FORM-1

CONSTRUCTION OF 4/5 STAR HOTEL AND CONVENTION CENTER

AT

VILLAGE - KOTRA SULTANABAD, BHOPAL (M.P.)

OF

M/S. GENEX HOTELS PVT. LTD.

AT

GREENWOOD COUNTRY CLUB PARISAR, VAN VIHAR ROAD, BHOPAL (M.P.)

APPENDIX - I
(See Paragraph - 6)
FORM-1

(I) Basic Information

<table>
<tr><th>S. No.</th><th>Item</th><th>Details</th></tr>
<tr><td>1.</td><td>Name of the project</td><td>Construction of 4/5 Star Hotel and Convention Center on Khasra No. 40/3 & 276/3 at Village Kotra Sultanabad Bhopal(M.P.)
Applicant: GENEX HOTELS PVT. LTD.</td></tr>
<tr><td>2.</td><td>S. No. in schedule</td><td>The project is categorized as 'B' under item 8 (a) of Schedule -Gazette Notification dated Sep 14th, 2006 and subsequent amendments issued by MoEF, New Delhi on 01.12.09 and 04.04.2011.</td></tr>
<tr><td>3.</td><td>Proposed capacity / area / length / tonnage to be handled / command area / lease area / number of wells to be drilled</td><td>
<table>
<tr><td>Total plot area</td><td>16194.00 Sq.Mt. (1.6194 Hect.)</td></tr>
<tr><td>Net Planning Area –</td><td>14976.17 Sq.mt. (1.4976 Hect.)</td></tr>
<tr><td>PERMISSIBLE F.A.R (1:2.5)</td><td>37440.42 Sq.mt</td></tr>
<tr><td>ADDITIONAL F.A.R. OF ROAD WIDENING 1217.83 X 2.5 X 2</td><td>6089.15 Sq.mt.</td></tr>
<tr><td>TOTAL Permissible F.A.R.</td><td>43529.57 Sq.mt.</td></tr>
<tr><td>a) Proposed F.A.R. (1:1.71)
b) Basement - I
C) Basement - II</td><td>25628.00 Sq.Mt.

10100 Sq.mt.
10100 Sq.mt.</td></tr>
<tr><td>Total Built up Area Including Basement</td><td>45828 Sq.mt.</td></tr>
<tr><td>Permissible Height of the project</td><td>= 45 M.</td></tr>
<tr><td>Proposed Height of the project</td><td>= 43.50 M.</td></tr>
</table>
The project involves the Construction of 4/5 Star hotel and Convention Center with 220 Rooms, Convention / banquet facilities of 2700 sqm. (Indoor and Outdoor space), meeting rooms, executive lounge and business center, restaurants (4 nos.), health club & Spa.
</td></tr>
</table>

4.	New / Expansion / Modernization	New
5.	Existing Capacity/Area etc.	N.A.
6.	Category of Project i.e. 'A[1] or 'B'	'B'
7.	Does it attract the General condition? If Yes, please specify.	No
8.	Does it attract the Specific condition? If Yes, please specify.	No
9.	Location	Coordinates: 23°12'56.93"N, 77°22'59.62"E Village – Kotra Sultanabad, Tehsil – Huzur, District - Bhopal, M.P.
	Plot/Survey/Khasra No.	40/3 & 276/3
	Village	Kotra Sultanabad
	Tehsil	Huzur
	District	Bhopal
	State	Madhya Pradesh
10.	Nearest railway station/airport along with distance in kms.	Aerial Distance: Bhopal Main Railway Station – 8.5 KMS. Habibganj Railway Station – 5.76 Kms. Bhopal Airport - 16.7 KMS. ISBT Bus Stop – 8.7 KMS.
11.	Nearest Town, City, District Headquarters along with distance in kms.	**Nearest** / **Name** / **Distance (Aerial)** City / Bhopal / Within Municipal Area District Headquarters / Bhopal / 8.2 Kms
12.	Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given)	Bhopal Municipal Corporation. Harshwardhan complex, Mata Mandir, Bhopal (M.P.) - 462003 +91-755-2701222
13.	Name of the applicant	Genex Hotels Pvt. Ltd.
14.	Registered Address	Green Wood Country Club Parisar, Van Vihar Road, Bhopal (M.P.)
15.	Address for correspondence:	Green Wood Country Club Parisar, Van Vihar Road, Bhopal (M.P.)

	Name	Mr. Bharat Singh
	Designation (Owner/Partner/CEO)	POA Holder
	Address	Green Wood Country Club Parisar, Van Vihar Road, Bhopal (M.P.)
	Pin Code	462003
	E-mail	genexhotels@gmail.com
	Telephone No.	7898501224
	Fax No.	-
16	Details of Alternative Sites examined, if any. Location of these sites should be shown on a Topo sheet.	N.A.
17.	Interlinked Projects	N.A.
18.	Whether separate application of interlinked project has been submitted?	N.A.
19.	If yes, date of submission	N.A.
20.	If no, reason	N.A.
21.	Whether the proposal involves approval/ clearance under: If yes, details of the same and their status to be given, (a) The Forest Conservation) Act, 1980?	N.A. No
	(b) The wild life (Protection) Act, 1972?	Our project is located 1.2 km away in the East direction from Van Vihar. As per draft Gazette notification S.O. 184(E) dated 18.01.2017 the eco-sensitive zone is marked at 100 mtrs. from the boundary of Van Vihar National Park.
	c) The C.R.Z. Notification, 1991?	No
22.	Whether there is any Government Order/Policy relevant/ relating to the site?	It's a land of MP State Tourism Development Corporation and lease has been allotted to Genex Hotels Pvt. Ltd.
23.	Forest land involved (hectares)	No

24.	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up? (a) Name of the Court (b) Case No. (c) Orders/directions of the Court, if any and its relevance with the proposed project.	No litigation is pending against the project or the project land in any court of law to the best of knowledge.
Capacity corresponding to sectoral activity (such as production capacity for manufacturing, mining lease area and production capacity for mineral production, area for mineral exploration, length for linear transport infrastructure, generation capacity for power generation etc.)		

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S. No.	Information/Checklist confirmation	Yes / No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	**Land Use:** Land use is residential and as per Bhopal Master Plan 2005 hotel activity is permitted. **Topography:** The topography of the site area is almost flat with minimal slope tending towards NW to SE. In post construction phase the overall slope will remain the same. **Contour map of site is attached as Annexure I.**
1.2	Clearance of existing land, vegetation and buildings?	Yes	Clearance of trees is proposed which cannot be accommodated in planning and necessary permission shall be obtained.
1.3	Creation of new land uses?	No	N.A.

<table>
<tr><td>1.4</td><td>Pre-construction investigations e.g. bore houses, soil testing?</td><td>Yes</td><td>Soil sample was collected and analyzed from the site and results were found satisfactory for construction and other related developments.
Geotechnical/soil investigation report is enclosed as Annexure II.</td></tr>
<tr><td>1.5</td><td>Construction works?</td><td>Yes</td><td>All construction activities will be confined within project area. There will be no physical changes outside the project boundary. Construction of proposed project will be done as per applicable norms/byelaws. The detailed area statement is given below:
<table>
<tr><th>S #</th><th>Items</th><th>Details</th></tr>
<tr><td>1</td><td>Type Of Building</td><td>4/5 Star Hotel With Convention Facility</td></tr>
<tr><td>2</td><td>Total Land Area</td><td>16194.00 Sq.Mt.</td></tr>
<tr><td>3</td><td>Area Under Road Widening</td><td>1217.83 Sq Mt</td></tr>
<tr><td>4</td><td>Net Planning Area</td><td>14,976.17 Sq Mt</td></tr>
<tr><td>5</td><td>Permissible F.A.R (1:2.5)</td><td>37440.42 Sq.Mt.</td></tr>
<tr><td>6</td><td>Additional F.A.R. Of Road Widening 1217.83 X 2.5 X 2</td><td>6089.15 Sq.Mt.</td></tr>
<tr><td>7</td><td>Total F.A.R.</td><td>43529.57 Sq.Mt.</td></tr>
<tr><td rowspan="2">8</td><td>a) Proposed F.A.R. (1:1.71)
b) Basement 1
C) Basement 2</td><td>25628.00 Sq.Mt.

10100 Sq.mt.
10100 Sq.mt.</td></tr>
<tr><td>Total Built up</td><td>45828 Sq.mt.</td></tr>
<tr><td>9</td><td>Permissible Ground Coverage (30%)</td><td>4492.85 Sq.Mt.</td></tr>
<tr><td>10</td><td>Permissible Open Area (11%) + Service Area (1%)</td><td>1797.0 Sq.Mt.</td></tr>
<tr><td>11</td><td>Proposed Open Area + Service Area 12%)</td><td>1797.00 Sq.Mt.</td></tr>
<tr><td>12</td><td>Additional Green Area</td><td>2556.00 Sq.mt.</td></tr>
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<table>
<tr><td>13</td><td>Permissible Height</td><td>45.00 Meters</td></tr>
<tr><td>14</td><td>Proposed Height</td><td>43.50 Meters</td></tr>
<tr><td>15</td><td>M.O.S
Front
All Sides And Rear</td><td>
15.00 Meters
7.50 Meters</td></tr>
<tr><td>16</td><td>Parking Required @ 75 Ecs / Sq.Mt Of Proposed Far</td><td>342 Ecs</td></tr>
<tr><td>17</td><td>Parking Provided In Basements</td><td>14580 Sq.Mt./ 416 Ecs</td></tr>
<tr><td>18</td><td>No. Of Trees</td><td>Proposed: 130 Nos.</td></tr>
<tr><td>19</td><td>Number Of Floors</td><td>B1+B2+G+Service Floor + 10 Floors</td></tr>
<tr><td>19</td><td>Power requirement & Source</td><td>1936.1 KW
Source : Madhya Pradesh Madhya Kshetra Vidyut Vitran Company Limited</td></tr>
<tr><td>20</td><td>Power Backup</td><td>3 DG sets of 1000 kVA Each</td></tr>
<tr><td>21</td><td>UPS</td><td>2 Nos. 40 KVA</td></tr>
<tr><td>22</td><td>Water Requirement and Source</td><td>263 KLD
Source: Municipal Water supply</td></tr>
<tr><td>23</td><td>STP
ETP</td><td>250 KLD
50 KLD</td></tr>
<tr><td>24</td><td>Solid Waste Generated</td><td>Domestic Waste 1770 kg/Day
Horticulture Waste – 5.39 kg/day
E-waste < 1 Kg/Day</td></tr>
<tr><td>25</td><td>Estimated Population (fixed + floating)</td><td>4425</td></tr>
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</tr>
<tr><td>1.6</td><td>Demolition works?</td><td>No</td><td>There is no existing building/structure available at site hence demolition is not required.</td></tr>
<tr><td>1.7</td><td>Temporary sites used for construction works or housing of construction workers?</td><td>Yes</td><td>Adjacent land towards North side of the property will be used for the storage of construction material and to setup the temporary labour shelters.</td></tr>
</table>

1.8	Above ground buildings, structures or earthworks including linear structures, cut And fill or excavations	Yes	The project involves The project involves the Construction of 4/5 Star hotel and Convention Center with 220 Rooms, Convention / banquet facilities of 2700 sqm. (Indoor and Outdoor space), meeting rooms, executive lounge and business center, restaurants (4 nos.), health club & Spa. Permissible Height of the project = 45 M. Proposed Height of the project = 43.50 M. There will be scraping off soil to the tune of-Approx. **76904.25 Cu.m.** During excavation & site preparation activities, this will be used for horticulture, backfilling & surface leveling within the site and nearby low lying areas.
1.9	Underground works including mining or tunneling?	No	No underground work including mining/ tunnel is required. Excavation of earth will be carried out for laying foundation of the proposed buildings, construction of basement and preparation of underground water storage tanks only.
1.10	Reclamation works?	No	N.A.
1.11	Dredging?	No	N.A.
1.12	Offshore structures?	No	N.A.
1.13	Production and manufacturing processes?	No	N.A.

1.14	Facilities for storage of goods or materials?	Yes	Construction Phase: required raw material will be purchased and will be stored on site with appropriate arrangement. Separate raw material storage yard will be made. Cement will be separately stored under cover in bales. Sand will be stacked neatly under tarpaulin cover. Bricks (AAC) and steel will be laid in open. Operation Phase: Not required except for common cleaning and maintenance equipment and material.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	The details of solid and liquid waste generated & their disposal during the construction and post construction phase are tabulated as:

Construction Phase

S. No.	Source	Nature of waste	Treatment/ Disposal
1	Site preparation activities	**Solid waste:** Excavated soil (76904.25 cu. m.)	Stored at earmarked places Backfilling & internal roads development.
2	Construction activities	**Solid waste:** Construction waste	8.5 TPD
		Recyclable waste	Sold to the vendors
		Inert waste (Brick, masonry, concrete, etc.)	Used for road making, & land filling within the project site.
3	Construction workers	**Solid waste:** Biodegradable (80-100 Kg/day Approx.)	Sent to Bhopal MSW disposal sites.
		Effluent: (0.5 KLD Approx.)	Will be treated in temporary septic tank & soak pit.

Post Construction Phase:

S. No.	Source	Treatment/ Disposal
	Domestic/ Industrial effluent	Waste Water will be Generated 277 KLD on 100% load. Proposed STP Capacity – 250 KLD. Proposed ETP Capacity – 50 KLD (Treated Water of ETP will go to STP for Final Treatment) Disposal of treated effluent: 225 KLD (for Reuse) • Flushing (72 KLD) • Landscaping (18 KLD), HVAC Makeup (135 KLD)
	Solid waste	As under:

S. No.	Bins	Particulars	Qty.	Treatment	Disposal
a.	Green	Compostable waste • Kitchen waste • Garden waste	996.51 kg/day	No in-situ treatment. Collected and Stored at designated places.	Bhopal Municipal Corporation Disposal sites.
b.	Dark grey bins	Non–biodegradable waste + recyclable waste: • Plastics • Metal cans • Glassware	798.97 kg/day		
c.	Blue	Paper waste • Paper • Newspaper • Cardboards •Packing material (paper)	Not Quantified	Efforts to recycle to the best possible extent. Will be collected on daily basis.	Sent to the vendors for recycling.
d.	Green bins (common areas)	• Metals (tins, & cans) • E-waste • Bulbs & tube lights • Batteries	Not Quantified	No in-situ treatment	Registered Actual users.

1.16	Facilities for long term housing of operational workers?	No	No long term housing plan for the operational worker is planned in the proposed project as the local population residing in the surrounding areas of the project site will find the employment opportunity for various maintenance needs of the project once it is occupied.

1.17	New road, rail or sea traffic during construction or operation?	No	There will be no new rail or sea traffic. During construction phase, traffic will marginally increased due to inward and outward movement of Vehicles carrying construction material. In the post construction phase, there will be increase in the traffic levels due to proposed project. The increased traffic load due to the proposed project will be **416 CAR** including the traffic load for the floating visitors. A detail of the parking facilities is given in conceptual plan along with car parking maps.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	There will be no new road, rail, air, waterborne transport infrastructures required for the project.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	No diversion of transport routes is required.
1.20	New or diverted transmission lines or pipelines?	No	There will be no diversion of transmission and pipelines, though the project involves construction of new internal pipelines for fresh water, recycled water, rain water harvesting, sewer lines and internal power distribution lines.
1.21	Impoundment, damming, culver ting, realignment or other changes to the hydrology of watercourses or aquifers?	No	No impounding, damming, culverting, realignment or other changes to the hydrology of surface watercourses is proposed.

1.22	Stream crossings?	No	There is no stream within the site.
1.23	Abstraction or transfers of water form ground or surface waters?	Yes	Construction Phase:- 77 KLD water will be required in construction phase which will be met through local water tanker supply. Operation Phase:- Water requirement will be met from the Municipal water supply and ground water. There will be no impact on ground water regime by the project; however rain water harvesting system has been devised to recharge the ground water. Provisions of capturing the maximum surface runoff and providing recharge to the tune of 164.06 Cum./Hr. (maximum recharge & Storage) will be done through the 1 numbers of rain water harvesting pit with capacity of 18.52 Cum. & 1 no. of RWH storage Tank with the capacity of 100 KLD. To store 90 kld approx. rain water and it will be utilized after treatment to minimize the BMC water supply load.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The land surface affecting the drainage will be altered (retaining the same slope) to provide effective surface runoff co-efficient from paved areas by capturing the maximum surface run off through well designed storm water pipe network of rain water harvesting and will be used for recharge of the aquifers.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Transport of personnel/ material during construction and operation phase are envisaged. Road network for smooth flow of traffic and adequate parking space will be provided for operational phase.

1.26	Long-term dismantling or decommissioning or restoration works?	No	N.A.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	N.A.
1.28	Influx of people to an area in either temporarily or permanently?	Yes	During the construction phase, there will be inward and outward movements of local labor & specialized workers to the project site, this will be a temporary activity and there will be no permanent influx of people. However, during the post construction phase, there will be regular movement of residents, visitors and staff and related personals.
1.29	Introduction of alien species?	No	No alien species will be introduced. Only selected local and native plant species will be planted.
1.30	Loss of native species or genetic diversity?	No	No loss of native species or genetic diversity is envisaged.
1.31	Any other actions?	No	N.A.

