

EPC Package for Lara Super Thermal Power Project, Stage II (2 X 800 MW)
Amendment No. 1 to Technical specification Section VI of Bidding Document No.: CS-9587-001R-2

S. No.	SPECIFICATION REFERENCE				Existing	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
D-1-01	VI / B	D-1-7	7.00.00	1 TO 12	Sub-Section D-1-7	Refer revised Sub-section D-1-7 at Annexure A
D-1-02	VI / B	D-1-12 ANNEXURE (C)	----	----	Sub-Section D-1-12 Annexure (C)	Refer revised Sub-Section D-1-12 Annexure(C) at Annexure-B.

Doc No.: CS-9587-001R-2-TECH-AMDT. 01	EPC Package for Lara Super Thermal Power Project, STAGE II (2 X 800MW)	Amendment No. 01 to Technical Specifications Section-VI
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CLAUSE NO.	TECHNICAL REQUIREMENTS			एनटीपीसी NTPC
7.00.00	FOUNDATION SYSTEM AND GEOTECHNICAL DATA			
7.01.00	Soil Data Owner has carried out detailed geotechnical investigation at the project site. Bore logs data and Bearing capacity for design of foundations are given at Annexure - C of this specification. The detailed geotechnical investigation report comprising of Boreholes, Laboratory tests, Chemical analysis, etc for the sub-strata prevailing at site would be made available for the Bidder's study at the Owner's office, if required. The onus of correct assessment / interpretation and understanding of the existing subsoil condition / data lies with the Bidder. In case, bidder feels that the available data is inadequate, he may carry out his own geotechnical investigation. Further, if any change in layout or for any area not covered in the provided geotechnical data, the bidder has to carry out geotechnical investigation in the area at no cost to Owner. Geotechnical investigation work shall got executed by the Contractor through the agencies as mentioned in Clause No. 7.07.01. However, no time extension shall be given on account of soil investigation carried out by the Bidder. The geotechnical investigation report shall be prepared with detailed recommendations regarding type of foundation and allowable bearing pressure for various structures/ facilities and other soil parameters. Net allowable bearing pressure shall be limited to Table-1 and Table-1a of Annexure-C. The report shall be submitted for Owner's approval prior to commencement of design of foundation. Bidder may refer enclosed topographical survey drawing and general layout plan along with borelogs for variation in existing/ natural ground level (NGL) and finished ground level (FGL). Wherever ash/coal deposit/brick-bats etc. is found the same shall be treated as filled up soil.			
7.01.01	The furnished borelog details are specific to the co-ordinates where the boreholes have been carried out and are provided for bidder's information only. Soil profile in the proposed area may vary with respect to the borelogs enclosed for bidder's information. Bidder has to consider all such variations in his estimation, over the extent of the work to be carried out. The Bidder should note that nothing extra whatsoever on account of variation between soil data collected by Owner and that found by the Bidder during geotechnical investigation by him or during execution of works, shall be Payable.			
7.01.02	Tank Foundations a) The tanks shall rest on flexible tank pad foundation, resting on sand with concrete ring wall to retain sand. Base of the concrete ring wall shall not rest on the expansive soil, if any. b) Entire loose/ soft soil inside the concrete ring wall shall be removed and shall be filled with sand. Sand for filling shall be clean and well graded conforming to IS 383 with grading Zone I to III. c) Sand shall be spread in layers not exceeding 30cm compacted thickness over the area. Each layer shall be uniformly compacted by mechanical means like plate vibrators, small vibratory rollers, etc to achieve a relative density of not less than 80%. d) Other requirements of tank foundations shall be as per IS 803 and as specified elsewhere in the specifications.			
7.02.00	Foundation System The requirements for the foundation system to be adopted are as given in subsequent clauses. Depending upon the depth of competent strata/stratum, type of structures, functional			
LARA STPP STAGE-II (2X800MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO:	SUB-SECTION CIVIL WORKS FOUNDATION SYSTEM	PAGE 1 OF 7

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	under such cases either the foundation shall be lowered completely into the virgin stratum or the filled up soil upto the virgin layers shall be removed and built up through PCC (1:4:8) up to designed foundation level. e) Wherever the intended bearing stratum is weathered rock, but the actual strata encountered during excavation consists of both overburden soil and weathered rock at founding level, under such cases, the overburden upto the weathered rock level including 0.5 m into the weathered rock shall be removed and built up through PCC (1:3:6) upto the designed founding level. Thus, maintaining the same founding level for all the footings of a structure. f) The last layer of about 300 mm before reaching the founding level shall be excavated carefully by such equipment so that soil / rock at the required level will be left in its natural condition.			
7.03.00	Special Requirements			
7.03.01	Details of treatment for foundations / underground structures required to counteract soil / water chemical environment, cement type, grade of concrete, type of reinforcement, cover to reinforcement and protective coating to foundations, etc. shall be as mentioned in Annexure-C of this specification			
7.04.00	Excavation, Filling and Dewatering			
7.04.01	For excavation works, comprehensive dewatering with well point or deep wells arrangement, if required, shall be adopted. Scheme for dewatering and design with all computations and back up data for dewatering shall be submitted for the owner's information. The water table shall be maintained at 0.5m below the founding depth.			
7.04.02	Excavation for shallow foundations shall be covered with PCC immediately after reaching the founding level. In case of any local loosening of soil or any loose pockets are encountered at founding level during excavation the same shall be removed and compensated by PCC M7.5. The final layer of about 300 mm thickness above the founding level shall be excavated by suitable means, so as to avoid disturbance to founding stratum.			
7.04.03	<u>Backfilling in Power House & Boiler Area</u> Backfilling around foundations, trenches, sumps, pits, plinths, etc. shall be carried out with sand in layers not exceeding 300 mm compacted thickness and each layer shall be compacted to minimum 80% of relative density. <u>Backfilling in other area</u> Backfilling around foundations, pipes, trenches, sumps, pits, plinths, etc. shall be carried out with approved material in layers not exceeding 300 mm compacted thickness (higher thickness of layers upto 500mm with heavy mechanical compacting equipment) and each layer shall be compacted to 90% of standard proctor density for cohesive soils and to 80% of relative density for non cohesive soils. Rock pieces having size less than 150 mm and interstices filled with soil may be used for backfilling around foundation, plinths etc. and shall be compacted to minimum of 85% of original stack of material after filling the interstices.			
7.04.04	Founding level for trenches/channels shall be decided as per functional requirement. The bottom of excavation shall be properly compacted prior to casting of bottom slab of trenches / channels.			
7.04.05	CBR tests for pavement/road design shall be carried out by the Contractor after earth filling (if applicable) has been completed upto the formation level.			
7.04.06	The contractor shall take all necessary measures during excavation to prevent the hazards of falling or sliding of material or article from any bank or side of such excavation which is more			
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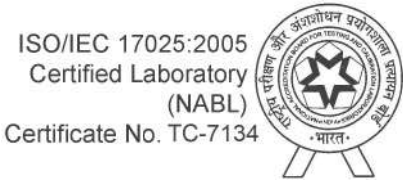
CLAUSE NO.	TECHNICAL REQUIREMENTS			
	than one and a half meter above the footing by providing adequate piling, shoring, bracing etc. against such bank or sides. Adequate and suitable warning signs shall be put up at conspicuous places at the excavation work to prevent any persons or vehicles falling into the excavation trench. No worker should be allowed to work where he may be stuck or endangered by excavation machinery or collapse of excavations or trenches.			
7.05.00	EXCAVATION IN ROCK Excavation in rock shall be carried out by mechanical means and if blasting is required for founding of some of the structures under this package, control blasting only shall be carried out.			
7.05.01	Controlled blasting shall be done by a specialised agency duly approved by Engineer. All controlled blasting shall be done by using time delay detonators (i.e. excel type).			
7.05.02	a) Contractor shall engage an agency expert in blasting such as, NIRM (National Institute of Rock Mechanics), CMPDIL, Central Institute of Mining and Fuel Research Dhanbad, Dept. of Mining of Govt. Institutions etc. to design detailed blasting scheme and get the same approved from Engineer before carrying out the blasting operation. All blasting shall be done as per the approved blasting scheme & initial blasting operations shall be done under the supervision & guidance of the representative of the blasting expert. b) All the statutory laws, (Explosives Act etc.) rules, regulations, Indian Standards, etc. pertaining to the acquisition, transport, storage, handling and use of explosives, etc. shall be strictly followed. c) The Contractor shall obtain Licenses from Competent Authorities for undertaking blasting work as well as for procuring, transporting to site and storing the explosives as per explosives act. The Contractor shall be responsible for the safe transport, use, custody and proper accounting of the explosive Materials. d) The Contractor shall be responsible and liable for any accident and injury / damage which may occur to any person or property of the project or public on account of any operations connected with the storage, transportation, handling or use of explosive and blasting operations.			
7.06.00	Sheeting & Shoring The contractor shall ascertain for himself the nature of materials to be excavated and difficulties, if any, likely to be encountered in excavation while executing the work. Sheet piling, sheeting and shoring, bracing and maintaining suitable slopes, drainage, etc. shall be provided and installed by the Contractor, to the satisfaction of the Engineer.			
7.07.01	Geotechnical investigation work may be got executed by the Contractor through the following suggested agencies 1. C.E.TESTING COMPANY Pvt. Ltd, Kolkata 2. Cengrs Geotechnica Pvt. Ltd, New Delhi 3. KCT Consultancy Services, Ahemdabad 4. M.K. Soil Testing Laboratory, Ahemdabad 5. Secon Private Limited, Bangalore 6. Soil Engineering Consultants, New Delhi 7. CEG Test House and Research Centre Private Limited, Jaipur 8. Geomarine Consultants Pvt Ltd., Chennai 9. Soiltech India Private Limited, Pune			
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CLAUSE NO.	TECHNICAL REQUIREMENTS			एनटीपीसी NTPC																																																																						
	Annexure-C SOIL DATA AND FOUNDATION SYSTEM Employer has carried out geotechnical investigation in the proposed area. Logs of boreholes of proposed area are enclosed with this Annexure. a) The minimum founding level and the corresponding net allowable bearing pressure shall be as given in Table – 1 below (except CWPB, FOPB, Switchyard, crusher house and stacker reclaimer area). Table-1 <table><tr><th rowspan="3">Founding Depth/ Stratum</th><th colspan="3">Net Allowable Bearing Pressure T/m2</th></tr><tr><th>Isolated and combined footings including raft for 25mm permissible settlement in case of soil and 12mm in case of rocky strata</th><th>Isolated and combined footings for 40mm permissible settlement in case of soil and 12mm in case of rocky strata</th><th>Rafts (width > 6m) for 75mm permissible settlement in case of soil and 12mm in case of rocky strata</th></tr><tr><th colspan="2">Width upto 6.0m</th><th></th></tr><tr><td colspan="4">In case of foundation stratum is soil</td></tr><tr><td>1.0m below NGL</td><td>8</td><td>10</td><td>12</td></tr><tr><td>2.0m below NGL</td><td>12</td><td>18</td><td>22</td></tr><tr><td>3.0m below NGL</td><td>15</td><td>22</td><td>25</td></tr><tr><td>4.0m below NGL</td><td>20</td><td>25</td><td>28</td></tr><tr><td>5.0m below NGL</td><td>25</td><td>28</td><td>30</td></tr><tr><td>6.0m below NGL</td><td>30</td><td>35</td><td>35</td></tr><tr><td>7.0m below NGL</td><td>35</td><td>40</td><td>40</td></tr><tr><td>8.0m or more than 8.0m below NGL</td><td>45</td><td>45</td><td>45</td></tr><tr><td colspan="4">In case of founding stratum is rock</td></tr><tr><td>0.6m embedment into weathered rock</td><td>35</td><td>35</td><td>35</td></tr><tr><td>1.0m embedment into weathered rock</td><td>40</td><td>40</td><td>40</td></tr><tr><td>2.0m embedment into weathered rock</td><td>50</td><td>50</td><td>50</td></tr><tr><td>3.0m embedment into weathered rock</td><td>52</td><td>52</td><td>52</td></tr><tr><td>3.5m or more than 3.5m embedment into weathered rock</td><td>55</td><td>55</td><td>55</td></tr></table> The minimum founding level and the corresponding net allowable bearing pressure for CWPB, FOPB, crusher house, Switchyard and stacker reclaimer area shall be as given in Table – 1a below. Table-1a				Founding Depth/ Stratum	Net Allowable Bearing Pressure T/m2			Isolated and combined footings including raft for 25mm permissible settlement in case of soil and 12mm in case of rocky strata	Isolated and combined footings for 40mm permissible settlement in case of soil and 12mm in case of rocky strata	Rafts (width > 6m) for 75mm permissible settlement in case of soil and 12mm in case of rocky strata	Width upto 6.0m			In case of foundation stratum is soil				1.0m below NGL	8	10	12	2.0m below NGL	12	18	22	3.0m below NGL	15	22	25	4.0m below NGL	20	25	28	5.0m below NGL	25	28	30	6.0m below NGL	30	35	35	7.0m below NGL	35	40	40	8.0m or more than 8.0m below NGL	45	45	45	In case of founding stratum is rock				0.6m embedment into weathered rock	35	35	35	1.0m embedment into weathered rock	40	40	40	2.0m embedment into weathered rock	50	50	50	3.0m embedment into weathered rock	52	52	52	3.5m or more than 3.5m embedment into weathered rock	55	55	55
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CLAUSE NO.	TECHNICAL REQUIREMENTS				
	Founding Depth/ Stratum	Net Allowable Bearing Pressure T/m2			
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		Width upto 6.0m			
	In case of foundation stratum is soil				
	1.0m below NGL	8	10	12	
	2.0m below NGL	10	12	22	
	3.0m below NGL	14	15	24	
	4.0m below NGL	14	16	28	
	5.0m below NGL	15	18	30	
	6.0m below NGL	16	19	31	
	7.0m below NGL	17	21	33	
	8.0m or more than 8.0m below NGL	19	23	35	
	In case of founding stratum is rock				
	0.6m embedment into weathered rock	35	35	35	
	1.0m embedment into weathered rock	40	40	40	
	2.0m embedment into weathered rock	50	50	50	
	For Finished ground level (FGL) refer General layout plan (GLP) To determine the Natural Ground Level (NGL) the following two tender drawings titled “TOPGRAPHICAL SURVEY OLD SURVEY DATA FOR NGL PURPOSE” and “TOPGRAPHICAL SURVEY (EXISTING GROUND LEVEL)” shall be referred. Further the above two tender drawings shall also be referred in conjunction with borelog data attached at Annexure to this chapter. The NGL for any particular structure/facility shall be the lowest of all the NGLs mentioned in the extent of the building/facility. The NGL of any point shall be the lowest of the levels at (a) TOPGRAPHICAL SURVEY OLD SURVEY DATA FOR NGL PURPOSE (b) TOPGRAPHICAL SURVEY (EXISTING GROUND LEVEL) and (c) Borelog data attached at Annexure to this chapter. In case any loose/soft pockets is encountered at founding level, the same shall be removed completely upto the hard strata and filled up with PCC (1:4:8). The net allowable bearing pressure higher than above mentioned values shall not be permitted. At intermediate levels the bearing capacity shall be same as the net allowable bearing pressure corresponding to the immediate shallower level mentioned above.				
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CLAUSE NO.	TECHNICAL REQUIREMENTS													
	For open foundations, the total permissible settlement shall be governed by IS: 1904 / IS: 13063 and from functional requirements whichever is more stringent. However, total settlement shall be restricted to the following:													
	<table><tr><td>Isolated & Raft (Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil</td><td>25 mm</td></tr><tr><td>Isolated & Strip (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil</td><td>40 mm</td></tr><tr><td>Raft (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil</td><td>75 mm</td></tr><tr><td>Foundations in Weathered rock / rock</td><td>12 mm</td></tr></table>			Isolated & Raft (Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	25 mm	Isolated & Strip (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	40 mm	Raft (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	75 mm	Foundations in Weathered rock / rock	12 mm			
	Isolated & Raft (Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	25 mm												
	Isolated & Strip (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	40 mm												
	Raft (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	75 mm												
	Foundations in Weathered rock / rock	12 mm												
	In case the total permissible settlement is to be restricted to less than as above specified from functional requirements, then the net allowable bearing pressure shall be reduced after review in consultation with Engineer.													
	c)	Special Requirements:												
		i) Chemicals in ground water and subsoil, as observed during investigation are:												
		<table><tr><td>Chemical</td><td>Sulphates</td><td>Chlorides</td><td>pH</td></tr><tr><td>Ground Water</td><td>60-120 mg/L</td><td>57-88 mg/L</td><td>7.64-7.95</td></tr><tr><td>Sub-soil</td><td><0.05%</td><td>0.007-.010</td><td>5.04-8.32</td></tr></table>	Chemical	Sulphates	Chlorides	pH	Ground Water	60-120 mg/L	57-88 mg/L	7.64-7.95	Sub-soil	<0.05%	0.007-.010	5.04-8.32
Chemical	Sulphates	Chlorides	pH											
Ground Water	60-120 mg/L	57-88 mg/L	7.64-7.95											
Sub-soil	<0.05%	0.007-.010	5.04-8.32											
	ii) In view of the above, the following shall be adopted.													
	<table><tr><td>Cement Type</td><td>As specified elsewhere in the specifications</td></tr><tr><td>Concrete Grade</td><td>As specified elsewhere in the specifications</td></tr><tr><td>Type of Reinforcement</td><td>As specified elsewhere in the specifications</td></tr><tr><td>Cover to Reinforcement</td><td>As specified elsewhere in the specifications</td></tr></table>	Cement Type	As specified elsewhere in the specifications	Concrete Grade	As specified elsewhere in the specifications	Type of Reinforcement	As specified elsewhere in the specifications	Cover to Reinforcement	As specified elsewhere in the specifications					
Cement Type	As specified elsewhere in the specifications													
Concrete Grade	As specified elsewhere in the specifications													
Type of Reinforcement	As specified elsewhere in the specifications													
Cover to Reinforcement	As specified elsewhere in the specifications													

ANNEXURE-C (Revised) TO AMENDMENT-1
Technical specification of Lara II (2X800 MW)
EPC Package



Soil Profile (BH-22)

Location : Track Hopper (Future)
UTM Coordinates : 752674 E, 2407273 N
Survey Coordinates : 2613S, 1254W

Surface Elevation : RL 212.332 m

Ground Water Depth : 21.87 m

Termination Depth : 35.24 m (RL 177.1 m)

Ground Water Level : RL 190.5 m

Boring Method : Shell & Auger

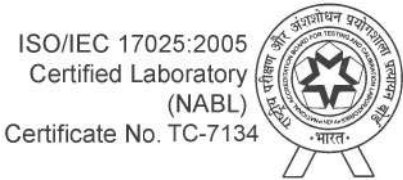
Casing Depth :

Boring Start : 03-Aug-18

Boring Finish : 05-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Medium dense brown silty sand with gravel (SM)		22	56	22	0													
1.00	1.30	UDS1					2.50									1.71	1.50	13.8						
2.50	2.95	SPT1	20	20		Very stiff to hard brown clayey silt, low plastic (CL)								17								8		
4.00	4.30	UDS2				- very stiff, 2.5 to 5.5 m										1.80	1.56	15.2		UU	1 ,2, 3	1.4	11.1	
5.50	5.95	SPT2	55	55		- hard, 5.5 to 10.0 m		10	11	65	14								2.63				13	
7.00	7.45	SPT3	75	75		- with gravel, 5.5 to 7.0 m						31.4	19.6	11.8										
8.50	8.95	SPT4	102	102			10.00																	
10.00	10.45	SPT5	101	101		Hard brown clayey silt, medium plastic (CI)		4	9	60	27													
11.50	11.95	SPT6	89	89		- with traces of gravel, 10.0 to 11.5 m						36.1	21.1	15.0										
13.00	13.45	SPT7	102	102																				
14.50	14.95	SPT8	68	68			16.00																	
16.00	16.45	SPT9	56	56		Hard brown clayey silt, low plastic (CL)						32.8	21.2	11.7										

⁽¹⁾ SPT is outside NABL scope.



Soil Profile (BH-22)

Location : Track Hopper (Future)
UTM Coordinates : 752674 E, 2407273 N
Survey Coordinates : 2613S, 1254W

Surface Elevation : RL 212.332 m
Ground Water Depth : 21.87 m
Termination Depth : 35.24 m (RL 177.1 m)
Ground Water Level : RL 190.5 m

Boring Method : Shell & Auger
Casing Depth :
Boring Start : 03-Aug-18
Boring Finish : 05-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
17.50	17.95	SPT10	62	62		Hard brown clayey silt, low plastic (CL)													UC			1.3		
19.00	19.45	SPT11	62	62																				
20.50	20.95	SPT12	51	51																				
22.00	22.45	SPT13	68	68																				
23.50	23.95	SPT14	56	56																				
25.00	25.45	SPT15	63	63																				
26.50	26.95	SPT16	24	24																				
28.00	28.34	SPT17	105/19cm	-		- with traces of gravel, 29.5 to 31.0 m																		
29.50	29.83	SPT18	101/18cm	-																				
31.00	31.37	SPT19	101/22cm	-																				
32.50	32.77	SPT20	101/12cm	-		Hard brown clayey silt, medium plastic (CI)	32.50																	
34.00	34.33	SPT21	101/18cm	-																				

⁽¹⁾ SPT is outside NABL scope.

ISO/IEC 17025:2005
Certified Laboratory
(NABL)
Certificate No. TC-7134



Soil Profile (BH-22)

Location : Track Hopper (Future)
UTM Coordinates : 752674 E, 2407273 N
Survey Coordinates : 2613S, 1254W

Surface Elevation : RL 212.332 m

Ground Water Depth : 21.87 m

Termination Depth : 35.24 m (RL 177.1 m)

Ground Water Level : RL 190.5 m

Boring Method : Shell & Auger

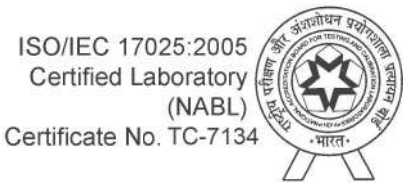
Casing Depth :

Boring Start : 03-Aug-18

Boring Finish : 05-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, Nr	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
35.00	35.24	SPT22	102/9cm	-		Hard brown clayey silt, medium plastic (CI)	35.24																	

⁽¹⁾ SPT is outside NABL scope.



