.659	1.36	3.26	4.15	61.24	29.99	29.99	0.00	-	-	-	-	-	-	SM
30.0	1.83	10.68	0.60	2.647	2.03	3.78	2.47	67.52	24.20	24.20	0.00	-	-	-	-	-	-	SM
31.5	1.85	10.98	0.59	2.655	1.63	1.62	3.52	67.36	25.87	25.87	0.00	-	-	-	-	-	-	SM
33.0	1.86	11.12	0.58	2.651	2.99	2.04	2.02	68.62	24.34	24.34	0.00	-	-	-	-	-	-	SM
34.5	1.87	11.51	0.58	2.647	1.41	1.69	3.66	72.14	21.10	21.10	0.00	-	-	-	-	-	-	SM
36.0	1.89	11.85	0.57	2.658	1.66	2.55	2.80	67.11	25.88	25.88	0.00	-	-	-	-	-	-	SM
37.5	1.89	12.02	0.57	2.643	1.82	3.14	4.28	65.36	25.40	25.40	0.00	-	-	-	-	-	-	SM
39.0	1.90	12.63	0.57	2.652	2.34	2.74	4.15	69.52	21.25	21.25	0.00	-	-	-	-	-	-	SM
40.0	1.91	12.85	0.56	2.638	2.02	1.46	2.69	64.74	29.09	29.09	0.00	-	-	-	-	-	-	SM



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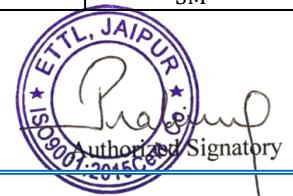
Depth of bore hole: 40.00 mtr										Water Table: Not Found									
LABORATORY TEST RESULT BH-03																			
Depth Below NGL (Meter)	Index Property				Grain Size Analysis					Grain Size Analysis by Hydrometer		Index Property			Shear Strength Parameters			Soil Classification	
	Bulk Density (gm/cc)	Moisture Content (%)	Void Ratio	Specific Gravity (Gs)	Gravel (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Type of Test	Cohesion (kg/cm ²)	Angle of Friction (Degree)		
1.0	FILLED UP MATERIAL																		
1.5	FILLED UP MATERIAL																		
2.5	FILLED UP MATERIAL																		
3.0	1.64	4.51	0.72	2.695	0.02	1.41	1.24	76.32	21.01	21.01	0.00	23.6	Nil	NP	DST	0.00	27	SM	
4.5	1.65	4.85	0.71	2.689	0.62	1.65	2.02	71.02	24.69	24.69	0.00	-	-	-	-	-	-	SM	
5.3	1.66	5.12	0.70	2.684	0.35	1.95	1.62	75.52	20.56	20.56	0.00	23.2	Nil	NP	DST	0.00	28	SM	
6.0	1.68	5.52	0.68	2.678	0.41	2.64	2.34	70.02	24.59	24.59	0.00	-	-	-	-	-	-	SM	
7.5	1.68	5.94	0.68	2.671	0.85	3.26	1.20	65.62	29.07	29.07	0.00	-	-	-	-	-	-	SM	
8.5	1.69	6.07	0.68	2.678	0.26	1.20	1.95	78.65	17.94	17.94	0.00	22.6	Nil	NP	DST	0.00	28	SM	
9.0	1.70	6.52	0.68	2.684	0.64	2.84	2.46	71.34	22.72	22.72	0.00	-	-	-	-	-	-	SM	
10.5	1.71	6.98	0.67	2.677	0.55	2.46	1.31	80.03	15.65	15.65	0.00	-	-	-	-	-	-	SM	
12.0	1.72	7.24	0.66	2.668	0.82	3.82	1.02	64.12	30.22	30.22	0.00	-	-	-	-	-	-	SM	
13.5	1.74	7.76	0.66	2.678	0.29	4.26	1.74	69.52	24.19	24.19	0.00	23.8	Nil	NP	DST	0.00	29	SM	
15.0	1.74	8.09	0.66	2.679	2.64	6.32	1.33	76.33	13.38	13.38	0.00	-	-	-	-	-	-	SM	
16.5	1.75	8.52	0.65	2.663	1.62	4.12	1.62	71.45	21.19	21.19	0.00	23.1	Nil	NP	DST	0.00	29	SM	
18.0	1.76	8.89	0.65	2.674	2.35	6.32	2.35	63.25	25.73	25.73	0.00	-	-	-	-	-	-	SM	
19.5	1.77	9.32	0.64	2.655	1.85	2.51	1.85	71.05	22.74	22.74	0.00	-	-	-	-	-	-	SM	
21.0	1.79	9.74	0.63	2.653	2.03	1.63	2.01	75.28	19.05	19.05	0.00	-	-	-	-	-	-	SM	
22.5	1.80	10.15	0.63	2.668	2.96	3.02	1.64	78.65	13.73	13.73	0.00	-	-	-	-	-	-	SM	
24.0	1.80	10.75	0.63	2.652	3.14	1.02	1.74	73.26	20.84	20.84	0.00	-	-	-	-	-	-	SM	
25.5	1.81	11.32	0.63	2.647	1.02	4.21	1.03	80.01	13.73	13.73	0.00	-	-	-	-	-	-	SM	
27.0	1.83	11.65	0.62	2.651	1.52	1.69	1.95	71.34	23.50	23.50	0.00	-	-	-	-	-	-	SM	
28.5	1.84	11.82	0.61	2.646	1.02	2.02	3.26	76.26	17.44	17.44	0.00	-	-	-	-	-	-	SM	
30.0	1.85	12.52	0.61	2.652	0.85	1.74	2.51	78.52	16.38	16.38	0.00	-	-	-	-	-	-	SM	
31.5	1.87	12.88	0.60	2.650	1.34	1.33	4.56	74.11	18.66	18.66	0.00	-	-	-	-	-	-	SM	
33.0	1.87	13.01	0.60	2.644	2.55	1.69	2.84	64.36	28.56	28.56	0.00	-	-	-	-	-	-	SM	
34.5	1.89	13.42	0.59	2.649	3.24	1.45	4.26	68.62	22.43	22.43	0.00	-	-	-	-	-	-	SM	
36.0	1.90	13.86	0.59	2.656	1.02	1.65	5.12	69.63	22.58	22.58	0.00	-	-	-	-	-	-	SM	
37.5	1.91	14.33	0.58	2.639	3.65	1.02	3.26	71.45	20.62	20.62	0.00	-	-	-	-	-	-	SM	
39.0	1.92	14.65	0.58	2.641	2.74	3.20	4.20	67.41	22.45	22.45	0.00	-	-	-	-	-	-	SM	
40.0	1.94	14.92	0.56	2.638	1.64	1.02	4.36	68.52	24.46	24.46	0.00	-	-	-	-	-	-	SM	