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S. No.	Information/ Checklist confirmation	Yes / No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	No.	The project is situated at fairly dense and developed area of Bhopal city. Project site is earmarked for the development of Hotel & Convention Centre project. The land will be developed as per Bhopal Master Plan 2005.
2.2	Water (expected source & competing users) unit: KLD	Yes	Construction Phase: 77 KLD water will be required in construction phase which will be met through local water tanker supply. Operational Phase: Total fresh water demand of the project is expected to be around 263 KLD. The Main source of water supply will be met from Municipal water supply, whereas additional water requirement for landscaping, flushing, will be fulfilled by treated water from STP.
2.3	Minerals (MT)	Yes	Sand and Murram will be required for the construction and development works. These will be purchased from various vendors as per the requirement.

<table>
<tr>
<td>2.4</td>
<td>Construction material - stone, aggregates, sand / soil (expected source - MT)</td>
<td>Yes</td>
<td>Stone, cement, bricks (AAC), marble, paints, tiles, electric wires, sanitary ware, and glass will be required for the construction and development works. These will be purchased from various vendors as and when required. It will be stored temporarily at the site.

The Detail of the construction material is given in below:
<table>
<tr><th>S. No.</th><th>Construction Material</th><th>Unit</th><th>Approx. Quantity</th></tr>
<tr><td>1</td><td>Cement (PPC)</td><td>Bags</td><td>167318</td></tr>
<tr><td>2</td><td>Sand</td><td>Cum</td><td>14756</td></tr>
<tr><td>3</td><td>Aggregate</td><td>Cum</td><td>21115</td></tr>
<tr><td>4</td><td>Steel</td><td>MT</td><td>2760</td></tr>
<tr><td>5</td><td>Formwork</td><td>Sq.m.</td><td>78575</td></tr>
<tr><td>6</td><td>Bricks (AAC)</td><td>No./Cu. m.</td><td>5162</td></tr>
<tr><td>7</td><td>Concrete</td><td>Cum</td><td>23197</td></tr>
</table>
</td>
</tr>
<tr>
<td>2.5</td>
<td>Forests and timber (source - MT)</td>
<td>NO</td>
<td>Minimum wood will be used in the project mainly in form of factory made shutters for doors etc. in the proposed project. Aluminium/ Steel frames will be used at most of the places.</td>
</tr>
<tr>
<td>2.6</td>
<td>Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)</td>
<td>Yes</td>
<td><u>Power Requirement:</u>
Construction Phase: for power backup 1 DG set of 100 KVA will be used.
Operational phase:
Anticipated power requirement from MPSEB is 1.93 MW(1936.1 KW.)
3 Nos. D.G sets capacity of 1000 KVA each will be used for back-up.
2 Nos. UPS Capacity of 40 KVA
<u>Fuel Requirement:</u>
Fuel Used : HSD Fuel – 541 Ltrs/hr. (Only for power backup use)</td>
</tr>
</table>

2.7	Any other natural resources (use appropriate standard units)	No	Not envisaged.

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health:

S. No.	Information / Checklist confirmation	Yes / No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	No	This is a construction of hotel project so no storage of hazardous chemicals (as per MSIHC rules) will be done, apart from spent oil. Suitable management practice will be adopted for the same. It will be stored in HDPE drums and kept in covered rooms, under lock and key and will be sold to authorize vendors only. Specialized care shall be taken to prevent leaks and/or spills. HSD (Low Sulphure Variety) will be used for DG set. However, the quantity stored will be below the threshold limit specified by the MSIHC rules.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	Site is fairly plain and no water body is present at site. Suitable drainage and waste management measures will be adopted in both construction and operational phase, which will restrict stagnation of water or accumulation of waste. This will effectively restrict the reproduction and growth of disease vectors.

3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	Use, storage, transport, handling or production of any harmful product is not envisaged from the proposed project. Thus, no adverse impact on human health/ environment is envisaged. Local workers will be employed during construction of the project and the project has beneficial impacts. It will create a more interactive environment for living, leisure and recreation.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	No	This is development of Hotel project, so no adverse impact is anticipated by this project.
3.5	Any other causes	No	N.A.

4. Production of solid waste during construction or operation or decommissioning (Ml/month):

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	

Area for Excavation	10118.98	sq.mt.
Excavation Depth	7.6	Mtrs.
Excavated Soil	76904.25	Cum.
soil used for backfilling in project site	13000	cum.
low lying area nearby project site	16500	sq.mt.
depth	3	Mtrs.
soil used for backfilling of nearby low lying area	49500	cum.
remaining soil which will be used for landscaping	14404.25	cum.

4.2	Municipal waste (domestic and or commercial wastes)	Yes	The total quantities of solid waste that will be generated from project in operational phase will be 1775.49 kg/day. During construction phase temporary arrangement shall be done for Municipal solid and liquid waste management. In Operational Phase it shall be made with nearest Municipal authority for solid waste disposal. The details of the various activities generating solid waste, classification, collection facilities, treatment and disposal has been explained at point 1.15.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	No	▪ Spent Oil from Transformer & DG set (approx. 300 l/yr.) is the only hazardous waste generated and will be disposed off as per *hazardous waste* (Management and Handling Rules). ▪ This spent oil will be carefully stored in HDPE drums in isolated covered facility. This spent oil will be sold to vendors authorized by MPPCB for the treatment of same. Suitable care will be taken so that spills/ leaks of spent oil from storage could be avoided.
4.4	Other industrial process wastes	No	N.A.
4.5	Surplus product	No	N.A.
4.6	Sewage sludge or other sludge from effluent treatment.	No	Very less amount of sewage sludge shall be generated which will be used as manure after drying or disposed with MSW to the municipal corporation.

4.7	Construction or demolition wastes	Yes	Construction waste generation will be limited to the construction phase only and will be limited to project site only. These will be reused for backfilling after manual segregation. Unusable and excess construction debris will be disposed at designated places in tune with the local norms. These wastes will be used for road development activities.
4.8	Redundant machinery or equipment	No	There will not be any redundant machinery or equipment at site.
4.9	Contaminated soils or other materials	No	N.A.
4.10	Agricultural wastes	No	There will be no agriculture waste.
4.11	Other solid wastes	No	There will be no other solid waste.

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr):

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources.	Yes	D.G. Set will be provided only in case of power failures during operational phase. The Pollutants like SPM, SO_2 that may arise from emissions from D.G. Set will be discharged through vent of proper height as per CPCB Norms.
5.2	Emissions from production processes	No	There is no production process in the project.
5.3	Emissions from materials handling including storage or transport	Yes	The fugitive emission expected from construction phase will be dust arising from material handling and vehicular emission from transport vehicles. These include the emissions due to idling of the vehicles during loading and unloading activities.

			Construction waste will be utilized within the site itself to reduce the emissions during transportation. Further, idling of the vehicles will be reduced to the extent possible. The haul road will be made moist to avoid the air borne dust & plantation will be done.
5.4	Emissions from construction activities including plant and equipment	Yes	Dust emissions may arise due to the materials handling during construction phase; these will be restricted to the construction phase and to the construction site only. Regular water sprinkling & tarpaulin covers will be provided to prevent dust emissions.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	• Water spraying to prevent dust pollution from different source of construction. • Speed restriction of all the vehicles approaching the site and within the site. • All transportation vehicles will be suitably covered with tarpaulin & overloading of the vehicles will be avoided. • Covering of the construction site on all four sides to a considerable height to prevent dust emission and other pollutant to the surrounding environment. • Provision will be made to avoid sick building syndrome by using products/materials having low level of VOC emissions. • Proper sewage treatment System and solid waste management system will be provided and will be well maintained so as to avoid the problems of odor.

5.6	Emissions from incineration of waste	No	N.A.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	No material waste will be burnt in open air.
5.8	Emissions from any other sources	No	N.A.

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S. No.	Information / Checklist confirmation	Yes / No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	Noise may be generated from the construction equipments and operation of DG set. The following measures will be taken: • Temporary noise barriers will be provided all around the project site. • Operation of DG set during occupancy phase. Appropriate and adequate noise control measures will be adopted to control noise. DG set with acoustic enclosures will be provided. • An area of about **1797** Sq.mt. open area will be under landscape/green belt which will help to contain the emissions within the project sites. • The machinery which will be used for construction will be of high standard and of reputed make and will adhere to international standard. These standards itself take care of noise pollution control • /vibration control and air emission control. Hence insignificant impacts due to construction machinery are envisaged.

			• Sources of noise in the operational phase will be D.G. set and from vehicular movement only. The D.G. sets will be in operation during power failure only and will generate noise level below **45 dB (A**) Each.
6.2	From industrial or similar processes	No	N.A.
6.3	From construction or demolition	Yes	Due to the various construction activities, there will be short-term noise impacts in the immediate vicinity of the project site. The construction activities will include the following noise generating activities: • Excavation activities etc. • Concreting and mixing • Construction plant • Heavy vehicle movement and • Operation of D.G. set
6.4	From blasting or piling	No	N.A.
6.5	From construction or operational traffic	Yes	Noise generated due to heavy vehicle movement will be minimized by proper traffic management is an integral part of design and plantation on the road sides of interior roads on open spaces and around the periphery of the campus.
6.6	From lighting or cooling systems	No	Not envisaged.
6.7	From any other sources	No	N.A.

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	Used oil from D.G. set will be handled with care, it will be stored in HDPE drums and provided to authorize vendor. Hence, no risk of contamination is envisaged.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	The wastewater generated will be treated in STP. Treated water shall be mainly used for green belt development/ plantation, flushing etc. Sewage will not be discharged into the open surface causing the contamination of ground water.
7.3	By deposition of pollutants emitted to air into the land or into water	No	Deposition of dust on land & plants from air due to transportation will be there, both during operational & construction phase but will be minimal. Water sprinkling and good housekeeping shall be regularly carried out.
7.4	From any other sources	No	N.A.
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	There is no risk of long term build up of pollutants in the environment from handling, storage, use or spillage of hazardous materials, discharge of sewage or other effluents to water or the land and by deposition of pollutants emitted to air into the land or into water sources.

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment:

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	No	This is hotel project, does not involve major hazardous construction activity. Hence chances of explosions, spillages, fires are minimal. During construction all construction workers will be provided with suitable personal protective equipment as required under the health & safety norms. Awareness & Training about safety norms will be provided to all the supervisors of construction workers involved in construction activities. No major hazardous waste will be stored within project site.
8.2	From any other causes	No	The major risks involved in the project would be working at different construction heights and mishaps due to human errors, bad construction practices and associated electric hazards. All safety measures will be in place prior to commencement of operations so as to avoid any risk of human life and as per the prevailing local by laws. All safe construction practices & precautionary measures will be adopted and use of PPE will be mandatory. First-aid measures will be provided at site. Adequate fire-fighting arrangements will be done as per National Building Code - 2005

			All applicable IS standards for electricity will be followed in construction phase. Indian Electricity Act of 1910 and rules issued there under revised up to date will be followed.
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	No	As per the secondary data available no such precedents has been reported. However the possibility of such incidents cannot be ruled out. Earthquakes: The project falls under seismic Zone II. Design and architecture of building is earthquake resistant and comply with the required IS Specifications Suitable seismic coefficients in horizontal and vertical directions respectively, are being adopted while designing the structures to minimize the impact of any disaster. Floods: Area is not flood or land slide prone. For effective functioning, pre-monsoon and post-monsoon checks of the drainage structures will be undertaken. The project has planned storm water layout in regards to the peak intensity of the rainfall so far received as recorded by IMD.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality:

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting, utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)	Yes	Net positive impact in terms of overall development of the area will expected from the project. Direct & Indirect Employment opportunities will create due to development of this project. New business opportunities are expected to cater the daily needs of the tourists and visitors of the project. In order to support the project power lines will be drawn, roads will be constructed within the site as well as for access, markets, public health amenities, and conveyance facilities are there in the area. Water supply and sewage systems will be laid extensively.
	• housing development	Yes	The project involves the Construction of 4/5 Star hotel and Convention Center with 220 Rooms, Convention / banquet facilities of 2700 sqm. (Indoor and Outdoor space), meeting rooms, executive lounge and business center, restaurants (4 nos.), health club & Spa. Permissible Height of the project = 45 M. Proposed Height of the project = 43.50 M.
	• extractive industries	No	N.A.
	• supply industries	No	N.A.

	• other	No	--
9.2	Lead to after-use of the site, which could have an impact on the environment	Yes	Negligible increase in traffic and there will be positive impact of socio economic environment.
9.3	Set a precedent for later developments	Yes	The project will lead to development of a hotel project, which will generate number of employment opportunities.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	The cumulative impact due to other projects coming up in the vicinity with effective storm water management, tree plantation and sewer network. This will help in better environmental management.

(III) Environmental Sensitivity

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value.	Yes	Van Vihar National Park: 1.95 km (NW)
2	Areas which are important or sensitive for ecological reasons -Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests.	Yes	Bada Talaab: 2.82 km (N), Chhota Talab: 3.44 (NE), Kaliyasot Dam: 1.10 km (N) Shahpura lake: 3.77 km(E), Kaliyasot River: 5.5 km (S)
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering, migration.	Yes	Van Vihar National Park: 1.95 km (NW)

4	Inland, coastal, marine or underground waters.	No	N.A.
5	State, National boundaries	No	N.A.
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	Yes	National/ State Highway Bhopal-Hoshangabad Road (NH-12) : 5.94 Km (E)
7	Defence installations	No	Not Located Nearby the Area.
8	Densely populated or built-up area	Yes	The project site area near to Bhopal city.
9	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	Yes	There are several medical health care and institutional centers near site. Hospitals: Sharda Hospital :2.4 Km (NE) Hajela Hospital: 3.2 Km (NE) Schools & Institutes: Kamla Nehru Higher Secondry School: 1.8 Km (NE), Delhi Public School: 3.4 km (SW) Kopal Higher Secondary School: 1.4 km (SE), Swami Vivekanand College Science And Technology: 3.8 km (NW) Mosque: 301 m. (W)
10	Areas containing important, high quality or scarce Resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	No	Bada Talaab: 2.82 km (N), Chhota Talab: 3.44 (NE), Kaliyasot Dam: 1.10 km (N) Shahpura lake: 3.77 km(E), Kaliyasot River: 5.5 km (S)

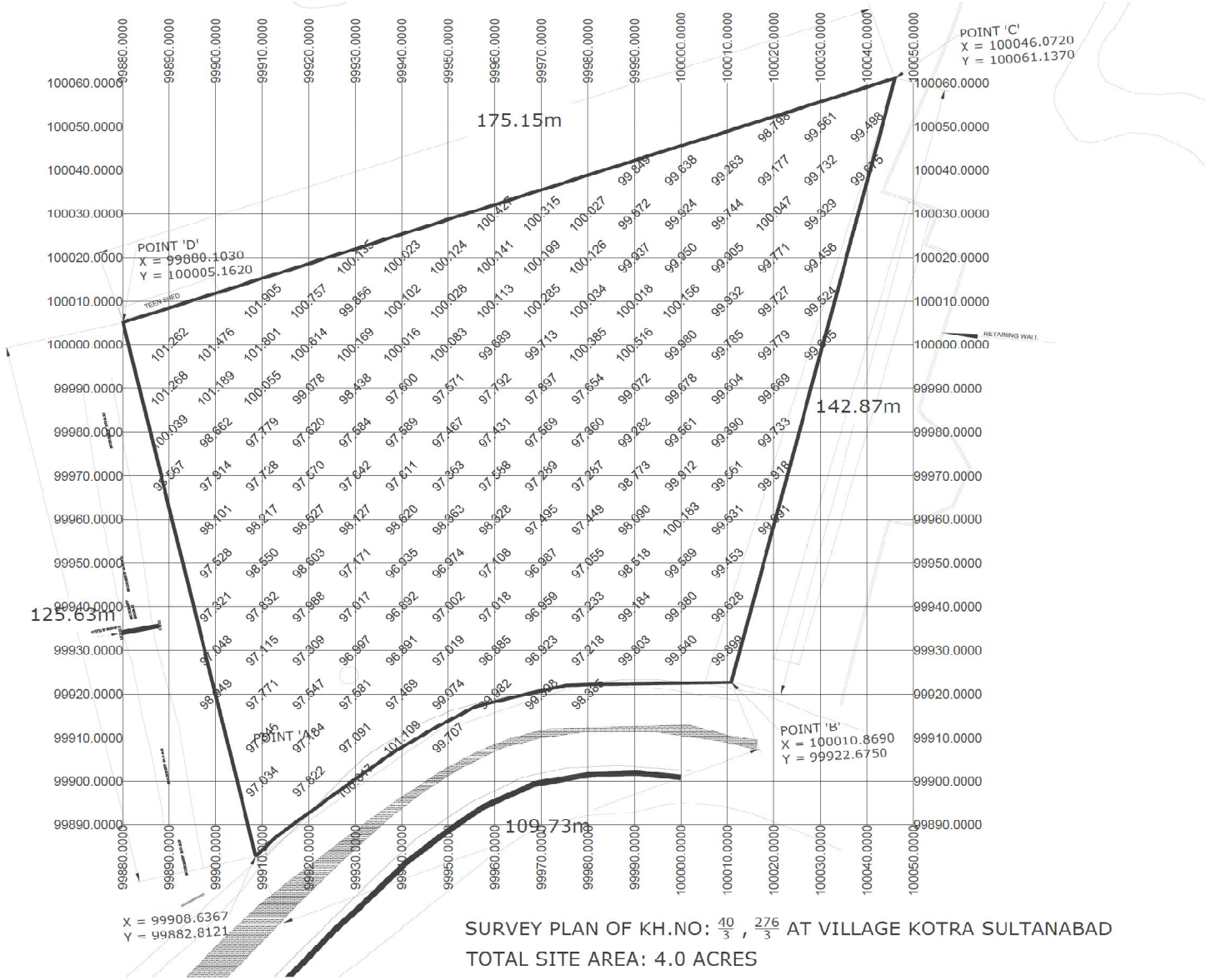
11	Areas already subjected to pollution or environmental damage, *(those where existing legal environmental standards are exceeded)*	No	No critically polluted areas are located within 10 km radius as declared by CPCB.
12	Areas susceptible to natural hazard which could cause the project to present environmental Problems *(earthquakes, subsidence, landslides, erosion, Flooding or extreme or adverse climatic conditions)*	No	The project falls under seismic Zone II. This Zone has been recognized as Low-Hazard one. Suitable seismic coefficients in horizontal and vertical directions will be adopted while designing the structures. There are no possibilities of the proposed project site getting flooded as per records available. Certificate for structure design is attached as **Annexure-III.**

I hereby given undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance give, if any to the project will be revoked at our risk and cost.