Soil Profile (BH-56)

Location : Crushed Coal Stock Pile
UTM Coordinates : 753201 E, 2407556 N
Survey Coordinates : 2280S, 727W

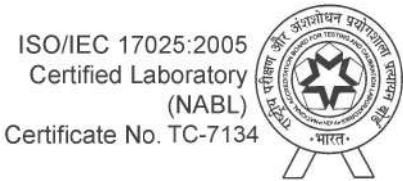
Surface Elevation : RL 210.071 m
Ground Water Depth : Not met
Termination Depth : 20.05 m (RL 190 m)

Boring Method : Shell & Auger
Casing Depth :
Boring Start : 11-Aug-18
Boring Finish : 09-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1	53	53		Dense brown silty fine sand with gravel (SM)	1.00	10	59	27	4					1.79	1.60	12.1	2.68	UU	1 ,2, 3	2.8	15.1	
1.00	1.30	UDS1				Hard brown clayey silt with gravel, medium plastic (CI)																		
2.50	2.95	SPT1																						
4.00	4.45	SPT2																						
5.50	5.84	SPT3																						
7.00	7.32	SPT4																						
8.50	8.79	SPT5																						
10.00	10.14	SPT6	Ref*/14cm		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																			

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-56)



Location : Crushed Coal Stock Pile
UTM Coordinates : 753201 E, 2407556 N
Survey Coordinates : 2280S, 727W

Surface Elevation : RL 210.071 m
Ground Water Depth : Not met
Termination Depth : 20.05 m (RL 190 m)

Boring Method : Rotary Drilling
Casing Depth :
Boring Start : 11-Aug-18
Boring Finish : 09-Sep-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Rig : Joy Voltas: 12B																				
													Return Water		Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compesive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)														
													Colour	Loss																						
Ref ^f */ 14cm	10.00	10.00	SPT6	1-5			Very weak, Brown GRANITE, disintegrated completely weathered		14	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit																					
	10.50	10.14	RK-1																																	
	11.00																																			
Ref ^f */ 4cm	11.50	11.50	SPT7																																	
	12.00	11.54	WS1																																	
	12.50																																			
Ref ^f */ 15cm	13.00	13.00	SPT8												0								0													
	13.50	13.15	WS2												0								0													
	14.00																																			
Ref ^f */ 4cm	14.50	14.50	SPT9	6-11											19								0													
	15.00	14.54	RK-2																																	
	15.50																																			
Ref ^f */ 5cm	16.00	16.00	SPT10																																	
	16.50	16.05																																		

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-56)

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Location : Crushed Coal Stock Pile
UTM Coordinates : 753201 E, 2407556 N
Survey Coordinates : 2280S, 727W

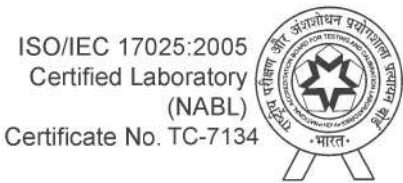
Surface Elevation : RL 210.071 m
Ground Water Depth : Not met
Termination Depth : 20.05 m (RL 190 m)

Boring Method : Rotary Drilling
Casing Depth :
Boring Start : 11-Aug-18
Boring Finish : 09-Sep-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Rig : Joy Voltas: 12B							
													Return	Water									
Ref*/ 5cm	16.50	17.50 17.55	WS3				Very weak, Brown GRANITE, disintegrated completely weathered		0	0	15		Colour			Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
	17.00																						
	17.50		Light Brown						100%	32 CT Diamond Impregnated Bit													
	18.00																						
	18.50																						
Ref*/ 4cm	19.00	19.00 19.04	SPT12	WS5	0	0																	
	19.50																						
Ref*/ 5cm	20.00	20.00 20.05	SPT13					20.05															

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-59)

Location : Crushed Coal Stock Pile
UTM Coordinates : 753246 E, 2407432 N
Survey Coordinates : 2400S, 672W

Surface Elevation : RL 206.645 m
Ground Water Depth : 18.41 m
Termination Depth : 30.04 m (RL 176.6 m)
Ground Water Level : RL 188.2 m

Boring Method : Shell & Auger
Casing Depth :
Boring Start : 13-Aug-18
Boring Finish : 09-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	1.00	DS1				Very stiff to hard brown clayey silt, low plastic (CL)		4	30	57	9													
1.00	1.45	SPT1	16	16		- very stiff, with traces of gravel, 0.0 to 7.0 m						26.7	15.5	11.1	14									8
2.50	2.80	UDS1														1.78	1.62	10.1		UU	1, 2, 3	2.4	1.7	
4.00	4.45	SPT2	22	22				3	8	60	29													
5.50	5.80	UDS2														1.91	1.72	11.1						
7.00	7.45	SPT3	79	79		- hard, with gravel, 7.0 to 17.5 m						30.0	21.0	9.0					2.68					
8.50	8.95	SPT4	92	92																				
10.00	10.42	SPT5	101/27cm					7	27	47	19													
11.50	11.95	SPT6	91	91																				
13.00	13.41	SPT7	101/26cm																					
14.50	14.83	SPT8	101/18cm																					
16.00	16.39	SPT9	101/24cm																					

⁽¹⁾ SPT is outside NABL scope.

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Soil Profile (BH-59)

Location : Crushed Coal Stock Pile
UTM Coordinates : 753246 E, 2407432 N
Survey Coordinates : 2400S, 672W

Surface Elevation : RL 206.645 m
Ground Water Depth : 18.41 m
Termination Depth : 30.04 m (RL 176.6 m)
Ground Water Level : RL 188.2 m

Boring Method : Shell & Auger
Casing Depth :
Boring Start : 13-Aug-18
Boring Finish : 09-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N _r ^{''}				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
17.50	17.82	SPT10	102/17cm	96		Hard brown clayey silt with gravel, low plastic (CL)	25.00					26.5	19.0	7.5										
19.00	19.28	SPT11	101/13cm																					
20.50	20.95	SPT12	96																					
22.00	22.41	SPT13	101/26cm																					
23.50	23.70	SPT14	100/5cm																					
25.00	25.14	SPT15	Ref*/14cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

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Location : Crushed Coal Stock Pile
UTM Coordinates : 753246 E, 2407432 N
Survey Coordinates : 2400S, 672W

Surface Elevation : RL 206.645 m
Ground Water Depth : 18.41 m
Termination Depth : 30.04 m (RL 176.6 m)
Ground Water Level : RL 188.2 m

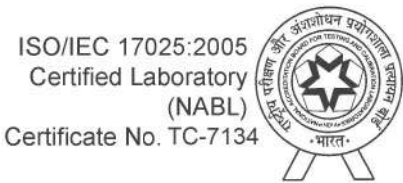
Boring Method : Rotary Drilling
Casing Depth :
Boring Start : 13-Aug-18
Boring Finish : 09-Sep-18

Rock Profile (BH-59)

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Rig : Joy Voltas: 12B						
													Return Water		Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Colour	Loss								
Ref*/14cm	25.00	25.00	SPT15	1-5			Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, completely weathered - weak, intensely fractured, 25.0 to 26.5 - Very weak, disintegrated, 26.5 to 30.04		22	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.50	2.69	0.071	1.12	112	2454*	
	25.50	25.14																				
	26.00																					
	26.50	26.50																				
	27.00		WS1																			
	27.50																					
Ref*/4cm	28.00	28.00	SPT16						0	0	15											
	28.50	28.04	WS2				0	0														
Ref*/5cm	29.00	29.00	SPT17						0	0												
	29.50	29.05	WS3																			
Ref*/4cm	30.00	30.00	SPT18					30.04														
		30.04																				

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-63)

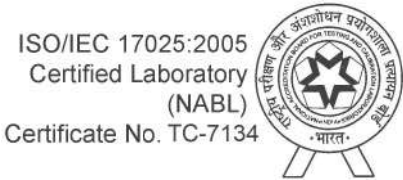
Location : Crushed Coal Stock Pile
UTM Coordinates : 753606 E, 2407602 N
Survey Coordinates : 2204S, 431W

Surface Elevation : RL 205.820 m
Ground Water Depth : 17.50 m
Termination Depth : 35.25 m (RL 170.6 m)
Ground Water Level : RL 188.3 m

Boring Method : Shell & Auger
Casing Depth :
Boring Start : 02-Aug-18
Boring Finish : 29-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown clayey silt, low plastic (CL)		10	25	44	21													
1.00	1.45	SPT1	23	23		- very stiff, with gravel, 0.0 to 4.0 m									14									
2.50	2.80	UDS1														1.80	1.59	12.7		UU	1, 2, 3	1.7	9.0	
4.00	4.45	SPT2	52	52		- hard, 4.0 to 17.5 m		1	8	70	21													
5.50	5.89	SPT3	101/24cm			- with traces of gravel, 4.0 to 13.0 m						32.5	22.8	9.8										
7.00	7.40	SPT4	103/25cm																2.70					
8.50	8.95	SPT5	78	78																				
10.00	10.38	SPT6	103/23cm									32.6	22.5	10.0										
11.50	11.88	SPT7	104/23cm																					
13.00	13.39	SPT8	102/24cm			- with gravel, 13.0 to 17.5 m																		
14.50	14.87	SPT9	103/22cm									34.3	17.8	16.6										
16.00	16.28	SPT10	102/13cm																					

⁽¹⁾ SPT is outside NABL scope.



Soil Profile (BH-63)

Location : Crushed Coal Stock Pile
UTM Coordinates : 753606 E, 2407602 N
Survey Coordinates : 2204S, 431W

Surface Elevation : RL 205.820 m
Ground Water Depth : 17.50 m
Termination Depth : 35.25 m (RL 170.6 m)
Ground Water Level : RL 188.3 m

Boring Method : Shell & Auger
Casing Depth :
Boring Start : 02-Aug-18
Boring Finish : 29-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, Nr	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
17.50	17.73	SPT11	103/8cm			Hard brown clayey silt with gravel, low plastic (CL)		22	36	32	10													
19.00	19.28	SPT12	101/13cm									32.5	22.5	10.0										
20.50	20.95	SPT13	96	96																				
22.00	22.45	SPT14	85	85															2.67					
23.50	23.82	SPT15	105/17cm																					
25.00	25.29	SPT16	102/14cm									30.6	16.2	14.4										
26.50	26.82	SPT17	103/17cm																					
28.00	28.29	SPT18	102/14cm																					
29.50	29.89	SPT19	103/24cm					9	29	49	13													
31.00	31.40	SPT20	101/25cm																					
32.50	32.88	SPT21	103/23cm																					
34.00	34.32	SPT22	102/17cm																					

⁽¹⁾ SPT is outside NABL scope.

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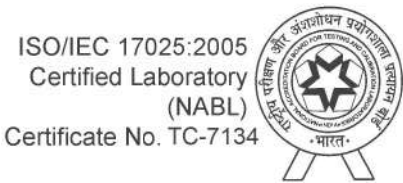


Soil Profile (BH-63)

Location :	Crushed Coal Stock Pile	Surface Elevation :	RL 205.820 m	Boring Method :	Shell & Auger
UTM Coordinates :	753606 E, 2407602 N	Ground Water Depth :	17.50 m	Casing Depth :	
Survey Coordinates :	2204S, 431W	Termination Depth :	35.25 m (RL 170.6 m)	Boring Start :	02-Aug-18
		Ground Water Level :	RL 188.3 m	Boring Finish :	29-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, Nr	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
35.00	35.25	SPT23	102/10cm			Hard brown clayey silt with gravel, low plastic (CL)	35.25	18	39	36	7													

⁽¹⁾ SPT is outside NABL scope.



Soil Profile (BH-64)

Location : WTP area (Stage-II)
UTM Coordinates : 753687 E, 2407797 N
Survey Coordinates : 1984S, 270W

Surface Elevation : RL 203.190 m
Ground Water Depth : 15.20 m
Termination Depth : 25.28 m (RL 177.9 m)
Ground Water Level : RL 188 m

Boring Method : Shell & Auger
Casing Depth : 12.0 m
Boring Start : 05-Sep-18
Boring Finish : 06-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)	
From	To		Field Value, N _r	Corrected Value, N _r ^{''}				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1				Very stiff to hard brown clayey silt with gravel, low plastic (CL) - very stiff, 0.0 to 4.0 m		5	13	61	21				9.9				2.68	UU	1 ,2, 3	1.0	7.9		
1.00	1.35	SPT1	29	29									32.2	18.0		14.2									
2.50	2.80	UDS1				- hard, 4.0 to 17.5 m										1.79	1.58	13.5							
4.00	4.45	SPT2	65	65																					
5.50	5.95	SPT3	67	67																					
7.00	7.45	SPT4	73	73																					
8.50	8.95	SPT5	54	54						13	7	68	12												
10.00	10.45	SPT6	65	65																					
11.50	11.95	SPT7	82	82																					
13.00	13.38	SPT8	103/23cm																						
14.50	14.89	SPT9	101/24cm									30.7	22.2	8.6											
16.00	16.39	SPT10	102/24cm																						

⁽¹⁾ SPT is outside NABL scope.

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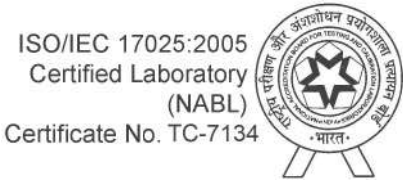
Location : WTP area (Stage-II)
UTM Coordinates : 753687 E, 2407797 N
Survey Coordinates : 1984S, 270W

Soil Profile (BH-64)

Surface Elevation : RL 203.190 m
Ground Water Depth : 15.20 m
Termination Depth : 25.28 m (RL 177.9 m)
Ground Water Level : RL 188 m
Boring Method : Shell & Auger
Casing Depth : 12.0 m
Boring Start : 05-Sep-18
Boring Finish : 06-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
17.50	17.82	SPT11	101/17cm			Hard brown clayey silt with traces of gravel, low plastic (CL)		4	13	73	10								2.69					
19.00	19.33	SPT12	101/18cm									34.5	21.0	13.5										
20.50	20.82	SPT13	101/17cm																					
22.00	22.20	SPT14	102/5cm																					
23.50	23.67	SPT15	103/2cm																					
25.00	25.28	SPT16	101/13cm				25.28																	

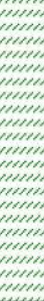
⁽¹⁾ SPT is outside NABL scope.



Soil Profile (BH-65)

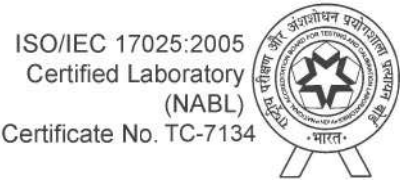
Location : WTP area (Stage-II)
UTM Coordinates : 753616 E, 2407905 N
Survey Coordinates : 1890S, 353W

Surface Elevation : RL 205.770 m
Ground Water Depth : 17.18 m
Termination Depth : 25.04 m (RL 180.7 m)
Ground Water Level : RL 188.6 m
Boring Method : Shell & Auger
Casing Depth : 17.2 m
Boring Start : 04-Sep-18
Boring Finish : 20-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1	100/17cm			Hard brown clayey silt with gravel, medium plastic (CI)	7.00	10	8	56	26	39.1	21.8	17.3	14	1.69	1.54	9.5	2.67					
1.00	1.45	UDS1																						
2.50	2.82	SPT1																						
4.00	4.32	SPT2																						
5.50	5.83	SPT3																						
7.00	7.09	SPT4	Ref*/9cm		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																			

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-65)



Location : WTP area (Stage-II)
UTM Coordinates : 753616 E, 2407905 N
Survey Coordinates : 1890S, 353W

Surface Elevation : RL 205.770 m
Ground Water Depth : 17.18 m
Termination Depth : 25.04 m (RL 180.7 m)
Ground Water Level : RL 188.6 m
Boring Method : Rotary Drilling
Casing Depth : 17.2 m
Boring Start : 04-Sep-18
Boring Finish : 20-Sep-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Rig : Joy Voltas: 12B																				
													Return Water		Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)														
													Colour	Loss																						
Ref*/ 9cm	7.00	7.00	SPT4	1-4	NX		Very weak, Brown GRANITE, disintegrated completely weathered		11	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit																					
	7.50	7.09	RK-1																																	
	8.00																																			
Ref*/ 5cm	8.50	8.50	SPT5	WS-1					0	0												0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9.00	8.55																																		
	9.50																																			
Ref*/ 6cm	10.00	10.00	SPT6	WS-2					0	0												0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10.50	10.06																																		
	11.00																																			
Ref*/ 6cm	11.50	11.50	SPT7	RK-2					5	0												0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12.00	11.56																																		
	12.50																																			
Ref*/ 7cm	13.00	13.00	SPT8																																	
	13.50	13.07																																		

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : WTP area (Stage-II)
UTM Coordinates : 753616 E, 2407905 N
Survey Coordinates : 1890S, 353W

Rock Profile (BH-65)

Surface Elevation : RL 205.770 m
Ground Water Depth : 17.18 m
Termination Depth : 25.04 m (RL 180.7 m)
Ground Water Level : RL 188.6 m
Boring Method : Rotary Drilling
Casing Depth : 17.2 m
Boring Start : 04-Sep-18
Boring Finish : 20-Sep-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Rig : Joy Voltas: 12B						
													Return Water		Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Colour	Loss								
Ref*/4cm	13.50	14.50 14.54	WS3		17.2		Very weak, Brown GRANITE, disintegrated completely weathered		0	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit							
	14.00																					
	14.50		SPT9																			
	15.00		WS4						0	0												
Ref*/3cm	15.50	16.00 16.03																				
	16.00		SPT10																			
	16.50		WS5						0	0												
Ref*/4cm	17.00	17.50 17.54																				
	17.50		SPT11																			
	18.00		WS6						0	0												
Ref*/5cm	18.50	19.00 19.05																				
	19.00		SPT12																			
	19.50		WS7						0	0												
	20.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : WTP area (Stage-II)
UTM Coordinates : 753616 E, 2407905 N
Survey Coordinates : 1890S, 353W

Rock Profile (BH-65)

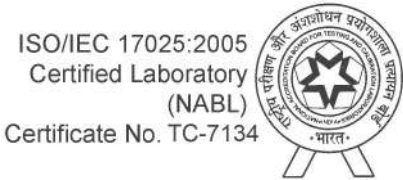
Surface Elevation : RL 205.770 m
Ground Water Depth : 17.18 m
Termination Depth : 25.04 m (RL 180.7 m)
Ground Water Level : RL 188.6 m
Boring Method : Rotary Drilling
Casing Depth : 17.2 m
Boring Start : 04-Sep-18
Boring Finish : 20-Sep-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Rig : Joy Voltas: 12B																																						
													Return Water		Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																
													Colour	Loss																																								
Ref*/ 5cm	20.00	20.50 20.55	SPT13 WS8	7-10			Very weak, Brown GRANITE, disintegrated completely weathered		0	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit																																							
	20.50																																																					
	21.00																																																					
	21.50																																																					
Ref*/ 3cm	22.00	22.00 22.03	SPT14 WS9						7-10														Very weak, Brown GRANITE, disintegrated completely weathered		0	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit																							
	22.50																																																					
	23.00																																																					
	23.50																																																					
Ref*/ 4cm	24.00	25.00 25.04	RK-3 SPT16																						7-10														Very weak, Brown GRANITE, disintegrated completely weathered	25.04	12	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit							
	24.50																																																					
	25.00																																																					
	25.04																																																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-52)



Location : ESP Termination Depth : 30 m (RL 177.7 m) Boring Method : Shell & Auger
UTM Coordinates : 752609 E, 2407824 N Ground Water Depth : 20.19 m Casing Depth : 13.0 m
Survey Coordinates : 2059S, 1053W Surface Elevation : RL 207.74 m Boring Start : 23-Aug-18
Ground Water Level : RL 187.6 m Boring Finish : 18-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Medium dense to dense brown clayey sand with gravels, low plastic (SC)		10	54	36		28.1	16.0	12.1									
1.00	1.45	SPT1	28	44		- medium dense, 0.0 to 4.0 m		25	42	13	20												
2.50	2.80	UDS1													1.69	1.53	10.5		UC		0.7		
4.00	4.45	SPT2	31	34		- dense, 4.0 to 5.5 m	5.50	15	52	33								2.70					
5.50	5.80	UDS2				Hard brown clayey silt, medium plastic (CI)																	
7.00	7.45	SPT3	72	72																			
8.50	8.95	SPT4	76	76								43.6	24.1	19.5									
10.00	10.45	SPT5	83	83			11.50																
11.50	11.95	SPT6	84	64		Very dense brown silty fine to coarse sand intermixed with gravels (SP-GP)	12.50	44	48	8	0												
12.50	12.64	SPT7	Ref*/14cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-52)

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Location : ESP
UTM Coordinates : 752609 E, 2407824 N
Survey Coordinates : 2059S, 1053W

Termination Depth : 30 m (RL 177.7 m)
Ground Water Depth : 20.19 m
Surface Elevation : RL 207.74 m
Ground Water Level : RL 187.6 m

Boring Method : Rotary Drilling
Casing Depth : 13.0 m
Boring Start : 23-Aug-18
Boring Finish : 18-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)						
													Return Water		Bits Used	Density (g/cc)	Specific Gravity											
													Colour	Loss														
Ref*/ 14cm	12.50	12.50	SPT7	1-4			Weak, grey GRANITE, very intensely fractured, highly fractured, highly weathered		22	0	18		Light Brown	Partial	32 CT Diamond Impregnated Bit													
	13.00	12.64																						RK1				
	13.50																											
	14.00	14.00	RK2	5-9																								
	14.50																											
	15.00																											
	15.50	15.50	RK3	10-12																								
	16.00																											
	16.50																											
	17.00	17.00	RK4	13-16																								
	17.50																											
	18.00																											
	18.50	18.50																										
	19.00																											

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : ESP
UTM Coordinates : 752609 E, 2407824 N
Survey Coordinates : 2059S, 1053W

Rock Profile (BH-52)

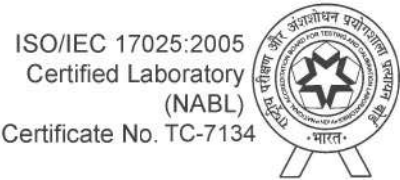
Termination Depth : 30 m (RL 177.7 m)
Ground Water Depth : 20.19 m
Surface Elevation : RL 207.74 m
Ground Water Level : RL 187.6 m
Boring Method : Rotary Drilling
Casing Depth : 13.0 m
Boring Start : 23-Aug-18
Boring Finish : 18-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)			
													Return Water		Bits Used	Density (g/cc)	Specific Gravity								
													Colour	Loss											
	19.00	20.00	RK5	17-21		Weak to moderately strong grey Granite, very intensely to intensely fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 12.5 to 21.5 m - moderately strong, intensely fractured, moderately weathered, 21.5 to 27.5m		23	0	18		Light Brown	Partial	32 CT Diamond Impregnated Bit	2.75	-	-	0.89	71	1562*					
	19.50																								
	20.00																								
	20.50	21.50	RK6	22-25				21	0	40		0	22	2.71	2.85	0.050	0.59	-	361						
	21.00																								
	21.50																								
	22.00	23.00	RK7	26-33				45	23	22		2.71	2.85	0.050	0.59	-	361								
	22.50																								
	23.00																								
	23.50	24.50	RK8	34-39				57	35																
	24.00																								
	24.50																								
	25.00	25.50	RK9	40-45																					
	25.50																								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-52)



Location : ESP

UTM Coordinates : 752609 E, 2407824 N

Survey Coordinates : 2059S, 1053W

Termination Depth : 30 m (RL 177.7 m)

Ground Water Depth : 20.19 m

Surface Elevation : RL 207.74 m

Ground Water Level : RL 187.6 m

Boring Method : Rotary Drilling

Casing Depth : 13.0 m

Boring Start : 23-Aug-18

Boring Finish : 18-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used									
													Colour	Loss										
	25.50	26.00	RK10	46-49			Moderately strong to strong, grey Granite, intensely to moderately fractured , moderately weathered	30.00	40	16	22		Light Brown	Partial	32 CT Diamond Impregnated Bit	2.75	2.82	0.024	0.48	-	597			
	26.00																							
	26.50																							
	27.00																							
	27.50	27.50	RK11	50-54	- moderately strong, intensely fractured, moderately weathered, 21.5 to 27.5m		85		72	40	32 CT Diamond Impregnated Bit		2.75	2.82		0.024	0.48	-	597					
	28.00																							
	28.50																							
	29.00	29.00	RK12	55-57	- strong, moderately fractured, moderately weathered, 27.5 to 30 m		60		50	32 CT Diamond Impregnated Bit	2.75		2.82	0.024		0.48	-	597						
	29.50																							
	30.00	30.00																						

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Space for FGD
UTM Coordinates : 752767 E, 2407998 N
Survey Coordinates : 1877S, 1204W

Soil Profile (BH-53)

