National Highways & Infrastructure Development Corporation Limited

(Ministry of Road Transport & Highways, Govt. of India)

PART DESIGN, CONSTRUCTION, OPERATION & MAINTENANCE (For a Period of 5 Years) OF FULLY AUTOMATIC MULTI-LEVEL CAR PARKING SYSTEM AT CENTRAL CIVIL SECRETARIAT, ITANAGAR, ARUNACHAL PRADESH

Contract No: NHIDCL/AMLCP Const Work/AP/2020

VOLUME 8

GEOTECHNICAL REPORT

FIELD TEST REPORT

FOR

PROPOSED MULTISTOREYED PARKING BUILDING
AT

CIVIL SECRETARIAT CAMPUS

ITANAGAR, ARUNACHAL PRADESH

CLIENT: DELHI INTEGRATED MULTI-MODEL TRANSIT SYSTEM LIMITED
ISBT BUILDING KASHMERE GATE, DELHI-06

CONSULTANCY SERVICES:

EXPERTO GEOTECHNICAL CONSULTANTS AND RESEARCH PVT. LTD. (GMDA/RTP/2015/GR. (GEO-TECH)/ 4/50)

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1. INTRODUCTION

A carefully planned detailed subsoil investigation was carried out for the proposed construction of Multistoreyed Parking Building at Civil Secretariat campus, Itanagar, Arunachal Pradesh. The subsoil investigation consisted of drilling of exploratory borehole at two locations including conducting Standard Penetration Tests as well as collecting soil samples for various laboratory tests. In all these field as well as laboratory tests provisions set by relevant bureau of Indian Standard codes of practice were strictly adhered to.

2. OBJECTIVE

The prime objective of this geo-technical investigation was to explore the suitability of the subsoil involved for the proposed engineering work and to suggest the most suitable type of foundation for preparing adequate and economical design. Effort was made to obtain necessary information about the subsoil such as stratification, hydrological conditions, strength and settlement characteristics of the site and to know the engineering properties of the soil up to a depth that is likely to get affected by the proposed structure load.

3. INVESTIGATION

A composite program comprising of both field and laboratory tests in consonance with relevant I.S. code of practice was followed.

3.1 FIELD INVESTIGATION

Field investigation consisted of vertical boring in two locations covering the proposed field area of the plot of at Itanagar, Arunachal. Borehole layout is shown schematically in Fig. 1.