Date: 29.12.2017 **FOR GENEX HOTELS PVT. LTD.**

Place: Bhopal **(Project Proponent/Authorized Signatory)**

ANNEXURE-I
CONTOUR MAP



SURVEY PLAN OF KH.NO: $\frac{40}{3}$, $\frac{276}{3}$ AT VILLAGE KOTRA SULTANABAD

TOTAL SITE AREA: 4.0 ACRES

ANNEXURE-II
SOIL TEST REPORT

INFINITE CIVIL SOLUTIONS PVT. LTD.

(GOVERNMENT APPROVED LABORATORY)

Lab.: F. P. 25, Near Aditya Elegance,
CIMS hospital Road, Sola
Ahmedabad – 380 060
Phone: +91 –09725916639,
E-mail: info@inficivil.com

Project : Soil Investigation Report for Genex Hotels Pvt. Ltd., Bhopal

Report No : 16170050

Soil Investigation Report For Genex Hotels Pvt. Ltd., Bhopal

Month : April 2016

INFINITE HOUSE | F. P. - 25, Near Aditya Elegance & Railway Track, CIMS Hospital Road, Sola, Ahmedabad-380 060. | +91 97259 16639 | +91 98980 12321 | info@inficivil.com | www.inficivil.com

INTRODUCTION:

Soil investigation for Proposed Khasra No: 40/3 & 276/3, Village Kotra Sultanabad, Tehsil-Huzur, District-Bhopal was carried out by the Infinite Civil Solutions Pvt. Ltd.

Table 1 Borehole reduced levels

Location	BH No.	Reduce Level
Genex Hotel	P-1	97.770
	P-2	97.230
	P-3	98.320
	P-4	100.050
	P-5	100.110
	P-6	99.740

FIELD TESTS:

1.1.1. Drilling Bore Holes

In soils, boreholes of diameter 150 mm were drilled with the help of rotary drilling machine. The machine was pressed into the soil using pressure. Extension rods were connected to increase the reach of auger inside the borehole, upto the required depth. Any loose soil was carefully removed from the bottom of the borehole so that the penetration test may be performed on undisturbed strata.

1.1.2. Sampling

The soil that was removed during drilling of boreholes was continuously examined for changes in the soil stratification at regular intervals and at levels of change in soil type; samples were collected for further testing in the laboratory. Disturbed soil samples were

collected during drilling operation & from SPT tube. Undisturbed soil samples were collected at required depth in thin wall samples tubes according to IS: 2132.

The sampling tube was pushed into soil by continuous and rapid motion. The tube was then turned at least for two revolutions to shear the sample off at the bottom. Sampling tubes were waxed and sealed at both ends and carefully labeled and transported to laboratory for testing.

1.1.3. Standard Penetration Test

The standard penetration was conducted in boreholes (in soil) following the standard procedure as per IS 2131 which specifies the procedure for conducting SPT for soils. The test was carried out using the standard split spoon sampler to measure the number of blows 'N'.

Standard split spoon sampler was attached to a 'A' rod. It was driven into the soil to a distance of 45 cm using a standard hammer of 63.5 kg falling freely from a height of 75 cm to the required depth. While driving, the number of blows required to penetrate every 15 cm are recorded. The total number of blows required for the last 30 cm is taken as 'N' value at that particular depth of the borehole. This value is then used for calculating the allowable bearing pressure of the soil.

1.1.4. Investigation of Rocky Strata (Rock Coring)

Rock coring was obtained by use of rotary drilling method, because of its ability in detaining higher quality of rock samples. Rock coring was carried out by using diamond bits and Tungsten carbide bits. For better core recovery in hard rock like basalt and granites, diamond bits were used. NX size of bit was used in coring. The drilling operation was conducted by attaching bits to core barrels through reamer shells.

Water was used as the drilling fluid, care was taken to see that water into the hole, be minimum, consistent with adequate removal of cutting from the hole and proper cooling of the bit.

Generally the core barrel was lifted after drilling through 1.50 m. There are two devices commonly used to retain the core as the core barrel is lifted. These are split ring core lifter and basket retainer. On removing the core from the barrel, all pieces of core were put in a partitioned wooden box specially built for the purpose. The ratio of total length of rock pieces collected to length drilled, expressed as percentage and known as core recovery was recorded. To obtain RQD, Rock Quality Designation, only those pieces of rock which were 10mm and longer were measured for their total length. The above length divided by length drilled, expressed as percentage, was recorded as RQD. Values of RQD were found to be less than the values for core recovery. Thus

(a) Core recovery in % = Length of Core/ Length of run x100

(b) RQD in %= Length of core in pieces of 10 cm and above/ Length of run x100

If the core was broken by handling or during drilling (i.e the fracture surface being fresh irregular breaks rather than natural joint surfaces), the fresh broken pieces were fitted together and counted as one pieces. Judgment was used in case of thinly bedded sedimentary rocks and foliated metamorphic rocks and the method. The cores were logged almost immediately upon removing them from the core barrel before air slacking and cracking could begin. The core recovery is an indication of Soundness and degree of weathering of rock.

1.1.5. Ground Water level

During investigations, water table is observed at all borehole locations. However, for calculation of bearing capacities, ground water is assumed at ground level. Borehole wise water levels are presented in below table 2.

Location	BH No.	Depth of water table (m)	Reduce Level (RL,
Genex Hotel	P-1	3.15	94.621
	P-2	0.50	96.733
	P-3	1.70	96.628
	P-4	2.75	97.300
	P-5	2.70	97.410
	P-6	2.50	97.240

1.1.6. Collection of Sample

Samples of Soil and Rock were collected from the boreholes wherever possible as per IS Code of practice. The photographs of rock core samples are given in below figure 4.

BH-P1

BH-P2

BH-P3

		
BH-P4	BH-P5	BH-P6

LABORATORY TEST:

1.2. Tests for Soil:

Undisturbed soil samples were tested in the laboratory for determination of the following characteristics and properties. The entire tests were conducted in accordance with the procedures prescribed in IS: 2720.

- Sieve Analysis (IS 2720 Part 4)
- Atterberg's Limit (IS 2720 Part 5)
- Specific Gravity test (IS 2720 Part 3)
- Shear strength (IS 2720 Part 11)
- Dry/Bulk Density
- Natural Moisture Content (IS 2720 Part 2)
- Free Swell Index (IS 2720 Part 40)

1.3. Tests for Rocks:

Rock samples recovered from various depths of strata were tested for the following properties.

(1) Water absorption (IS : 13030)

(2) Specific gravity (IS : 2720 (Part -3))

(3) Porosity (IS : 13030)

(4) Unconfined Compressive strength (IS 9143)

(5) Core Recovery (IS 11315 Part 11)

(6) RQD (IS 11315 Part 11)

(7) Petrography

The common practice adopted in the field and laboratory testing by & large are as per I S code as indicated below: unless otherwise stated in report.

I.S. CLASSIFICATION

GW: Well graded gravels, gravel-sand mixture or no fines.

GP: Poorly graded gravels or gravel sand mixture, little or no fines.

GM: Silty gravels, poorly graded gravel-sand-silt mixtures.

GC: Clayey gravels, poorly graded gravel-sand-clay mixtures.

SW: Well-graded sands, gravely sands; little or no fines.

SP: Poorly graded sands or gravely sands, little or no fines.

SC: Silty sands, poorly graded sand-silt mixtures.

SC: Clayey sands, poorly graded sand-clay mixtures.

ML: Inorganic silt and very fine sands rock flour; silty or clayey fine sands or clayey silts with non-to low plasticity.

CL: Inorganic clays, gravely clays, sandy clays, silty clays, lean clays of low plasticity.

OL: organic silts and organic silty clay of low plasticity.

MI: Inorganic silts, silty or clayey fine sands or clayey silts of medium plasticity.

CI: Inorganic clays, gravely clays, sandy clays, silty clays, lean clays of medium plasticity.

OI: Organic silts and organic silty clays of medium plasticity.

MH: Inorganic silt of highly compressibility, micaceous or diatomaceous fine sandy or silty soils, elastic silts.

CH: Inorganic clays of high plasticity, fat clays.

OH: Organic Clays of medium to high plasticity.

Pt: Peat and other highly organic soil with very high compressibility.

2. Bearing Capacity Calculation

2.1. Open Foundation for Soil Strata

2.1.1. Calculation of Bearing Capacity On The Basis Of Shear Failure Criteria

The unconfined compressive test is valid for clayey soils only. For soils containing both coarse grained (gravels & sands) and fine grained (clays), c and ϕ are used to determine the soil strength. In case of predominantly fine grained soils, c and ϕ are determined by the Triaxial Compression test as per IS : 2720 Pt XII. For predominantly coarse grained and fine grained soils, c and ϕ are determined by Direct Shear test as per IS; 2720 pt XIII.

These c and ϕ values were used for determining the SBC of soil as per shear failure criteria. Assumptions and formula used in calculation as per IS: 6403-1981 are given below.

The ultimate net bearing capacity in case of general shear failure is given by

$$qd = cN_c s_c d_c i_c + q\,(N_q - 1)\, s_q d_q i_q + \tfrac{1}{2} B \gamma N_\gamma s_\gamma d_\gamma i_\gamma W$$

Where

c = Cohesion

q = Effective surcharge at base of fdn (kgf/cm²)

B = Width of footing (cm)

γ = Bulk unit weight of foundation soil (kgf/cm³)

W' = Correction factor for location of water table

Ø = Angle of shearing resistance of soil in degrees

N_c = Bearing Capacity Factor

N_q = Bearing Capacity Factor

N_γ = Bearing Capacity Factor

s_c = Shape factor

s_q = Shape factor

s_γ = Shape factor

d_c = Depth Factor

d_q = Depth Factor

d_γ = Depth Factor

i_c = Inclination Factor

i_q = Inclination Factor

i_γ = Inclination Factor

2.1.2. Calculation of Bearing Capacity on the Basis of Settlement Criteria

2.1.2.1. Settlement Criteria for Cohesion less Soils

The method mentioned in IS: 8009 (Pt-I) is being referred for calculation of settlement of foundation. The assumptions used in calculation of S.B.C. are given below:

The average N values within the effective zone of pressure bulb up to 1.5 times the width of foundation (B) have been considered for calculation. While computing the average 'N' values (as per IS; 6403-1981), then any individual value more than 50% greater than the average shall be neglected but the N values for loose seams shall be included. Correction for overburden & dilatancy is applied to the observed N value to arrive at N' & N''.

2.1.2.2. Settlement Criteria for Cohesive Soils

Total Settlement in case of cohesive soil is given as

Total Settlement $S_f = S_i + S_c$

Where

S_i = Immediate Settlement

S_c= Consolidation Settlement

Immediate Settlement in Cohesive Layer (S_i)

$= p B (1 - \mu^2) I / E$

Where

p = Foundation Pressure (kg/cm²)

B = Width of footing (cm)

μ = Poisson's ratio

I = Influence factor from Fig 11 [IS 8009 (Part 1)]

E = Young's Modulus of elasticity (kg/cm²)

Consolidation Settlement in Pre-Compressed Cohesive Layer (Sc)

$= \lambda \Delta p \times m_v \times H$

Where

Δp = Pressure increment in kg/cm² [obtained from B-1.3 and Fig 17, IS 8009 Part 1]
= p x IB x number of Influence Areas (kg/cm²)

mv = Coefficient of volume (cm²/kg)

H = Thickness of compressible stratum from foundation level (cm)

λ = A Factor related to pore pressure parameter

Consolidation settlement is considered only of the soil is saturated and the water table is above foundation level. In case where the soil is not fully saturated and the water table is much below the founding level, no consolidation settlement is considered.

Estimation of shear parameters in hard clay

In cases where hard clay with SPT values Ns > 30 is encountered, collection if UDS sample is not possible. In such cases, the shear parameters are recommended based on our previous

experience in such strata and available published literature using correlation of shear parameters and SPT values. Reference for equivalent cohesion values from SPT has been taken from "Foundation Analysis & Design" by J. Bowles, 4th Edition, page 142. As per Bowles reference, qu = k * N in ksf where k = 0.25 and N= SPT value

"Foundation Design Manual" by Naik also gives a correlation between SPT values and cohesion which is q_u = N / 7.5 Kg/cm^2 which gives similar values as Bowles.

2.1.2.3. Allowable Bearing Pressure

Considering the proposed structure and taking into account the 'N' values, an allowable settlement of 50 mm has been adopted for evaluating the net allowable bearing capacity, based on the settlement criterion.

Average shear strength parameters have been used for calculating safe bearing capacity from shear failure criterion as per IS: 6403-1981 by using of 2.5 as factor of safety.

Lower of the two values obtained from settlement and shear criteria is used in arriving at net allowable bearing capacity of the soil.

2.2. Open foundation on the basis of rock core strength

The method mentioned in IS: 12070 is being referred for calculation of S.B.C. are given below: Where the rock is sound the strength of the foundation rock is generally much in excess of design requirement. The safe bearing pressure should be estimated from the equation:

$$Q_B = q_0 N_j$$

Where

Q_B = safe bearing pressure (gross)

q_o = average uniaxial compressive strength of rock cores

Nj = empirical coefficient depending on the spacing of discontinuities

$$= \frac{3 + \frac{S}{B_f}}{10\sqrt{1 + 300\frac{\delta}{S}}}$$

Where,

δ = thickness of discontinuities in cm

S = spacing of discontinuities in cm

B_f = footing width in cm

(where equation include a factor of safety of 2.5.)

2.2.1. Calculation of bearing capacity on the basis of rock RMR

Rock Mass Rating may also be used to give net allowable pressure as per IS 12070 table -3.To applies the geomechanics classification system, a site should be divided into a number of geological structural units. The rock mass rating (RMR) should be determined as algebraic sum of rating for all the rating for all the parameter given in Item to I to VI after adjustment for orientation of discontinuities given in item VII of Annex B of IS 13365 part-I. The sum of Item II to V is called Rock condition Rating (RCR) which discounts the effect of compressive strength of intact rock material and orientation of Joints. This is called RMR.

OBSERVATION

- In borehole P1, Top 3.0 m depth is brown colored clay in stiff consistency. This is followed by brown colored clayey sand in dense to very dense state. Below 4.45 to 15.0 m depth is grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5.
- In borehole P2, Top 4.0 m depth is brown colored clay in stiff to hard consistency. This is followed by brown colored clayey sand in medium state. Below 4.45 to 15.0 m depth is grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5.
- In borehole P3, Top 5.0 m depth is brown colored clay in medium to very stiff consistency. This is followed by brown colored sand in dense state. Below 5.45 to 7.0 m depth is weathered rock recovered as fragmented rock pieces. This is followed by brown colored sand in dense state. Below 7.45 to 12.0 m depth is grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5.
- In borehole P4, Top 4.5 m depth is dark brown colored clay in very stiff to hard consistency. This is followed by weathered rock recovered as fragmented rock pieces with poor core recovery. Below 6.0 to 15.0 m depth is yellowish gray colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5.
- In borehole P5, Top 4.45 m depth is light brown colored clay in hard consistency. This is followed by grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5. Below 7.0 to 8.0 m depth is weathered rock recovered as fragmented rock pieces. This is followed by grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5.