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Depth of bore hole: 40.00 mtr										Water Table: Not Found								
LABORATORY TEST RESULT BH-04																		
Depth Below NGL (Meter)	Index Property				Grain Size Analysis					Grain Size Analysis by Hydrometer		Index Property			Shear Strength Parameters			Soil Classification
	Bulk Density (gm/cc)	Moisture Content (%)	Void Ratio	Specific Gravity (Gs)	Gravel (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Type of Test	Cohesion C (kg/cm ²)	Angle of Friction (Degree)	
1.0	FILLED UP MATERIAL																	
1.5	FILLED UP MATERIAL																	
2.5	FILLED UP MATERIAL																	
3.0	1.62	4.16	0.73	2.685	0.00	1.02	2.65	72.15	24.18	24.18	0.00	23.1	Nil	NP	DST	0.00	28	SM
4.5	1.63	4.65	0.72	2.679	0.00	2.62	3.14	79.32	14.92	14.92	0.00	-	-	-	-	-	-	SM
5.3	1.65	4.96	0.71	2.686	0.00	1.02	2.55	74.02	22.41	22.41	0.00	23.5	Nil	NP	DST	0.00	28	SM
6.0	1.68	5.22	0.67	2.671	0.00	0.95	2.95	71.02	25.08	25.08	0.00	-	-	-	-	-	-	SM
7.5	1.69	5.85	0.67	2.670	0.00	0.64	3.26	73.26	22.84	22.84	0.00	-	-	-	-	-	-	SM
8.5	1.70	6.04	0.67	2.670	0.00	0.75	4.12	76.65	18.48	18.48	0.00	23.0	Nil	NP	DST	0.00	29	SM
9.0	1.70	6.32	0.67	2.665	0.00	0.25	2.02	78.52	19.21	19.21	0.00	-	-	-	-	-	-	SM
10.5	1.72	6.85	0.65	2.659	0.00	0.52	2.85	74.51	22.12	22.12	0.00	-	-	-	-	-	-	SM
12.0	1.74	7.16	0.64	2.661	0.00	0.34	5.32	74.32	20.02	20.02	0.00	-	-	-	-	-	-	SM
13.5	1.75	7.65	0.63	2.657	0.00	0.74	2.69	76.32	20.25	20.25	0.00	23.6	Nil	NP	DST	0.00	30	SM
15.0	1.77	7.92	0.63	2.678	0.12	0.10	4.12	72.02	23.64	23.64	0.00	-	-	-	-	-	-	SM
16.5	1.78	8.45	0.63	2.675	0.25	1.02	6.32	70.03	22.38	22.38	0.00	22.8	Nil	NP	DST	0.00	30	SM
18.0	1.78	8.92	0.62	2.650	0.03	1.48	2.74	68.65	27.10	27.10	0.00	-	-	-	-	-	-	SM
19.5	1.80	9.65	0.62	2.653	0.52	2.34	2.02	76.32	18.80	18.80	0.00	-	-	-	-	-	-	SM
21.0	1.81	10.41	0.62	2.651	0.12	1.62	1.36	79.52	17.38	17.38	0.00	-	-	-	-	-	-	SM
22.5	1.82	10.75	0.61	2.640	0.63	3.25	3.26	70.01	22.85	22.85	0.00	-	-	-	-	-	-	SM
24.0	1.84	11.26	0.60	2.652	0.52	1.02	1.02	64.29	33.15	33.15	0.00	-	-	-	-	-	-	SM
25.5	1.85	11.86	0.60	2.648	0.16	1.65	4.12	68.63	25.44	25.44	0.00	-	-	-	-	-	-	SM
27.0	1.86	12.34	0.60	2.641	0.82	2.85	1.85	69.65	24.83	24.83	0.00	-	-	-	-	-	-	SM
28.5	1.87	12.85	0.60	2.655	1.62	2.06	2.02	76.32	17.98	17.98	0.00	-	-	-	-	-	-	SM
30.0	1.89	13.24	0.58	2.640	2.34	1.70	2.85	75.02	18.09	18.09	0.00	-	-	-	-	-	-	SM
31.5	1.90	13.62	0.57	2.632	1.02	1.06	4.12	71.34	22.46	22.46	0.00	-	-	-	-	-	-	SM
33.0	1.91	14.02	0.57	2.628	1.72	0.95	2.02	68.74	26.57	26.57	0.00	-	-	-	-	-	-	SM
34.5	1.92	14.52	0.56	2.615	2.65	1.45	6.32	76.32	13.26	13.26	0.00	-	-	-	-	-	-	SM
36.0	1.93	15.02	0.56	2.625	3.05	0.58	2.02	64.15	30.20	30.20	0.00	-	-	-	-	-	-	SM
37.5	1.94	15.22	0.56	2.635	1.24	2.54	1.95	76.52	17.75	17.75	0.00	-	-	-	-	-	-	SM
39.0	1.95	15.65	0.56	2.633	3.02	2.07	3.26	79.52	12.13	12.13	0.00	-	-	-	-	-	-	SM
40.0	1.97	15.92	0.55	2.628	0.85	3.25	1.74	82.01	12.15	12.15	0.00	-	-	-	-	-	-	SM