Termination Depth : 25 m (RL 181.6 m) Boring Method : Shell & Auger
Ground Water Depth : 20.80 m Casing Depth : 16.0 m
Surface Elevation : RL 206.56 m Boring Start : 23-Aug-18
Ground Water Level : RL 185.8 m Boring Finish : 12-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff brown sandy silt with gravels, low plastic (CL)	1.00	23	39	29	9												
1.00	1.45	SPT1	22	22		Very stiff to hard brown clayey silt, medium plastic (CI)						37.1	23.8	13.3									13
2.50	2.80	UDS1				- very stiff, 1.0 to 4.0 m																	
4.00	4.45	SPT2	83	83		- hard, 4.0 to 10.0 m																	
5.50	5.95	SPT3	89	89								35.5	20.5	14.9				2.69					
7.00	7.45	SPT4	97	97																			
8.50	8.95	SPT5	55	55		- with traces of gravel, 8.5 to 10.0 m		3	5	44	48												
10.00	10.45	SPT6	26	26		- very stiff, 10.0 to 14.5 m						40.9	23.9	17.0									
11.50	11.95	UDS2													1.89	1.68	12.5		UU	1, 2, 3	3.9	9.7	
13.00	13.45	SPT7	28	28		- with gravels, 13.0 to 14.5 m	14.50	24	20	10	46												
14.50	14.70	SPT8	102/5cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

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Location : Space for FGD
UTM Coordinates : 752767 E, 2407998 N
Survey Coordinates : 1877S, 1204W

Rock Profile (BH-53)

Termination Depth : 25 m (RL 181.6 m)
Ground Water Depth : 20.80 m
Surface Elevation : RL 206.56 m
Ground Water Level : RL 185.8 m
Boring Method : Rotary Drilling
Casing Depth : 16.0 m
Boring Start : 23-Aug-18
Boring Finish : 12-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)								
													Return Water		Bits Used	Density (g/cc)	Specific Gravity													
													Colour	Loss																
102*/5cm	14.50	14.50	SPT8	1-4			Weak, grey GRANITE, very intensely fractured, highly weathered,		23	0			↕	↕	↕															
	15.00	14.70	RK1																			Light Brown	100%	32 CT Diamond Impregnated Bit						
	15.50																													
	16.00	16.00	RK2	5-12					33	0																				
	16.50																													
	17.00																													
	17.50	17.50	RK3	13-18					35	0	18																			
	18.00																													
	18.50																													
	19.00	19.00	RK4	19-25					37	0																				
	19.50																													
	20.00																													
	20.50	20.50																												
	21.00																													

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Space for FGD
UTM Coordinates : 752767 E, 2407998 N
Survey Coordinates : 1877S, 1204W

Rock Profile (BH-53)

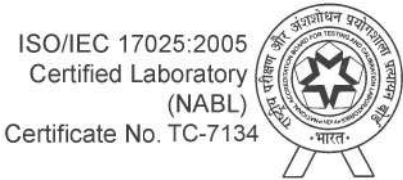
Termination Depth : 25 m (RL 181.6 m)
Ground Water Depth : 20.80 m
Surface Elevation : RL 206.56 m
Ground Water Level : RL 185.8 m
Boring Method : Rotary Drilling
Casing Depth : 16.0 m
Boring Start : 23-Aug-18
Boring Finish : 12-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used							
													Colour	Loss								
	21.00	22.00	RK5	26-32			Weak, grey GRANITE, very intensely fractured, highly weathered,		36	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.47	-	-	0.75	105	2314*	
	21.50																					
	22.00																					
	22.50	23.50	RK6	33-38					27	0												
	23.00																					
	23.50																					
	24.00	25.00	RK7	39-45				25.00	39	0												
	24.50																					
	25.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

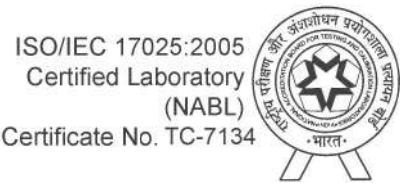
Soil Profile (BH-72)



Location : ESP Termination Depth : 17 m (RL 187.1 m) Boring Method : Shell & Auger
UTM Coordinates : 752449 E, 2407946 N Ground Water Depth : Casing Depth : 8.5 m
Survey Coordinates : 1544S, 1942W Surface Elevation : RL 204.09 m Boring Start : 21-Sep-18
Ground Water Level : m Boring Finish : 03-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Stiff to very stiff brown clayey silt, medium plastic (CI)		0	9	71	20												
1.00	1.45	SPT1	10	10		- stiff, 0.0 to 4.0 m						58.5	23.7	34.8									
2.50	2.80	UDS1													1.78	1.60	11.6		UU	1, 2, 3	1.5	18.6	
4.00	4.45	SPT2	21	21		- very stiff, 4.0 to 6.0 m		17	32	40	11							2.69					
5.50	5.80	DS2				- with gravels, 4.0 to 5.5 m	6.00																
6.00	6.09	SPT3	Ref*/9cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.



Rock Profile (BH-72)

Location : ESP

UTM Coordinates : 752449 E, 2407946 N

Survey Coordinates : 1544S, 1942W

Termination Depth : 17 m (RL 187.1 m)

Ground Water Depth :

Surface Elevation : RL 204.09 m

Ground Water Level : m

Boring Method : Rotary Drilling

Casing Depth : 8.5 m

Boring Start : 21-Sep-18

Boring Finish : 03-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used	Density (g/cc)	Specific Gravity					
													Colour	Loss								
Ref*/ 9cm Ref*/ 5cm	6.00	6.00	SPT3	1-4			Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered		16	0	15		Light Brown	Partial	32 CT Diamond Impregnated Bit	2.69	-	-	0.26	111	2452*	
	6.50	6.09	RK1				- weak, very intensely fractured, highly weathered, 6.0 to 12.0 m															
	7.00																					
	7.50	7.50	SPT4	5-9				21	0													
	8.00	7.55																				
	8.50		RK2																			
	9.00	9.00		10-17				26	0	18												
	9.50																					
	10.00		RK3																			
	10.50	10.50		18-26				28	0													
	11.00																					
	11.50																					
12.00	12.00																					
12.50						- strong, moderately fractured, moderately weathered, 12.0 to 17m																

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-72)

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Location : ESP
UTM Coordinates : 752449 E, 2407946 N
Survey Coordinates : 1544S, 1942W

Termination Depth : 17 m (RL 187.1 m)
Ground Water Depth :
Surface Elevation : RL 204.09 m
Ground Water Level : m

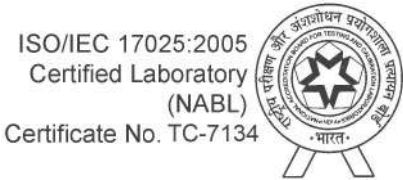
Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 21-Sep-18
Boring Finish : 03-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																																		
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																																																							
													Colour	Loss																																																										
	12.50	13.50	RK5	27-39			Strong, grey Granite, moderately fractured, moderately weathered		97	60	40		↑	Light Brown	↑	32 CT Diamond Impregnated Bit	2.76	2.84	0.027	0.26	-	388																																																		
	13.00																																																																							
	13.50																																																																							
	14.00	15.00	RK6	40-53																				88	52																																															
	14.50																																																																							
	15.00																																																																							
	15.50	16.00	RK7	54-60																																				83	58																															
	16.00																																																																							
	16.50																																																																							
	16.50	17.00	RK8	61-68																																																				93	59															
17.00																																																																								
17.00																																																																								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

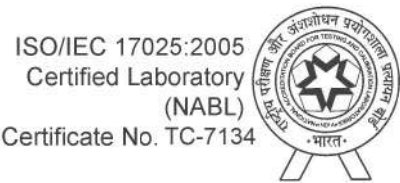
Soil Profile (BH-73)



Location : ESP Termination Depth : 35 m (RL 169.5 m) Boring Method : Shell & Auger
UTM Coordinates : 752631 E, 2407910 N Ground Water Depth : 22.04 m Casing Depth : 8.5 m
Survey Coordinates : 1388S, 1966W Surface Elevation : RL 204.48 m Boring Start : 22-Sep-18
Ground Water Level : RL 182.4 m Boring Finish : 09-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very dense brown silty fine sand with gravels (SM)	1.00	20	67	13	0												
1.00	1.30	UDS1				Hard brown clayey silt, medium plastic (CI)						46.7	19.2	27.5	1.68	1.54	8.9		UU	1, 2, 3	0.9	14.8	
2.50	2.95	SPT1	52	52																			
4.00	4.41	SPT2	102/26cm				5.50	0	7	60	33							2.68					
5.50	5.58	SPT3	Ref*/8cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.



Rock Profile (BH-73)

Location : ESP

UTM Coordinates : 752631 E, 2407910 N

Survey Coordinates : 1388S, 1966W

Termination Depth : 35 m (RL 169.5 m)

Ground Water Depth : 22.04 m

Surface Elevation : RL 204.48 m

Ground Water Level : RL 182.4 m

Boring Method : Rotary Drilling

Casing Depth : 8.5 m

Boring Start : 22-Sep-18

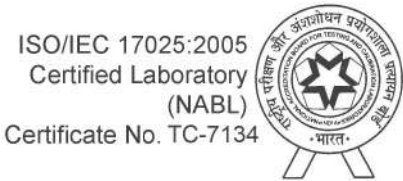
Boring Finish : 09-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
													Return Water		Bits Used	Density (g/cc)	Specific Gravity						
Ref*/ 5cm	Ref*/ 8cm	5.50	5.50	SPT3	1-2		Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered - very weak, disintegrated, completely weathered, 5.5 to 7.0 m		7	0	15		Colour	Loss				Bits Used	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)
	6.00	5.58	RK1																				
	6.50																						
	7.00	7.00	SPT4	3-8			- weak, very intensely fractured, highly weathered, 7.0 to 25.0 m		22	0			Light Brown	100%	32 CT Diamond Impregnated Bit	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
	7.50	7.05	RK2																				
	8.00																						
	8.50	8.50		9-13					26	0	18				32 CT Diamond Impregnated Bit	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
	9.00		RK3																				
	9.50																						
	10.00	10.00		14-19					25	0						32 CT Diamond Impregnated Bit	Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
	10.50		RK4																				
	11.00																						
11.50	11.50																						
12.00																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-73)



Location : ESP
UTM Coordinates : 752631 E, 2407910 N
Survey Coordinates : 1388S, 1966W

Termination Depth : 35 m (RL 169.5 m)
Ground Water Depth : 22.04 m
Surface Elevation : RL 204.48 m
Ground Water Level : RL 182.4 m

Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 22-Sep-18
Boring Finish : 09-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
													Return Water		Bits Used						Density (g/cc)
	12.00	13.00	RK5	20-22			Weak, grey GRANITE, very intensely fractured, highly weathered,		27	10			Colour	Loss							
	12.50																				
	13.00																				
	13.50	14.50	RK6	23-28						29	0										
	14.00																				
	14.50																				
	15.00	16.00	RK7	29-32						25	7	18									
	15.50																				
	16.00																				
	16.50	17.50	RK8	33-36						23	0										
	17.00																				
	17.50																				
	18.00	18.50	RK9	37-41						27	0										
	18.50																				

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : ESP
UTM Coordinates : 752631 E, 2407910 N
Survey Coordinates : 1388S, 1966W

Rock Profile (BH-73)

Termination Depth : 35 m (RL 169.5 m)
Ground Water Depth : 22.04 m
Surface Elevation : RL 204.48 m
Ground Water Level : RL 182.4 m
Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 22-Sep-18
Boring Finish : 09-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)				
													Return Water		Bits Used	Density (g/cc)	Specific Gravity									
													Colour	Loss												
	18.50	19.00	RK10	42-48		Weak, grey GRANITE, very intensely fractured, highly weathered,			26	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.70	2.81	0.039	1.68	-	636					
	19.00																									
	19.50																									
	20.00																									
	20.50	20.50	RK11	49-53														2.70	2.81	0.039	1.68	-	636			
	21.00																									
	21.50																									
	22.00																									
	22.50	23.50	RK12	54-58															2.54	-	-	0.30	56	1228*		
	23.00																									
	23.50																									
	24.00																									
	24.50	25.00	RK13	59-62																2.73	2.83	0.036	0.24	-	394	
	25.00																									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-73)

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Certificate No. TC-7134



Location : ESP
UTM Coordinates : 752631 E, 2407910 N
Survey Coordinates : 1388S, 1966W

Termination Depth : 35 m (RL 169.5 m)
Ground Water Depth : 22.04 m
Surface Elevation : RL 204.48 m
Ground Water Level : RL 182.4 m

Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 22-Sep-18
Boring Finish : 09-Oct-18

SPT N- Value (N ₆₀) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)					
													Return Water		Bits Used	Density (g/cc)	Specific Gravity										
	25.00		WS1				Very weak, Brown GRANITE, disintegrated completely weathered		0	0			Colour						32 CT Diamond Impregnated Bit								
Ref*/ 5cm	25.50														Loss												
	26.00																										
Ref*/ 5cm	26.50	26.50 26.55	SPT5							0	0		15		Light Brown	100%											
	27.00																										
	27.50																										
Ref*/ 4cm	28.00	28.00 28.04	SPT6																								
	28.50																										
	29.00																										
Ref*/ 4cm	29.50	29.50 29.54	SPT7																								
	30.00																										
	30.50																										
Ref*/ 6cm	31.00	31.00 31.06	SPT8																								
	31.50																										

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

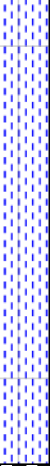
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Location : ESP
UTM Coordinates : 752631 E, 2407910 N
Survey Coordinates : 1388S, 1966W

Rock Profile (BH-73)

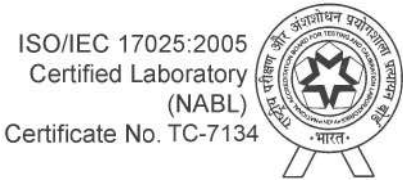
Termination Depth : 35 m (RL 169.5 m)
Ground Water Depth : 22.04 m
Surface Elevation : RL 204.48 m
Ground Water Level : RL 182.4 m
Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 22-Sep-18
Boring Finish : 09-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return	Water								
Ref*/ 8cm	31.50	32.50 32.58	WS5				Very weak, Brown GRANITE, disintegrated completely weathered		0	0	15		Light Brown									
	32.00																					
	33.00																					
	33.50																					
Ref*/ 5cm	34.00	34.00 34.05	SPT10						0	0												
Ref*/ 4cm	35.00	35.00 35.04	WS7 SPT11																			

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-87)



Location : Boiler Termination Depth : 25 m (RL 179.521 m) Boring Method : Shell & Auger
UTM Coordinates : 752440 E, 2407772 N Ground Water Depth : 22.13 m Casing Depth : 13.0 m
Survey Coordinates : 2128S, 1512W Surface Elevation : RL 204.52 m Boring Start : 12-Oct-18
Ground Water Level : RL 182.391 m Boring Finish : 26-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Dense brown silty fine sand with gravels (SM)	1.00	15	64	21	0												
1.00	1.45	SPT1	35	35		Hard to very stiff brown clayey silt, medium plastic (CI)						37.1	23.8	13.3									
2.50	2.80	UDS1				- hard, 1.0 to 4.0 m									1.82	1.59	14.7		UU	1, 2, 3	0.7	12.7	
4.00	4.45	SPT2	28	28		- very stiff, 4.0 to 7.0 m		0	17	46	37							2.68					
5.50	5.80	UDS2				- hard, 7.0 to 11.5 m						46.1	22.8	23.4	1.92	1.71	12.8						
7.00	7.45	SPT3	40	40		- hard, 7.0 to 11.5 m																	
8.50	8.80	UDS3				- with traces of gravel, 10.0 to 11.5 m	11.50	2	12	38	48												
10.00	10.45	SPT4	66	66		Disintegrated Rock	12.00																
11.50	11.63	SPT5	Ref ^{ft} /13cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-87)

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Location : Boiler
UTM Coordinates : 752440 E, 2407772 N
Survey Coordinates : 2128S, 1512W

Termination Depth : 25 m (RL 179.521 m)
Ground Water Depth : 22.13 m
Surface Elevation : RL 204.52 m
Ground Water Level : RL 182.391 m
Boring Method : Rotary Drilling
Casing Depth : 13.0 m
Boring Start : 12-Oct-18
Boring Finish : 26-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)							
													Return Water		Bits Used	Density (g/cc)	Specific Gravity												
													Colour	Loss															
Ref*/6cm	12.00	12.00	RK1	1-5			Weak, grey GRANITE, very intensely fractured, highly weathered,		15	0			↑	↑	↑														
	12.50																												
	13.00																												
13.50	13.50	SPT6	6-9						17	0			15	Light Brown	100%	32 CT Diamond Impregnated Bit	2.63	-	-	0.15	144	3166*							
14.00	13.56																												
14.50																													
Ref*/4cm	15.00	15.00	SPT7	10-13						16	0		15		↓	↓	↓	2.80	-	-	0.1	46	1003*						
	15.50	15.04																											
	16.00																												
Ref*/5cm	16.50	16.50	SPT8	14-16						15	0				↓	↓	↓												
	17.00	16.55																											
	17.50																												
Ref*/6cm	18.00	18.00	SPT9												↓	↓	↓												
	18.50	18.06																											

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

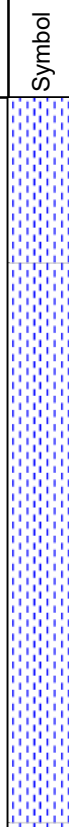
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Certificate No. TC-7134



Location : Boiler
UTM Coordinates : 752440 E, 2407772 N
Survey Coordinates : 2128S, 1512W

Rock Profile (BH-87)

Termination Depth : 25 m (RL 179.521 m)
Ground Water Depth : 22.13 m
Surface Elevation : RL 204.52 m
Ground Water Level : RL 182.391 m
Boring Method : Rotary Drilling
Casing Depth : 13.0 m
Boring Start : 12-Oct-18
Boring Finish : 26-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)						
													Return	Water	Bits Used	Density (g/cc)	Specific Gravity											
	18.50	19.50	RK5	17-21		Weak, grey GRANITE, very intensely fractured, highly weathered,		25	0	18		Light Brown	↕	↕				32 CT Diamond Impregnated Bit	2.42	-	-	0.64	91	2003*				
	19.00												↕	↕														
	19.50																											
	20.00	21.00	RK6	22-27									21	0														
	20.50																											
	21.00																											
	21.50	22.50	RK7	28-32									23	0														
	22.00																											
	22.50																											
	23.00	24.00	RK8	33-38									31	0														
	23.50																											
	24.00																											
	24.50	25.00	RK9	39-45									31	0														
	25.00			25.00																								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-88)

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Location : Boiler
UTM Coordinates : 752506 E, 2407831 N
Survey Coordinates : 2055S, 1448W

Termination Depth : 25 m (RL 181.037 m) Boring Method : Shell & Auger
Ground Water Depth : 21.80 m Casing Depth : 9.5 m
Surface Elevation : RL 206.04 m Boring Start : 29-Oct-18
Ground Water Level : RL 184.237 m Boring Finish : 08-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Dense brown silty fine sand with gravels (SM)	1.00	24	54	22	0												
1.00	1.30	UDS1				Hard brown silty clay, high plastic (CH)									1.69	1.52	11.1						
2.50	2.95	SPT1	30	30								51.8	20.6	31.2				2.65					
4.00	4.30	UDS2													1.89	1.68	12.5		UU	1, 2, 3	4.1	12.9	
5.50	5.95	SPT2	38	38			7.00	0	9	58	33												
7.00	7.30	UDS3				Hard brown clayey silt, medium plastic (CI)																	
8.50	8.95	SPT3	89	89			9.00					39.6	24.1	15.5									
9.00	9.17	SPT4	102/2cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

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Location : Boiler
UTM Coordinates : 752506 E, 2407831 N
Survey Coordinates : 2055S, 1448W

Rock Profile (BH-88)

Termination Depth : 25 m (RL 181.037 m)
Ground Water Depth : 21.80 m
Surface Elevation : RL 206.04 m
Ground Water Level : RL 184.237 m
Boring Method : Rotary Drilling
Casing Depth : 9.5 m
Boring Start : 29-Oct-18
Boring Finish : 08-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)				
													Return Water		Bits Used	Density (g/cc)	Specific Gravity									
													Colour	Loss												
100/2cm	9.00	9.00 9.17	SPT4	1-5			Weak, grey GRANITE, very intensely fractured, highly weathered,		22	0			Light Brown	100%	32 CT Diamond Impregnated Bit	2.83	-	-	0.50	106.0	2329*					
	9.50																									
	10.00																									
	10.50	10.50	RK2	6-10						23	0															
	11.00																									
	11.50																									
	12.00	12.00	RK3	11-14						31	10	18														
	12.50																									
	13.00																									
	13.50	13.50	RK4	15-18						24	7															
	14.00																									
	14.50																									
	15.00	15.00																								
	15.50																									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

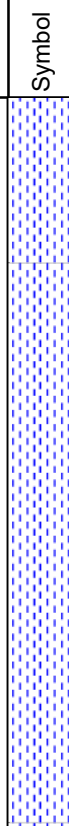
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Location : Boiler
UTM Coordinates : 752506 E, 2407831 N
Survey Coordinates : 2055S, 1448W

Rock Profile (BH-88)

Termination Depth : 25 m (RL 181.037 m)
Ground Water Depth : 21.80 m
Surface Elevation : RL 206.04 m
Ground Water Level : RL 184.237 m
Boring Method : Rotary Drilling
Casing Depth : 9.5 m
Boring Start : 29-Oct-18
Boring Finish : 08-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																										
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																															
													Colour	Loss																																		
	15.50	16.50	RK5	19-24		Weak, grey GRANITE, very intensely fractured, highly weathered,		21	0			Light Brown	100%	32 CT Diamond Impregnated Bit	2.55	-	-	0.73	197	4334*																												
	16.00																																															
	16.50																																															
	17.00	18.00	RK6	25-29																																												
	17.50																																															
	18.00																																															
	18.50	19.50	RK7	30-33																		18																										
	19.00																																															
	19.50																																															
	20.00	21.00	RK8	34-38					24	0																																						
	20.50																																															
	21.00																																															
	21.50		RK9	39-41					19	0																																						
	22.00																																															

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-88)

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Location : Boiler
UTM Coordinates : 752506 E, 2407831 N
Survey Coordinates : 2055S, 1448W

Termination Depth : 25 m (RL 181.037 m)
Ground Water Depth : 21.80 m
Surface Elevation : RL 206.04 m
Ground Water Level : RL 184.237 m
Boring Method : Rotary Drilling
Casing Depth : 9.5 m
Boring Start : 29-Oct-18
Boring Finish : 08-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)		
													Return Water		Bits Used	Density (g/cc)	Specific Gravity							
													Colour	Loss										
	22.00	22.50	RK10	42-44			Weak, grey GRANITE, very intensely fractured, highly weathered,	25.00	16	0	18		Light Brown	100%	3/2 C I Diamond Impregnated Bit	2.60	2.78	0.065	0.59	99	2176*			
	22.50																							
	23.00																							
	23.50																							
	24.00	24.00	RK11	45-48					22	0							2.78	-	-	0.68	223	4901*		
	24.50																							
	25.00	25.00																						

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-89)

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Certificate No. TC-7134



Location : Boiler

UTM Coordinates : 752444 E, 2407872 N

Survey Coordinates : 2021S, 1512W

Termination Depth : 13 m (RL 191.687 m) Boring Method : Shell & Auger

Ground Water Depth : Not met Casing Depth : 5.0 m

Surface Elevation : RL 204.69 m Boring Start : 27-Oct-18

Boring Finish : 03-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Dense grey fine sand with gravels (SP-SM)	1.00	11	81	8	0												
1.00	1.30	UDS1				Hard brown silty clay, high plastic (CH)									1.81	1.65	9.6		UU	1, 2, 3	2.3	13.6	
2.50	2.95	SPT1	31	31			3.50	0	7	61	32							2.69					
3.50	3.62	SPT2	Ref*/12cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

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Location : Boiler
UTM Coordinates : 752444 E, 2407872 N
Survey Coordinates : 2021S, 1512W

Rock Profile (BH-89)