- In borehole P6, Top 5.0 m depth is light brown colored clay in very stiff to hard consistency. This is followed by light brown colored clayey sand in very dense state. Below 6.0 to 6.45 m depth is light brown colored silty sand in very dense state. This is followed by grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5.
- Detailed description of the strata encountered at each bore hole location is presented in the bore log along with their properties and other test parameters are attached with this report.
- The foundation can be placed at 6.5 m depth below bed level on weathered rock. SBC is calculated based on C = 0 and Ø = 35 for highly weathered and fragmented rock where RQD nil. The recommended founding size and the bearing capacity will be as follows:

Sr. No.	Size of Foundation	Recommended Bearing Capacity (t/m^2)
1	2.0 x 2.0 m	38
2	2.5 x 2.5 m	40
3	3.0 x 3.0 m	42
4	3.5 x 3.5 m	45
5	4.0 x 4.0 m	47
6	4.5 x 4.5 m	50

- The detail calculations for footing size 2.0 m x 2.0 m is presented in this report. The bearing capacity has been conservatively reduced.

Calculations (2.0 x 2.0 m):

Ultimate Bearing Capacity (for General Failure) q_d

$= c\ Nc\ sc\ dc\ ic + q\ (Nq - 1)\ sq\ dq\ iq + ½\ B\ \gamma\ N\gamma\ s\gamma\ d\gamma\ i\gamma\ W$

$= 0 \times 46.12 \times 1.2 \times 1.288 \times 1 + 0.1425 \times (33.3 - 1) \times 1.2 \times 1.144 \times 1 + 0.5 \times 200 \times 0.00195$

$\times 48.03 \times 0.6 \times 1.144 \times 1 \times 0.5$

$= 0 + 6.319 + 3.214$

$= 9.533\ Kg/cm^2$

$= 95.33\ T/m^2$

Where

c = Cohesion = 0 kgf/cm²

q = Effective surcharge at base of fdn = 0.1425 kgf/cm²

B = Width of footing = 200 cm

γ = Bulk unit weight of foundation soil = 0.00195 Kgf/cm³

W' = Correction factor for location of water table = 0.5

Ø = Angle of shearing resistance of soil in degrees = 35

Nc = Bearing Capacity Factor = 46.12

Nq = Bearing Capacity Factor = 33.30

Nγ = Bearing Capacity Factor = 48.03

sc = Shape factor = 1.2

sq = Shape factor = 1.2

sγ = Shape factor = 0.6

dc = Depth Factor = 1.288

dq = Depth Factor = 1.144

dγ = Depth Factor = 1.144

ic = Inclination Factor = 1

iq = Inclination Factor = 1

i_γ = Inclination Factor = 1

Safe Bearing Capacity

= 38.13 T/m² [Considering a Safety Factor of 2.5]

Settlement Calculation

Settlement in Non-Cohesive Layer

[from graph - Fig 9 (IS 8009 Part 1 - 1976)], for Width 'B' = 2 m and N = 100, Settlement

= 3.8 mm (per Kg/cm² of Pressure) x 3.81 Kg/cm² (Foundation Pressure) / 0.5 (Correction for Water Table at 1.5 m above Foundation Level)

= 28.96 mm

Total Settlement

Sf = S1

= 28.96

= 28.96 mm

Applying Correction for Effect of Depth of Foundation

Sfd = Sf × Depth Factor

= 28.96 × 0.78

= 22.58 mm

Where

Depth Factor = 0.78 [from Fox's Correction Curves (Fig 12, IS 8009) for D / √(L B) = 0.75 and L /B = 1]

Allowable Bearing Capacity

= 38.1 T/m².

TABLE - 1

FIELD PROGRAMME OF TESTS

Project :GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner :Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Location of Bore Hole : RL of Ground Level (mt): 97.77

Depth in mts.	Visual Soil Description	Field Tests		Remarks
00.00	Brown colored clay in stiff consistency		DS	
01.00		SPT		N=12
02.00			UDS	C=0.73 , Phi=13.48
03.00	Brown colored clayey sand in dense to very dense state	SPT		N=34
04.00		SPT		N=55
04.45	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE	CR/RQD=5
05.00			DS	
05.50			CORE	CR/RQD=2
06.00			DS	
06.50			CORE	CR/RQD=5
07.00			DS	
07.50			CORE	CR/RQD=21
08.00			DS	
08.50			CORE	CR/RQD=19/12
09.00			DS	
09.50			CORE	CR/RQD=27
10.00			DS	
10.50			CORE	CR/RQD=29
11.00			DS	
11.50			CORE	CR/RQD=46
12.00			DS	
12.50			CORE	CR/RQD=25
13.00			DS	
13.50			CORE	CR/RQD=33
14.00			DS	
14.50			CORE	CR/RQD=34/20
15.00			DS	

TABLE - 2

LABORATORY PROGRAMME

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Depth Type of Sample	N. M. C.	Density	Specific Gravity	Particle Size Analysis	Atterberg Limits	Shrinkage Limit / Free Swell	Shear Test (UCC/Trx/ Box/Vane)	Other Tests
1.00/S				Part	Yes	FRS		
2.00/U	Yes	Yes	Yes	Part	Yes	FRS	TRX	
3.00/S				Part	Yes	FRS		
4.00/S				Part	Yes	FRS		
4.50/C							UCS	
5.50/C							UCS	
6.50/C							UCS	
7.50/C							UCS	
8.50/C							UCS	
9.50/C							UCS	
10.50/C							UCS	
11.50/C							UCS	
12.50/C							UCS	
13.50/C							UCS	
14.50/C							UCS	

TABLE - 3

RESULTS OF STANDARD PENETRATION TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Depth in mts.	No. of Blows for Penetration			Ns (Blows /300 mm)	Nc(Corrected value of Ns)	N. M. C. (in %)
	0 - 150 mm	150 - 300 mm	300 - 450 mm			
1.00	03	05	07	12	12	
3.00	07	15	19	34	34	
4.00	18	20	35	55	55	

TABLE - 4

INSITU DENSITY, MOISTURE CONTENT, DRY DENSITY & SPECIFIC GRAVITY

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Depth Sample (mts.)	Bulk Density in gms/cc	Natural Moisture Content (%)	Dry Density in gms/cc	Specific Gravity	Saturation
2.00	1.99	26.55	1.57	2.55	1.08

TABLE - 5

PARTICLE SIZE ANALYSIS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425µ)	(425 - 75 µ)	
0.00 to 3.00	1.00/S	2	4	6	12	76
0.00 to 3.00	2.00/U	4	9	9	11	67
3.00 to 4.45	3.00/S	14	12	18	12	44
3.00 to 4.45	4.00/S	8	16	10	18	48

TABLE - 5A

PARTICLE SIZE DISTRIBUTION

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Depth Type of Sample		Soil Strata	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
				Coarse (4.75 - 2 mm)	Medium (2mm - 425µ)	Fine (425 - 75 µ)	
1.00/S		0.00 to 3.00	2	4	6	12	76
2.00/U		0.00 to 3.00	4	9	9	11	67
3.00/S		3.00 to 4.45	14	12	18	12	44
4.00/S		3.00 to 4.45	8	16	10	18	48

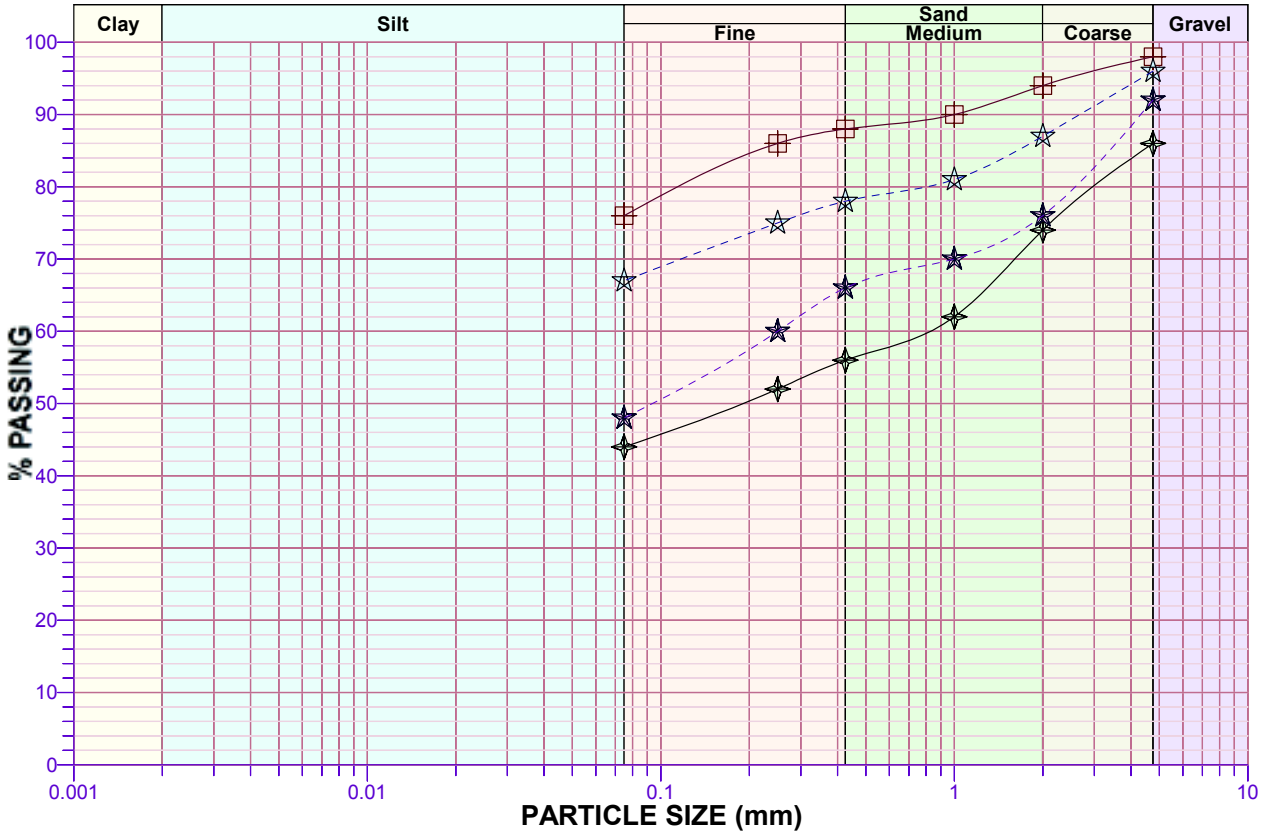


TABLE - 6

ATTERBERG LIMITS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Soil Strata	Depth Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Shrinkage Limit	Freeswell Index	I.S. Classi-fication
0.00 to 3.00	1.00/S	41	18	23		42	CI
0.00 to 3.00	2.00/U	40	19	21		39	CI
3.00 to 4.45	3.00/S	41	17	24		37	SC
3.00 to 4.45	4.00/S	38	20	18		42	SC

TABLE - 7B

TRIAXIAL SHEAR TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : Bhopal 5 Star Hotel - R0

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm²)	Pore Pressure (Kg/cm²)	Shear Values from Graph	
					Cuu (Kg/cm²)	Øuu (Kg/cm²)
2.00	Undisturbed	2.50	0.50	0.00	0.73	13.48
	Undisturbed	4.42	1.50	0.00		
	Undisturbed	5.71	2.50	0.00		

MODIFIED SHEAR GRAPH

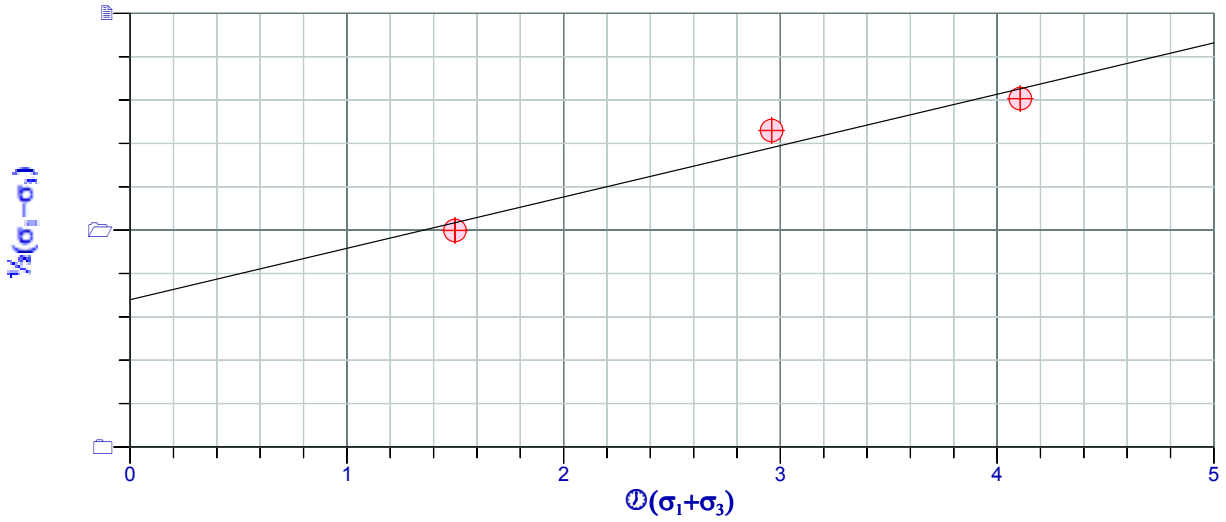


TABLE - 11

PROPERTIES OF ROCK

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P1-LHS

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm²)
4.50	5.00		1.35	2.61	
5.50	2.00		31.10	2.74	
6.50	5.00		27.26	2.70	
7.50	21.00		31.66	2.60	
8.50	19.00	12.00	24.92	2.60	200.24
9.50	27.00		31.05	2.72	
10.50	29.00		14.90	2.73	
11.50	46.00		16.61	2.78	
12.50	25.00		19.85	2.68	
13.50	33.00		19.11	2.76	
14.50	34.00	20.00	17.16	2.72	235.97

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Name of Project : GENEX Hotels Pvt. Ltd.

Depth of Water Table : 3.15 mts from Ground Level

Bore Hole Start Date : 09-04-16

R.L. of Borehole : 97.771

Structure No./Ch :

Bore Hole No : P1-LHS

Bore Hole End Date : 15-04-16

Method of Drilling : Rotary Drilling

Depth in metres	I. S. Classification	Visual Soil Description	Water Table	Nature of Sample	Ns No. of Blows per 300 mm	Core Recovery %	RQD %	Water Absorption %	Specific Gravity	Dry Density (g/cc)	Porosity %	Crus.Streng Point Load Index	Crus.Streng Uniaxl Streng kg/cm²	Particle Size Analysis Gravl %	Sand in % Coar	Sand in % Med	Sand in % Fine	Silt+ Clay %	Atterberg Limits LL %	Atterberg Limits PL %	Atterberg Limits PI %	Remarks
00.00		Brown colored clay in stiff consistency		DS																		
01.00	CI			SPT	12									2	4	6	12	76	41	18	23	
02.00				UDS					2.55	1.57	38.48			4	9	9	11	67	40	19	21	C=0.73 , Phi=13.48
03.00	SC	Brown colored clayey sand in dense to very dense state	WT	SPT	34									14	12	18	12	44	41	17	24	
04.00				SPT	55									8	16	10	18	48	38	20	18	
04.45		Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE		5		1.35	2.61	2.52	3.41											
05.00				DS																		
05.50				CORE		2		31.10	2.74	1.48	46.04											
06.00				DS																		
06.50				CORE		5		27.26	2.70	1.56	42.42											
07.00				DS																		
07.50				CORE		21		31.66	2.60	1.43	45.11											
08.00				DS																		
08.50				CORE		19	12	24.92	2.60	1.58	39.30		200.2									
09.00				DS																		
09.50				CORE		27		31.05	2.72	1.48	45.81											
10.00				DS																		
10.50				CORE		29		14.90	2.73	1.94	28.88											
11.00				DS																		
11.50				CORE		46		16.61	2.78	1.90	31.51											
12.00				DS																		
12.50				CORE		25		19.85	2.68	1.75	34.71											
13.00				DS																		
13.50				CORE		33		19.11	2.76	1.81	34.50											
14.00				DS																		
14.50				CORE		34	20	17.16	2.72	1.85	31.79		236.0									
15.00				DS																		

CLIENT :- Dilip Buildcon Limited

LABORATORY :- Infinite Civil Solutions Pvt. Ltd.