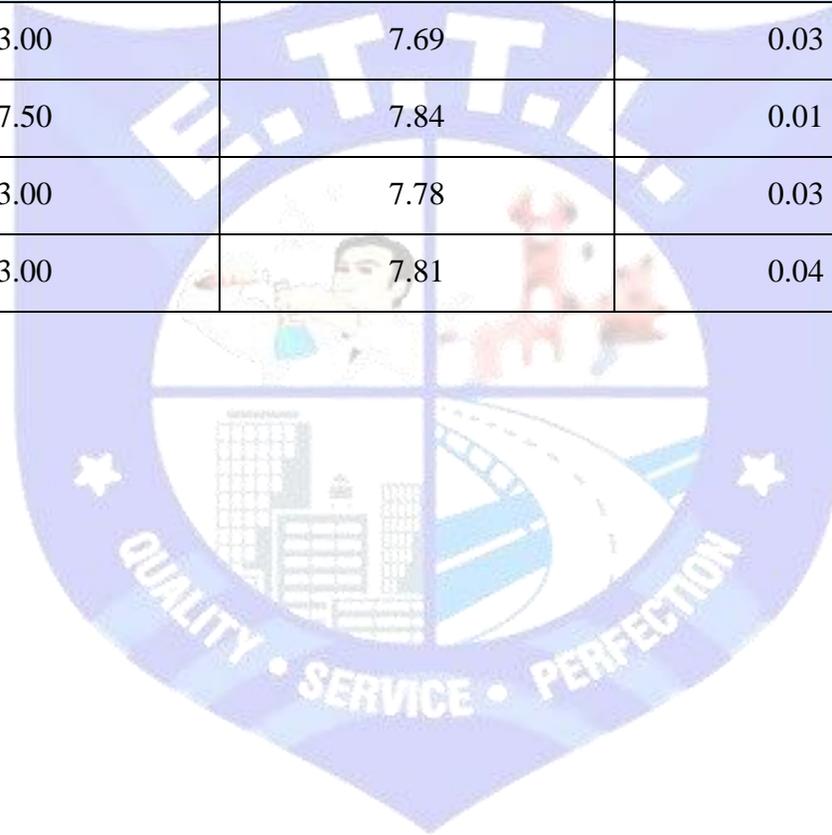


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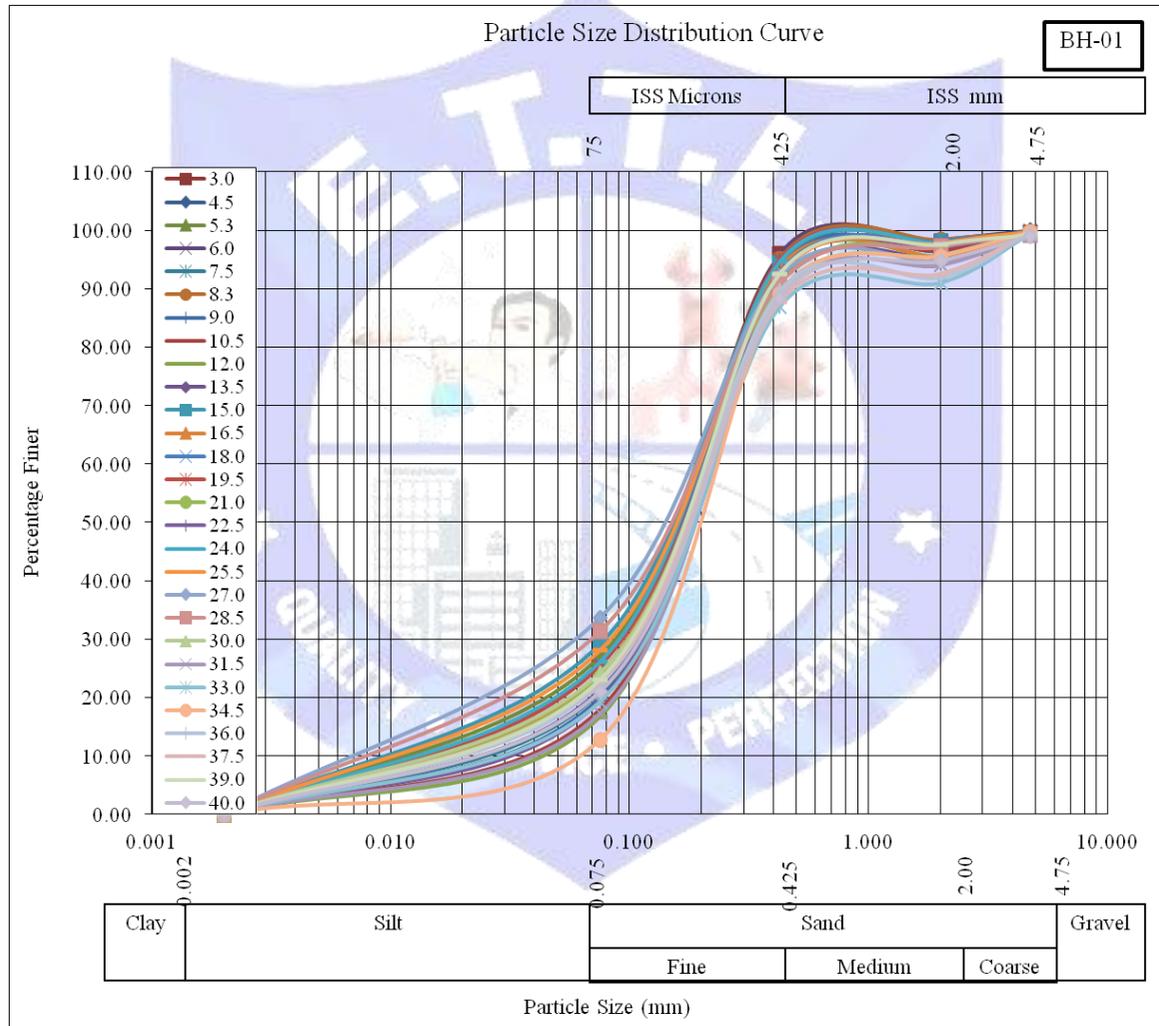
Chemical test