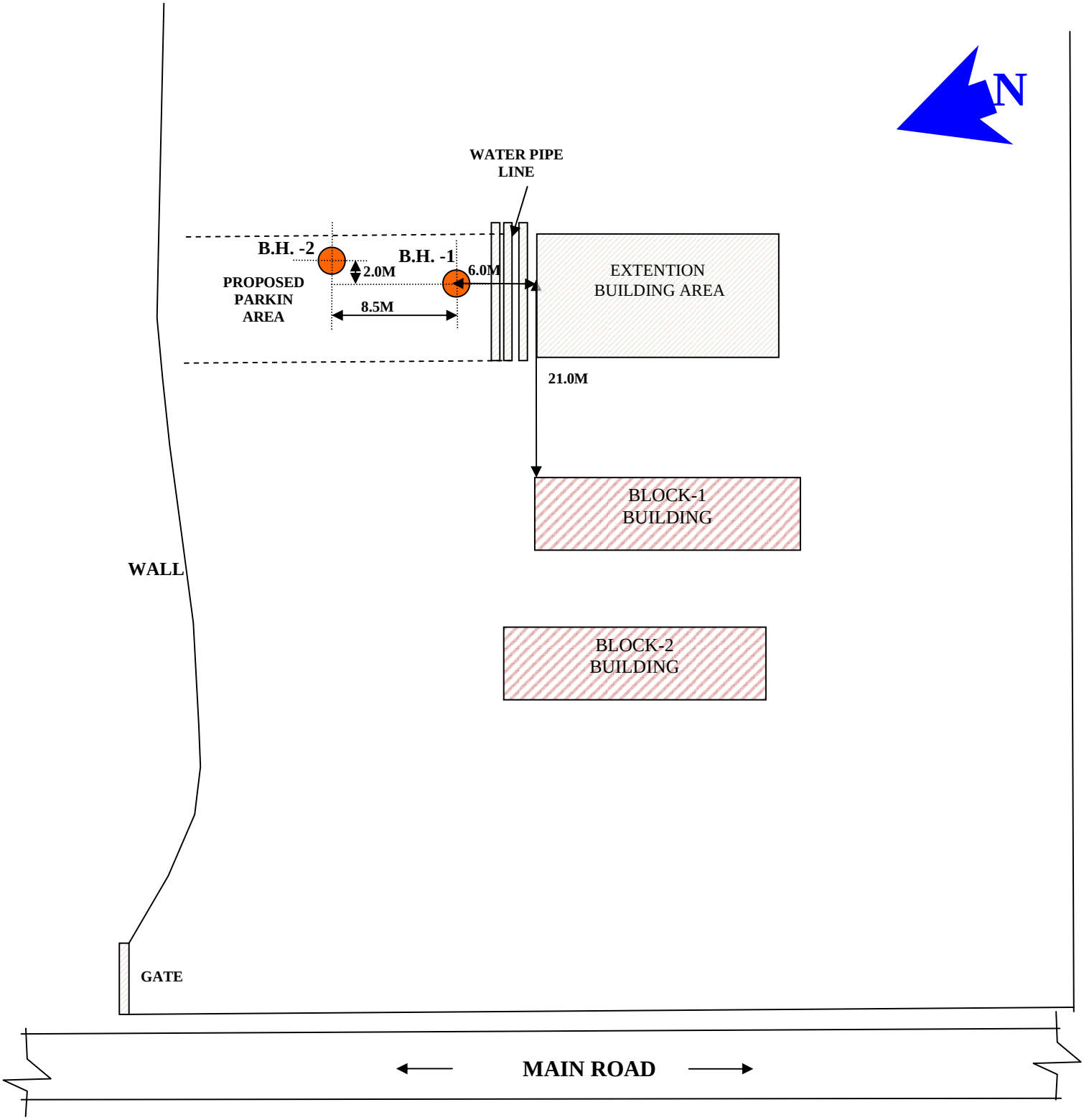

Fig.-1 Site plan showing the layout of boreholes(not to scale)

Visual Inspection: During boring, changes in soil stratification were identified by the feel and color of the wash. Color, odor etc. were visually identified during the process of boring. Soil stratification is represented pictorially in the borehole logs.

Standard Penetration Tests (SPT)- Standard Penetration Tests were conducted at each 1.50m interval or where significant variations in soil strata were observed. Standard Penetration Tests were carried out using a split-spoon sampler as per IS: 2131-1981. A drive weight of 63.5kg drop hammer for a free fall of 75cm was used. Number of blows required to drive the sampler for first 150mm was neglected. The sampler is further driven to a depth of 300mm or 100 blows. The number of blows required to affect each 15cm of penetration was recorded. Total blows required for the second and third 15cm of penetration was termed the penetration resistance (observed N-value).

Collection of Undisturbed soil sample-Undisturbed soil samples were collected (IS: 1892-1979, 11594-1985) at an interval of 2.0m to 3.0m starting from 2.0m from existing ground surface or whenever significant change in soil stratum were encountered into 100mm diameter and 450mm long open drive sampler of area-ratio 12.36, labeled and waxed at the both ends and the same were transported to laboratory to conduct various laboratory tests.

Recording of ground water table- Ground water level in bore hole location was recorded after 24 hours of boring or when stability in ground water table was achieved, whichever was later as per IS: 6935-1973. Ground water tables are shown in borehole logs.

Field investigation was started on 04-01-2020 and was completed on 08-01-2020.