TABLE - 1

FIELD PROGRAMME OF TESTS

Project : GENEX Hotels Pvt. Ltd. — Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. — Bore Hole No. : P2-LHS

Location of Bore Hole : — RL of Ground Level (mt): 97.23

Depth in mts.	Visual Soil Description	Field Tests		Remarks
00.00	Brown colored clay in stiff to hard consistency		DS	
01.00		SPT		N=14
02.00			UDS	C=0.88 , Phi=11.02
03.00		SPT		N=31
04.00	Brown colored clayey sand in medium state	SPT		N=22
04.45	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE	CR/RQD=14
05.00			DS	
05.50			CORE	CR/RQD=20
06.00			DS	
06.50			CORE	CR/RQD=20
07.00			DS	
07.50			CORE	CR/RQD=18
08.00			DS	
08.50			CORE	CR/RQD=25
09.00			DS	
09.50			CORE	CR/RQD=22
10.00			DS	
10.50			CORE	CR/RQD=30
11.00			DS	
11.50			CORE	CR/RQD=51/47
12.00			DS	
12.50			CORE	CR/RQD=86/64
13.00			DS	
13.50			CORE	CR/RQD=77/58
14.00			DS	
14.50			CORE	CR/RQD=54/27
15.00			DS	

TABLE - 2

LABORATORY PROGRAMME

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Depth Type of Sample	N. M. C.	Density	Specific Gravity	Particle Size Analysis	Atterberg Limits	Shrinkage Limit / Free Swell	Shear Test (UCC/Trx/ Box/Vane)	Other Tests
1.00/S				Part	Yes	FRS		
2.00/U	Yes	Yes	Yes	Part	Yes	FRS	TRX	
3.00/S				Part	Yes	FRS		
4.00/S				Part	Yes	FRS		
4.50/C							UCS	
5.50/C							UCS	
6.50/C							UCS	
7.50/C							UCS	
8.50/C							UCS	
9.50/C							UCS	
10.50/C							UCS	
11.50/C							UCS	
12.50/C							UCS	
13.50/C							UCS	
14.50/C							UCS	

TABLE - 3

RESULTS OF STANDARD PENETRATION TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Depth in mts.	No. of Blows for Penetration			Ns (Blows /300 mm)	Nc(Corrected value of Ns)	N. M. C. (in %)
	0 - 150 mm	150 - 300 mm	300 - 450 mm			
1.00	04	05	09	14	14	
3.00	11	14	17	31	31	
4.00	06	08	14	22	22	

TABLE - 4

INSITU DENSITY, MOISTURE CONTENT, DRY DENSITY & SPECIFIC GRAVITY

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Depth Sample (mts.)	Bulk Density in gms/cc	Natural Moisture Content (%)	Dry Density in gms/cc	Specific Gravity	Saturation
2.00	1.86	16.89	1.59	2.62	0.68

TABLE - 5

PARTICLE SIZE ANALYSIS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425µ)	(425 - 75 µ)	
0.00 to 4.00	1.00/S	6	6	4	10	74
0.00 to 4.00	2.00/U	10	5	10	13	62
0.00 to 4.00	3.00/S	20	2	10	12	56
4.00 to 4.45	4.00/S	4	4	16	38	38

TABLE - 5A

PARTICLE SIZE DISTRIBUTION

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Depth Type of Sample	Soil Strata	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			Coarse (4.75 - 2 mm)	Medium (2mm - 425µ)	Fine (425 - 75 µ)	
1.00/S	0.00 to 4.00	6	6	4	10	74
2.00/U	0.00 to 4.00	10	5	10	13	62
3.00/S	0.00 to 4.00	20	2	10	12	56
4.00/S	4.00 to 4.45	4	4	16	38	38

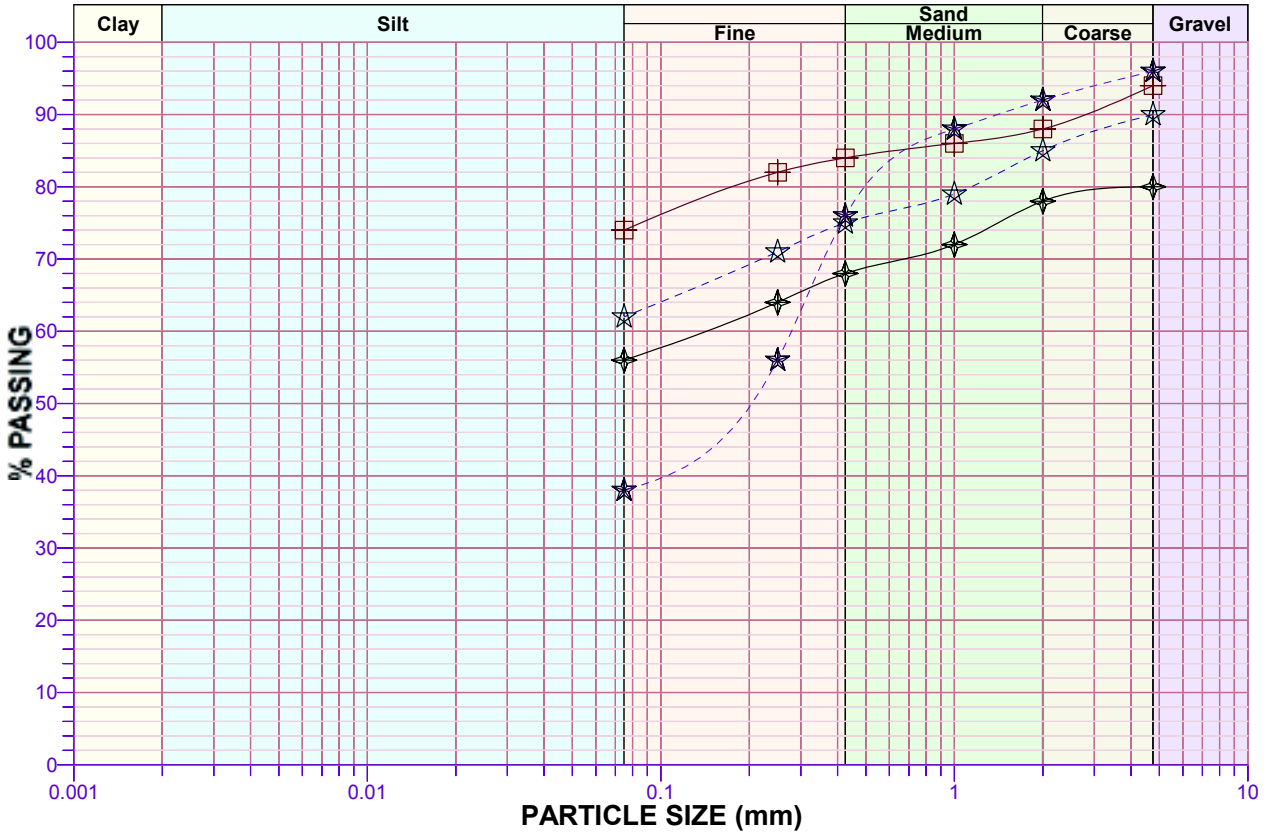


TABLE - 6

ATTERBERG LIMITS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Soil Strata	Depth Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Shrinkage Limit	Freeswell Index	I.S. Classi-fication
0.00 to 4.00	1.00/S	39	18	21		20	CI
0.00 to 4.00	2.00/U	39	18	21		39	CI
0.00 to 4.00	3.00/S	49	20	29		39	CI
4.00 to 4.45	4.00/S	35	18	17		21	SC

TABLE - 7B

TRIAXIAL SHEAR TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : Bhopal 5 Star Hotel - R0

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm²)	Pore Pressure (Kg/cm²)	Shear Values from Graph	
					Cuu (Kg/cm²)	Øuu (Kg/cm²)
2.00	Undisturbed	2.69	0.50	0.00	0.88	11.02
	Undisturbed	4.52	1.50	0.00		
	Undisturbed	5.64	2.50	0.00		

MODIFIED SHEAR GRAPH

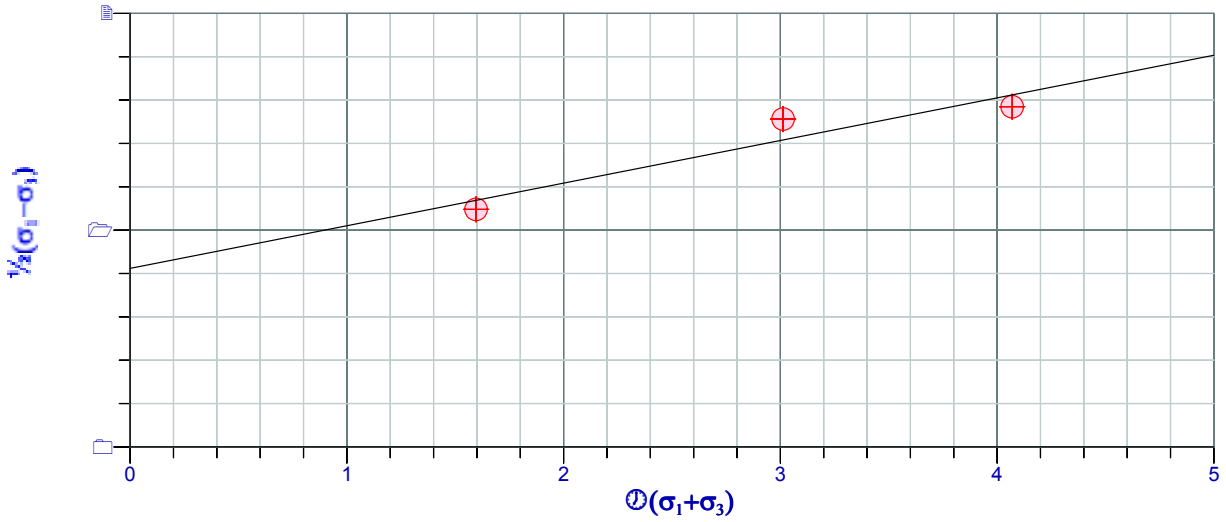


TABLE - 11

PROPERTIES OF ROCK

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P2-LHS

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm²)
4.50	14.00		15.21	2.65	
5.50	20.00		13.11	2.75	
6.50	20.00		6.31	2.71	
7.50	18.00		6.54	2.75	
8.50	25.00		5.20	2.70	
9.50	22.00		6.38	2.81	
10.50	30.00		6.24	2.83	
11.50	51.00	47.00	10.48	2.95	199.65
12.50	86.00	64.00	15.98	2.89	203.20
13.50	77.00	58.00	10.08	2.86	
14.50	54.00	27.00	8.94	2.93	220.32

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Name of Project : GENEX Hotels Pvt. Ltd.

Depth of Water Table : 0.50 mts from Ground Level

Bore Hole Start Date : 01-04-16

R.L. of Borehole : 97.233

Structure No./Ch :

Bore Hole No : P2-LHS

Bore Hole End Date : 05-04-16

Method of Drilling : Rotary Drilling

Depth in metres	I. S. Classification	Visual Soil Description	Water Table	Nature of Sample	Ns No. of Blows per 300 mm	Core Recovery %	RQD %	Water Absorption %	Specific Gravity	Dry Density (g/cc)	Porosity %	Crus.Streng Point Load Index	Crus.Streng Uniaxl Streng kg/cm²	Particle Size Analysis Gravl %	Sand in % Coar	Sand in % Med	Sand in % Fine	Silt+ Clay %	Atterberg Limits LL %	Atterberg Limits PL %	Atterberg Limits PI %	Remarks
00.00		Brown colored clay in stiff to hard consistency	WT	DS																		
01.00				SPT	14									6	6	4	10	74	39	18	21	
02.00	CI			UDS					2.62	1.59	39.39			10	5	10	13	62	39	18	21	C=0.88 , Phi=11.02
03.00				SPT	31									20	2	10	12	56	49	20	29	
04.00	SC	Brown colored clayey sand in medium		SPT	22									4	4	16	38	38	35	18	17	
04.45		Greyish colored fine to medium grained		CORE		14		15.21	2.65	1.89	28.70											
05.00		volcanic igneous rock known as basalt		DS																		
05.50		rock with the hardness is 5.0-5.5		CORE		20		13.11	2.75	2.02	26.48											
06.00				DS																		
06.50				CORE		20		6.31	2.71	2.32	14.61											
07.00				DS																		
07.50				CORE		18		6.54	2.75	2.33	15.24											
08.00				DS																		
08.50				CORE		25		5.20	2.70	2.36	12.30											
09.00				DS																		
09.50				CORE		22		6.38	2.81	2.38	15.21											
10.00				DS																		
10.50				CORE		30		6.24	2.83	2.40	14.99											
11.00				DS																		
11.50				CORE		51	47	10.48	2.95	2.26	23.54		199.7									
12.00				DS																		
12.50				CORE		86	64	15.98	2.89	1.97	31.56		203.2									
13.00				DS																		
13.50				CORE		77	58	10.08	2.86	2.22	22.41											
14.00				DS																		
14.50				CORE		54	27	8.94	2.93	2.32	20.68		220.3									
15.00				DS																		

CLIENT :- Dilip Buildcon Limited

LABORATORY :- Infinite Civil Solutions Pvt. Ltd.

TABLE - 1

FIELD PROGRAMME OF TESTS

Project : GENEX Hotels Pvt. Ltd. — Project No. : 16170050
Owner : Infinite Civil Solutions Pvt. Ltd. — Bore Hole No. : P3-LHS
Location of Bore Hole : — RL of Ground Level (mt): 98.33

Depth in mts.	Visual Soil Description	Field Tests		Remarks
00.00	Brown colored clay in medium to very stiff consistency		DS	
01.00		SPT		N=06
02.00			UDS	C=0.77 , Phi=13.52
03.00		SPT		N=19
04.00			UDS	
05.00	Brown colored sand in dense state	SPT		N=32
05.45	Weathered rock recovered as fragmented rock pieces		CORE	CR/RQD=20
06.00			DS	
07.00	Brown colored sand in dense state	SPT		N=32
07.45	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE	CR/RQD=9
08.00			DS	
08.50			CORE	CR/RQD=17
09.00			DS	
09.50			CORE	CR/RQD=42
10.00			DS	
10.50			CORE	CR/RQD=65/33
11.00			DS	
11.50			CORE	CR/RQD=55/55
12.00			DS	

TABLE - 2

LABORATORY PROGRAMME

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Depth Type of Sample	N. M. C.	Density	Specific Gravity	Particle Size Analysis	Atterberg Limits	Shrinkage Limit / Free Swell	Shear Test (UCC/Trx/ Box/Vane)	Other Tests
1.00/S				Part	Yes	FRS		
2.00/U	Yes	Yes	Yes	Part	Yes	FRS	TRX	
3.00/S				Part	Yes	FRS		
4.00/U				Part	Yes	FRS		
5.00/S				Part	Yes			
5.50/C							UCS	
7.00/S				Part	Yes			
7.50/C							UCS	
8.50/C							UCS	
9.50/C							UCS	
10.50/C							UCS	
11.50/C							UCS	

TABLE - 3

RESULTS OF STANDARD PENETRATION TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Depth in mts.	No. of Blows for Penetration			Ns (Blows /300 mm)	Nc(Corrected value of Ns)	N. M. C. (in %)
	0 - 150 mm	150 - 300 mm	300 - 450 mm			
1.00	02	03	03	06	06	
3.00	04	04	15	19	19	
5.00	05	11	21	32	32	
7.00	09	13	19	32	28	

TABLE - 4

INSITU DENSITY, MOISTURE CONTENT, DRY DENSITY & SPECIFIC GRAVITY

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Depth Sample (mts.)	Bulk Density in gms/cc	Natural Moisture Content (%)	Dry Density in gms/cc	Specific Gravity	Saturation
2.00	1.83	18.32	1.55	2.56	0.71

TABLE - 5

PARTICLE SIZE ANALYSIS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425µ)	(425 - 75 µ)	
0.00 to 5.00	1.00/S	6	12	12	14	56
0.00 to 5.00	2.00/U	5	8	11	23	53
0.00 to 5.00	3.00/S	8	10	14	16	52
0.00 to 5.00	4.00/U	10	6	12	14	58
5.00 to 5.45	5.00/S	12	20	42	8	18
7.00 to 7.45	7.00/S	10	20	26	28	16

TABLE - 5A

PARTICLE SIZE DISTRIBUTION

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Depth Type of Sample	Soil Strata	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			Coarse (4.75 - 2 mm)	Medium (2mm - 425µ)	Fine (425 - 75 µ)	
1.00/S	0.00 to 5.00	6	12	12	14	56
2.00/U	0.00 to 5.00	5	8	11	23	53
3.00/S	0.00 to 5.00	8	10	14	16	52
4.00/U	0.00 to 5.00	10	6	12	14	58
5.00/S	5.00 to 5.45	12	20	42	8	18
7.00/S	7.00 to 7.45	10	20	26	28	16