BH No.	Depth of Sampling (mtr)	Chemical Properties		
		pH	Sulphate so ₃ (%)	Chloride (%)
BH-01	3.00	7.69	0.03	0.008
BH-02	7.50	7.84	0.01	0.002
BH-03	3.00	7.78	0.03	0.006
BH-04	3.00	7.81	0.04	0.005



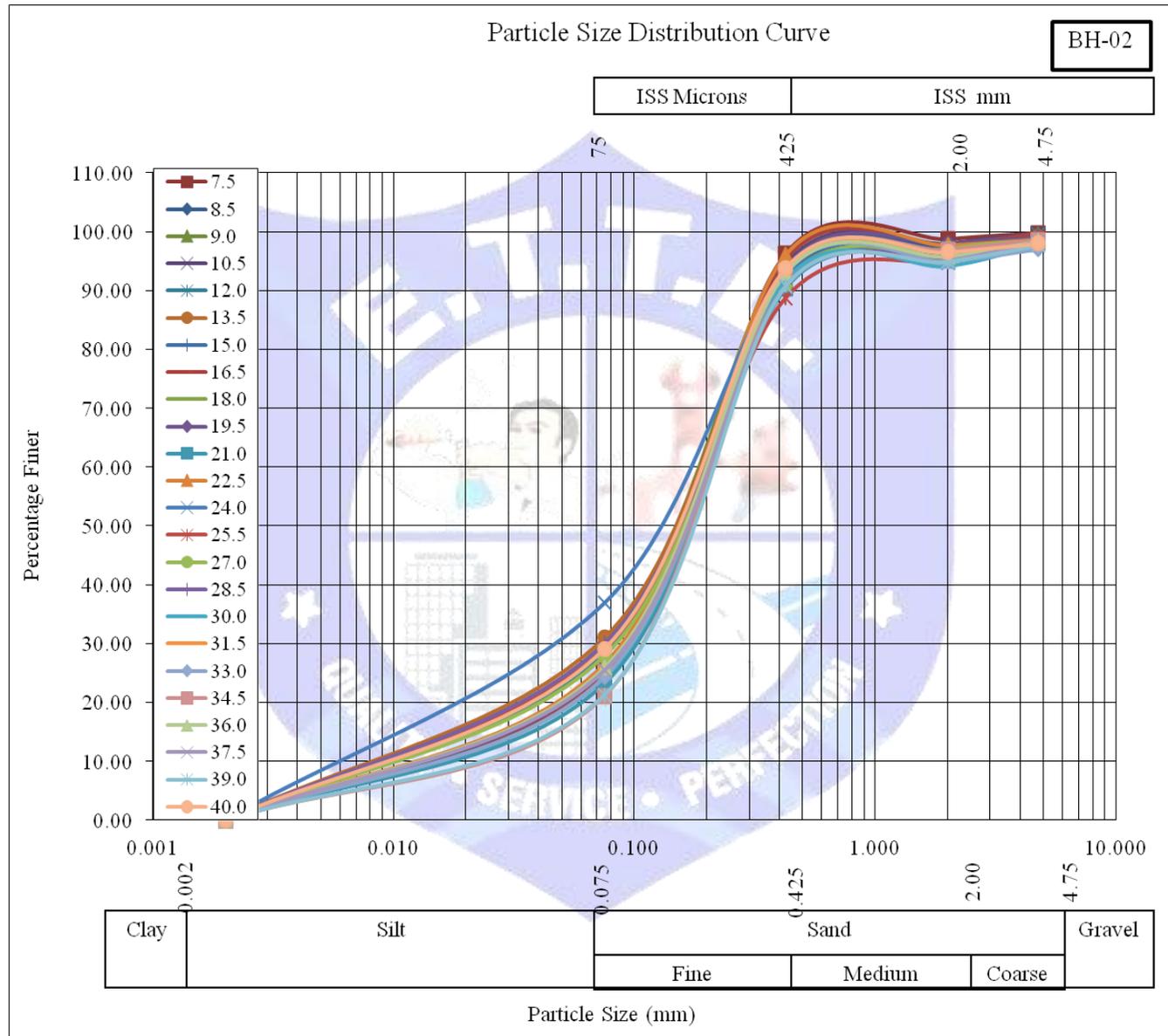
10. TEST PLOTS