Termination Depth : 13 m (RL 191.687 m)
Ground Water Depth : Not met
Surface Elevation : RL 204.69 m
Boring Method : Rotary Drilling
Casing Depth : 5.0 m
Boring Start : 27-Oct-18
Boring Finish : 03-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
													Return Water		Bits Used	Density (g/cc)	Specific Gravity						
													Colour	Loss									
Ref*/12cm	3.50	3.50	SPT2	1-6			Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered		27	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.75	2.83	0.028	0.33	-	588		
	4.00	3.62																					RK1
	4.50																						
	5.00	5.00																					
	5.50		RK2	7-12																			
	6.00																						
	6.50	6.50																					
	7.00		RK3	13-20																			
	7.50																						
	8.00	8.00																					
	8.50		RK4	21-30			- strong, moderately fractured, moderately weathered, 8.0 to 13m	88	56	40													
	9.00																						
	9.50	9.50																					
	10.00																						

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-89)

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Location : Boiler

UTM Coordinates : 752444 E, 2407872 N

Survey Coordinates : 2021S, 1512W

Termination Depth : 13 m (RL 191.687 m)

Ground Water Depth : Not met

Surface Elevation : RL 204.69 m

Boring Method : Rotary Drilling

Casing Depth : 5.0 m

Boring Start : 27-Oct-18

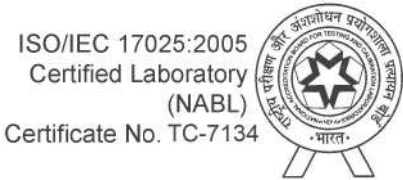
Boring Finish : 03-Nov-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)											
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																
													Colour	Loss																			
	10.00	11.00	RK5	31-38			Strong, grey Granite, moderately fractured, moderately weathered		87	61	40		↑ Colour	↑ Loss	↑ Bits Used	2.79	2.83	0.014	0.32	-	509												
	10.50																																
	11.00																																
	11.50	12.00	RK6	39-43							Strong, grey Granite, moderately fractured, moderately weathered		65	52	40		Light Brown	100%	3/2 C I Diamond Impregnated Bit	2.71	-	-	0.29	122.0	2677*								
	12.00																																
	12.50																																
	13.00	13.00	RK7	44-48											Strong, grey Granite, moderately fractured, moderately weathered		82	54			↓	↓	↓										
						Strong, grey Granite, moderately fractured, moderately weathered		13.00																									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-90)



Location : Boiler Termination Depth : 10 m (RL 194.487 m) Boring Method : Shell & Auger
UTM Coordinates : 752518 E, 2407967 N Ground Water Depth : Not met Casing Depth : 4.5 m
Survey Coordinates : 1923S, 1459W Surface Elevation : RL 204.49 m Boring Start : 25-Oct-18
Boring Finish : 28-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Hard brown clayey silt with traces of gravel, medium plastic (CI)		4	20	63	13												
1.00	1.30	UDS1													1.78	1.61	10.5		UU	1, 2, 3	2.5	8.3	
2.50	2.95	SPT1	43	43			3.50					36.0	20.5	15.5				2.67					
3.50	3.67	SPT2	101/2cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-90)

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Location : Boiler
UTM Coordinates : 752518 E, 2407967 N
Survey Coordinates : 1923S, 1459W

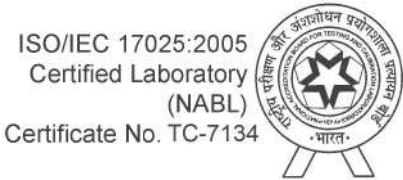
Termination Depth : 10 m (RL 194.487 m)
Ground Water Depth : Not met
Surface Elevation : RL 204.49 m
Boring Method : Rotary Drilling
Casing Depth : 4.5 m
Boring Start : 25-Oct-18
Boring Finish : 28-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used	Density (g/cc)	Specific Gravity					
													Colour	Loss								
101/2cm	3.50	3.50	SPT2	1-5			Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 3.5 to 5.0 m - strong, moderately fractured, moderately weathered, 5.0 to 10m	10.00	23	0	18		↑	↑	↑	2.74	2.88	0.049	1.23	-	490	
	4.00	3.67	RK1										Light Brown	100%	32 CT Diamond Impregnated Bit							
	4.50																					
	5.00	5.00	RK2	6-12									2.74	2.88	0.049	1.23	-	490				
	5.50																					
	6.00																					
	6.50	6.50	RK3	13-22									2.74	-	-	0.39	46	1005*				
	7.00																					
	7.50																					
	8.00	8.00	RK4	23-25									2.78	2.82	0.013	0.48	-	662				
	8.50																					
	9.00	9.00																				
	9.50		RK5	26-30									2.78	2.82	0.013	0.48	-	662				
10.00	10.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

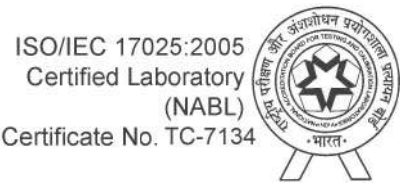
Soil Profile (BH-91)



Location : ESP Termination Depth : 13 m (RL 189.787 m) Boring Method : Shell & Auger
UTM Coordinates : 752447 E, 2408023 N Ground Water Depth : Not met Casing Depth : 4.0 m
Survey Coordinates : 1867S, 1513W Surface Elevation : RL 202.79 m Boring Start : 16-Nov-18
Boring Finish : 19-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Hard brown sandy silt with gravels, low plastic (CL)		10	45	34	11							2.68					
1.00	1.30	UDS1					2.50					34.5	20.4	14.0	1.79	1.61	11.0		UU	1, 2, 3	2.2	9.5	
2.50	2.95	SPT1	48	61		Dense brown silty fine sand with gravels (SM)	3.50	21	57	22													
3.50	3.58	SPT2	Ref*/8cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.



Rock Profile (BH-91)

Location : ESP

UTM Coordinates : 752447 E, 2408023 N

Survey Coordinates : 1867S, 1513W

Termination Depth : 13 m (RL 189.787 m)

Ground Water Depth : Not met

Surface Elevation : RL 202.79 m

Boring Method : Rotary Drilling

Casing Depth : 4.0 m

Boring Start : 16-Nov-18

Boring Finish : 19-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water									
Ref*/8cm	3.50	3.50	SPT2	1-2			Very weak to strong grey Granite, very intensely to moderately fractured, completely to moderately weathered		9	0			Colour	Loss	Bits Used							
	4.00	3.58	RK1																			
	4.50																					
Ref*/5cm	5.00	5.00	SPT3	3-4			- very weak, disintegrated, completely weathered, 3.5 to 8.0 m		11	0	15		Light Brown	100%	32 CT Diamond Impregnated Bit							
	5.50	5.05	RK2																			
	6.00																					
Ref*/6cm	6.50	6.50	SPT4	5-8					12	0												
	7.00	6.56	RK3																			
	7.50																					
Ref*/4cm	8.00	8.00	SPT5	9-13			- strong, moderately fractured, moderately weathered, 8.0 to 13m		65	53	40					2.70	2.83	0.047	2.14	-	243.0	
	8.50	8.04	RK4																			
	9.00																					
	9.50	9.50																				
	10.00															2.60	-	-	2.15	54	1181*	

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-91)

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Location : ESP

UTM Coordinates : 752447 E, 2408023 N

Survey Coordinates : 1867S, 1513W

Termination Depth : 13 m (RL 189.787 m)

Ground Water Depth : Not met

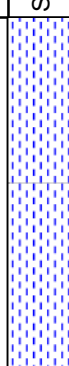
Surface Elevation : RL 202.79 m

Boring Method : Rotary Drilling

Casing Depth : 4.0 m

Boring Start : 16-Nov-18

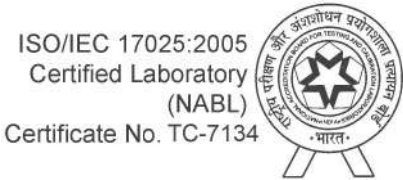
Boring Finish : 19-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)		Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
	Return Water													Bits Used										
	Colour	Loss																						
	10.00		11.00	RK5	14-18			Strong, grey Granite, moderately fractured, moderately weathered		57	55			↑ Colour	↑ Loss	↑ Bits Used								
	10.50															Light Brown	100%	32 C I Diamond Impregnated Bit						
	11.00		12.00	RK6	19-23					90	60	40												
	11.50																							
	12.00		13.00	RK7	24-29					95	64					↓	↓	↓	2.71	2.82	0.040	0.49	-	459.0
	12.50																							
	13.00																							
									13.00															

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-92)



Location : Boiler Termination Depth : 25 m (RL 176.687 m) Boring Method : Shell & Auger
UTM Coordinates : 752578 E, 2408004 N Ground Water Depth : 22.03 m Casing Depth : 12.0 m
Survey Coordinates : 1872S, 1383W Surface Elevation : RL 201.69 m Boring Start : 08-Nov-18
Ground Water Level : RL 179.657 m Boring Finish : 15-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Hard brown clayey silt with gravels, medium plastic (CI)		10	20	53	17												
1.00	1.30	UDS1					2.50					45.5	16.5	29.1	1.70	1.56	9.1		UU	1, 2, 3	3.0	5.9	
2.50	2.95	SPT1	43	54		Dense brown silty fine sand intermixed with gravels (SM)	4.00	45	39	16	0							2.75					
4.00	4.10	SPT2	Ref*/10cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

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Location : Boiler
UTM Coordinates : 752578 E, 2408004 N
Survey Coordinates : 1872S, 1383W

Rock Profile (BH-92)

Termination Depth : 25 m (RL 176.687 m) Boring Method : Rotary Drilling
Ground Water Depth : 22.03 m Casing Depth : 12.0 m
Surface Elevation : RL 201.69 m Boring Start : 08-Nov-18
Ground Water Level : RL 179.657 m Boring Finish : 15-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)							
													Return Water		Bits Used	Density (g/cc)	Specific Gravity												
													Colour	Loss															
Ref*/10cm	4.00	4.00	SPT2	1-3		Weak, grey GRANITE, very intensely fractured, highly weathered,			21	7			Light Brown	100%	32 CT Diamond Impregnated Bit														
	4.50	4.10																						Colour	Loss	Bits Used			
	5.00																												
	5.50	5.50	RK2	4-7						30	13																		
	6.00																									Colour	Loss	Bits Used	
	6.50																												
	7.00	7.00	RK3	8-12						22	0	18																	
	7.50																										Colour	Loss	Bits Used
	8.00																												
	8.50	8.50	RK4	13-17						21	0																		
	9.00																										Colour	Loss	Bits Used
	9.50																												
	10.00	10.00																											
	10.50																												

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

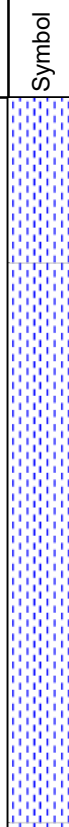
Rock Profile (BH-92)

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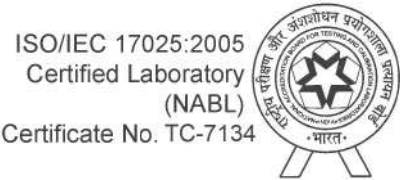
Location : Boiler
UTM Coordinates : 752578 E, 2408004 N
Survey Coordinates : 1872S, 1383W

Termination Depth : 25 m (RL 176.687 m)
Ground Water Depth : 22.03 m
Surface Elevation : RL 201.69 m
Ground Water Level : RL 179.657 m
Boring Method : Rotary Drilling
Casing Depth : 12.0 m
Boring Start : 08-Nov-18
Boring Finish : 15-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used	Density (g/cc)	Specific Gravity					
													Colour	Loss								
Ref*/ 5cm	10.50	11.50	RK5	18-23		Weak, grey GRANITE, very intensely fractured, highly weathered,		31	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit								
	11.00																					
	11.50																					
	12.00	13.00	RK6	24-28				34	0													
	12.50																					
	13.00																					
	13.50	14.50	RK7	29-31				15	0													
	14.00																					
	14.50																					
	15.00	16.00	RK8	32-35				24	0													
	15.50																					
	16.00																					
	16.50	17.00	RK9	36-41				22	0													
	17.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Rock Profile (BH-92)

Location : Boiler

UTM Coordinates : 752578 E, 2408004 N

Survey Coordinates : 1872S, 1383W

Termination Depth : 25 m (RL 176.687 m)

Ground Water Depth : 22.03 m

Surface Elevation : RL 201.69 m

Ground Water Level : RL 179.657 m

Boring Method : Rotary Drilling

Casing Depth : 12.0 m

Boring Start : 08-Nov-18

Boring Finish : 15-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)					
													Return Water		Bits Used	Density (g/cc)	Specific Gravity										
													Colour	Loss													
	17.00	17.50	RK10	42-44			Weak, grey GRANITE, very intensely fractured, highly weathered,		29	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit												
	17.50																										
	18.00																										
	18.50																										
	19.00	19.00	RK11	45-50																							
	19.50																										
	20.00																										
	20.50																										
	21.00	20.50	RK12	51-55																							
	21.50																										
	22.00																										
	22.50																										
	23.00	22.00	RK13	56-59																							
	23.50																										

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Boiler
UTM Coordinates : 752578 E, 2408004 N
Survey Coordinates : 1872S, 1383W

Rock Profile (BH-92)

Termination Depth : 25 m (RL 176.687 m) Boring Method : Rotary Drilling
Ground Water Depth : 22.03 m Casing Depth : 12.0 m
Surface Elevation : RL 201.69 m Boring Start : 08-Nov-18
Ground Water Level : RL 179.657 m Boring Finish : 15-Nov-18

	SPT N- Value (N _f) ⁽¹⁾		Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX				Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
	Return Water														Bits Used										
	Colour	Loss																							
	23.50	23.50	RK14	60-66			Weak, grey GRANITE, very intensely fractured, highly weathered,	25.00	44	7	18		Light Brown	100%	IMP Bit	2.66	-	-	1.20	70	1549*				
	24.00																								
	24.50																								
	25.00	25.00																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : ESP
UTM Coordinates : 752559 E, 2407750 N
Survey Coordinates : 2129S, 1384W

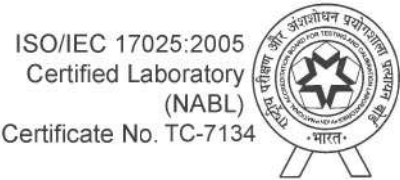
Soil Profile (BH-94)

Termination Depth : 25.06 m (RL 182.527 m)
Ground Water Depth : 20.15 m
Surface Elevation : RL 207.59 m
Ground Water Level : RL 187.437 m
Boring Method : Shell & Auger
Casing Depth : 12.0 m
Boring Start : 26-Nov-18
Boring Finish : 29-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1	27	27		Very stiff to hard brown clayey silt, medium plastic (CI) - very stiff, 0.0 to 4.0 m - intermixed with gravels, 1.0 to 2.5 m - hard, 4.0 to 13.0 m - with gravels, 8.5 to 10.0 m		42	16	24	18												
1.00	1.45	SPT1																					
2.50	2.80	DS2																					
4.00	4.45	SPT2																					
5.50	5.95	SPT3																					
7.00	7.45	SPT4																					
8.50	8.95	SPT5																					
10.00	10.45	SPT6																					
11.50	11.95	SPT7																					
13.00	13.30	SPT8																					
			102/15cm		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-94)



Location : ESP
UTM Coordinates : 752559 E, 2407750 N
Survey Coordinates : 2129S, 1384W

Termination Depth : 25.06 m (RL 182.527 m) Boring Method : Rotary Drilling
Ground Water Depth : 20.15 m Casing Depth : 12.0 m
Surface Elevation : RL 207.59 m Boring Start : 26-Nov-18
Ground Water Level : RL 187.437 m Boring Finish : 29-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return	Water	Bits Used							
102/15cm	13.00	13.00	SPT8				Very weak, Brown GRANITE, disintegrate completely weathered															
	13.50	13.30	WS1						0	0												
	14.00																					
Ref*/6cm	14.50	14.50	SPT9																			
	15.00	14.56	WS2						0	0												
	15.50																					
Ref*/5cm	16.00	16.00	SPT 10								15											
	16.50	16.05	WS3						0	0												
	17.00																					
Ref*/8cm	17.50	17.50	SPT 11																			
	18.00	17.58	WS4																			
	18.50								0	0												
Ref*/4cm	19.00	19.00	SPT 12																			
	19.50	19.04																				

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-94)

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Location : ESP
UTM Coordinates : 752559 E, 2407750 N
Survey Coordinates : 2129S, 1384W

Termination Depth : 25.06 m (RL 182.527 m) Boring Method : Rotary Drilling
Ground Water Depth : 20.15 m Casing Depth : 12.0 m
Surface Elevation : RL 207.59 m Boring Start : 26-Nov-18
Ground Water Level : RL 187.437 m Boring Finish : 29-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																	
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																						
													Colour	Loss																									
Ref*/6cm	19.50	20.50 20.56	WS5				Very weak, Brown GRANITE, disintegrate completely weathered		0	0	15		Light Brown	Partial	32 CT Diamond Impregnated Bit																								
	20.00																																						
	20.50																																						
	21.00																																						
21.50	WS6																																						
Ref*/8cm	22.00	22.00 22.08	SPT 14																																				
	22.50																																						
	23.00		WS7																																				
Ref*/5cm	23.50	23.50 23.55	SPT 15																																				
	24.00																																						
	24.50		WS8																																				
Ref*/6cm	25.00	25.00 25.06	SPT 16																																				
																									25.06														

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : ESP
UTM Coordinates : 752729 E, 2407823 N
Survey Coordinates : 2043S, 1224W

Soil Profile (BH-96)

Termination Depth : 20 m (RL 183.687 m) Boring Method : Shell & Auger
Ground Water Depth : Not met Casing Depth : 6.0 m
Surface Elevation : RL 203.69 m Boring Start : 21-Nov-18
Boring Finish : 24-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Hard brown clayey silt, medium plastic (CI)																	
1.00	1.30	UDS1													1.76	1.62	8.7						
2.50	2.95	SPT1	65	65																			
4.00	4.45	SPT2	62	62		- with gravels, 4.0 to 5.5 m		12	23	40	25												
5.50	5.95	SPT3	87	87			6.50																
6.50	6.59	SPT4	Ref*/9cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-96)

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Location : ESP
UTM Coordinates : 752729 E, 2407823 N
Survey Coordinates : 2043S, 1224W

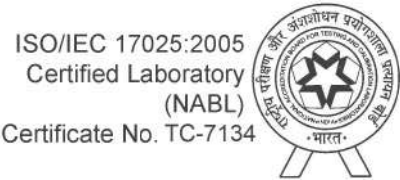
Termination Depth : 20 m (RL 183.687 m)
Ground Water Depth : Not met
Surface Elevation : RL 203.69 m
Boring Method : Rotary Drilling
Casing Depth : 6.0 m
Boring Start : 21-Nov-18
Boring Finish : 24-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMIR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compesive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)					
													Return Water		Bits Used	Density (g/cc)	Specific Gravity										
													Colour	Loss													
Ref*/ 9cm	6.50	6.50	SPT4				Very weak, Brown GRANITE, disintegrate completely weathered		0	0			Light Brown	100%	32 CT Diamond Impregnated Bit												
	7.00	6.59	WS1																								
	7.50																										
Ref*/ 5cm	8.00	8.00	SPT5						0	0																	
	8.50	8.05	WS2																								
	9.00																										
Ref*/ 4cm	9.50	9.50	SPT6						0	0	15																
	10.00	9.54	WS3																								
	10.50																										
Ref*/ 5cm	11.00	11.00	SPT7						0	0																	
	11.50	11.05	WS4																								
	12.00																										
Ref*/ 6cm	12.50	12.50	SPT8																								
	13.00	12.56																									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-96)



Location : ESP

UTM Coordinates : 752729 E, 2407823 N

Survey Coordinates : 2043S, 1224W

Termination Depth : 20 m (RL 183.687 m)

Ground Water Depth : Not met

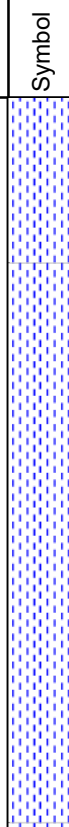
Surface Elevation : RL 203.69 m

Boring Method : Rotary Drilling

Casing Depth : 6.0 m

Boring Start : 21-Nov-18

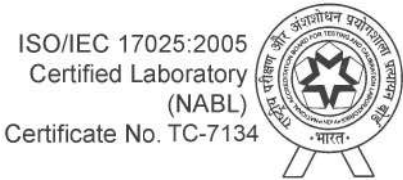
Boring Finish : 24-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used	Density (g/cc)	Specific Gravity					
													Colour	Loss								
Ref*/6cm	13.00	14.00 14.06	RK1	1-3		Weak, grey GRANITE, very intensely fractured, highly weathered,			15	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.72	2.77	0.018	0.40	97	2124*	
	13.50																					
	14.00																					
	14.50																					
	15.00	15.50	RK2	4-8					20	0												
	15.50																					
	16.00																					
	16.50																					
	17.00	17.00	RK3	9-12					14	0												
	17.50																					
	18.00																					
	18.50																					
	19.00	18.50	RK4	13-15					16	0												
	20.00																					
19.00	18.50	RK5	16-21	23	0																	
20.00																						
	20.00					20.00																

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-97)

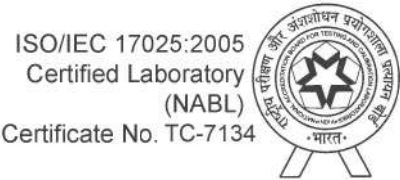


Location : ESP Termination Depth : 20 m (RL 185.481 m) Boring Method : Shell & Auger
UTM Coordinates : 752747 E, 2407866 N Ground Water Depth : Not met Casing Depth : 6.0 m
Survey Coordinates : 2003S, 1213W Surface Elevation : RL 205.48 m Boring Start : 27-Oct-18
Boring Finish : 20-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1	18	18		Very stiff brown clayey silt with traces of gravel , medium plastic (CI)	5.00	4	30	52	14	40.9	23.9	17.0	1.76	1.62	8.9	2.68					
1.00	1.45	SPT1																					
2.50	2.80	UDS1																					
4.00	4.45	SPT2	30	30		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.		1	25	46	28												
5.00	5.12	SPT3	Ref*/12cm																				

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-97)



Location : ESP

UTM Coordinates : 752747 E, 2407866 N

Survey Coordinates : 2003S, 1213W

Termination Depth : 20 m (RL 185.481 m)

Ground Water Depth : Not met

Surface Elevation : RL 205.48 m

Boring Method : Rotary Drilling

Casing Depth : 6.0 m

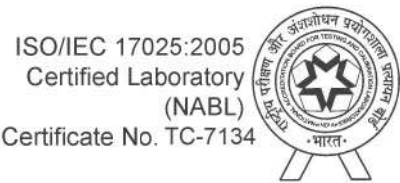
Boring Start : 27-Oct-18

Boring Finish : 20-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)								
													Return Water		Bits Used	Density (g/cc)	Specific Gravity													
													Colour	Loss																
Ref*/12cm	5.00	5.00	SPT3	1-4			Very weak, Brown GRANITE, disintegrate completely weathered		11	0			↑	↑	↑	2.88	-	-	0.60	169	3720*									
	5.50	5.12	RK1																											
	6.00																													
Ref*/6cm	6.50	6.50	SPT4	5-8					17	0			2.88	-	-	0.60						169	3720*							
	7.00	6.56	RK2																											
	7.50																													
Ref*/3cm	8.00	8.00	SPT5	9-12					15	0	15		2.68				2.76	0.029	0.85	158	3469*									
	8.50	8.03	RK3																											
	9.00																													
Ref*/6cm	9.50	9.50	SPT6	13-14					13	0																				
	10.00	9.56	RK4																											
	10.50																													
Ref*/4cm	11.00	11.00	SPT7																											
	11.50	11.04																												

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Rock Profile (BH-97)