3.2 FIELD INVESTIGATION PHOTOGRAPHS

Fig-2.0 Boring in Progress,

Fig-2.1 SPT arrangement in Progress

Fig-2.2 SPT in Progress

Fig-2.3 SPT sample collection

4. DISCUSSION

4.1 GENERAL

Field exploratory program together with standard penetration tests reveal a generalized pattern in subsoil strata is as follows.

BH NO-1&2: Subsoil in general consists of medium dense to dense silty sand with or without weathered rock/gravel etc. from EGL up to explored depth have been observed. Generally, consistency of subsoil increases with increase in depth in the borehole.

BORE HOLE CHART

E.G.C.R. PVT. LTD.

BORE HOLE NUMBER: 01 (ONE) **DATE OF STARTING: 04-01-2020**

TYPE OF BORING: WASH BORING **DATE OF COMPLETION: 06-01-2020**

NAME OF PROJECT: Construction of multistoreyed Parking Building, Itanagar, Arunachal

DIA OF BOREHOLE: 150MM **G. W. L.: Not Encountered**

DESCRIPTION	DEPTH (M)	STRATA	SAMPLE d/s	SAMPLE u/s	S. P. T. 10 20 30	N-VALUE	RECOVERY (%)	REMARK
Brownish silty sandy clay with gravel from G.L. up to 1.2m.	-0.0							
	-1.0							
Brownish silty sand with weathered rock from 1.2m up to 4.1m.			-1.5			33		
	-2.0							
	-3.0		-3.0			22		
				-4.0				
Brownish clayey silty sand with gravel from 4.1m up to 7.2m.	-4.0							
			-4.5			19		
	-5.0							
	-6.0		-6.0			28		
				-6.5				
	-7.0							
Brownish silty sand with weathered rock/rock fragments etc. from 7.2m up to 11.5m.			-7.5			25		
	-8.0							
	-9.0		-9.0			29		
				-9.5				
	-10.0							
			-10.5			23		
	-11.0							
Weathered rock/rock fragments etc. from 11.5m up to explored depth of 13.0m.	-12.0		-12.0			**		** denote refusal
			-12.6			**		
	-13.0							
	-14.0							
	-15.0							

BORE HOLE CHART

E.G.C.R. PVT. LTD.

BORE HOLE NUMBER: 02 (TWO) **DATE OF STARTING: 06-01-2020**

TYPE OF BORING: WASH BORING **DATE OF COMPLETION: 08-01-2020**

NAME OF PROJECT: Construction of multistoreyed Parking Building, Itanagar, Arunachal

DIA OF BOREHOLE: 150MM **G. W. L.: Not Encountered**

DESCRIPTION	DEPTH (M)	STRATA	SAMPLE d/s	SAMPLE u/s	S. P. T. 10 20 30	N-VALUE	RECOVERY (%)	REMARK
Brownish clayey silty sand with boulder from G.L. up to 2.4m.	-0.0							
	-1.0							
Brownish silty sand with weathered rock from 2.4m up to 3.7m.	-2.0		-1.5			15		
	-3.0		-3.0			22		
Brownish clayey silty sand with weathered rock from 3.7m up to 4.4m.	-4.0			-4.0				
	-4.5		-4.5			36		
Weathered rock from 4.4m up to 6.6m.	-5.0							
	-6.0		-6.0			**		
Brownish silty sand with weathered rock from 6.6m up to 7.7m.	-7.0							
	-7.5		-7.5			33		
Weathered rock from 7.7m up to 10.0m.	-8.0							
	-9.0		-9.0			**		
Brownish clayey silty sand with weathered rock from 10.0m up to 10.4m.	-10.0			-10.0				
	-10.5		-10.5			68		
Weathered rock from 10.4m up to 11.8m.	-11.0							
	-12.0		-12.0			41		
Brownish silty sand with weathered rock from 11.8m up to 12.9m.	-13.0							** denote refusal
			-13.5			**		
Weathered rock from 12.9m up to explored depth of 14.0m.	-14.0		-14.0			**		
	-15.0							