Grain Size Analysis



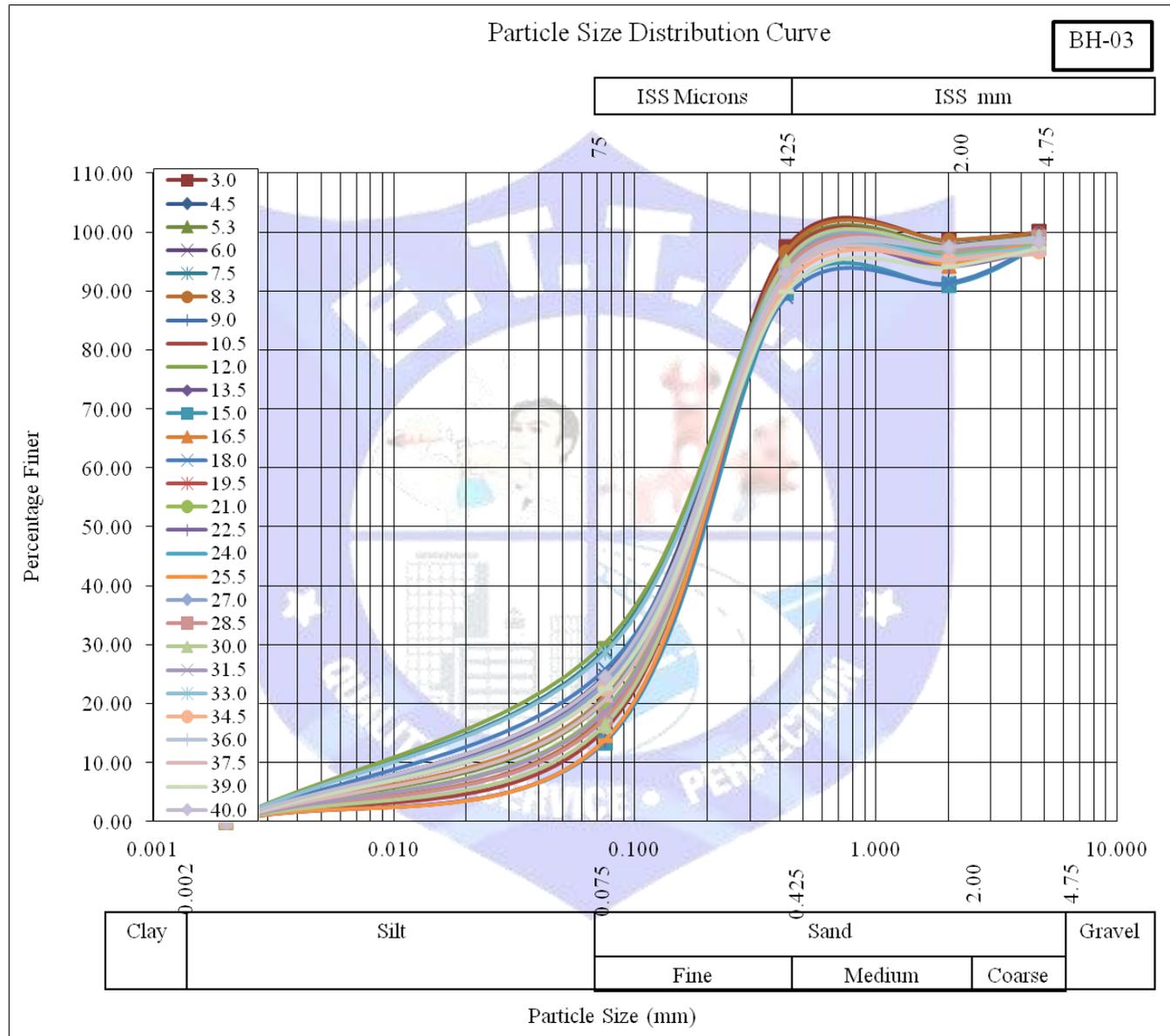
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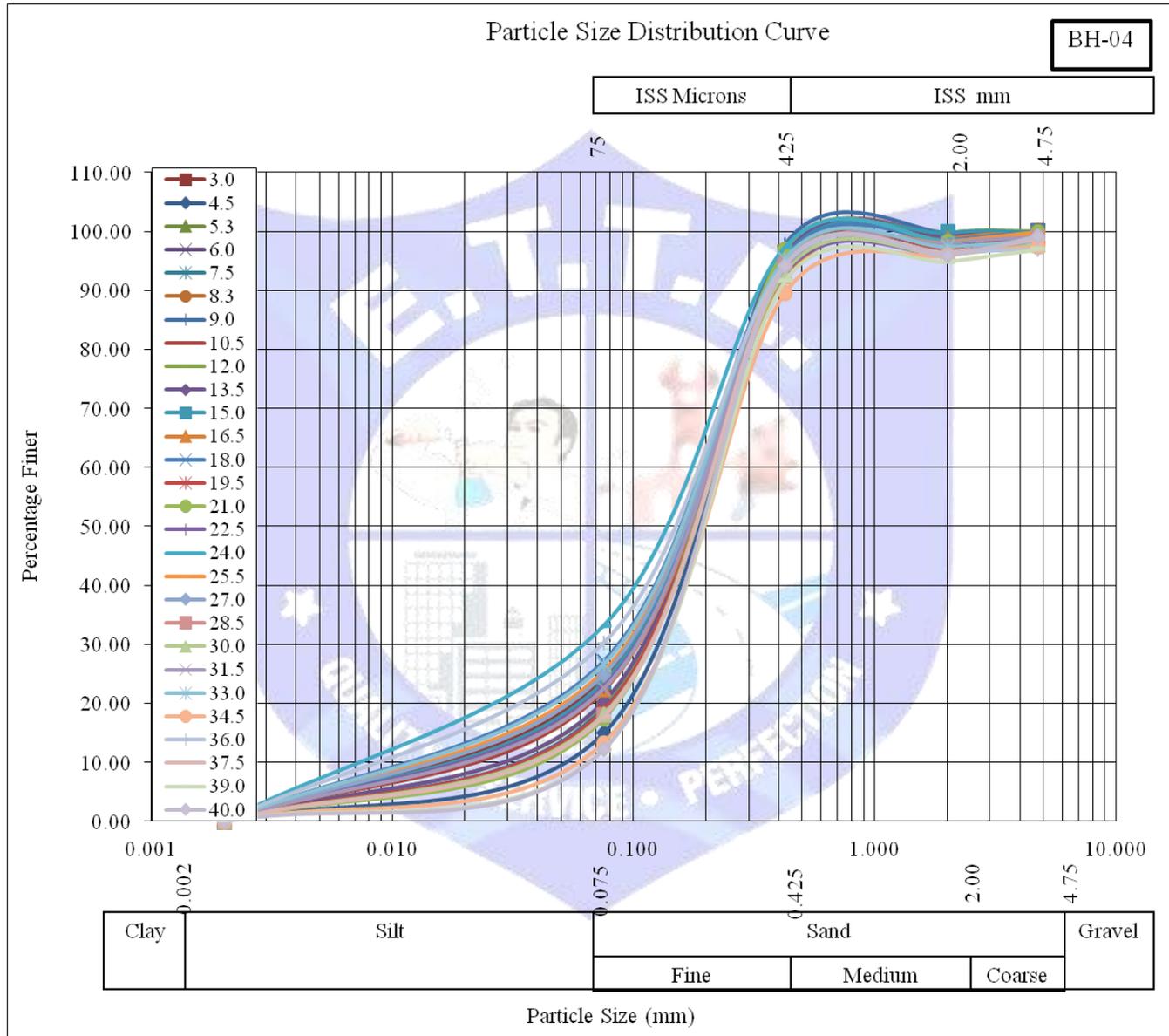
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11. SHEAR FAILURE AND CALCULATION