Location : ESP

UTM Coordinates : 752747 E, 2407866 N

Survey Coordinates : 2003S, 1213W

Termination Depth : 20 m (RL 185.481 m)

Ground Water Depth : Not met

Surface Elevation : RL 205.48 m

Boring Method : Rotary Drilling

Casing Depth : 6.0 m

Boring Start : 27-Oct-18

Boring Finish : 20-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)		
													Return Water		Bits Used						Density (g/cc)	Specific Gravity
													Colour	Loss								
	11.50	12.50	RK5	15-18		Weak, grey GRANITE, very intensely fractured, highly weathered,		21	0				Light Brown	100%	32 CT Diamond Impregnated Bit	2.83	-	-	0.21	279	6133*	
	12.00																					
	12.50																					
	13.00	14.00	RK6	19-22				22	0				Light Brown	100%	32 CT Diamond Impregnated Bit	2.83	-	-	0.21	279	6133*	
	13.50																					
	14.00																					
	14.50	15.50	RK7	23-26				21	0	18				Light Brown	100%	32 CT Diamond Impregnated Bit	2.66	-	-	0.31	255	5600*
	15.00																					
	15.50																					
	16.00	17.00	RK8	27-34				33	0				Light Brown	100%	32 CT Diamond Impregnated Bit	2.73	2.83	0.035	0.20	100	2188*	
	16.50																					
	17.00																					
	17.50	17.00	RK9	35-40				34	0				Light Brown	100%	32 CT Diamond Impregnated Bit	2.70	-	-	0.41	216	4752*	
	18.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-97)

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Location : ESP

UTM Coordinates : 752747 E, 2407866 N

Survey Coordinates : 2003S, 1213W

Termination Depth : 20 m (RL 185.481 m)

Ground Water Depth : Not met

Surface Elevation : RL 205.48 m

Boring Method : Rotary Drilling

Casing Depth : 6.0 m

Boring Start : 27-Oct-18

Boring Finish : 20-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water	Colour	Loss	Bits Used						
	18.00	18.50	RK10	41-51			Weak, grey GRANITE, very intensely fractured, highly weathered,		48	0	18			Light Brown	100%	32 CT IMP Bit						
	18.50																					
	19.00																					
	19.50																					
	20.00	20.00						20.00														

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : ESP
UTM Coordinates : 752696 E, 2407850 N
Survey Coordinates : 2021S, 1258W

Soil Profile (BH-98)

Termination Depth : 25 m (RL 180.687 m) Boring Method : Shell & Auger
Ground Water Depth : 21.32 m Casing Depth : 9.0 m
Surface Elevation : RL 205.69 m Boring Start : 20-Nov-19
Ground Water Level : RL 184.367 m Boring Finish : 23-Nov-19

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	1.00	DS1				Hard brown silty clay, high plastic (CH)																	
1.00	1.42	SPT1	102/27cm					0	4	42	54												
2.50	2.95	SPT2	46	46			3.50					59.2	23.3	35.9									
3.50	3.60	SPT3	Ref*/10cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-98)

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Location : ESP

UTM Coordinates : 752696 E, 2407850 N

Survey Coordinates : 2021S, 1258W

Termination Depth : 25 m (RL 180.687 m)

Ground Water Depth : 21.32 m

Surface Elevation : RL 205.69 m

Ground Water Level : RL 184.367 m

Boring Method : Rotary Drilling

Casing Depth : 9.0 m

Boring Start : 20-Nov-19

Boring Finish : 23-Nov-19

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)													
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																		
													Colour	Loss																					
Ref*/10cm	3.50	3.50	SPT3				Very weak, Brown GRANITE, disintegrate completely weathered						Light Brown																						
	4.00	3.60	WS1					0	0																										
	4.50																																		
Ref*/5cm	5.00	5.00	SPT4							0	0																								
	5.50	5.05	WS2																																
	6.00																																		
Ref*/3cm	6.50	6.50	SPT5									15																							
	7.00	6.53	WS3							0	0																								
	7.50																																		
Ref*/6cm	8.00	8.00	SPT6																																
	8.50	8.06	WS4							0	0																								
	9.00																																		
Ref*/6cm	9.50	9.50	SPT7																																
	10.00	9.56																																	

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-98)

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Certified Laboratory
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Location : ESP
UTM Coordinates : 752696 E, 2407850 N
Survey Coordinates : 2021S, 1258W

Termination Depth : 25 m (RL 180.687 m)
Ground Water Depth : 21.32 m
Surface Elevation : RL 205.69 m
Ground Water Level : RL 184.367 m
Boring Method : Rotary Drilling
Casing Depth : 9.0 m
Boring Start : 20-Nov-19
Boring Finish : 23-Nov-19

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compesive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)									
													Return Water		Bits Used	Density (g/cc)	Specific Gravity														
													Colour	Loss																	
Ref*/ 3cm	10.00	11.00 11.03	WS5				Very weak, Brown GRANITE, disintegrate completely weathered		0	0	15		↕	↕	↕																
	10.50		SPT8																				WS6								
	11.00																														
	11.50																														
Ref*/ 4cm	12.00	12.50 12.54	SPT9													0	0			Light Brown	Partial	32 CT Diamond Impregnated Bit									
	12.50																													WS7	
	13.00																														
	13.50																														
Ref*/ 6cm	14.00	14.00 14.06	SPT 10													0	0			↕	↕	↕									
	14.50		WS8																												
	15.00																														
	15.50		SPT 11																												
Ref*/ 6cm	16.00	15.56	WS9						0	0			↕	↕	↕																
	16.50																														

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-98)

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Location : ESP

UTM Coordinates : 752696 E, 2407850 N

Survey Coordinates : 2021S, 1258W

Termination Depth : 25 m (RL 180.687 m)

Ground Water Depth : 21.32 m

Surface Elevation : RL 205.69 m

Ground Water Level : RL 184.367 m

Boring Method : Rotary Drilling

Casing Depth : 9.0 m

Boring Start : 20-Nov-19

Boring Finish : 23-Nov-19

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																							
													Return	Water	Bits Used	Density (g/cc)	Specific Gravity																												
													Colour					Loss																											
Ref*/4cm	16.50	17.00 17.04	SPT 12 WS10				Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered		0	0	15		Light Brown	↑	↑	↑																													
	17.00																																												
	17.50																																												
	18.00																																												
Ref*/15cm	18.50	18.50 18.65	SPT 13 WS11				- very weak, disintegrated, completely weathered, 3.5 to 20.0 m		0	0				Partial	↑	32 CT Diamond Impregnated Bit																													
	19.00																																												
	19.50																																												
Ref*/5cm	20.00	20.00 20.05	SPT 14 RK1				- weak, very intensely fractured, highly weathered, 20.0 to 25.0 m		18	0			↓		↓	↓																													
	20.50																																												
	21.00																																												
Ref*/6cm	21.50	21.50 21.56	SPT 15 RK2						26	0	18		↓		↓	↓																													
	22.00																																												
	22.50																																												
	23.00																								23.00																				

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

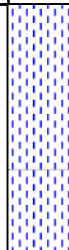
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Location : ESP
UTM Coordinates : 752696 E, 2407850 N
Survey Coordinates : 2021S, 1258W

Rock Profile (BH-98)

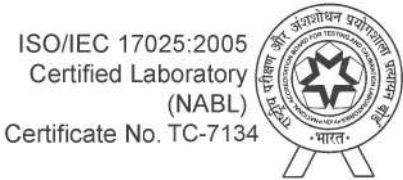
Termination Depth : 25 m (RL 180.687 m) Boring Method : Rotary Drilling
Ground Water Depth : 21.32 m Casing Depth : 9.0 m
Surface Elevation : RL 205.69 m Boring Start : 20-Nov-19
Ground Water Level : RL 184.367 m Boring Finish : 23-Nov-19

SPT N- Value (N _t) ⁽¹⁾	Depth (m)		Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
	Return Water													Bits Used									
	Colour	Loss																					
	23.00	23.00	RK3					Weak, grey GRANITE, very intensely fractured, highly weathered,	25.00	30	0	18		Light Brown	Partial	IMP Bit							
	23.50																						
	24.00	24.00	RK4																				
	24.50																						
	25.00	25.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Soil Profile (BH-67)



Location : Space for Future Provision Termination Depth : 25.05 m (RL 181.399 m) Boring Method : Shell & Auger
UTM Coordinates : 752045 E, 2407645 N Ground Water Depth : 20.10 m Casing Depth : 15.0 m
Survey Coordinates : 2293S, 1893W Surface Elevation : RL 206.449 m Boring Start : 25-Aug-18
Ground Water Level : RL 186.349 m Boring Finish : 25-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1				Very dense brown medium to coarse sand intermixed with gravel (SM)	4.00																	
1.00	1.30	SPT1	100/15cm	-				28	52	20	0													
2.50	2.89	SPT2	101/24cm	-																				
4.00	4.45	SPT3	76	76		Hard brown clayey silt (CI)		5	8	64	23													
5.50	5.95	SPT4	57	57		- with gravel, 4.0 to 10.0 m						47.0	14.1	32.9										
7.00	7.30	UDS1											1.66	1.48	12.1		UC	1.2						
8.50	8.95	SPT5	65	65													2.68							
10.00	10.45	SPT6	77	77		- with traces of gravel, 10.0 to 14.5 m		2	6	46	46													
11.50	11.95	SPT7	89	89							46.0	25.1	20.9											
13.00	13.45	SPT8	94	94																				
14.50	14.70	SPT9	102/5cm	-		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-67)

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Location : Space for Future Provision
UTM Coordinates : 752045 E, 2407645 N
Survey Coordinates : 2293S, 1893W

Termination Depth : 25.05 m (RL 181.399 m) Boring Method : Rotary Drilling
Ground Water Depth : 20.10 m Casing Depth : 15.0 m
Surface Elevation : RL 206.449 m Boring Start : 25-Aug-18
Ground Water Level : RL 186.349 m Boring Finish : 25-Aug-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
												Return Water		Bits Used									
												Colour	Loss										
100/5cm	14.50	14.50	SPT9	1-3			Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered - weak, very intensely fractured, highly weathered, 14.5 to 16.0 m - very weak, disintegrated, completely weathered, 16.0 to 22.0 m		22	12	18	↑	↑	↑	2.77	2.89	0.04	0.45	-	664			
	15.00	14.70	RK1																				
	15.50																						
	16.00	16.00																					
	16.50		RK2	4-5					11	0		↑	↑	↑	2.38	-	-	1.57	21.00	470*			
	17.00																						
	17.50	17.50																				SPT 10	
Ref*/6cm	18.00	17.56		6-8					12	0	15	↑	↑	↑	2.38	-	-	1.57	21.00	470*			
		18.50																				RK3	
	19.00	19.00	SPT 11																				
Ref*/5cm	19.50	19.05		-					0	0		↑	↑	↑	2.38	-	-	1.57	21.00	470*			
		20.00																				WS1	
	20.50	20.50	SPT 12																				
Ref*/6cm	21.00	20.56										↓	↓	↓									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-67)

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Certificate No. TC-7134



Location : Space for Future Provision

UTM Coordinates : 752045 E, 2407645 N

Survey Coordinates : 2293S, 1893W

Termination Depth : 25.05 m (RL 181.399 m) Boring Method : Rotary Drilling

Ground Water Depth : 20.10 m

Surface Elevation : RL 206.449 m

Ground Water Level : RL 186.349 m

Casing Depth : 15.0 m

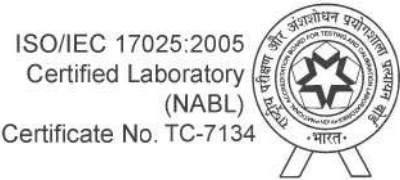
Boring Start : 25-Aug-18

Boring Finish : 25-Aug-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)	
												Return Water		Bits Used	Density (g/cc)	Specific Gravity						
												Colour	Loss									
Ref*/ 7cm	21.00	22.00 22.07	WS2	-		Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered		0	0	15	↑	Light Brown	↓	100%	32 CT Diamond Impregnated Bit	2.47	-	-	0.15	63.00	1394*	
	21.50																					
	22.00		SPT 13	9-12																		
	22.50																					
Ref*/ 8cm	23.00	23.50 23.58	RK4	13-16		- weak, very intensely fractured, highly weathered, 22.0 to 25.05 m		18	0	18	↓											
	23.50		SPT 14																			
	24.00		RK5																			
Ref*/ 5cm	24.50	25.00 25.05	SPT 15					16	0		↓											
	25.00																					
								25.05														

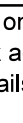
⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-68)

Location : Space for Future Provision Termination Depth : 30 m (RL 176.02 m) Boring Method : Shell & Auger
UTM Coordinates : 752290 E, 2407626 N Ground Water Depth : 20.32 m Casing Depth : 12.0 m
Survey Coordinates : 2291S, 1647W Surface Elevation : RL 206.020 m Boring Start : 22-Aug-18
Ground Water Level : RL 185.7 m Boring Finish : 17-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1				Hard brown clayey silt with gravels (CI)																		
1.00	1.30	UDS1													1.84	1.56	17.8							
2.50	2.95	SPT1	46	46				5	25	34	36													
4.00	4.30	UDS2													1.87	1.62	15.5		UU	1 ,2, 3	2.2	8.2		
5.50	5.95	SPT2	52	52								40.2	24.6	15.6				2.67						
7.00	7.45	SPT3	53	53																				
8.50	8.95	SPT4	59	59				4	17	45	34													
10.00	10.45	SPT5	65	65			11.50					43.5	24.8	18.8										
11.50	11.52	SPT6	Ref*/2cm	-		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-68)

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Location : Space for Future Provision
UTM Coordinates : 752290 E, 2407626 N
Survey Coordinates : 2291S, 1647W

Termination Depth : 30 m (RL 176.02 m)
Ground Water Depth : 20.32 m
Surface Elevation : RL 206.02 m
Ground Water Level : RL 185.7 m

Boring Method : Rotary Drilling
Casing Depth : 12.0 m
Boring Start : 22-Aug-18
Boring Finish : 17-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMIR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)										
												Return Water		Bits Used	Density (g/cc)	Specific Gravity															
												Colour	Loss																		
Ref*/ 2cm	11.50	11.50	SPT6	1-4			Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered		41	32	18	Light Brown	100%	32 CT Diamond Impregnated Bit																	
	12.00	11.52																			RK-1										
	12.50																														
	13.00	13.00	RK-2																												
	13.50			5-6																											
	14.00																														
	14.50	14.50	RK-3																												
	15.00			7-8																											
	15.50																														
	16.00	16.00	RK-4																												
16.50		9-10																													
17.00																															
Ref*/ 12cm	17.50		17.50	SPT7																											
	18.00	17.62																													

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-68)

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Certificate No. TC-7134



Location : Space for Future Provision

UTM Coordinates : 752290 E, 2407626 N

Survey Coordinates : 2291S, 1647W

Termination Depth : 30 m (RL 176.02 m)

Ground Water Depth : 20.32 m

Surface Elevation : RL 206.02 m

Ground Water Level : RL 185.7 m

Boring Method : Rotary Drilling

Casing Depth : 12.0 m

Boring Start : 22-Aug-18

Boring Finish : 17-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMIR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)											
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																
												Colour	Loss																			
Ref*/ 10cm	18.00	19.00 19.10	WS-1	11-12		Very weak, Brown GRANITE, disintegrated completely weathered		0	0	15	Light Brown	100%	32 CT Diamond Impregnated Bit	-	2.77	-	0.16	-	-													
	18.50																															
	19.00		SPT8																													
	19.50		RK-5																													
Ref*/ 11cm	20.00	20.50 20.61						9	0																							
	20.50		SPT9																													
	21.00		WS2					0	0																							
	21.50																															
Ref*/ 13cm	22.00	22.00 22.13	SPT10																			0	0									
	22.50																															
	23.00		WS3					0	0																							
	23.50																															
Ref*/ 11cm	24.00	23.50 23.61	SPT11																													
	24.50		WS4					0	0																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-68)

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Location : Space for Future Provision
UTM Coordinates : 752290 E, 2407626 N
Survey Coordinates : 2291S, 1647W

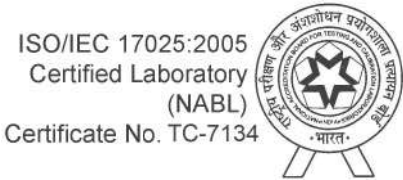
Termination Depth : 30 m (RL 176.02 m)
Ground Water Depth : 20.32 m
Surface Elevation : RL 206.02 m
Ground Water Level : RL 185.7 m

Boring Method : Rotary Drilling
Casing Depth : 12.0 m
Boring Start : 22-Aug-18
Boring Finish : 17-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)												
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																	
												Colour	Loss																				
Ref*/9cm	24.50	25.00 25.09	SPT12	13-17			Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered	30.00	0	0	15	↑	↓	↑	2.71	-	-	-	-	-	565												
	25.00																																
	25.50																																
	26.00																																
Ref*/12cm	26.50	26.50 26.62	SPT13				WS5		- very weak, disintegrated, completely weathered, 16.0 to 28.0 m	0	0	15	↑	↓									↑	2.71	-	-	-	-	-	-	-	565	
	26.50																																
	27.00																																
Ref*/8cm	27.50	28.00 28.08	SPT14				WS6		- weak, very intensely fractured, highly weathered, 28.0 to 30.0 m	69	33	18	↑	↓									↑	2.71	-	-	-	-	-	-	-	565	
	28.00																																
	28.50																																
	29.00																																
	29.50																																
	30.00	30.00	RK6	18-22		54	36		↓	↓	↓	2.44	-	-	0.37	52.00	1152*																

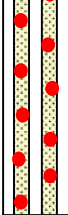
⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

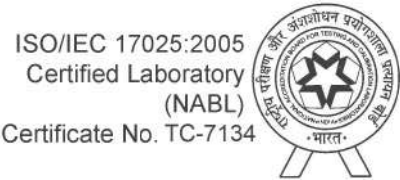


Soil Profile (BH-69)

Location : Switchyard Termination Depth : 35 m (RL 169.825 m) Boring Method : Shell & Auger
UTM Coordinates : 752117 E, 2408014 N Ground Water Depth : 18.15 m Casing Depth : 16.0 m
Survey Coordinates : 1921S, 1854W Surface Elevation : RL 204.825 m Boring Start : 26-Aug-18
Ground Water Level : RL 186.675 m Boring Finish : 22-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	102/25cm	43		Hard brown clayey silt with traces of gravel (CI)		2	23	60	15							2.68						
1.00	1.40	SPT1				Very dense gravel (GP)	2.50	96	1	3	0													
2.50	2.55	DS2				Hard brown clayey silt (CI)		2	27	45	26													
4.00	4.38	SPT2	43			- with traces of gravel, 4.0 to 8.5 m						49.8	18.9	30.9										
5.50	5.95	SPT3	43			- with traces of gravel, 4.0 to 8.5 m																		
7.00	7.30	UDS1				- with traces of gravel, 4.0 to 8.5 m														UU	1 ,2, 3	2.0	6.0	
8.50	8.79	SPT4	101/14cm			- with gravel, 8.5to 10.0 m	10.00	7	23	51	19													
10.00	10.21	SPT5	103/6cm			Very dense sandy gravel (GP-SM)						29.4	18.0	11.4										
11.50	11.63	SPT6	Ref*/13cm																					
13.00	13.14	SPT7	Ref*/14cm						78	14	8	0												
14.50	14.58	SPT8	Ref*/8cm					15.50					28.0	16.3	11.7									
15.50	15.80	SPT9	103/15cm				Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

Rock Profile (BH-69)



Location : Switchyard
UTM Coordinates : 752117 E, 2408014 N
Survey Coordinates : 1921S, 1854W

Termination Depth : 35 m (RL 169.825 m)
Ground Water Depth : 18.15 m
Surface Elevation : RL 204.83 m
Ground Water Level : RL 186.675 m
Boring Method : Rotary Drilling
Casing Depth : 16.0 m
Boring Start : 26-Aug-18
Boring Finish : 22-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)								
												Return Water		Bits Used	Density (g/cc)	Specific Gravity													
												Colour	Loss																
103/15cm	15.50	15.50	SPT10	1-6			Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 15.5 to 21.5 m		21	0		Light Brown	100%	32 CT Diamond Impregnated Bit	2.84	-	-	0.37	-	586									
	16.00	15.80	RK-1																										
	16.50																												
	17.00	17.00	RK-2	7-10					41	28																			
	17.50																												
	18.00																												
	18.50	18.50	RK-3	11-15					22	0	18																		
	19.00																												
	19.50																												
	20.00	20.00	RK-4	16-19					26	12																			
	20.50																												
	21.00																												
	21.50	21.50				- strong, moderately fractured, moderately weathered, 21.5 to 23.0m																							
22.00																													

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-69)

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Location : Switchyard
UTM Coordinates : 752117 E, 2408014 N
Survey Coordinates : 1921S, 1854W

Termination Depth : 35 m (RL 169.825 m)
Ground Water Depth : 18.15 m
Surface Elevation : RL 204.83 m
Ground Water Level : RL 186.675 m
Boring Method : Rotary Drilling
Casing Depth : 16.0 m
Boring Start : 26-Aug-18
Boring Finish : 22-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)				
												Return Water		Bits Used	Density (g/cc)	Specific Gravity									
												Colour	Loss												
	22.00	23.00	RK-5	20-24		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - strong, moderately fractured, moderately weathered, 21.5 to 23.0m - weak, very intensely fractured, highly weathered, 23.0 to 34.0 m		47	39	35	Light Brown	100%	32 CT Diamond Impregnated Bit	-	2.81	-	0.70	-	-	470					
	22.50																								
	23.00																								
	23.50	24.00	RK6	25-33					60	10							-	-	-	-					
	24.00																								
	24.50	25.00	RK7	34-42																					61
	25.00																								
	25.50							26.50	RK8	43-48					29	0	18				-	-	-		
	26.00																								
	26.50	28.00	RK9	49-52																					27
	27.00																								
	27.50							28.50																	
	28.00																								
	28.50																								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-69)

Location : Switchyard

Termination Depth : 35 m (RL 169.825 m)

Boring Method : Rotary Drilling

UTM Coordinates : 752117 E, 2408014 N

Ground Water Depth : 18.15 m

Casing Depth : 16.0 m

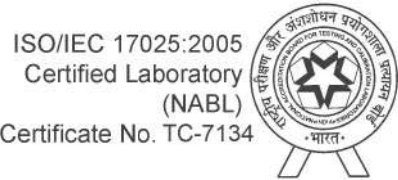
Survey Coordinates : 1921S, 1854W

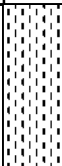
Surface Elevation : RL 204.83 m

Boring Start : 26-Aug-18

Ground Water Level : RL 186.675 m

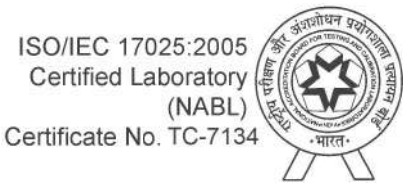
Boring Finish : 22-Oct-18



SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																																																																										
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																																																																																															
												Colour	Loss																																																																																																		
	28.50	29.50	RK10	53-58		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 23.0 to 34.0 m		28	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit																																																																																																		
	29.00																																																																																																														
	29.50	31.00	RK11	59-63																		- strong, moderately fractured, moderately weathered, 34.0 to 35.0m	35.00	57	42	35	Light Brown	100%	32 CT Diamond Impregnated Bit																																																																																		
	30.00																																																																																																														
	30.50	32.50	RK12	64-68																																	- strong, moderately fractured, moderately weathered, 34.0 to 35.0m	35.00	57	42	35	Light Brown	100%	32 CT Diamond Impregnated Bit																																																																			
	31.00																																																																																																														
	31.50	34.00	RK13	69-73																																																- strong, moderately fractured, moderately weathered, 34.0 to 35.0m	35.00	57	42	35	Light Brown	100%	32 CT Diamond Impregnated Bit																																																				
	32.00																																																																																																														
	32.50	35.00	RK14	74-75																																																															- strong, moderately fractured, moderately weathered, 34.0 to 35.0m	35.00	57	42	35	Light Brown	100%	32 CT Diamond Impregnated Bit																																					
	33.00																																																																																																														
	33.50																																																																																	- strong, moderately fractured, moderately weathered, 34.0 to 35.0m	35.00	57	42	35	Light Brown	100%	32 CT Diamond Impregnated Bit																						
	34.00																																																																																																														
	34.50																																																																																																- strong, moderately fractured, moderately weathered, 34.0 to 35.0m	35.00	57	42	35	Light Brown	100%	32 CT Diamond Impregnated Bit							
	35.00																																																																																																														