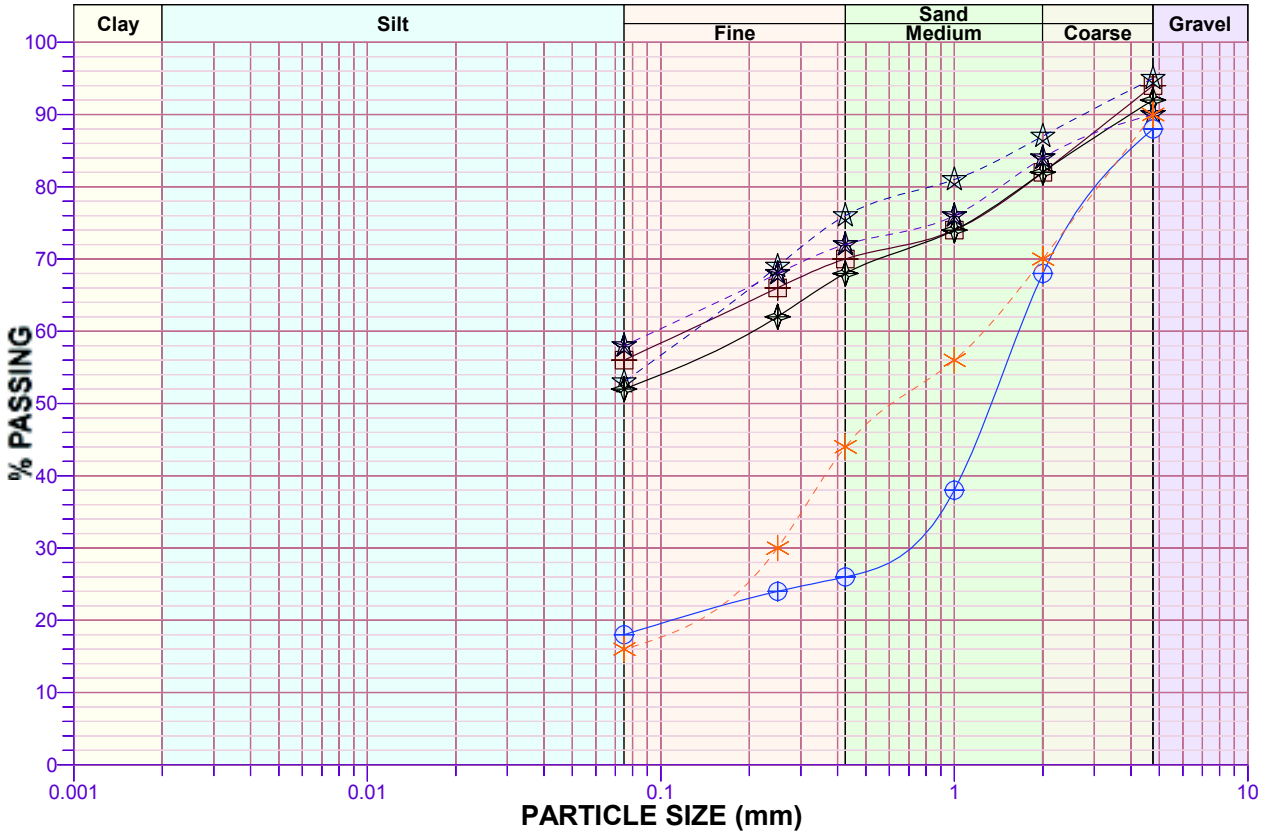


TABLE - 6

ATTERBERG LIMITS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Soil Strata	Depth Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Shrinkage Limit	Freeswell Index	I.S. Classi-fication
0.00 to 5.00	1.00/S	32	15	17		28	CL
0.00 to 5.00	2.00/U	29	16	13		22	CL
0.00 to 5.00	3.00/S	32	17	15		29	CL
0.00 to 5.00	4.00/U	31	18	13		20	CL
5.00 to 5.45	5.00/S	22	-	-			SM
7.00 to 7.45	7.00/S	35	-	-			SM

TABLE - 7B

TRIAXIAL SHEAR TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : Star Hotel - R0

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm²)	Pore Pressure (Kg/cm²)	Shear Values from Graph	
					Cuu (Kg/cm²)	Øuu (Kg/cm²)
2.00	Undisturbed	2.53	0.50	0.00	0.77	13.52
	Undisturbed	4.60	1.50	0.00		
	Undisturbed	5.75	2.50	0.00		

MODIFIED SHEAR GRAPH

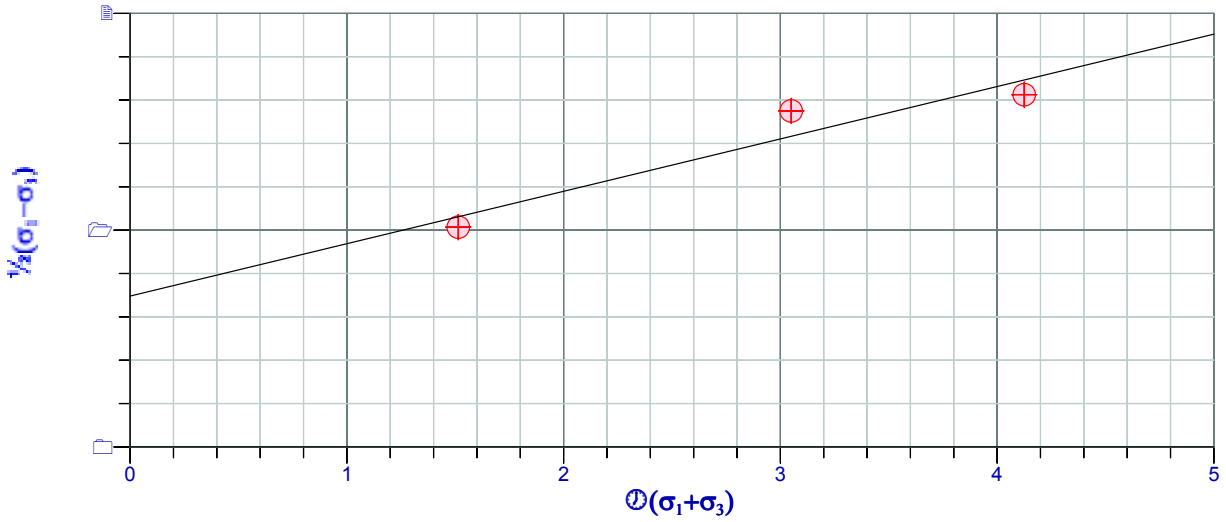


TABLE - 11

PROPERTIES OF ROCK

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P3-LHS

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm²)
5.50	20.00		1.78	2.77	
7.50	9.00		21.26	2.73	
8.50	17.00		9.75	2.72	
9.50	42.00		7.92	2.75	
10.50	65.00	33.00	6.35	2.78	215.68
11.50	55.00	55.00	7.57	2.75	280.55

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Name of Project : GENEX Hotels Pvt. Ltd.

Depth of Water Table : 1.70 mts from Ground Level

Bore Hole Start Date : 06-04-16

R.L. of Borehole : 98.328

Structure No./Ch :

Bore Hole No : P3-LHS

Bore Hole End Date : 08-04-16

Method of Drilling : Rotary Drilling

Depth in metres	I. S. Classification	Visual Soil Description	Water Table	Nature of Sample	Ns No. of Blows per 300 mm	Core Recovery %	RQD %	Water Absorption %	Specific Gravity	Dry Density (g/cc)	Porosity %	Crus.Streng Point Load Index	Crus.Streng Uniaxl Streng kg/cm²	Particle Size Analysis Gravl %	Sand in % Coar	Sand in % Med	Sand in % Fine	Silt+ Clay %	Atterberg Limits LL %	Atterberg Limits PL %	Atterberg Limits PI %	Remarks
00.00	CL	Brown colored clay in medium to very stiff consistency		DS																		
01.00			WT	SPT	06									6	12	12	14	56	32	15	17	
02.00				UDS					2.56	1.55	39.69			5	8	11	23	53	29	16	13	C=0.77 , Phi=13.52
03.00				SPT	19									8	10	14	16	52	32	17	15	
04.00				UDS										10	6	12	14	58	31	18	13	
05.00	SM	Brown colored sand in dense state		SPT	32									12	20	42	8	18	22	-	-	
05.45				CORE		20		1.78	2.77	2.64	4.70											
05.50		Weathered rock recovered as fragmented rock pieces																				
06.00				DS																		
07.00	SM	Brown colored sand in dense state		SPT	32									10	20	26	28	16	35	-	-	
07.45				CORE		9		21.26	2.73	1.73	36.68											
07.50		Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5																				
08.00				DS																		
08.50				CORE		17		9.75	2.72	2.15	20.98											
09.00				DS																		
09.50				CORE		42		7.92	2.75	2.26	17.88											
10.00				DS																		
10.50				CORE		65	33	6.35	2.78	2.37	15.02		215.7									
11.00				DS																		
11.50				CORE		55	55	7.57	2.75	2.28	17.23		280.6									
12.00				DS																		

CLIENT :- Dilip Buildcon Limited

LABORATORY :- Infinite Civil Solutions Pvt. Ltd.

TABLE - 1

FIELD PROGRAMME OF TESTS

Project :GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner :Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Location of Bore Hole : RL of Ground Level (mt): 100.05

Depth in mts.	Visual Soil Description	Field Tests		Remarks
00.00	Dark brown colored clay in very stiff to hard consistency		DS	
01.00		SPT		N=52
02.00		SPT		N=20
03.00			UDS	C=0.50 , Phi=11.27
04.00		SPT		N=65
04.50	Weathered rock recovered as fragmented rock pieces with poor core recovery		CORE	CR/RQD=7
05.00			DS	
05.50			CORE	
06.00	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		DS	
06.50			CORE	CR/RQD=5
07.00			DS	
07.50			CORE	CR/RQD=7
08.00			DS	
08.50			CORE	CR/RQD=22
09.00			DS	
09.50			CORE	CR/RQD=12
10.00			DS	
10.50			CORE	CR/RQD=22
11.00			DS	
11.50			CORE	CR/RQD=16
12.00			DS	
12.50			CORE	CR/RQD=24
13.00			DS	
13.50			CORE	CR/RQD=28/10
14.00			DS	
14.50			CORE	CR/RQD=33
15.00			DS	

TABLE - 2

LABORATORY PROGRAMME

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Depth Type of Sample	N. M. C.	Density	Specific Gravity	Particle Size Analysis	Atterberg Limits	Shrinkage Limit / Free Swell	Shear Test (UCC/Trx/ Box/Vane)	Other Tests
1.00/S				Part	Yes	FRS		
2.00/S				Part	Yes	FRS		
3.00/U	Yes	Yes	Yes	Part	Yes	FRS	TRX	
4.00/S				Part	Yes	FRS		
4.50/C							UCS	
5.50/C							UCS	
6.50/C							UCS	
7.50/C							UCS	
8.50/C							UCS	
9.50/C							UCS	
10.50/C							UCS	
11.50/C							UCS	
12.50/C							UCS	
13.50/C							UCS	
14.50/C							UCS	

TABLE - 3

RESULTS OF STANDARD PENETRATION TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Depth in mts.	No. of Blows for Penetration			Ns (Blows /300 mm)	Nc(Corrected value of Ns)	N. M. C. (in %)
	0 - 150 mm	150 - 300 mm	300 - 450 mm			
1.00	09	33	19	52	52	
2.00	07	09	11	20	20	
4.00	09	15	50	65	65	

TABLE - 4

INSITU DENSITY, MOISTURE CONTENT, DRY DENSITY & SPECIFIC GRAVITY

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Depth Sample (mts.)	Bulk Density in gms/cc	Natural Moisture Content (%)	Dry Density in gms/cc	Specific Gravity	Saturation
3.00	1.89	23.09	1.54	2.53	0.90

TABLE - 5

PARTICLE SIZE ANALYSIS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425µ)	(425 - 75 µ)	
0.00 to 4.50	1.00/S	8	10	12	18	52
0.00 to 4.50	2.00/S	2	10	4	12	72
0.00 to 4.50	3.00/U	4	3	4	20	69
0.00 to 4.50	4.00/S	8	12	8	18	54

TABLE - 5A

PARTICLE SIZE DISTRIBUTION

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Depth Type of Sample	Soil Strata	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			Coarse (4.75 - 2 mm)	Medium (2mm - 425µ)	Fine (425 - 75 µ)	
1.00/S	0.00 to 4.50	8	10	12	18	52
2.00/S	0.00 to 4.50	2	10	4	12	72
3.00/U	0.00 to 4.50	4	3	4	20	69
4.00/S	0.00 to 4.50	8	12	8	18	54

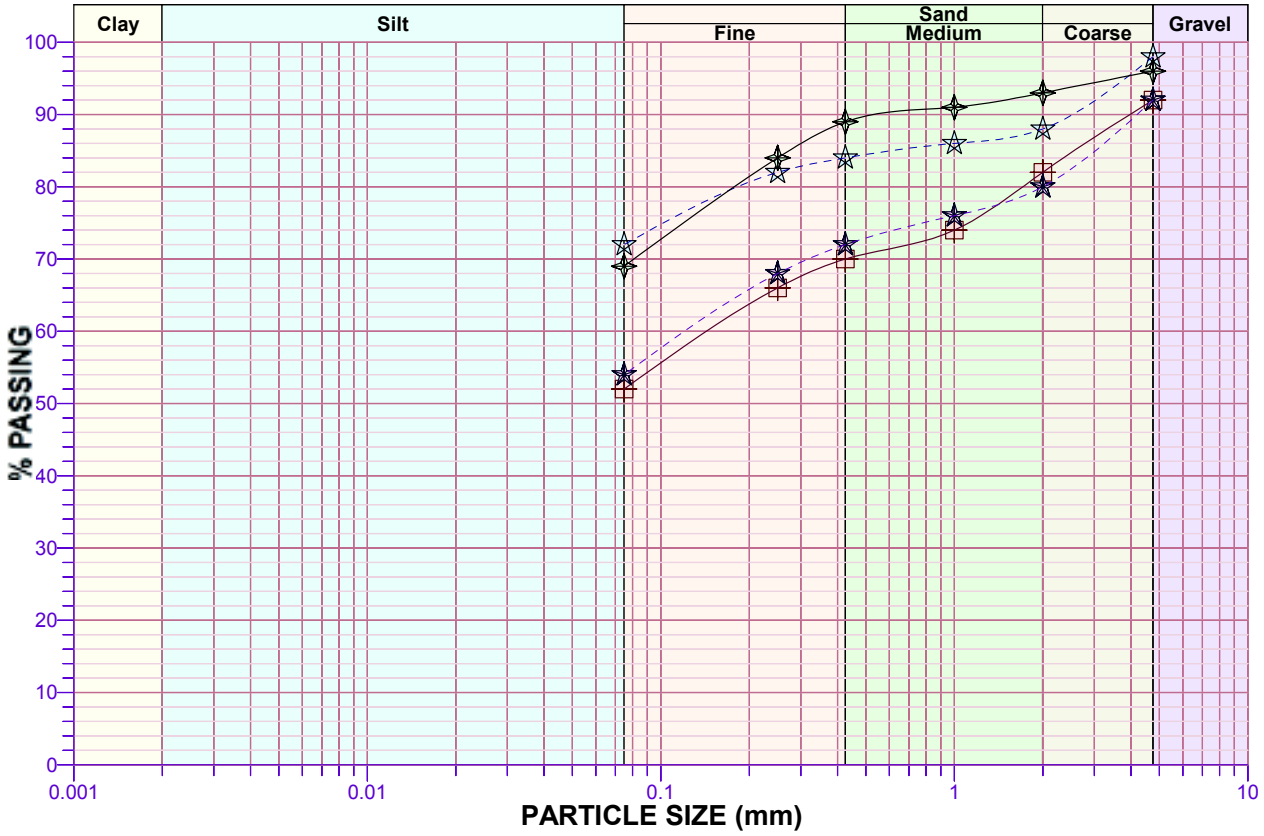


TABLE - 6

ATTERBERG LIMITS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Soil Strata	Depth Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Shrinkage Limit	Freeswell Index	I.S. Classi-fication
0.00 to 4.50	1.00/S	36	18	18		42	CI
0.00 to 4.50	2.00/S	44	20	24		42	CI
0.00 to 4.50	3.00/U	39	17	22		33	CI
0.00 to 4.50	4.00/S	40	18	22		33	CI

TABLE - 7B

TRIAXIAL SHEAR TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : Bhopal 5 Star Hotel - R0

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm²)	Pore Pressure (Kg/cm²)	Shear Values from Graph	
					Cuu (Kg/cm²)	Øuu (Kg/cm²)
3.00	Rm(FDD/NMC)	1.83	0.50	0.00	0.50	11.27
	Rm(FDD/NMC)	3.58	1.50	0.00		
	Rm(FDD/NMC)	4.80	2.50	0.00		

MODIFIED SHEAR GRAPH

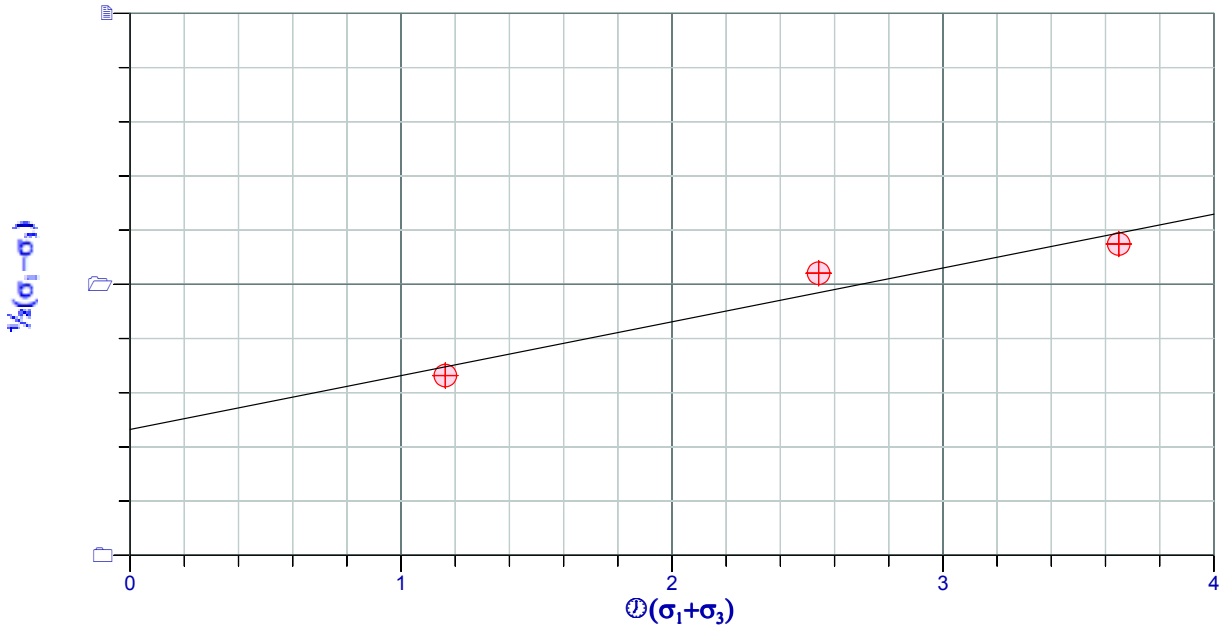


TABLE - 11

PROPERTIES OF ROCK

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P4-LHS

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm²)
4.50	7.00		8.13	2.72	
5.50			8.36	2.77	
6.50	5.00		8.31	2.71	
7.50	7.00		31.60	2.62	
8.50	22.00		26.78	2.62	
9.50	12.00		16.60	2.64	
10.50	22.00		21.28	2.64	
11.50	16.00		7.42	2.75	
12.50	24.00		8.01	2.79	
13.50	28.00	10.00	20.83	2.70	250.30
14.50	33.00		6.98	2.73	

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Name of Project : GENEX Hotels Pvt. Ltd.