BH-01 (Local Shear Failure)

Calculation of Net Safe Bearing Capacity Based on Shear Parameters C- Φ
 $Q_{ns} = 1/FS [2/3 * C * N_c S_{cd} + q(N_q - 1) S_{qd} + 0.5 * B * \gamma * N_{\gamma} * W_q S_{ydy}]$; $Q_s = Q_{ns} + \gamma d$
 FS=2.50, Water Table as per Clause No.2.2.

Sr.No	Size of Foundation		Depth of Foundation m	Shear Parameter			Bearing Capacity Factors			Unit Weight (γ) (gm/cc)	Overburden q	Water Table Correction		Shape Factor			Net Safe Bearing Capacity t/m ² (Q _{ns})	Gross Safe Bearing Capacity t/m ² (Q _s)
	Length m	Width m		C (kg/cm ²)	Φ	Φ'	N _c	N _q	N _{γ}			W _q	W _{γ}	S _c	S _q	S _y		
1	6.00	6.00	3.00	0.0	27	18.8	13.68	5.65	4.52	1.63	4.890	1.0	1.0	1.3	1.2	0.8	17.99	22.88
2	6.00	6.00	4.50	0.0	28	19.5	14.34	6.09	5.03	1.64	7.380	1.0	1.0	1.3	1.2	0.8	25.93	33.31
3	6.00	6.00	6.00	0.0	28	19.5	14.34	6.09	5.03	1.64	9.840	1.0	1.0	1.3	1.2	0.8	31.93	41.77

BH-01 (General Shear Failure)

Calculation of Net Safe Bearing Capacity Based on Shear Parameters C- Φ
 $Q_{ns} = 1/FS [C * N_c S_{cd} + q(N_q - 1) S_{qd} + 0.5 * B * \gamma * N_{\gamma} * W_q S_{ydy}]$; $Q_s = Q_{ns} + \gamma d$
 FS=2.50, Water Table as per Clause No.2.2.

S.N O	Size of Foundation		Depth of Foundation m	Shear Parameter		Bearing Capacity Factors			Unit Weight (γ) (gm/cc)	Overburden q	Water Table Correction		Shape Factor			Net Safe Bearing Capacity t/m ² (Q _{ns})	Gross Safe Bearing Capacity t/m ² (Q _s)
	Length m	Width m		C (kg/cm ²)	Φ	N _c	N _q	N _{γ}			W _q	W _{γ}	S _c	S _q	S _y		
1	6.00	6.00	3.00	0.00	27	23.82	13.13	14.40	1.63	4.890	1.0	1.0	1.3	1.2	0.8	51.02	55.91
2	6.00	6.00	4.50	0.00	28	25.66	14.65	16.64	1.64	7.380	1.0	1.0	1.3	1.2	0.8	74.53	81.91
3	6.00	6.00	6.00	0.00	28	25.66	14.65	16.64	1.64	9.840	1.0	1.0	1.3	1.2	0.8	90.64	100.48

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BH-03 (Local Shear Failure)

Calculation of Net Safe Bearing Capacity Based on Shear Parameters C- Φ
 $Q_{ns} = 1/FS [2/3 * C * N_c \text{Secdcic} + q(N_q - 1)S_{qd}q_{iq} + 0.5 * B * \gamma * N_{\gamma} * W_q \text{Sydyiy}] ; Q_s = Q_{ns} + \gamma d$
 FS=2.50, Water Table as per Clause No.2.2.