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

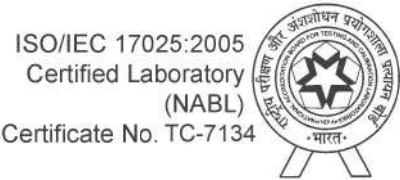


Soil Profile (BH-75)

Location : Switchyard Termination Depth : 25 m (RL 179.987 m) Boring Method : Shell & Auger
UTM Coordinates : 752091 E, 2407936 N Ground Water Depth : 21.01 m Casing Depth : 15.0 m
Survey Coordinates : 2027S, 1915W Surface Elevation : RL 204.987 m Boring Start : 27-Nov-18
Ground Water Level : RL 183.977 m Boring Finish : 29-Nov-18

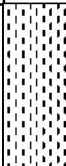
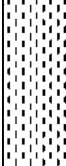
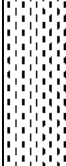
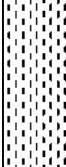
Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)																
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)																		
0.00	0.50	DS1	46	72		Hard brown sandy silt, low plastic (CL)	1.00	26	39	35																														
1.00	1.45	SPT1																																						
2.50	2.80	DS2	62	62		Very dense brown clayey garvel, medium plastic (GC)																																		
4.00	4.45	SPT2																																						
5.50	5.95	SPT3																																						
7.00	7.45	SPT4																																						
8.50	8.95	SPT5																																						
10.00	10.45	SPT6																																						
11.50	11.95	SPT7																																						
13.00	13.45	SPT8																																						
14.50	14.59	SPT9	Ref*/9cm	-		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																																		

Rock Profile (BH-75)



Location : Switchyard
UTM Coordinates : 752091 E, 2407936 N
Survey Coordinates : 2027S, 1915W

Termination Depth : 25 m (RL 179.987 m)
Ground Water Depth : 21.01 m
Surface Elevation : RL 204.987 m
Ground Water Level : RL 183.977 m
Boring Method : Rotary Drilling
Casing Depth : 15.0 m
Boring Start : 27-Nov-18
Boring Finish : 29-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																		
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																																							
												Colour	Loss																																										
Ref*/9cm	14.50	14.50	SPT10	1-4			Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered - very weak, disintegrated, completely weathered, 14.5 to 17.5 m		13	0	15	Light Brown	100%	32 CT Diamond Impregnated Bit																																									
	15.00	14.59	RK1																																																				
	15.50																																																						
Ref*/6cm	16.00	16.00	SPT11	5-8																		- weak, very intensely fractured, highly weathered, 17.5 to 25.0 m		15	0		Light Brown	100%	32 CT Diamond Impregnated Bit																										
	16.50	16.06	RK2																																																				
	17.00																																																						
Ref*/5cm	17.50	17.50	SPT12	9-12			- weak, very intensely fractured, highly weathered, 17.5 to 25.0 m		21	0																											Light Brown	100%	32 CT Diamond Impregnated Bit																
	18.00	17.55	RK3																																																				
	18.50																																																						
	19.00	19.00		13-16																				28	0	18																					Light Brown	100%	32 CT Diamond Impregnated Bit						
	19.50		RK4																																																				
	20.00																																																						
20.50	20.50																																																						
21.00																																																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-75)

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Location : Switchyard
UTM Coordinates : 752091 E, 2407936 N
Survey Coordinates : 2027S, 1915W

Termination Depth : 25 m (RL 179.987 m)
Ground Water Depth : 21.01 m
Surface Elevation : RL 204.987 m
Ground Water Level : RL 183.977 m
Boring Method : Rotary Drilling
Casing Depth : 15.0 m
Boring Start : 27-Nov-18
Boring Finish : 29-Nov-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)
												Return Water		Bits Used	Density (g/cc)	Specific Gravity					
												Colour	Loss								
	21.00	22.00	RK5	17-22			Weak, grey GRANITE, very intensely fractured, highly weathered,		28	0		↑ Colour	↑ Loss	↑ Bits Used	2.7	2.7	-	0.3	212.0	4661*	
	21.50											Light Brown	100%	32 CT Diamond Impregnated Bit							
	22.00																				
	22.50	23.50	RK6	23-26					21	0	18				2.5	-	-	1.1	112.0	2463*	
	23.00																				
	23.50																				
	24.00	25.00	RK7	27-32				25.00	29	0		↓	↓	↓							
	24.50																				
	25.00																				

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Transformer yard
UTM Coordinates : 752331 E, 2407939 N
Survey Coordinates : 2004S, 1773W

Soil Profile (BH-77)

Termination Depth : 25 m (RL 179.287 m)
Ground Water Depth : 20.50 m
Surface Elevation : RL 204.287 m
Ground Water Level : RL 183.787 m
Boring Method : Shell & Auger
Casing Depth : 12.5 m
Boring Start : 29-Nov-18
Boring Finish : 04-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	53	83		Hard brown sandy silt, low plastic (CL)	4.00											UC	1.3					
1.00	1.45	SPT1																						
2.50	2.95	SPT2																						
4.00	4.45	SPT3				Hard brown clayey silt with gravel, medium plastic (CI)																		
5.50	5.95	SPT4																						
7.00	7.45	SPT5																						
8.50	8.95	SPT6																						
10.00	10.45	SPT7			97	97																		
11.50	11.90	SPT8			122	122																		
11.60	12.00	DS2				Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

Rock Profile (BH-77)

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Location : Transformer yard

UTM Coordinates : 752331 E, 2407939 N

Survey Coordinates : 2004S, 1773W

Termination Depth : 25 m (RL 179.287 m)

Ground Water Depth : 20.50 m

Surface Elevation : RL 204.287 m

Ground Water Level : RL 183.787 m

Boring Method : Rotary Drilling

Casing Depth : 12.5 m

Boring Start : 29-Nov-18

Boring Finish : 04-Dec-18

SPT N- Value (N_t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
												Return Water		Bits Used	Density (g/cc)	Specific Gravity					
												Colour	Loss								
	12.00	12.00	RK1	1-5		Weak, grey GRANITE, very intensely fractured, highly weathered,		21	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit								
	12.50																				
	13.00																				
	13.50	13.50	RK2	6-11				23	0												
	14.00																				
	14.50																				
	15.00	15.00	RK3	12-18				28	0												
	15.50																				
	16.00																				
	16.50	16.50	RK4	19-27				26	0												
	17.00																				
	17.50																				
	18.00	18.00																			
	18.50																				

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Transformer yard
UTM Coordinates : 752331 E, 2407939 N
Survey Coordinates : 2004S, 1773W

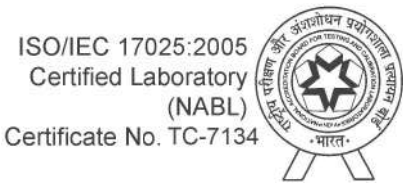
Rock Profile (BH-77)

Termination Depth : 25 m (RL 179.287 m) Boring Method : Rotary Drilling
Ground Water Depth : 20.50 m Casing Depth : 12.5 m
Surface Elevation : RL 204.287 m Boring Start : 29-Nov-18
Ground Water Level : RL 183.787 m Boring Finish : 04-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)			
												Return Water		Bits Used	Density (g/cc)	Specific Gravity								
												Colour	Loss											
	18.50	19.50	RK5	28-37		Weak, grey GRANITE, very intensely fractured, highly weathered,	25.00	27	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit											
	19.00																							
	19.50																							
	20.00	21.00	RK6	38-48				31	0	33										0	36	0	41	0
	20.50																							
	21.00																							
	21.50	22.50	RK7	49-60				33	0	36										0	41	0		
	22.00																							
	22.50																							
	23.00	24.00	RK8	61-75				36	0	41										0				
	23.50																							
	24.00																							
	24.50	25.00	RK9	76-83				41	0															
	25.00																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-78)

Location : CPU Regeneration

Termination Depth : 25 m (RL 178.687 m)

Boring Method : Shell & Auger

UTM Coordinates : 752277 E, 2408064 N

Ground Water Depth : 21.06 m

Casing Depth : 8.0 m

Survey Coordinates : 1874S, 1742W

Surface Elevation : RL 203.687 m

Boring Start : 30-Nov-18

Ground Water Level : RL 182.627 m

Boring Finish : 02-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	43	43		Hard brown silty clay with gravel, high plastic (CH)	5.50		7	11	31	51			59.0	25.3	33.8							
1.00	1.45	SPT1																						
2.50	2.80	DS2																						
4.00	4.35	SPT2																						
5.00	5.12	SPT3																						
5.00	5.12	SPT3																						
5.00	5.50	DS3																						
					Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																			

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Location : CPU Regeneration
UTM Coordinates : 752277 E, 2408064 N
Survey Coordinates : 1874S, 1742W

Rock Profile (BH-78)

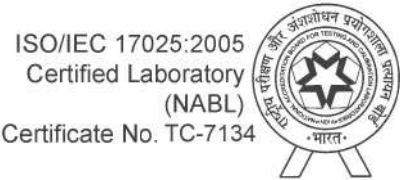
Termination Depth : 25 m (RL 178.687 m) Boring Method : Rotary Drilling
Ground Water Depth : 21.06 m Casing Depth : 8.0 m
Surface Elevation : RL 203.687 m Boring Start : 30-Nov-18
Ground Water Level : RL 182.627 m Boring Finish : 02-Dec-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compessive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)		
												Return Water		Bits Used	Density (g/cc)	Specific Gravity							
												Colour	Loss										
	5.50	5.50	RK1	1-6		Weak, grey GRANITE, very intensely fractured, highly weathered,		21	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit										
	6.00																						
	6.50																						
	7.00	7.00	RK2	7-12				24	0														
	7.50																						
	8.00																						
	8.50	8.50	RK3	13-18				27	0														
	9.00																						
	9.50																						
	10.00	10.00	RK4	19-25				23	0														
	10.50																						
	11.00																						
	11.50	11.50																					
	12.00																						

⁽¹⁾Outside NABL scope.

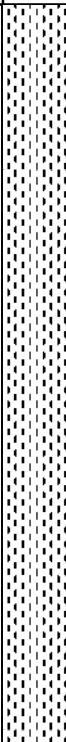
* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-78)



Location : CPU Regeneration
UTM Coordinates : 752277 E, 2408064 N
Survey Coordinates : 1874S, 1742W

Termination Depth : 25 m (RL 178.687 m)
Ground Water Depth : 21.06 m
Surface Elevation : RL 203.687 m
Ground Water Level : RL 182.627 m
Boring Method : Rotary Drilling
Casing Depth : 8.0 m
Boring Start : 30-Nov-18
Boring Finish : 02-Dec-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																																											
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																																																																
												Colour	Loss																																																																			
	12.00	13.00	RK5	26-33		Weak, grey GRANITE, very intensely fractured, highly weathered,		25	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit																																																																			
	12.50																																																																															
	13.00																																																																															
	13.50	14.50	RK6	34-43																			28	0	30	0	35	0	18.00																																																			
	13.50																																																																															
	14.00																																																																															
	14.50	16.00	RK7	44-49																																		30	0	35	0	18.00																																						
	14.50																																																																															
	15.00																																																																															
	15.50	17.50	RK8	50-59																																																35	0	18.00																										
	15.50																																																																															
	16.00																																																																															
	16.50	17.50	RK8	50-59																																																															35	0	18.00											
	16.50																																																																															
17.00																																																																																
17.50	17.50	RK8	50-59		35	0	18.00																																																																									
17.50																																																																																
18.00																																																																																
18.50	17.50	RK9	60-71																	32	0																																																											
18.50																																																																																

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-78)

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Location : CPU Regeneration
UTM Coordinates : 752277 E, 2408064 N
Survey Coordinates : 1874S, 1742W

Termination Depth : 25 m (RL 178.687 m)
Ground Water Depth : 21.06 m
Surface Elevation : RL 203.687 m
Ground Water Level : RL 182.627 m
Boring Method : Rotary Drilling
Casing Depth : 8.0 m
Boring Start : 30-Nov-18
Boring Finish : 02-Dec-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)													
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																		
												Colour	Loss																					
	18.50	19.00	RK10	72-81		Weak, grey GRANITE, very intensely fractured, highly weathered,			34	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit																				
	19.00																																	
	19.50																																	
	20.00																																	
	20.50	20.50	RK11	82-95																														
	21.00																																	
	21.50																																	
	22.00																																	
	22.50	23.50	RK12	96-102																														
	23.00																																	
	23.50																																	
	24.00																																	
	24.50	25.00	RK13	103-113																														
	25.00																																	

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Transformer yard
UTM Coordinates : 752335 E, 2408008 N
Survey Coordinates : 1922S, 1675W

Soil Profile (BH-79)

Termination Depth : 20 m (RL 183.687 m)
Ground Water Depth : Not met
Surface Elevation : RL 203.687 m
Boring Method : Shell & Auger
Casing Depth : 4.8 m
Boring Start : 02-Dec-18
Boring Finish : 04-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1				Hard brown clayey silt with gravel, high plastic (CI)																		
1.00	1.45	SPT1	63	63			8	26	49	17														
2.50	2.95	SPT2	73	73																				
3.50	3.85	SPT3	102/20cm				4.50																	
4.50	4.59	SPT4	Ref*/9cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		
																								
																								

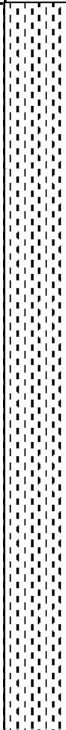
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Location : Transformer yard
UTM Coordinates : 752335 E, 2408008 N
Survey Coordinates : 1922S, 1675W

Termination Depth : 20 m (RL 183.687 m)
Ground Water Depth : Not met
Surface Elevation : RL 203.687 m
Boring Method : Rotary Drilling
Casing Depth : 4.8 m
Boring Start : 02-Dec-18
Boring Finish : 04-Dec-18

Rock Profile (BH-79)

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)
												Return Water		Bits Used	Density (g/cc)	Specific Gravity					
												Colour	Loss								
Ref*/9cm	4.50	4.50	SPT4	1-5		Weak, grey GRANITE, very intensely fractured, highly weathered,			22	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit							
	5.00	4.59																			RK1
	5.50																				
	6.00	6.00	RK2	6-11																	
	6.50																				
	7.00																				
	7.50	7.50	RK3	12-16																	
	8.00																				
	8.50																				
	9.00	9.00	RK4	17-22																	
	9.50																				
	10.00																				
	10.50	10.50																			
11.00																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-79)

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Location : Transformer yard
UTM Coordinates : 752335 E, 2408008 N
Survey Coordinates : 1922S, 1675W

Termination Depth : 20 m (RL 183.687 m)
Ground Water Depth : Not met
Surface Elevation : RL 203.687 m

Boring Method : Rotary Drilling
Casing Depth : 4.8 m
Boring Start : 02-Dec-18
Boring Finish : 04-Dec-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)											
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																
												Colour	Loss																			
	11.00	12.00	RK5	23-28		Weak, grey GRANITE, very intensely fractured, highly weathered,		35	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit																			
	11.50																															
	12.00																															
	12.50	13.50	RK6	29-34					28											0												
	13.00																															
	13.50																															
	14.00	15.00	RK7	35-39					26											0												
	14.50																															
	15.00																															
	15.50	16.50	RK8	40-46					31											15												
	16.00																															
	16.50																															
	17.00	17.50	RK9	47-52					35											19												
	17.50																															

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-79)

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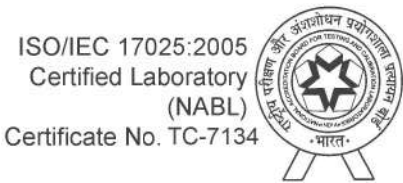
Location : Transformer yard
UTM Coordinates : 752335 E, 2408008 N
Survey Coordinates : 1922S, 1675W

Termination Depth : 20 m (RL 183.687 m)
Ground Water Depth : Not met
Surface Elevation : RL 203.687 m
Boring Method : Rotary Drilling
Casing Depth : 4.8 m
Boring Start : 02-Dec-18
Boring Finish : 04-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)			
												Return Water		Bits Used												
												Colour	Loss													
	17.50	18.00	RK10	53-59			Weak, grey GRANITE, very intensely fractured, highly weathered,		42	27	20	→	→	→												
	18.00											→	→	→												
	18.50	19.00	RK11	60-68							44	26			→	→	→									
	19.00														→	→	→									
	19.50	20.00													→	→	→									
	20.00														→	→	→									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-81)

Location : Transformer yard

Termination Depth : 16 m (RL 186.887 m)

Boring Method : Shell & Auger

UTM Coordinates : 752338 E, 2407956 N

Ground Water Depth : Not met

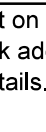
Casing Depth : 10.0 m

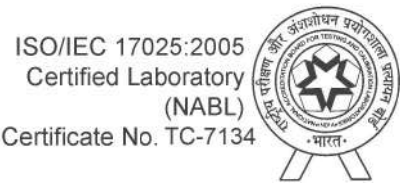
Survey Coordinates : 1946S, 1617W

Surface Elevation : RL 202.887 m

Boring Start : 25-Oct-18

Boring Finish : 30-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	32	50		Dense brown silty coarse sand with gravel (SM)	2.50	32	53	15	0				1.81	1.61	12.1	2.68						
1.00	1.45	SPT1			14			65	21	0														
2.50	2.80	UDS1	37	37		Hard brown silty clay, high plastic (CH)		0	9	63	28	62.8	27.0	35.8	1.85	1.63	13.7	UU	1 ,2, 3	2.2	5.1			
4.00	4.45	SPT2																						
5.50	5.80	UDS2																						
7.00	7.45	SPT3																						
8.50	8.80	UDS3																						
9.50	9.68	SPT4	102/3cm	-		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

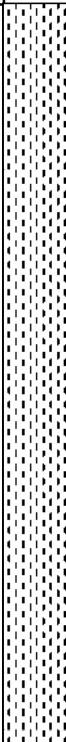


Rock Profile (BH-81)

Location : Transformer yard
UTM Coordinates : 752338 E, 2407956 N
Survey Coordinates : 1946S, 1617W

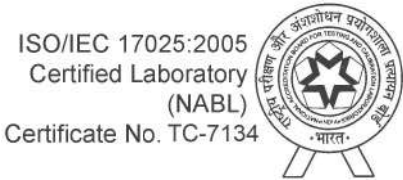
Termination Depth : 16 m (RL 186.887 m)
Ground Water Depth : Not met
Surface Elevation : RL 202.89 m

Boring Method : Rotary Drilling
Casing Depth : 10.0 m
Boring Start : 25-Oct-18
Boring Finish : 30-Oct-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)							
												Return Water		Bits Used	Density (g/cc)	Specific Gravity												
												Colour	Loss															
102/3cm	9.50	9.50	SPT4	1-9		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 9.5 to 11.0 m - strong, moderately fractured, moderately weathered, 11.0 to 16m	16.00	39	0	18	Light Brown	Partial	32 CT Diamond Impregnated Bit	2.77	2.87	0.03	0.51	-	942									
	10.00	9.68																										
	10.50																											
	11.00	11.00	RK2	10-21				98	53																			
	11.50																											
	12.00																											
	12.50	12.50	RK3	22-34				100	68	40																		
	13.00																											
	13.50																											
	14.00	14.00	RK4	35-43				94	50																			
	14.50																											
	15.00	15.00																										
	15.50		RK5	44-48				95	77																			
	16.00	16.00																										

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-82)

Location : Transformer yard

Termination Depth : 17.5 m (RL 186.487 m)

Boring Method : Shell & Auger

UTM Coordinates : 752273 E, 2407911 N

Ground Water Depth : Not met

Casing Depth : 4.0 m

Survey Coordinates : 1999S, 1675W

Surface Elevation : RL 203.987 m

Boring Start : 23-Oct-18

Boring Finish : 28-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)		
0.00	0.50	DS1	28	28		Very stiff to hard brown silty clay, high plastic (CH)	3.50	0	19	61	20			61.1	24.6	36.5	1.79	1.64	9.3	2.68	UU	1 ,2, 3	1.9	4.5
1.00	1.30	UDS1				- very stiff, 0.0 to 3.0 m																		
2.50	2.95	SPT1				- hard, 3.0 to 3.5																		
3.50	3.59	SPT2			Ref ^{ft} /9cm																			

Rock Profile (BH-82)

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Location : Transformer yard
UTM Coordinates : 752273 E, 2407911 N
Survey Coordinates : 1999S, 1675W

Termination Depth : 17.5 m (RL 186.487 m) Boring Method : Rotary Drilling
Ground Water Depth : Not met Casing Depth : 4.0 m
Surface Elevation : RL 203.99 m Boring Start : 23-Oct-18
Boring Finish : 28-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)
												Return Water		Bits Used	Density (g/cc)	Specific Gravity					
												Colour	Loss								
Ref*/4cm <																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-82)

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Location : Transformer yard
UTM Coordinates : 752273 E, 2407911 N
Survey Coordinates : 1999S, 1675W

Termination Depth : 17.5 m (RL 186.487 m) Boring Method : Rotary Drilling
Ground Water Depth : Not met Casing Depth : 4.0 m
Surface Elevation : RL 203.99 m Boring Start : 23-Oct-18
Boring Finish : 28-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
												Return Water		Bits Used	Density (g/cc)	Specific Gravity						
												Colour	Loss									
	10.00	11.00	RK-5	18-23		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 3.5 to 12.5 m - strong, moderately fractured, moderately weathered, 12.5 to 17.5m		47	21	18	Light Brown	100%	32 CT Diamond Impregnated Bit	2.78	2.83	0.02	0.25	-	626			
	10.50																					
	11.00																					
	11.50	12.50	RK-6	24-32				61	18	97											69	40
	12.00																					
	12.50																					
	13.00	14.00	RK-7	33-40				98	89	51												
	13.50																					
	14.00																					
	14.50	15.50	RK-8	41-46																		
	15.00																					
	15.50																					
	16.00	RK-9	47-52																			
	16.50																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Transformer yard
UTM Coordinates : 752273 E, 2407911 N
Survey Coordinates : 1999S, 1675W

Rock Profile (BH-82)

Termination Depth : 17.5 m (RL 186.487 m) Boring Method : Rotary Drilling
Ground Water Depth : Not met Casing Depth : 4.0 m
Surface Elevation : RL 203.99 m Boring Start : 23-Oct-18
Boring Finish : 28-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)		Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX			Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)	
	Return Water												Density (g/cc)	Specific Gravity							
	Colour	Loss													Bits Used						
	16.50	16.50	RK-10	53-58			Strong, grey Granite, moderately fractured, moderately weathered	17.50	92	66	40	Light Brown	100% 32 CT	Diamond Impregnated Bit	2.71	2.80	0.03	0.28	-	916	
	17.00														2.90	-	-	0.16	98.00	2167*	
	17.50	17.50																			

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : SWGR
UTM Coordinates : 752364 E, 2407871 N
Survey Coordinates : 2037S, 1616W

Soil Profile (BH-84)