Depth of Water Table : 2.75 mts from Ground Level

Bore Hole Start Date : 15-04-16

R.L. of Borehole : 100.05

Structure No./Ch :

Bore Hole No : P4-LHS

Bore Hole End Date : 18-04-16

Method of Drilling : Rotary Drilling

Depth in metres	I. S. Classi-fication	Visual Soil Description	Water Table	Nature of Sample	Ns No. of Blows per 300 mm	Core Recovery %	RQD %	Water Absorption %	Specific Gravity	Dry Density (g/cc)	Porosity %	Crus.Streng Point Load Index	Crus.Streng Uniaxl Streng kg/cm²	Particle Size Analysis Gravl %	Sand in % Coar	Sand in % Med	Sand in % Fine	Silt+ Clay %	Atterberg Limits LL %	Atterberg Limits PL %	Atterberg Limits PI %	Remarks
00.00		Dark brown colored clay in very stiff to hard consistency		DS																		
01.00				SPT	52									8	10	12	18	52	36	18	18	
02.00	CI		WT	SPT	20									2	10	4	12	72	44	20	24	
03.00				UDS					2.53	1.54	39.24			4	3	4	20	69	39	17	22	C=0.50 , Phi=11.27
04.00				SPT	65									8	12	8	18	54	40	18	22	
04.50		Weathered rock recovered as fragmented rock pieces with poor core recovery		CORE		7		8.13	2.72	2.23	18.11											
05.00				DS																		
05.50				CORE				8.36	2.77	2.25	18.78											
06.00		Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		DS																		
06.50				CORE		5		8.31	2.71	2.21	18.37											
07.00				DS																		
07.50				CORE		7		31.60	2.62	1.43	45.30											
08.00				DS																		
08.50				CORE		22		26.78	2.62	1.54	41.21											
09.00				DS																		
09.50				CORE		12		16.60	2.64	1.83	30.44											
10.00				DS																		
10.50				CORE		22		21.28	2.64	1.69	35.94											
11.00				DS																		
11.50				CORE		16		7.42	2.75	2.28	16.94											
12.00				DS																		
12.50				CORE		24		8.01	2.79	2.28	18.27											
13.00				DS																		
13.50				CORE		28	10	20.83	2.70	1.73	35.98		250.3									
14.00				DS																		
14.50				CORE		33		6.98	2.73	2.29	15.98											
15.00				DS																		

CLIENT :- Dilip Buildcon Limited

LABORATORY :- Infinite Civil Solutions Pvt. Ltd.

TABLE - 1

FIELD PROGRAMME OF TESTS

Project : GENEX Hotels Pvt. Ltd. — Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. — Bore Hole No. : P5-LHS

Location of Bore Hole : — RL of Ground Level (mt): 100.11

Depth in mts.	Visual Soil Description	Field Tests		Remarks
00.00	Light brown colored clay in hard consistency		DS	
01.00		SPT		N=36
02.00		SPT		N=44
03.00		SPT		N=62
04.00		SPT		N=71
04.45	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE	CR/RQD=9
05.00			DS	
05.50			CORE	CR/RQD=2
06.00			DS	
06.50			CORE	CR/RQD=4
07.00	Weathered rock recovered as fragmented rock pieces		DS	
07.50			CORE	
08.00	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		DS	
08.50			CORE	CR/RQD=6
09.00			DS	
09.50			CORE	CR/RQD=9
10.00			DS	
10.50			CORE	CR/RQD=5
11.00			DS	
11.50			CORE	CR/RQD=19
12.00			DS	
12.50			CORE	CR/RQD=64/48
13.00			DS	
13.50			CORE	CR/RQD=53/12
14.00			DS	
14.50			CORE	CR/RQD=30
15.00			DS	

TABLE - 2

LABORATORY PROGRAMME

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P5-LHS

Depth Type of Sample	N. M. C.	Density	Specific Gravity	Particle Size Analysis	Atterberg Limits	Shrinkage Limit / Free Swell	Shear Test (UCC/Trx/ Box/Vane)	Other Tests
1.00/S				Part	Yes	FRS		
2.00/S				Part	Yes	FRS		
3.00/S				Part	Yes	FRS		
4.00/S				Part	Yes	FRS		
4.50/C							UCS	
5.50/C							UCS	
6.50/C							UCS	
7.50/C							UCS	
8.50/C							UCS	
9.50/C							UCS	
10.50/C							UCS	
11.50/C							UCS	
12.50/C							UCS	
13.50/C							UCS	
14.50/C							UCS	

TABLE - 3

RESULTS OF STANDARD PENETRATION TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P5-LHS

Depth in mts.	No. of Blows for Penetration			Ns (Blows /300 mm)	Nc(Corrected value of Ns)	N. M. C. (in %)
	0 - 150 mm	150 - 300 mm	300 - 450 mm			
1.00	05	09	27	36	36	
2.00	13	15	29	44	44	
3.00	17	25	37	62	62	
4.00	25	32	39	71	71	

TABLE - 5

PARTICLE SIZE ANALYSIS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P5-LHS

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425µ)	(425 - 75 µ)	
0.00 to 4.45	1.00/S	8	8	8	12	64
0.00 to 4.45	2.00/S	8	10	4	10	68
0.00 to 4.45	3.00/S	10	8	4	10	68
0.00 to 4.45	4.00/S	8	8	10	8	66

TABLE - 5A

PARTICLE SIZE DISTRIBUTION

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P5-LHS

Depth Type of Sample	Soil Strata	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			Coarse (4.75 - 2 mm)	Medium (2mm - 425µ)	Fine (425 - 75 µ)	
1.00/S	0.00 to 4.45	8	8	8	12	64
2.00/S	0.00 to 4.45	8	10	4	10	68
3.00/S	0.00 to 4.45	10	8	4	10	68
4.00/S	0.00 to 4.45	8	8	10	8	66

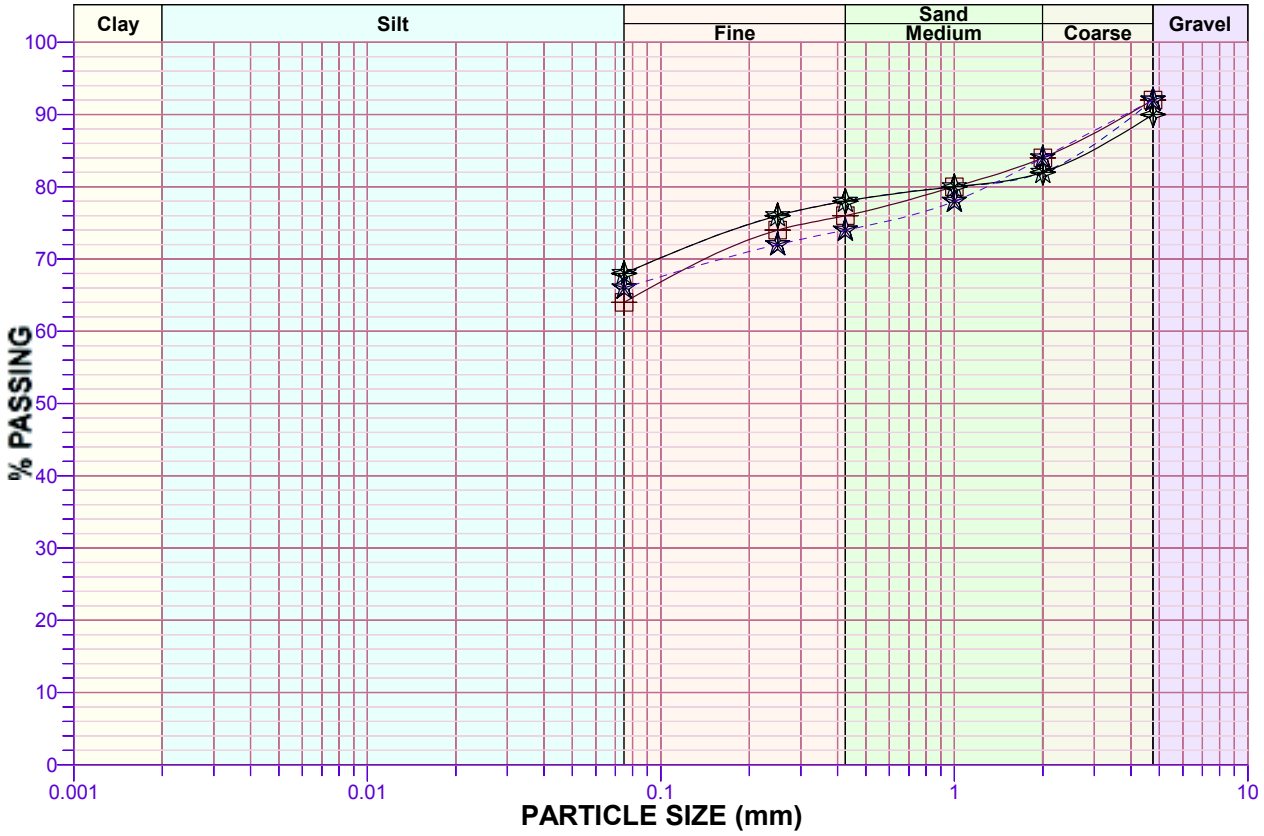


TABLE - 6

ATTERBERG LIMITS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P5-LHS

Soil Strata	Depth Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Shrinkage Limit	Freeswell Index	I.S. Classi-fication
0.00 to 4.45	1.00/S	35	14	21		26	CI
0.00 to 4.45	2.00/S	41	16	25		30	CI
0.00 to 4.45	3.00/S	47	16	31		42	CI
0.00 to 4.45	4.00/S	48	18	30		40	CI

TABLE - 11

PROPERTIES OF ROCK

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P5-LHS

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm²)
4.50	9.00		25.43	2.53	
5.50	2.00		11.34	2.79	
6.50	4.00		7.14	2.68	
7.50			19.42	2.74	
8.50	6.00		29.96	2.64	
9.50	9.00		20.30	2.77	
10.50	5.00		8.59	2.75	
11.50	19.00		10.21	2.74	
12.50	64.00	48.00	9.90	2.79	298.83
13.50	53.00	12.00	9.10	2.76	314.66
14.50	30.00		10.71	2.75	

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Name of Project : GENEX Hotels Pvt. Ltd.

Depth of Water Table : 2.70 mts from Ground Level

Bore Hole Start Date : 11-04-16

R.L. of Borehole : 100.11

Structure No./Ch :

Bore Hole No : P5-LHS

Bore Hole End Date : 14-04-16

Method of Drilling : Rotary Drilling

Depth in metres	I. S. Classification	Visual Soil Description	Water Table	Nature of Sample	Ns No. of Blows per 300 mm	Core Recovery %	RQD %	Water Absorption %	Specific Gravity	Dry Density (g/cc)	Porosity %	Crus.Streng Point Load Index	Crus.Streng Uniaxl Streng kg/cm²	Particle Size Analysis Gravl %	Sand in % Coar	Sand in % Med	Sand in % Fine	Silt+ Clay %	Atterberg Limits LL %	Atterberg Limits PL %	Atterberg Limits PI %	Remarks
00.00		Light brown colored clay in hard consistency		DS																		
01.00				SPT	36									8	8	8	12	64	35	14	21	
02.00	CI		WT	SPT	44									8	10	4	10	68	41	16	25	
03.00				SPT	62									10	8	4	10	68	47	16	31	
04.00				SPT	71									8	8	10	8	66	48	18	30	
04.45				CORE		9		25.43	2.53	1.54	39.15											
04.50		Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		DS																		
05.00				CORE		2		11.34	2.79	2.12	24.05											
05.50				DS																		
06.00				CORE		4		7.14	2.68	2.25	16.09											
06.50				DS																		
07.00		Weathered rock recovered as fragmented rock pieces		CORE				19.42	2.74	1.88	32.02											
07.50				DS																		
08.00		Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE		6		29.96	2.64	1.47	44.14											
08.50				DS																		
09.00				CORE		9		20.30	2.77	1.77	36.02											
09.50				DS																		
10.00				CORE		5		8.59	2.75	2.22	19.11											
10.50				DS																		
11.00				CORE		19		10.21	2.74	2.14	21.83											
11.50				DS																		
12.00				CORE		64	48	9.90	2.79	2.19	21.66		298.8									
12.50				DS																		
13.00				CORE		53	12	9.10	2.76	2.20	20.05		314.7									
13.50				DS																		
14.00				CORE		30		10.71	2.75	2.12	22.72											
14.50				DS																		
15.00																						

CLIENT :- Dilip Buildcon Limited

LABORATORY :- Infinite Civil Solutions Pvt. Ltd.