Sr.No	Size of Foundation		Depth of Foundation m	Shear Parameter			Bearing Capacity Factors			Unit Weight (γ) (gm/cc)	Overburden q	Water Table Correction		Shape Factor			Net Safe Bearing Capacity t/m2 (Qns)	Gross Safe Bearing Capacity t/m2 (Qs)
	Length m	Width m		C (kg/cm ²)	Φ	Φ'	N _c	N _q	N _{γ}			W _q	W _{γ}	Sc	S _q	S _y		
1	6.00	6.00	3.00	0.0	27	18.8	13.68	5.65	4.52	1.64	4.920	1.0	1.0	1.3	1.2	0.8	18.10	23.02
2	6.00	6.00	4.50	0.0	28	19.5	14.34	6.09	5.03	1.66	7.470	1.0	1.0	1.3	1.2	0.8	26.25	33.72
3	6.00	6.00	6.00	0.0	28	19.5	14.34	6.09	5.03	1.66	9.960	1.0	1.0	1.3	1.2	0.8	32.32	42.28

BH-03 (General Shear Failure)

Calculation of Net Safe Bearing Capacity Based on Shear Parameters C- Φ
 $Q_{ns} = 1/FS [C * N_c \text{Secdcic} + q(N_q - 1)S_{qd}q_{iq} + 0.5 * B * \gamma * N_{\gamma} * W_q \text{Sydyiy}] ; Q_s = Q_{ns} + \gamma d$
 FS=2.50, Water Table as per Clause No.2.2.

S.NO	Size of Foundation		Depth of Foundation m	Shear Parameter			Bearing Capacity Factors			Unit Weight (γ) (gm/cc)	Overburden q	Water Table Correction		Shape Factor			Net Safe Bearing Capacity t/m2 (Qns)	Gross Safe Bearing Capacity t/m2 (Qs)
	Length m	Width m		C (kg/cm ²)	Φ		N _c	N _q	N _{γ}			W _q	W _{γ}	Sc	S _q	S _y		
1	6.00	6.00	3.00	0.00	27		23.82	13.13	14.40	1.64	4.920	1.0	1.0	1.3	1.2	0.8	51.34	56.26
2	6.00	6.00	4.50	0.00	28		25.66	14.65	16.64	1.66	7.470	1.0	1.0	1.3	1.2	0.8	75.44	82.91
3	6.00	6.00	6.00	0.00	28		25.66	14.65	16.64	1.66	9.960	1.0	1.0	1.3	1.2	0.8	91.75	101.71

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BH-04 (Local Shear Failure)

Calculation of Net Safe Bearing Capacity Based on Shear Parameters C- Φ
 $Q_{ns} = 1/FS [2/3 * C * N_c \text{Secdcic} + q(N_q - 1)S_{qd}q_{iq} + 0.5 * B * \gamma * N_{\gamma} * W_q \text{Sydyiy}] ; Q_s = Q_{ns} + \gamma d$
FS=2.50, Water Table as per Clause No.2.2.

Sr.No	Size of Foundation		Depth of Foundation m	Shear Parameter			Bearing Capacity Factors			Unit Weight (γ) (gm/cc)	Overburden q	Water Table Correction		Shape Factor			Net Safe Bearing Capacity t/m2 (Qns)	Gross Safe Bearing Capacity t/m2 (Qs)
	Length m	Width m		C (kg/cm ²)	Φ	Φ'	N _c	N _q	N _{γ}			W _q	W _{γ}	Sc	S _q	S _y		
1	6.00	6.00	3.00	0.0	28	19.5	14.34	6.09	5.03	1.62	4.860	1.0	1.0	1.3	1.2	0.8	19.68	24.54
2	6.00	6.00	4.50	0.0	28	19.5	14.34	6.09	5.03	1.65	7.425	1.0	1.0	1.3	1.2	0.8	26.09	33.51
3	6.00	6.00	6.00	0.0	28	19.5	14.34	6.09	5.03	1.65	9.900	1.0	1.0	1.3	1.2	0.8	32.13	42.03

BH-04 (General Shear Failure)

Calculation of Net Safe Bearing Capacity Based on Shear Parameters C- Φ
 $Q_{ns} = 1/FS [C * N_c \text{Secdcic} + q(N_q - 1)S_{qd}q_{iq} + 0.5 * B * \gamma * N_{\gamma} * W_q \text{Sydyiy}] ; Q_s = Q_{ns} + \gamma d$
FS=2.50, Water Table as per Clause No.2.2.

S.NO	Size of Foundation		Depth of Foundation m	Shear Parameter			Bearing Capacity Factors			Unit Weight (γ) (gm/cc)	Overburden q	Water Table Correction		Shape Factor			Net Safe Bearing Capacity t/m2 (Qns)	Gross Safe Bearing Capacity t/m2 (Qs)
	Length m	Width m		C (kg/cm ²)	Φ		N _c	N _q	N _{γ}			W _q	W _{γ}	Sc	S _q	S _y		
1	6.00	6.00	3.00	0.00	28		25.66	14.65	16.64	1.62	4.860	1.0	1.0	1.3	1.2	0.8	57.71	62.57
2	6.00	6.00	4.50	0.00	28		25.66	14.65	16.64	1.65	7.425	1.0	1.0	1.3	1.2	0.8	74.98	82.41
3	6.00	6.00	6.00	0.00	28		25.66	14.65	16.64	1.65	9.900	1.0	1.0	1.3	1.2	0.8	91.19	101.09