Termination Depth : 17 m (RL 187.387 m)
Ground Water Depth : Not met
Surface Elevation : RL 204.387 m
Boring Method : Shell & Auger
Casing Depth : 8.0 m
Boring Start : 14-Oct-18
Boring Finish : 22-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	15	15		Very stiff brown silty clay with traces of gravel (CH) Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.	3.00	3	12	67	18	62.8	26.3	36.5	1.78	1.56	14.2	2.67	UU	1 ,2, 3	1.5	9.8		
1.00	1.30	UDS1																						
2.50	2.95	SPT1																						
3.00	3.08	SPT2																						
			Ref*/8cm																					

Rock Profile (BH-84)

Location : SWGR

Termination Depth : 17 m (RL 187.387 m)

Boring Method : Rotary Drilling

UTM Coordinates : 752364 E, 2407871 N

Ground Water Depth : Not met

Casing Depth : 8.0 m

Survey Coordinates : 2037S, 1616W

Surface Elevation : RL 204.39 m

Boring Start : 14-Oct-18

Boring Finish : 22-Oct-18

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SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)													
												Return Water		Bits Used	Density (g/cc)	Specific Gravity																		
												Colour	Loss																					
Ref*/ 8cm	3.00	3.00	SPT2	1-2			Very weak, Brown GRANITE, disintegrate completely weathered		8	0	15	Light Brown	100%	32 CT Diamond Impregnated Bit	2.84	-	-	0.13	63.00	1377*														
	3.50	3.08																				RK1												
	4.00																																	
Ref*/ 4cm	4.50	4.50	SPT3	3-4					10	0																								
	5.00	4.54																																RK2
	5.50																																	
Ref*/ 4cm	6.00	6.00	SPT4	5-7						11												0												
	6.50	6.04																																RK3
	7.00																																	
Ref*/ 6cm	7.50	7.50	SPT5	8-10						15												0												
	8.00	7.56																																RK4
	8.50																																	
Ref*/ 4cm	9.00	9.00	SPT6																															
	9.50	9.04																																

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-84)

Location : SWGR

Termination Depth : 17 m (RL 187.387 m)

Boring Method : Rotary Drilling

UTM Coordinates : 752364 E, 2407871 N

Ground Water Depth : Not met

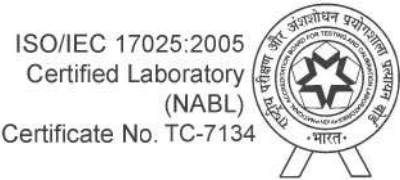
Casing Depth : 8.0 m

Survey Coordinates : 2037S, 1616W

Surface Elevation : RL 204.39 m

Boring Start : 14-Oct-18

Boring Finish : 22-Oct-18



SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)						
												Return Water		Bits Used	Density (g/cc)	Specific Gravity											
												Colour	Loss														
Ref*/ 6cm	9.50	10.50 10.56	RK5	11-12		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 3.0 to 12.0 m - strong, moderately fractured, moderately weathered, 12.0 to 17m		18	0	18	Light Brown	Partial	32 CT Diamond Impregnated Bit	2.70	2.81	0.04	0.30	-	220								
	10.00		SPT7	13-15				73	52												40	2.78	2.86	0.03	0.46	-	696
	10.50																										
	11.00																										
	11.50	12.00	RK6	16-21				61	54	60				55	2.78	2.86	0.03	0.46	-		696						
	12.00																										
	12.50																										
	13.00																										
	13.50	15.00	RK8	22-26				60	55	2.78				2.86	0.03	0.46	-	696									
	14.00																										
	14.50																										
	15.00																										
	15.50	16.00	RK9	27-29				60	55	2.78				2.86	0.03	0.46	-	696									
	16.00																										

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Termination Depth :	17 m (RL 187.387 m)	Boring Method :	Rotary Drilling
Ground Water Depth :	Not met	Casing Depth :	8.0 m
Surface Elevation :	RL 204.39 m	Boring Start :	14-Oct-18
		Boring Finish :	22-Oct-18

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* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Transformer yard
UTM Coordinates : 752263 E, 2407822 N
Survey Coordinates : 2092S, 1675W

Soil Profile (BH-85)

Termination Depth : 22.5 m (RL 181.387 m) Boring Method : Shell & Auger
Ground Water Depth : 21.05 m Casing Depth : 8.0 m
Surface Elevation : RL 203.887 m Boring Start : 30-Oct-18
Ground Water Level : RL 182.837 m Boring Finish : 05-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1	36	56		Dense brown clayey sand with gravel (SC)	2.50	15	43	8	34				1.81	1.62	11.5	2.67	UU	1 ,2, 3	1.6	9.3		
1.00	1.45	SPT1				Hard brown clayey silt with gravel (CI)		13	42	28	17													
2.50	2.80	UDS1	45	45			7.00	0	8	56	36	41.2	21.9	19.4	1.85	1.64	12.5							
4.00	4.45	SPT2																						
5.50	5.80	UDS2	104/3cm	-		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		
7.00	7.18	SPT3																						

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Location : Transformer yard
UTM Coordinates : 752263 E, 2407822 N
Survey Coordinates : 2092S, 1675W

Rock Profile (BH-85)

Termination Depth : 22.5 m (RL 181.387 m) Boring Method : Rotary Drilling
Ground Water Depth : 21.05 m Casing Depth : 8.0 m
Surface Elevation : RL 203.89 m Boring Start : 30-Oct-18
Ground Water Level : RL 182.837 m Boring Finish : 05-Nov-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)	
												Return Water		Bits Used	Density (g/cc)	Specific Gravity						
												Colour	Loss									
100/3cm	7.00	7.00	SPT3	1-5			Weak, grey GRANITE, very intensely fractured, highly weathered,		27	7	18	Light Brown	100%	32 CT Diamond Impregnated Bit	2.63	-	-	1.08	70.00	1534*		
	7.50	7.18																				RK-1
	8.00																					
	8.50	8.50	RK-2	6-10					40	0												
	9.00																					
	9.50																					
	10.00	10.00	RK-3	11-19					43	9												
	10.50																					
	11.00																					
	11.50	11.50	RK-4	20-27																		
	12.00																					
	12.50																					
	13.00	13.00																				
13.50																						

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-85)

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Location : Transformer yard
UTM Coordinates : 752263 E, 2407822 N
Survey Coordinates : 2092S, 1675W

Termination Depth : 22.5 m (RL 181.387 m) Boring Method : Rotary Drilling
Ground Water Depth : 21.05 m Casing Depth : 8.0 m
Surface Elevation : RL 203.89 m Boring Start : 30-Oct-18
Ground Water Level : RL 182.837 m Boring Finish : 05-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)		
												Return Water		Bits Used	Density (g/cc)	Specific Gravity							
												Colour	Loss										
	13.50	14.50	RK-5	28-34		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 7.0 to 17.5 m - strong, moderately fractured, moderately weathered, 17.5 to 22.5m		49	7	18	Light Brown	100%	32 CT Diamond Impregnated Bit			0.02	0.42	-	504				
	14.00																						
	14.50																						
	15.00	16.00	RK-6	35-39				40	13	64				17	80	67	2.76	2.80	0.01	0.58	-	1253	
	15.50																						
	16.00																						
	16.50	17.50	RK-7	40-48				85	65	40				2.78	2.81	0.01	0.58	-	1253				
	17.00																						
	17.50																						
	18.00	19.00	RK-8	49-54				85	65	40				2.78	2.81	0.01	0.58	-	1253				
	18.50																						
	19.00																						
	19.50	20.00	RK-9	55-61				85	65	40				2.78	2.81	0.01	0.58	-	1253				
	20.00																						

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-85)

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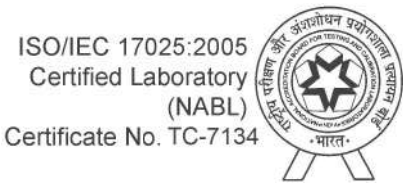
Location : Transformer yard
UTM Coordinates : 752263 E, 2407822 N
Survey Coordinates : 2092S, 1675W

Termination Depth : 22.5 m (RL 181.387 m) Boring Method : Rotary Drilling
Ground Water Depth : 21.05 m Casing Depth : 8.0 m
Surface Elevation : RL 203.89 m Boring Start : 30-Oct-18
Ground Water Level : RL 182.837 m Boring Finish : 05-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)		Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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	Colour	Loss																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	20.00							Strong, grey Granite, moderately fractured, moderately weathered					Colour																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-86)

Location : Transformer yard

Termination Depth : 23 m (RL 181.687 m)

Boring Method : Shell & Auger

UTM Coordinates : 752185 E, 2407814 N

Ground Water Depth : 19.08 m

Casing Depth : 11.0 m

Survey Coordinates : 2109S, 1749W

Surface Elevation : RL 204.687 m

Boring Start : 06-Nov-18

Ground Water Level : RL 185.607 m

Boring Finish : 14-Nov-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests					Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _c				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)		
0.00	0.50	DS1				Stiff to hard brown clayey silt, medium plastic (CI)		2	23	56	19													
1.00	1.45	SPT1	12	12		- stiff, with traces of gravel, 0.0 m to 2.5m						42.3	16.3	26.0										
2.50	2.80	UDS1										1.80	1.59	12.9				UU	1 ,2, 3	1.2	3.2			
4.00	4.45	SPT2	52	52		- hard, 2.5 to 9.0 m																		
5.50	5.95	SPT3	72	72			0	15	47	38								2.68						
7.00	7.45	SPT4	83	83								45.0	22.0	23.1										
8.50	8.90	SPT5	101/25cm	-			9.00																	
9.00	9.10	SPT6	Ref*/8cm	-		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

Rock Profile (BH-86)

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Location : Transformer yard
UTM Coordinates : 752185 E, 2407814 N
Survey Coordinates : 2109S, 1749W

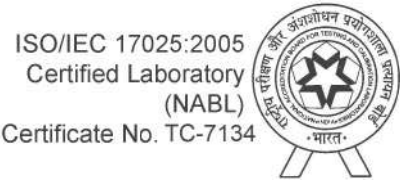
Termination Depth : 23 m (RL 181.687 m)
Ground Water Depth : 19.08 m
Surface Elevation : RL 204.69 m
Ground Water Level : RL 185.607 m
Boring Method : Rotary Drilling
Casing Depth : 11.0 m
Boring Start : 06-Nov-18
Boring Finish : 14-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)			
												Return Water		Bits Used	Density (g/cc)	Specific Gravity								
												Colour	Loss											
Ref*/ 4cm	9.00	9.00	SPT6	1-4		Weak, grey GRANITE, very intensely fractured, highly weathered,		17	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit											
	9.50	9.08																		RK-1				
	10.00																							
	10.50	10.50	SPT7	5-9				31	0											27	0	24	0	
	11.00	10.54																						RK-2
	11.50																							
	12.00	12.00	RK-3	10-15				27	0											24	0			
	12.50																							
	13.00																							
	13.50	13.50	RK-4	16-20				24	0															
	14.00																							
	14.50																							
	15.00	15.00																						
	15.50																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-86)



Location : Transformer yard
UTM Coordinates : 752185 E, 2407814 N
Survey Coordinates : 2109S, 1749W

Termination Depth : 23 m (RL 181.687 m)
Ground Water Depth : 19.08 m
Surface Elevation : RL 204.69 m
Ground Water Level : RL 185.607 m
Boring Method : Rotary Drilling
Casing Depth : 11.0 m
Boring Start : 06-Nov-18
Boring Finish : 14-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)				
												Return Water		Bits Used	Density (g/cc)	Specific Gravity									
												Colour	Loss												
	15.50	16.50	RK-5	21-26		Weak to strong grey Granite, very intensely to moderately fractured, highly to moderately weathered		30	0	18	Light Brown	100%	32 CT Diamond Impregnated Bit												
	16.00																								
	16.50																								
	17.00		RK-6	27-32		- weak, very intensely fractured, highly weathered, 9.0 to 18.0 m		32	0																
	17.50																								
	18.00																								
	18.50	19.50	RK-7	33-41		- strong, moderately fractured, moderately weathered, 18.0 to 23.0m		80	52																
	19.00																								
	19.50																								
	20.00	21.00	RK-8	42-50				88	57	40								2.8	2.8	0.0	0.5	-	1182		
	20.50																								
	21.00																								
	21.50	22.00	RK-9	51-55				75	61										2.7	2.7	0.0	0.4	107.0	2352*	
	22.00																								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Transformer yard
UTM Coordinates : 752185 E, 2407814 N
Survey Coordinates : 2109S, 1749W

Rock Profile (BH-86)

Termination Depth : 23 m (RL 181.687 m) Boring Method : Rotary Drilling
Ground Water Depth : 19.08 m Casing Depth : 11.0 m
Surface Elevation : RL 204.69 m Boring Start : 06-Nov-18
Ground Water Level : RL 185.607 m Boring Finish : 14-Nov-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)		Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (ka/cm ²)								
	Return Water												Bits Used																	
	Colour	Loss																												
	22.00		23.00	RK-10	56-60			Strong, grey Granite, moderately fractured, moderately weathered	23.00	78	63	40	Light Brown	100%	32 CT Diamond Impregnated Bit	2.8	-	-	0.2	-	1380									
	22.50																													
	23.00	23.00																												

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Location : Lagoon-1
UTM Coordinates : 753266 E, 2408325 N
Survey Coordinates : 1506S, 740W

Soil Profile (BH-10)

Surface Elevation : RL 205.242 m
Ground Water Depth : 0.00 m
Termination Depth : 15.45 m (RL 189.8 m)
Ground Water Level : RL 205.2 m
Boring Method : Shell & Auger
Casing Depth : 8.1 m
Boring Start : 27-Aug-18
Boring Finish : 27-Aug-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Hard brown silty clay, high plastic (CH) - with gravel, 0.0 to 1.0 m																		
1.00	1.45	SPT1	30	30										66.6	27.6	39.0	14							21
2.50	2.80	UDS1												1.72	1.50	14.7		UC		1.8				
4.00	4.45	SPT2	42	42				0	3	59	38													
5.50	5.80	UDS2																						
7.00	7.45	SPT3	53	53								58.2	25.0	33.2			2.67							
8.50	8.95	SPT4	62	62																				
10.00	10.45	SPT5	73	73				0	6	62	32													
11.50	11.95	SPT6	79	79																				
13.00	13.45	SPT7	92	92																				
14.50	14.92	SPT8	101/27cm	-																				
15.00	15.45	SPT9	81	81					- with traces of gravel, 15.0 to 15.45 m	15.45														

⁽¹⁾ SPT is outside NABL scope.

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Soil Profile (BH-54)

Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 207.279 m Boring Method : Shell & Auger
UTM Coordinates : 752888 E, 2407788 N Ground Water Depth : 20.09 m Casing Depth : 9.0 m
Survey Coordinates : 2079S, 1063W Termination Depth : 25 m (RL 182.3 m) Boring Start : 22-Aug-18
Ground Water Level : RL 187.2 m Boring Finish : 07-Oct-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown clayey silt, medium plastic (CI)		14	35	40	11													8
1.00	1.45	SPT1	15	15		- very stiff, 0.0 to 7.0 m						47.1	27.0	20.1	13				2.68					
2.50	2.80	DS2				- with gravel, 0.0 to 1.0 m																		
4.00	4.45	SPT2	22	22																				
5.50	5.80	UDS1														1.85	1.67	11.1		UU	1, 2, 3	9.9	7.2	
7.00	7.45	SPT3	57	57		- hard, 7.0 to 8.5 m	8.50																	
8.50	8.78	SPT4	102/13cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-54)

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Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 207.279 m Boring Method : Rotary Drilling
UTM Coordinates : 752888 E, 2407788 N Ground Water Depth : 20.09 m Casing Depth : 9.0 m
Survey Coordinates : 2079S, 1063W Termination Depth : 25 m (RL 182.3 m) Boring Start : 22-Aug-18
Ground Water Level : RL 187.2 m Boring Finish : 07-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)		
													Return Water		Bits Used											
													Colour	Loss												
102*/13cm	8.50	8.50	SPT4	1-6		Weak, grey GRANITE, very intensely fractured, highly weathered		26	0		18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.77	2.86	0.03	0.37	-	398					
	9.00	8.78	RK-1																							
	9.50																									
	10.00	10.00	RK-2	7-10				28	8		2.77		2.86	0.03		0.37	-	398								
	10.50																									
	11.00																									
	11.50	11.50	RK-3	11-14				33	8		2.77		2.83	0.02		0.48	-	257								
	12.00																									
	12.50																									
	13.00	13.00	RK-4	15-17				29	0																	
	13.50																									
	14.00																									
	14.50	14.50																								
	15.00																									

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-54)

Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 207.279 m Boring Method : Rotary Drilling
UTM Coordinates : 752888 E, 2407788 N Ground Water Depth : 20.09 m Casing Depth : 9.0 m
Survey Coordinates : 2079S, 1063W Termination Depth : 25 m (RL 182.3 m) Boring Start : 22-Aug-18
Ground Water Level : RL 187.2 m Boring Finish : 07-Oct-18

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SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)
													Return Water		Bits Used	Density (g/cc)	Specific Gravity					
													Colour	Loss								
	15.00	16.00	RK-5	18-22		Weak, grey GRANITE, very intensely fractured, highly weathered		30	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit	2.59	-	-	1.86	60.00	1315*		
	15.50																					
	16.00																					
	16.50	17.50	RK-6	23-25				21	0			22	0	23	0	21.00	20.50	RK-9	34-38	34	0	
	17.00																					
	17.50																					
	18.00	19.00	RK-7	26-29				22	0			23	0									
	18.50																					
	19.00																					
	19.50	20.50	RK-8	30-33				23	0													
	20.00																					
	20.50																					
	21.00	21.50	RK-9	34-38				34	0													
	21.50																					

⁽¹⁾Outside NABL scope.

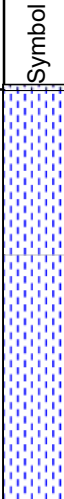
* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-54)

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Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 207.279 m Boring Method : Rotary Drilling
UTM Coordinates : 752888 E, 2407788 N Ground Water Depth : 20.09 m Casing Depth : 9.0 m
Survey Coordinates : 2079S, 1063W Termination Depth : 25 m (RL 182.3 m) Boring Start : 22-Aug-18
Ground Water Level : RL 187.2 m Boring Finish : 07-Oct-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																						
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																																											
													Colour	Loss																																														
	21.50	22.00	RK-10	39-46			Weak, grey GRANITE, very intensely fractured, highly weathered	25.00	30	0	18		Light Brown	100%	32 C 1 Diamond Impregnated Bit																																													
	22.00																																																											
	22.50	23.50																																																										
	23.00																																																											
	23.50	23.50	RK-11	47-54					36	0																																																		
	24.00																																																											
	24.50	25.00																																																										
	25.00																																																											

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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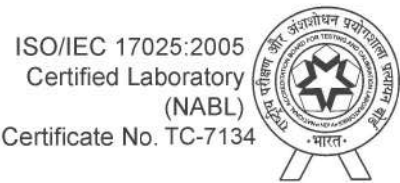


Soil Profile (BH-70)

Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 201.378 m Boring Method : Shell & Auger
UTM Coordinates : 752494 E, 2408434 N Ground Water Depth : 19.19 m Casing Depth : 8.0 m
Survey Coordinates : 1470S, 15.2W Termination Depth : 25 m (RL 176.4 m) Boring Start : 08-Dec-18
Ground Water Level : RL 182.2 m Boring Finish : 09-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits		Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _f	Corrected Value, N _r				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)		Plasticity Index (%)	Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)		Moisture Content (%)	Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	
0.00	0.50	DS1				Hard brown silty clay, high plastic (CH)																	
1.00	1.45	SPT1	54	54																			
2.50	2.95	SPT2	60	60																			
4.00	4.45	SPT3	76	76				6.50															
6.50	6.53	SPT4	Ref*/3cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																	

⁽¹⁾ SPT is outside NABL scope.



Rock Profile (BH-70)

Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 201.378 m Boring Method : Rotary Drilling
UTM Coordinates : 752494 E, 2408434 N Ground Water Depth : 19.19 m Casing Depth : 8.0 m
Survey Coordinates : 1470S, 15.2W Termination Depth : 25 m (RL 176.4 m) Boring Start : 08-Dec-18
Ground Water Level : RL 182.2 m Boring Finish : 09-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX				Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																											
													Return Water		Bits Used																																			
													Colour	Loss																																				
Ref ^{6*} / 3cm	6.50	6.50 6.53	SPT4	1-4	NX ↓		Weak, grey GRANITE, very intensely fractured, highly weathered		21	0	18		↑	Light Brown	↑	100%	↑	32 CT Diamond Impregnated Bit																																
	7.00																																																	
	7.50																																																	
	8.00	8.00																																																
	8.50		RK2	5-8	8.00								24	0		↑																																		
	9.00																																																	
	9.50																																	9.50																
	10.00		RK3	9-14																															28	0	↑													
	10.50																																																	
	11.00												11.00																																					
	11.50		RK4	15-21										32		11	↑																																	
	12.00																																																	
	12.50																																		12.50															
	13.00																																																	

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-70)

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Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 201.378 m Boring Method : Rotary Drilling
UTM Coordinates : 752494 E, 2408434 N Ground Water Depth : 19.19 m Casing Depth : 8.0 m
Survey Coordinates : 1470S, 15.2W Termination Depth : 25 m (RL 176.4 m) Boring Start : 08-Dec-18
Ground Water Level : RL 182.2 m Boring Finish : 09-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																	
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																						
													Colour	Loss																									
	13.00	14.00	RK5	22-28		Weak, grey GRANITE, very intensely fractured, highly weathered		31	13	18		Light Brown	100%	32 CT Diamond Impregnated Bit																									
	13.50																																						
	14.00																																						
	14.50	15.50	RK6	29-37																					40	15	43	10	44	17	48	18							
	15.00																																						
	15.50																																						
	16.00	17.00	RK7	38-44																													43	10	18				
	16.50																																						
	17.00																																						
	17.50	18.50	RK8	45-52																																44	17		
	18.00																																						
	18.50																																						
	19.00	19.50	RK9	53-60																																		48	18
	19.50																																						

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Rock Profile (BH-70)

Location : Space for Raw Water Reservoir (Future) Surface Elevation : RL 201.378 m Boring Method : Rotary Drilling
UTM Coordinates : 752494 E, 2408434 N Ground Water Depth : 19.19 m Casing Depth : 8.0 m
Survey Coordinates : 1470S, 15.2W Termination Depth : 25 m (RL 176.4 m) Boring Start : 08-Dec-18
Ground Water Level : RL 182.2 m Boring Finish : 09-Dec-18

SPT N- Value (N _f) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																																
													Return Water		Bits Used																																							
													Colour	Loss																																								
	19.50	20.00	RK10	61-67			Weak, grey GRANITE, very intensely fractured, highly weathered		43	21			↕	↕	↕																																							
	20.00																																																					
	20.50																																																					
	21.00																																																					
	21.50	21.50	RK11	68-75																						Light Brown	↕	↕																										
	22.00																																																					
	22.50																																																					
	23.00																																																					
	23.50	23.00	RK12	76-84																																						↕												
	24.00																																																					
	24.50																																																					
	25.00																																																					
25.00	25.00	RK13	85-92																																																			
																																															</							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Soil Profile (BH-74)

Location : OAC Surface Elevation : RL 204.923 m Boring Method : Shell & Auger
UTM Coordinates : 752832 E, 2407862 N Ground Water Depth : Casing Depth : 8.5 m
Survey Coordinates : 1934S, 1136W Termination Depth : 17.5 m (RL 187.4 m) Boring Start : 25-Sep-18
Ground Water Level : m Boring Finish : 30-Sep-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Hard brown silty clay, high plastic (CH)	5.00								1.75	1.56	12.0							
1.00	1.45	UDS1																						
2.50	2.95	SPT1	56	56																				
4.00	4.45	SPT2	64	64																				
5.00	5.09	SPT3	Ref ¹ /9 cm		Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																			

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-74)

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Location : OAC
UTM Coordinates : 752832 E, 2407862 N
Survey Coordinates : 1934S, 1136W