TABLE - 1

FIELD PROGRAMME OF TESTS

Project : GENEX Hotels Pvt. Ltd. — Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. — Bore Hole No. : P6-LHS

Location of Bore Hole : — RL of Ground Level (mt): 99.74

Depth in mts.	Visual Soil Description	Field Tests		Remarks
00.00	Light brown colored clay in very stiff to hard consistency		DS	
01.00		SPT		N=28
02.00			UDS	C=1.02 , Phi=10.52
03.00		SPT		N=53
04.00		SPT		N=46
05.00	Light brown colored clayey sand in very dense state	SPT		N=94
06.00		SPT		N=73
06.45	Light brown colored silty sand in very dense state			
06.50	Grayish colored fine to medium grained volcanic igneous rock known as basalt rock with the hardness is 5.0-5.5		CORE	CR/RQD=7
07.00			DS	
07.50			CORE	CR/RQD=12
08.00			DS	
08.50			CORE	CR/RQD=11
09.00			DS	
09.50			CORE	CR/RQD=12
10.00			DS	
10.50			CORE	CR/RQD=10
11.00			DS	
11.50			CORE	CR/RQD=30
12.00			DS	
12.50			CORE	CR/RQD=25
13.00			DS	
13.50			CORE	CR/RQD=34/15
14.00			DS	
14.50			CORE	CR/RQD=11
15.00			DS	

TABLE - 2

LABORATORY PROGRAMME

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Depth Type of Sample	N. M. C.	Density	Specific Gravity	Particle Size Analysis	Atterberg Limits	Shrinkage Limit / Free Swell	Shear Test (UCC/Trx/ Box/Vane)	Other Tests
1.00/S				Part	Yes			
2.00/U	Yes	Yes	Yes	Part	Yes	FRS	TRX	
3.00/S				Part	Yes	FRS		
4.00/S				Part	Yes	FRS		
5.00/S				Part	Yes	FRS		
6.00/S				Part	Yes			
6.50/C							UCS	
7.50/C							UCS	
8.50/C							UCS	
9.50/C							UCS	
10.50/C							UCS	
11.50/C							UCS	
12.50/C							UCS	
13.50/C							UCS	
14.50/C							UCS	

TABLE - 3

RESULTS OF STANDARD PENETRATION TEST

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Depth in mts.	No. of Blows for Penetration			Ns (Blows /300 mm)	Nc(Corrected value of Ns)	N. M. C. (in %)
	0 - 150 mm	150 - 300 mm	300 - 450 mm			
1.00	15	10	18	28	28	
3.00	13	21	32	53	53	
4.00	14	18	28	46	46	
5.00	26	44	50	94	94	
6.00	41	35	38	73	77	

TABLE - 4

INSITU DENSITY, MOISTURE CONTENT, DRY DENSITY & SPECIFIC GRAVITY

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Depth Sample (mts.)	Bulk Density in gms/cc	Natural Moisture Content (%)	Dry Density in gms/cc	Specific Gravity	Saturation
2.00	1.82	17.11	1.56	2.58	0.67

TABLE - 5

PARTICLE SIZE ANALYSIS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425µ)	(425 - 75 µ)	
0.00 to 5.00	1.00/S	0	14	16	16	54
0.00 to 5.00	2.00/U	5	10	12	17	56
0.00 to 5.00	3.00/S	10	4	10	8	68
0.00 to 5.00	4.00/S	0	8	10	10	72
5.00 to 6.00	5.00/S	18	16	14	18	34
6.00 to 6.45	6.00/S	0	0	12	34	54

TABLE - 5A

PARTICLE SIZE DISTRIBUTION

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Depth Type of Sample	Soil Strata	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			Coarse (4.75 - 2 mm)	Medium (2mm - 425µ)	Fine (425 - 75 µ)	
1.00/S	0.00 to 5.00	0	14	16	16	54
2.00/U	0.00 to 5.00	5	10	12	17	56
3.00/S	0.00 to 5.00	10	4	10	8	68
4.00/S	0.00 to 5.00	0	8	10	10	72
5.00/S	5.00 to 6.00	18	16	14	18	34
6.00/S	6.00 to 6.45	0	0	12	34	54

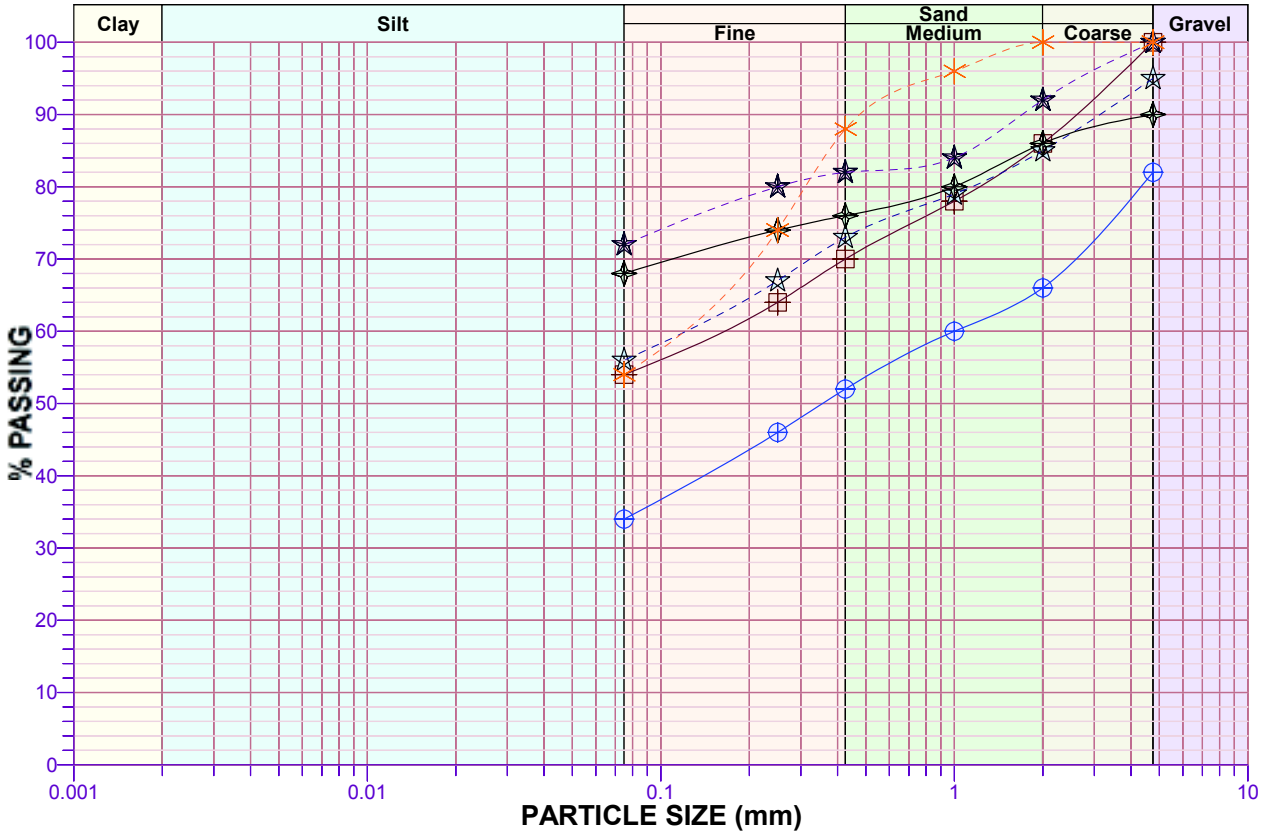


TABLE - 6

ATTERBERG LIMITS

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Soil Strata	Depth Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Shrinkage Limit	Freeswell Index	I.S. Classi-fication
0.00 to 5.00	1.00/S	39	17	22			CI
0.00 to 5.00	2.00/U	36	16	20		44	CI
0.00 to 5.00	3.00/S	43	18	25		39	CI
0.00 to 5.00	4.00/S	45	18	27		37	CI
5.00 to 6.00	5.00/S	44	19	25		42	SC
6.00 to 6.45	6.00/S	52	-	-			MH

TABLE - 7B

TRIAXIAL SHEAR TEST

Project : GENEX Hotels Pvt. Ltd. Project Name : Bhopal 5 Star Hotel - R0

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm²)	Pore Pressure (Kg/cm²)	Shear Values from Graph	
					Cuu (Kg/cm²)	Øuu (Kg/cm²)
2.00	Rm(FDD/NMC)	3.20	0.50	0.00	1.02	10.52
	Rm(FDD/NMC)	4.60	1.50	0.00		
	Rm(FDD/NMC)	6.09	2.50	0.00		

MODIFIED SHEAR GRAPH

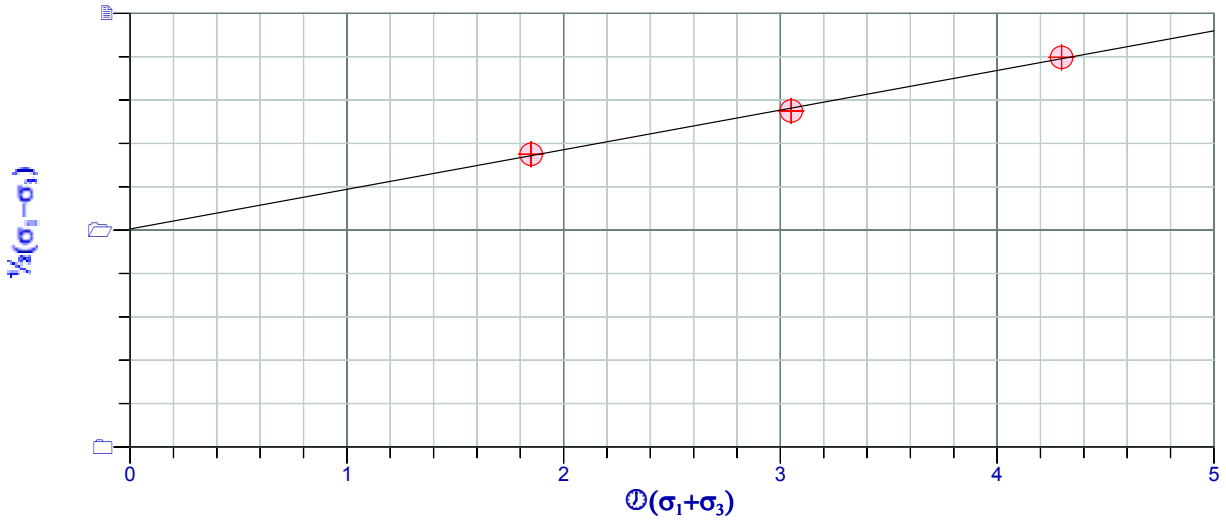


TABLE - 11

PROPERTIES OF ROCK

Project : GENEX Hotels Pvt. Ltd. Project No. : 16170050

Owner : Infinite Civil Solutions Pvt. Ltd. Bore Hole No. : P6-LHS

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm²)
6.50	7.00		31.10	2.58	
7.50	12.00		25.84	2.69	
8.50	11.00		19.41	2.70	
9.50	12.00		14.15	2.72	
10.50	10.00		9.14	2.76	
11.50	30.00		4.87	2.77	
12.50	25.00		8.26	2.90	209.94
13.50	34.00	15.00	7.82	2.87	275.08
14.50	11.00		8.54	2.78	

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Name of Project : GENEX Hotels Pvt. Ltd.

Depth of Water Table : 2.50 mts from Ground Level

Bore Hole Start Date : 07-04-16

R.L. of Borehole : 99.74

Structure No./Ch :

Bore Hole No : P6-LHS

Bore Hole End Date : 10-04-16

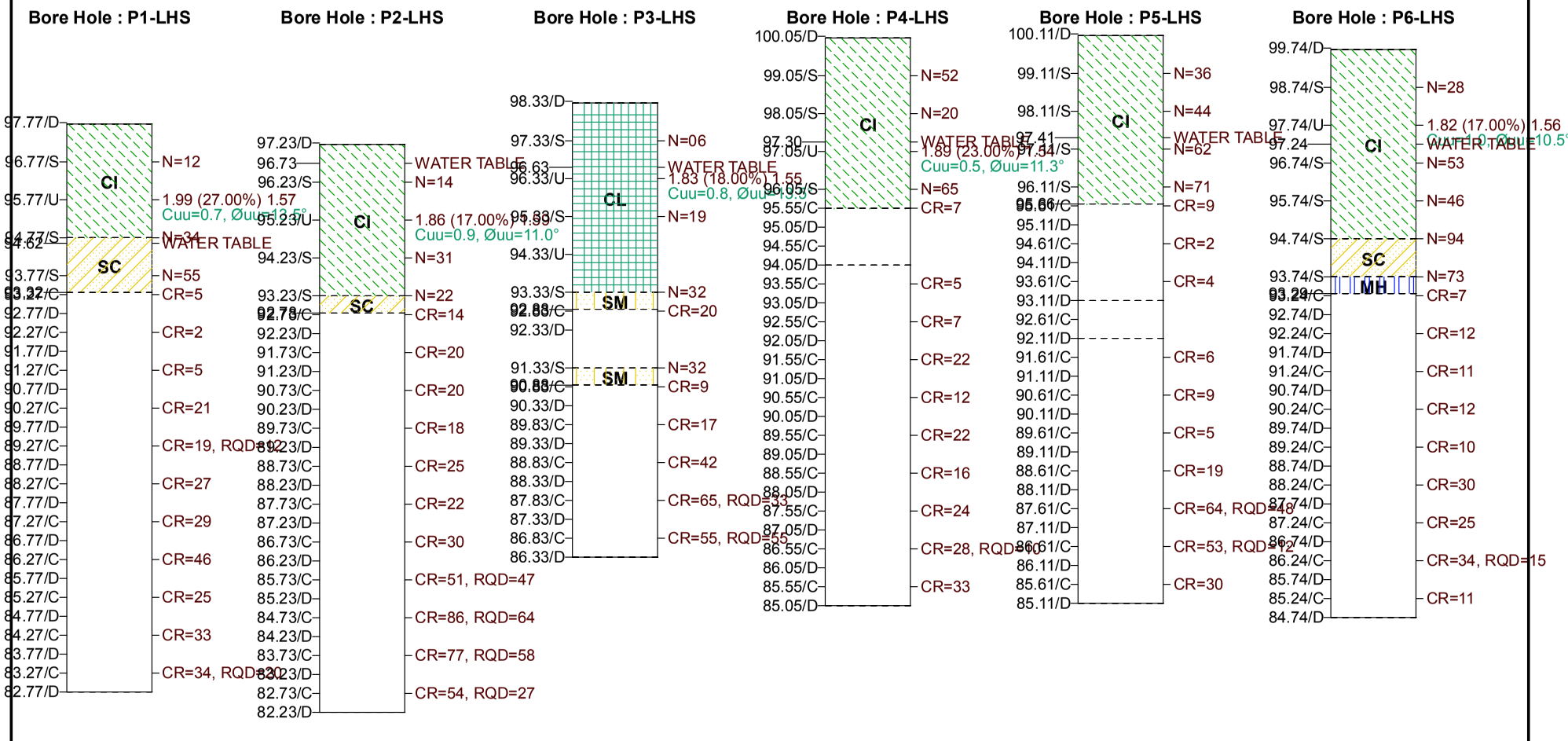
Method of Drilling : Rotary Drilling

Depth in metres	I. S. Classification	Visual Soil Description	Water Table	Nature of Sample	Ns No. of Blows per 300 mm	Core Recovery %	RQD %	Water Absorption %	Specific Gravity	Dry Density (g/cc)	Porosity %	Crus.Streng Point Load Index	Crus.Streng Uniaxl Streng kg/cm²	Particle Size Analysis Gravl %	Sand in % Coar	Sand in % Med	Sand in % Fine	Silt+ Clay %	Atterberg Limits LL %	Atterberg Limits PL %	Atterberg Limits PI %	Remarks
00.00		Light brown colored clay in very stiff to hard consistency		DS																		
01.00				SPT	28									0	14	16	16	54	39	17	22	
02.00	CI		WT	UDS					2.58	1.56	39.59			5	10	12	17	56	36	16	20	C=1.02 , Phi=10.52
03.00				SPT	53									10	4	10	8	68	43	18	25	
04.00				SPT	46									0	8	10	10	72	45	18	27	
05.00	SC	Light brown colored clayey sand in very dense state		SPT	94									18	16	14	18	34	44	19	25	
06.00	MH	Light brown colored silty sand in very		SPT	73									0	0	12	34	54	52	-	-	
06.45		Grayish colored fine to medium grained		CORE		7		31.10	2.58	1.43	44.52											
07.00		volcanic igneous rock known as basalt		DS																		
07.50		rock with the hardness is 5.0-5.5		CORE		12		25.84	2.69	1.59	40.97											
08.00				DS																		
08.50				CORE		11		19.41	2.70	1.80	33.58											
09.00				DS																		
09.50				CORE		12		14.15	2.72	1.99	26.94											
10.00				DS																		
10.50				CORE		10		9.14	2.76	2.21	20.17											
11.00				DS																		
11.50				CORE		30		4.87	2.77	2.44	11.89											
12.00				DS																		
12.50				CORE		25		8.26	2.90	2.34	19.33		209.9									
13.00				DS																		
13.50				CORE		34	15	7.82	2.87	2.34	18.31		275.1									
14.00				DS																		
14.50				CORE		11		8.54	2.78	2.25	19.19											
15.00				DS																		

CLIENT :- Dilip Buildcon Limited

LABORATORY :- Infinite Civil Solutions Pvt. Ltd.

BORE-LOG SECTION FOR PROJECT : 16170050



Note:(1) Figures on the Left Side shows R.L. and Type of Sample (D - DS, U - UDS, S - SPT, C - Core, V - Field Vane Shear)
(2) Figures on the Right Side shows : (a) for SPT Samples : Nc - No. of Blows/300 mm Penetration (N.M.C.)
(b) for UDS Samples : Bulk Density, (N.M.C), Dry Density

INFINITE CIVIL SOLUTIONS PVT. LTD.
Office- F. P. 25, Near Aditya Elegance, CIMS hospital Road, Sola Ahmedabad - 380060

ANNEXURE-III

CERTIFICATE OF STRUCTURE DESIGN

Kushwah & Kushwah architecture, planning & interior design

B-293, Shahpura, Bhopal (MP) India
tel.+91-755-4049400, 4049444 fax+91-755-4049413
email: mail@kushwahandkushwah.com
rakesh@kushwahandkushwah.com
web: www.kushwahandkushwah.com

EARTHQUAKE CERTIFICATE

THIS IS TO CERTIFY THAT DEVELOPMENT OF **4/5 STAR HOTEL AND CONVENTION CENTER IS PROPOSED ON KHASRA NO. 40/3 & 276/3, AT VILLAGE KOTRA SULTANABAD OF BHOPAL,** THE LAYOUT IS BEEN SUBMITTED FOR THE APPROVAL FROM BUILDING PERMISSION SECTION OF NAGAR NIGAM, BHOPAL. THE PERMISSION DRAWINGS HAS BEEN MADE UNDER SECTION 84 OF M.P. LAND DEVELOPMENT CODE ACT 1984 AND ALL THE CALCULATIONS IN THE STRUCTURAL WORK HAVE BEEN TAKEN REGARDING THE EARTHQUAKE AFFECTED AREA.

THIS PROPERTY BELONGS TO: - GENEX HOTELS PVT. LTD.

Rakesh Singh Kushwah
Architect
CA-91-13677
BMC No.A-161

Ar. RAKESH SINGH KUSHWAH