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12. SETTLEMENT FAILUR AND CALCULATION

BH-01

Depth(m)	width(m)	Length(m)	corrected N	Weighted average corrected 'N' value	from Figure 12 of IS:8009 part -1, depth factor	Settlement in 'm' per unit pressure (reading from graph)	Recommended allowable bearing pressure for 25 mm settlement
3.00	6.00	6.00	49	48	1.000	0.006	42.37
4.50	6.00	6.00	52	49	1.000	0.006	43.85
6.00	6.00	6.00	55	51	1.000	0.006	45.45

BH-03

Depth(m)	width(m)	Length(m)	corrected N	Weighted average corrected 'N' value	from Figure 12 of IS:8009 part -1, depth factor	Settlement in 'm' per unit pressure (reading from graph)	Recommended allowable bearing pressure for 25 mm settlement
3.00	6.00	6.00	51	49	1.000	0.006	44.64
4.50	6.00	6.00	54	51	1.000	0.006	45.45
6.00	6.00	6.00	56	52	1.000	0.005	47.16

BH-04

Depth(m)	width(m)	Length(m)	corrected N	Weighted average corrected 'N' value	from Figure 12 of IS:8009 part -1, depth factor	Settlement in 'm' per unit pressure (reading from graph)	Recommended allowable bearing pressure for 25 mm settlement
3.00	6.00	6.00	51	50	1.000	0.006	44.64
4.50	6.00	6.00	55	51	1.000	0.005	46.29
6.00	6.00	6.00	57	53	1.000	0.005	47.16

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13. SAMPLE CALCULATION FOR BH-01

SAFE BEARING CAPACITY OF SOIL - Based on IS: 6403

Shape of footing		Rectangle		
Depth of footing, D	3.00	Cohesion, C, kg/sq.cm	0.000	
Width of footing, B	6.00	Angle of Int.Friction, f	27.00	
	6.00	Specific Gravity, g	2.694	
Depth of Water Table, m	Not found	Bulk Density, Y _d , gm/cc	1.630	
Ratio d/B	0.500	Sat. Density, Y _{sat} , gm/cc	1.985	
Water Table Factor	1.00	Sub. Density, Y', gm/cc	0.985	
Effective Surcharge over EGL, m	0.00	Inclination Angle a	0	
Dry Density, Y _d , gm/cc	1.564	Factor of Safety	2.5	
	4.25	Surcharge Density Assumed, gm/cc	1.000	
Overburden Pressure, t/m ²	4.890	Void Ratio, e _o = $\frac{Gx}{Y_w} - 1$	-	
Shear Zone, H	5.41	= $\frac{Y_d}{Y_a}$	0.72	
	= 0.5 B tan (45+φ/2)	Mode of Failure =	Intermediate Shear Failure	
$F' = \tan^{-1}(0.67 \tan F)$		Nc'' =	15.201	23.82
= 18.85		Nq'' =	6.773	13.13
		Ng'' =	6.003	14.40
		Inter	General	Local
For general shear failure i.e. Void Ratio < 0.55				
$qu = cNcScdcic + q(Nq-1) Sqdqiq + 0.5 BgNgSgdgig W'$				
= 127.56		qs =	51.02	t/m ²
For local shear failure i.e. Void Ratio > 0.75				
$qu = 0.67cN'cScdcic + q(N'q-1) Sqdqiq + 0.5 BgN'gSgdgig W'$				
= 44.97			17.99	t/m ²
For intermediate shear failure i.e. Void Ratio < 0.55 and > 0.75				
	Void Ratio	e <= 0.55	e >= 0.75	0.55 < e < 0.75
	e	0.55	0.75	0.72
qu = Net Safe Bearing Capacity, t/m²		51.02	17.99	22.94

Factors- Tan-1(0.67 tan F)				Factors- tan F			
d, s, i	Depth factor	Shape factor	Inclination factor	d, s, i	Depth factor	Shape factor	Inclination factor
dc, sc, ic	1.000	1.300	1.000	dc, sc, ic	1.000	1.300	1.000
dq, sq, iq	1.000	1.200	1.000	dq, sq, iq	1.000	1.200	1.000
dg,sg,ig	1.000	0.800	1.000	dg,sg,ig	1.000	0.800	1.000



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SETTLEMENT ANALYSIS FOR SHALLOW FOUNDATIONS BASED ON N - VALUES

Analysis as per IS:8009(Part 1)-1976 , Clause 9.1.4

Width of footing	B =	6.00	m
Length of footing	L =	6.00	m
Depth of foundation	D_f =	3.00	m
Depth of Influence	=	9.00	m
CORRECTED 'N' VALUE=NVALUE*	$N' = (0.77 \log 10 20/\rho) N$		(ρ = Overburden Pressure)

Weighted average 'N' value

Calculation

46.5

Weighted average corrected

'N' value

N = 46.50

Design Depth of water table $d =$ Not found m

Water Table Correction $W' =$ 1.00

from Figure 12 of IS:8009 part -1,
 depth factor $=$ 1.000

Settlement in 'm' per unit pressure (reading from graph) $=$ 0.0059 m/kg/sq cm

Settlement after applying water table correction for 1 unit pressure $=$ 0.000059 m/kN/m²

Bearing Pressure for 25 mm settlement $= 25 / (0.000059 * 1000) =$ 423.7 kN/m²

Recommended allowable bearing pressure for 25 mm settlement $=$ 423.7 kN/m²

$=$ 42.37 t/m²

END OF REPORT