Surface Elevation : RL 204.923 m
Ground Water Depth :
Termination Depth : 17.5 m (RL 187.4 m)
Ground Water Level : m
Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 25-Sep-18
Boring Finish : 30-Sep-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)			
													Return Water		Bits Used	Density (g/cc)	Specific Gravity								
													Colour	Loss											
Ref*/9cm	5.00	5.00	SPT3	1-7	NX		Weak, grey GRANITE, very intensely fractured, highly weathered		35	0			Light Brown	100%	32 CT Diamond Impregnated Bit										
	5.50	5.09																							RK-1
	6.00																								
	6.50	6.50	RK2	8-14																					
	7.00																								
	7.50																								
	8.00	8.00	RK3	15-20					28	0	18														
	8.50	8.50																							
	9.00																								
	9.50	9.50	RK4	21-25					29	0				2.72	-	-	0.73	151.0	3315*						
	10.00																								
	10.50																								
	11.00	11.00																							
	11.50																								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-74)

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Location : OAC
UTM Coordinates : 752832 E, 2407862 N
Survey Coordinates : 1934S, 1136W

Surface Elevation : RL 204.923 m
Ground Water Depth :
Termination Depth : 17.5 m (RL 187.4 m)
Ground Water Level : m

Boring Method : Rotary Drilling
Casing Depth : 8.5 m
Boring Start : 25-Sep-18
Boring Finish : 30-Sep-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)												
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																	
													Colour	Loss																				
	11.50	12.50	RK5	26-32		Weak to moderately strong grey GRANITE very intensely to moderately fractured, highly to moderately weathered - weak, very intensely fractured, highly weathered, 5.0 to 12.5 m - moderately strong, moderately fractured, moderately weathered 12.5 to 17.5 m		37	0			Light Brown	100%	32 CT Diamond Impregnated Bit	2.77	2.84	0.03	1.10	-	848														
	12.00																																	
	12.50																																	
	13.00	14.00	RK6	33-34				70	60													66	51	30	2.79	2.86	0.03	0.30	-	742				
	13.50																																	
	14.00																																	
	14.50	15.50	RK7	35-43				66	51													30	2.79	2.86	0.03	0.30	-	742						
	15.00																																	
	15.50																																	
	16.00	16.50	RK8	44-45				58	53													82	65											
	16.50																																	
	17.00																																	
	17.50	17.50		RK9				46-52															17.50											

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Soil Profile (BH-93)

Location : Lagoon-1 Surface Elevation : RL 208.640 m Boring Method : Shell & Auger
UTM Coordinates : 752995 E, 2408464 N Ground Water Depth : 21.82 m Casing Depth : 9.5 m
Survey Coordinates : 1380S, 1011W Termination Depth : 30 m (RL 178.64 m) Boring Start : 19-Dec-18
Ground Water Level : RL 186.82 m Boring Finish : 21-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Hard brown silty clay, high plastic (CH)																		
1.00	1.45	SPT1	51	51																				
2.50	2.95	SPT2	64	64																				
4.00	4.45	SPT3	72	72																				
5.50	5.95	SPT4	83	83																				
7.00	7.45	SPT5	93	93																				
8.50	8.83	SPT6	101/18cm			10.00																		
10.00	10.06	SPT7	Ref*/6cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-93)

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Location : Lagoon-1
UTM Coordinates : 752995 E, 2408464 N
Survey Coordinates : 1380S, 1011W

Surface Elevation : RL 208.640 m
Ground Water Depth : 21.82 m
Termination Depth : 30 m (RL 178.64 m)
Ground Water Level : RL 186.82 m

Boring Method : Rotary Drilling
Casing Depth : 9.5 m
Boring Start : 19-Dec-18
Boring Finish : 21-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																					
													Colour	Loss																								
Ref*/6cm	10.00	10.00	SPT7	1-4		Weak, grey GRANITE, very intensely fractured, highly weathered		22	0		18	Light Brown	100%	32 CT Diamond Impregnated Bit																								
	10.50	10.06	RK1																																			
	11.00																																					
	11.50	11.50																																				
	12.00		RK2	5-10					28		0																											
	12.50																																					
	13.00	13.00																																				
	13.50		RK3	11-17					37		13													18														
	14.00																																					
	14.50	14.50																																				
	15.00		RK4	18-26					48		16																											
	15.50																																					
	16.00																																					
	16.50																																					

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-93)

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Location : Lagoon-1
UTM Coordinates : 752995 E, 2408464 N
Survey Coordinates : 1380S, 1011W

Surface Elevation : RL 208.640 m
Ground Water Depth : 21.82 m
Termination Depth : 30 m (RL 178.64 m)
Ground Water Level : RL 186.82 m

Boring Method : Rotary Drilling
Casing Depth : 9.5 m
Boring Start : 19-Dec-18
Boring Finish : 21-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)										
													Return Water		Bits Used	Density (g/cc)	Specific Gravity															
													Colour	Loss																		
	16.50	17.00	RK5	27-37			Weak to moderately strong grey GRANITE very intensely to moderately fractured, highly to moderately weathered		55	21	18		↕	↕	↕																	
	17.00																															
	17.50																															
	18.00																															
	18.50	18.50	RK6	38-46			- weak, very intensely fractured, highly weathered, 10.0 to 18.5 m		61	37			↕	↕	↕																	
	19.00																															
	19.50																															
	20.00	20.00																														
	20.50	21.50	RK7	47-57			- moderately strong, moderately fractured, moderately weathered 18.5 to 30.0 m		68	31	30		↕	↕	↕																	
	21.00																															
	21.50																															
	22.00																															
	22.50	23.00	RK8	58-69					73	40			↕	↕	↕																	
	23.00																															

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

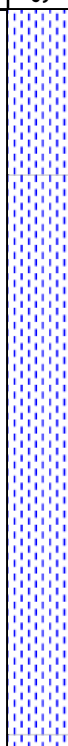
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Location : Lagoon-1
UTM Coordinates : 752995 E, 2408464 N
Survey Coordinates : 1380S, 1011W

Rock Profile (BH-93)

Surface Elevation : RL 208.640 m
Ground Water Depth : 21.82 m
Termination Depth : 30 m (RL 178.64 m)
Ground Water Level : RL 186.82 m
Boring Method : Rotary Drilling
Casing Depth : 9.5 m
Boring Start : 19-Dec-18
Boring Finish : 21-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ₍₁₎	Penetration Rate (minutes/cm)	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																							
													Return Water		Bits Used	Density (g/cc)	Specific Gravity																														
													Colour	Loss																																	
	23.00	24.00	RK9	70-77			Moderately strong grey GRANITE, moderately fractured, moderately weathered		76	43	30		Light Brown	100%	32 CT Diamond Impregnated Bit																																
	23.50																									Colour	Loss	Bits Used																			
	24.00																																														
	24.50	25.00	RK10	78-87					79	45																80	40	84	42	81	45																
	25.00																																											Colour	Loss	Bits Used	
	25.50																																														
	26.00	26.50	RK11	88-97					80	40																84	42	81	45																		
	26.50																																											Colour	Loss	Bits Used	
	27.00																																														
	27.50	28.00	RK12	98-107					84	42																81	45																				
	28.00																																												Colour	Loss	Bits Used
	28.50																																														
	29.00	29.00	RK13	108-116																																											
	29.50																																												Colour	Loss	Bits Used

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-93)

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Location : Lagoon-1

UTM Coordinates : 752995 E, 2408464 N

Survey Coordinates : 1380S, 1011W

Surface Elevation : RL 208.640 m

Ground Water Depth : 21.82 m

Termination Depth : 30 m (RL 178.64 m)

Ground Water Level : RL 186.82 m

Boring Method : Rotary Drilling

Casing Depth : 9.5 m

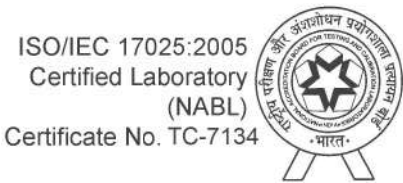
Boring Start : 19-Dec-18

Boring Finish : 21-Dec-18

	SPT N- Value (N _t) ⁽¹⁾		Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ₍₁₎	Penetration Rate (minutes/cm)	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)		
		Return Water													Colour	Loss	Bits Used											
	29.50		RK14	117-124					Moderately strong grey GRANITE, moderately fractured, moderately weathered	30.00	83	46	30		Light Bro	100 %	32 CT											
	30.00	30.00																										

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-101)

Location : SWGR Room Surface Elevation : RL 207.817 m Boring Method : Shell & Auger
UTM Coordinates : 752854 E, 2407944 N Ground Water Depth : 22.80 m Casing Depth : 15.0 m
Survey Coordinates : 1933S, 1145W Termination Depth : 25 m (RL 182.817 m) Boring Start : 03-Dec-18
Ground Water Level : RL 185.017 m Boring Finish : 05-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, φ (degrees)	
0.00	0.50	DS1				Very dense brown sandy gravels (GM)		65	27	8	0													
1.00	1.45	SPT1	74	74			2.50																	
2.50	2.95	SPT2	89	89		Hard brown silty clay, high plastic (CH)																		
4.00	4.45	SPT3	56	56																				
5.50	5.95	SPT4	70	70																				
7.00	7.45	SPT5	82	82		- with traces of gravel, 7.0 to 8.5 m																		
8.50	8.95	SPT6	82	82																				
10.00	10.45	SPT7	59	59																				
11.50	11.95	SPT8	63	63																				
13.00	13.45	SPT9	93	93																				
14.50	14.62	SPT10	Ref*/12cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-101)

Location : SWGR Room

Surface Elevation : RL 207.817 m

Boring Method : Rotary Drilling

UTM Coordinates : 752854 E, 2407944 N

Ground Water Depth : 22.80 m

Casing Depth : 15.0 m

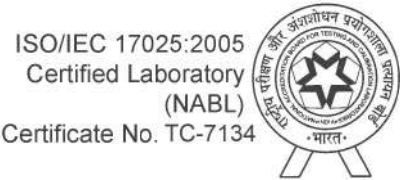
Survey Coordinates : 1933S, 1145W

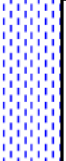
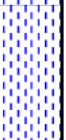
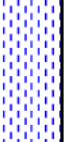
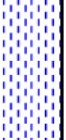
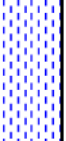
Termination Depth : 25 m (RL 182.817 m)

Boring Start : 03-Dec-18

Ground Water Level : RL 185.017 m

Boring Finish : 05-Dec-18



SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
													Return Water		Bits Used	Density (g/cc)	Specific Gravity						
													Colour	Loss									
Ref*/12cm	14.50	14.50	SPT 10	-			Very weak to weak, grey GRANITE, disintegrated to very intensely fractured, highly to completely weathered		0	0			↕	↕	↕								
	15.00	14.62	WS1																				
	15.50																						
Ref*/6cm	16.00	16.00	SPT 11	-			- very weak, disintegrated, completely weathered, 14.5 to 19.0 m		0	0			Light Brown	100%	32 CT Diamond Impregnated Bit								
	16.50	16.06	WS2																				
	17.00																						
Ref*/5cm	17.50	17.50	SPT 12	-					0	0			↕	↕	↕								
	18.00	17.55	WS3																				
	18.50																						
Ref*/7cm	19.00	19.00	SPT 13	1-5			- weak, very intensely fractured, highly weathered, 19.0 to 25.0 m		21	0			↕	↕	↕								
	19.50	19.07																					
	20.00		RK1																				
	20.50	20.50																					
	21.00												↕	↕	↕								

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-101)

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Location : SWGR Room
UTM Coordinates : 752854 E, 2407944 N
Survey Coordinates : 1933S, 1145W

Surface Elevation : RL 207.817 m
Ground Water Depth : 22.80 m
Termination Depth : 25 m (RL 182.817 m)
Ground Water Level : RL 185.017 m
Boring Method : Rotary Drilling
Casing Depth : 15.0 m
Boring Start : 03-Dec-18
Boring Finish : 05-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)		
													Return Water		Bits Used	Density (g/cc)	Specific Gravity							
													Colour	Loss										
	21.00	22.00	RK2	6-10			Weak, grey GRANITE, very intensely fractured, highly weathered	25.00	26	0	18		Light Brown	100%	3/2 C-1 Diamond Impregnated Bit									
	21.50																							
	22.00	23.50	RK3	11-18																				
	22.50																							
	23.00	25.00	RK4	19-26																				
	23.50																							
	24.00																							
	24.50																							
	25.00																							

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

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Soil Profile (BH-102)

Location : Space for Lime & Gypsum Handling Area Surface Elevation : RL 208.087 m Boring Method : Shell & Auger
UTM Coordinates : 752960 E, 2407959 N Ground Water Depth : 18.32 m Casing Depth : 13.5 m
Survey Coordinates : 1906S, 1039W Termination Depth : 30 m (RL 178.087 m) Boring Start : 05-Dec-18
Ground Water Level : RL 189.767 m Boring Finish : 07-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Hard brown silty clay with gravel, high plastic (CH)		11	3	38	48	58.5	26.3	32.2										
1.00	1.45	SPT1	52	52																				
2.50	2.95	SPT2	63	63																				
4.00	4.45	SPT3	66	66																				
5.50	5.95	SPT4	71	71																				
7.00	7.45	SPT5	76	76																				
8.50	8.95	SPT6	85	85																				
10.00	10.45	SPT7	80	80																				
11.50	11.95	SPT8	90	90	13.00	Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		
13.00	13.09	SPT9	Ref ¹ /9cm																					

⁽¹⁾ SPT is outside NABL scope.

Location :	Space for Lime & Gypsum Handling Area
UTM Coordinates :	752960 E, 2407959 N
Survey Coordinates :	1906S, 1039W

Boring Method : Rotary Drilling

Casing Depth : 13.5 m

Boring Start : 05-Dec-18

Boring Finish : 07-Dec-18

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-102)

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Location : Space for Lime & Gypsum
Handling Area
UTM Coordinates : 752960 E, 2407959 N
Survey Coordinates : 1906S, 1039W

Surface Elevation : RL 208.087 m
Ground Water Depth : 18.32 m
Termination Depth : 30 m (RL 178.087 m)
Ground Water Level : RL 189.767 m

Boring Method : Rotary Drilling
Casing Depth : 13.5 m
Boring Start : 05-Dec-18
Boring Finish : 07-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)								
													Return Water		Bits Used	Density (g/cc)	Specific Gravity													
													Colour	Loss																
	19.50	20.50	RK5	28-35		Weak, grey GRANITE, very intensely fractured, highly weathered			32	13	18		Light Brown	100%	32 CT Diamond Impregnated Bit															
	20.00																													
	20.50																													
	21.00	22.00	RK6	36-43					28	0															26	0	27	12	35	15
	21.50																													
	22.00																													
	22.50	23.50	RK7	44-52					26	0	27														12	35	15			
	23.00																													
	23.50																													
	24.00	25.00	RK8	53-61					27	12	35														15					
	24.50																													
	25.00																													
	25.50		RK9	62-72						35	15																			
	26.00																													

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-102)

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Location : Space for Lime & Gypsum
Handling Area
UTM Coordinates : 752960 E, 2407959 N
Survey Coordinates : 1906S, 1039W

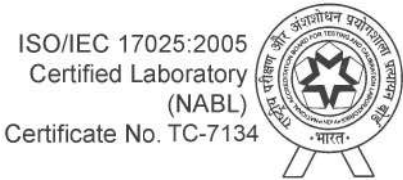
Surface Elevation : RL 208.087 m
Ground Water Depth : 18.32 m
Termination Depth : 30 m (RL 178.087 m)
Ground Water Level : RL 189.767 m

Boring Method : Rotary Drilling
Casing Depth : 13.5 m
Boring Start : 05-Dec-18
Boring Finish : 07-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ₍₁₎	Penetration Rate (minutes/cm)	Size of Hole: NX			Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)	
													Return Water		Bits Used								
													Colour	Loss									
	26.00	26.50	RK10	73-83			Weak, grey GRANITE, very intensely fractured, highly weathered		42	19			Light Brown	100%	32 CT Diamond Impregnated Bit								
	26.50																						
	27.00																						
	27.50																						
	28.00	28.00	RK11	84-95					44	15	18												
	28.50																						
	29.00																						
	29.50	30.00	RK12	96-104					49	18													
	30.00																						
								30.00															

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-103)

Location : Ash Classifier Surface Elevation : RL 206.887 m Boring Method : Shell & Auger
UTM Coordinates : 752864 E, 2407826 N Ground Water Depth : 20.12 m Casing Depth : 14.0 m
Survey Coordinates : 2048S, 1121W Termination Depth : 25 m (RL 181.887 m) Boring Start : 10-Dec-18
Ground Water Level : RL 186.767 m Boring Finish : 11-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Very stiff to hard brown clayey silt, medium plastic (CI) - very stiff, 0.0 to 4.0 m - hard, 4.0 to 13.0 m																		
1.00	1.45	SPT1	26	26																				
2.50	2.45	SPT2	30	30																				
4.00	4.45	SPT3	41	41																				
5.50	5.95	SPT4	52	52																				
7.00	7.45	SPT5	70	70				0	4	60	36													
8.50	8.95	SPT6	78	78																				
10.00	10.45	SPT7	90	90								41.2	19.2	22.0										
11.50	11.95	SPT8	98	98			13.00																	
13.00	13.26	SPT9	102/11cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		
																								

⁽¹⁾ SPT is outside NABL scope.

Rock Profile (BH-103)

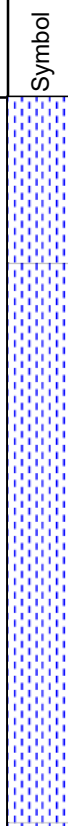
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Location : Ash Classifier
UTM Coordinates : 752864 E, 2407826 N
Survey Coordinates : 2048S, 1121W

Surface Elevation : RL 206.887 m
Ground Water Depth : 20.12 m
Termination Depth : 25 m (RL 181.887 m)
Ground Water Level : RL 186.767 m

Boring Method : Rotary Drilling
Casing Depth : 14.0 m
Boring Start : 10-Dec-18
Boring Finish : 11-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)																		
													Return		Water	Bits Used	Penetration Rate (minutes/cm)																									
													Colour	Loss	Penetration Rate (minutes/cm)																											
	13.50	13.50	RK1	1-5			Weak, grey GRANITE, very intensely fractured, highly weathered		31	0	18		Light Brown	100%	32 CT Diamond Impregnated Bit																											
	14.00																																									
	14.50																																									
	15.00	15.00	RK2	6-11					28	0			34	14												26	0															
	15.50																																									
	16.00																																									
	16.50	16.50	RK3	12-19					34	14			26	0																												
	17.00																																									
	17.50																																									
	18.00	18.00	RK4	20-25					26	0																																
	18.50																																									
	19.00																																									
	19.50	19.50																																								
20.00																																										

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index

Rock Profile (BH-103)

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Location : Ash Classifier
UTM Coordinates : 752864 E, 2407826 N
Survey Coordinates : 2048S, 1121W

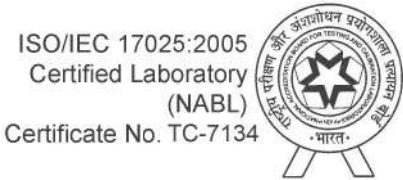
Surface Elevation : RL 206.887 m
Ground Water Depth : 20.12 m
Termination Depth : 25 m (RL 181.887 m)
Ground Water Level : RL 186.767 m

Boring Method : Rotary Drilling
Casing Depth : 14.0 m
Boring Start : 10-Dec-18
Boring Finish : 11-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX				Density (g/cc)	Specific Gravity	Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)												
													Return Water		Bits Used																				
													Colour	Loss																					
	20.00	21.00	RK5	26-31			Moderately strong to weak, grey GRANITE very intensely fractured, highly weathered - weak, 13.5 to 21.0 m - moderately strong, 21.0 to 25.0 m	25.00	25	10			Light Brown	100%	32 CT Diamond Impregnated Bit																				
	20.50																																		
	21.00																																		
	21.50	22.50	RK6	32-43					46	31	22																								
	22.00																																		
	22.50																																		
	23.00	24.00	RK7	44-53					63	38																									
	23.50																																		
	24.00																																		
	24.50	25.00	RK8	54-60					69	30																									
	25.00																																		

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index



Soil Profile (BH-104)

Location :	TAC	Surface Elevation :	RL 208.237 m	Boring Method :	Shell & Auger
UTM Coordinates :	752848 E, 2407736 N	Ground Water Depth :	23.82 m	Casing Depth :	11.0 m
Survey Coordinates :	2138S, 1129W	Termination Depth :	35 m (RL 173.237 m)	Boring Start :	12-Dec-18
		Ground Water Level :	RL 184.417 m	Boring Finish :	15-Dec-18

Depth, m		Sample No.	SPT ⁽¹⁾		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N _r	Corrected Value, N _r ¹				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm ³)	Dry Density (gms/cm ³)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm ²)	Cohesion Intercept, 'c' (kg/cm ²)	Angle of Internal Friction, ϕ (degrees)	
0.00	1.00	DS1				Very stiff to hard brown clayey silt, medium plastic (CI)																		
1.00	1.45	SPT1	27	27		- very stiff, 0.0 to 4.0 m																		
2.50	2.95	SPT2	28	28																				
4.00	4.45	SPT3	52	52		- hard, 4.0 to 13.0 m																		
5.50	5.95	SPT4	60	60								41.6	21.7	19.8										
7.00	7.45	SPT5	63	63																				
8.50	8.95	SPT6	71	71																				
10.00	10.45	SPT7	76	76																				
11.50	11.95	SPT8	90	90								40.8	23.2	17.6										
13.00	13.45	SPT9	96	96			14.00																	
14.00	14.02	SPT10	Ref*/2cm			Refusal met on Rock. Core drilling through rock adopted. Refer to next page for details.																		

⁽¹⁾ SPT is outside NABL scope.

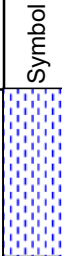
Rock Profile (BH-104)

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Location : TAC
UTM Coordinates : 752848 E, 2407736 N
Survey Coordinates : 2138S, 1129W

Surface Elevation : RL 208.237 m
Ground Water Depth : 23.82 m
Termination Depth : 35 m (RL 173.237 m)
Ground Water Level : RL 184.417 m
Boring Method : Rotary Drilling
Casing Depth : 11.0 m
Boring Start : 12-Dec-18
Boring Finish : 15-Dec-18

SPT N- Value (N _t) ⁽¹⁾	Depth (m)	Drill Run (m)	Sample No.	Serial No. of Cores	Casing Lowered (Size)	Symbol	ROCK DESCRIPTION	Depth of Strata, (m)	Percent Recovery (%) ⁽¹⁾	Rock Quality Designation (RQD, %) ⁽¹⁾	Rock Mass Rating (RMR) ⁽¹⁾	Penetration Rate (minutes/cm)	Size of Hole: NX					Porosity (%)	Water Absorption (%)	Point Load Index (kg/cm ²)	Unconfined Compressive Strength (kg/cm ²)	Modulus of Elasticity (kg/cm ²)							
													Return Water		Bits Used	Density (g/cc)	Specific Gravity												
													Colour	Loss															
Ref*/ 2cm	14.00	14.00	SPT 10	1-4			Weak, grey GRANITE, very intensely fractured, highly weathered		24	0			↕	↕	↕														
	14.50	14.02																											
	15.00																												
	15.50	15.50	RK2	5-9																									
	16.00																												
	16.50																												
	17.00	17.00	RK3	10-15															Light Brown	100%	32 CT Diamond Impregnated Bit								
	17.50																												
	18.00																												
	18.50	18.50	RK4	16-21															↕	↕	↕								
	19.00																												
	19.50																												
	20.00	20.00																											
20.50													↕	↕	↕														

⁽¹⁾Outside NABL scope.

* Equivalent Unconfined Compressive Strength based on Point Load Strength Index