No: EE/P.W.D./138/2025

Annexure D

BUILDING SAFETY CERTIFICATE

It is certified that the existing building of **Kurvey's New Model Public School, Diksha Bhumi Sq, Nagpur** comprised of building block 1 is having block's/floor's as per details :

Details of block(s) in school	Block (1)	Block (2)
No of Floor(s) in the Block	G+2	

The building is owned **by Kurvey's New Model Public School, Diksha Bhumi Sq, Nagpur-22** and occupied by the school and have complied with the building safety requirements in accordance with National building Code rule and verified by the officers concerned of Public Works Division, Nagpur, Govt. of Maharashtra on 15/04/2025 in the presence of **Smt Devyani Palit, Principal (Kurveys New model Public School, Diksha bhumi Sq, Nagpur**) and that the building structure is fit for occupancy for running the school with effect from **20/04/2025**. This certificate is issued for the period of **One (1)** year in accordance with rule and subject to compliance of the specific conditions as appended.

1. Structural stability certificate by Geotech Services, Nagpur Report No 86/INV/MAR-25 Dated 17/03/2025
2. Building Photos

Date : 20/04/2025

Place : Nagpur

(Abhijit A. Kuchewar)
Executive Engineer
Public Works Division No.1
Nagpur

To
Principal
Kurveys New Model Public School
Diksha Bhumi Sq, Shradhanand peth Nagpur

ENDORSEMENT

The Building safety certificate issued by the department stands cancelled and annulled due to Earth Quake, Fire or any other natural calamities.

Principal
Kurvey's New Model
Public School, Shraddhanand Peth,
Nagpur.

(Abhijit A. Kuchewar)
Executive Engineer
Public Works Division No.1
Nagpur

Administrator
Kurvey's New Model
Public School, Shraddhanand Peth,
Nagpur.

GEOTECH SERVICES

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email : info@geotechservices.in, www.geotechservices.in

Report No . 87/INV/MAR-25

Date 17.03.2025

REPORT

CUSTOMER	:	**KURVEY'S NEW MODEL PUBLIC SCHOOL**	ADDRESS	:	Dikhshabhoomi Sq. Nagpur
LETTER REF.	:	NA	AGENCY	:	NA
PROJECT	:	Structural assessment at kurvey's new model public school building.	MATERIAL IDENTIFICATION	:	NA
DATE OF RECEIPT	:	NA	SAMPLED BY	:	NA
SAMPLE CONDITION WHEN RECEIVED	:	NA	TEST PERFORMED	:	Rebound Hammer Test &Ultrasonic Pulse Velocity (UPV)
DATE OF TEST	:	08.03.2025 to 09.03.2025	METHOD OF TEST	:	As per IS: 13311(Part – I& 2) 1992.

1. INTRODUCTION

Geotechnical investigation for **Foundation Adequacy** and Non-Destructive Testing for **structural assessment** of school building was carried out for **Kurvey's New Model Public School** near Dikhshabhoomi Square Nagpur. NDT was intended to determine the strength, quality and homogeneity of the concrete at selected locations of the structural member i.e. Columns and Beams. Geotechnical Investigation was conducted to evaluate allowable bearing capacity at the foundation depth, for the design of suitable foundation, so as to assess the feasibility of the structure for construction of additional floor.

Scope of work included Rebound Hammer test, Ultrasonic Pulse Velocity Test (UPV), standard penetration test, soil sampling at field as well as necessary laboratory tests on soil samples and compressive strength test& water absorption test on brick samples.

2. NDT TEST DETAILS

The test was conducted at selected points of Columns and Beams of the structure. Observation points were selected at both Old portion and new portion of the structure – for comparison. The number and location of points were verified by the representative official.

For Ultrasonic Pulse Velocity both direct and Semi-Direct measurements were recorded as per the accessibility. Detail readings of the tests are enclosed in **Annexure.**

3. PROVISION OF IS CODE FOR NDT

- Quality of concrete defined as per clause 7.1.1 (Table 2), IS: 13311 (Part I): 1992.

Velocity By Cross Probing	Concrete Quality Grading
Above 4500 m/second	Excellent
3500 to 4500 m/second	Good
3000 to 3500 m/second	Medium
Below 3000 m/second	Doubtful

- As per IS: 13311 (Part II): 1992, clause no. 8.1, "*The estimation of compressive strength of concrete by rebound hammer method cannot be held to be very accurate; and probable accuracy of predictions of concrete strength in a structure is ± 25 %*"

4. Observation of NDT

a. Rebound Hammer

Rebound hammer, R values, for both old and new portion of the structure are in close agreement showing an average strength of concrete as **35 MPa**.

b. Ultrasonic Pulse Velocity

The UPV of old portion with average velocity of around 3400 m/sec. indicates that concrete is **Medium** in terms of uniformity, homogeneity and density. Whereas UPV of new portion with average velocity of around 3900 m/sec. indicates that concrete is **Good**.

5. Test results of bricks.

The laboratory test results of sampled Bricks from site are as follows;

A. COMPRESSIVE STRENGTH: *(Tested as per IS: 3495 Part - I: 1992)*

Identification Mark	Dimensions	Load at Failure	Compressive Strength
	mm	KN	Mpa
Burnt Clay Bricks	233X105X75	94	3.84
Burnt Clay Bricks	222X110X75	116	4.75
Burnt Clay Bricks	231X107X77	120	4.85
Burnt Clay Bricks	237X112X78	76	2.94
Burnt Clay Bricks	225X115X79	141	5.44
Average Compressive Strength : 4.36 MPa			

Compressive Strength

- *The Compressive Strength of any individual brick shall not fall below the minimum average compressive strength specified for the Corresponding class of bricks by more than 20 percent.*
- *If the test result of compressive strength of individual brick exceeds the upper limit for a particular class, the strength of same shall be restricted to the upper limit of the class for the purpose of averaging.*
- *IS do not specify requirements Dry Compressive Strength*

B. WATER ABSORPTION: *(Tested as per IS: 3495 Part - II: 1992)*

Identification Mark	Dry Weight	Wet Weight	Water Absorption
	gms	gms	%
Burnt Clay Bricks	2709.0	3171.0	17.05
Burnt Clay Bricks	2838.5	3293.5	16.03
Burnt Clay Bricks	2943.0	3447.0	17.13
Burnt Clay Bricks	3086.0	3572.0	15.75
Burnt Clay Bricks	2854.5	3370.5	18.08
Average Water Absorption : 16.81 %			

Water Absorption shall not be more than 20% up to Class 12.5 & 15% for higher classes.

IS provisions: Compressive Strength: (IS 1077 - 1992)

SerialNo.	**Average Compressive Strength** notlessthanN/mm^2	**ClassDesignation**	**MaxWaterAbsorption**Allowed%byWt.
1.	3.5to5.0	3.5	20
2.	5.0to7.5	5.0	20
3.	7.5to10.0	7.5	20
4.	10.0to12.5	10.0	20
5.	12.5to15.0	12.5	20

Remark: Based on above specification, Bricks sample conforms to class 3.5 Designations.

6. LOAD CARRYING CAPACITY OF BRICK MASONRY:

The capacity of brick masonry is workout as per **table 8-Part6-Section4**, of national Building Code (2005).

Mortar of M1 grade is assumed (proportion 1:5)

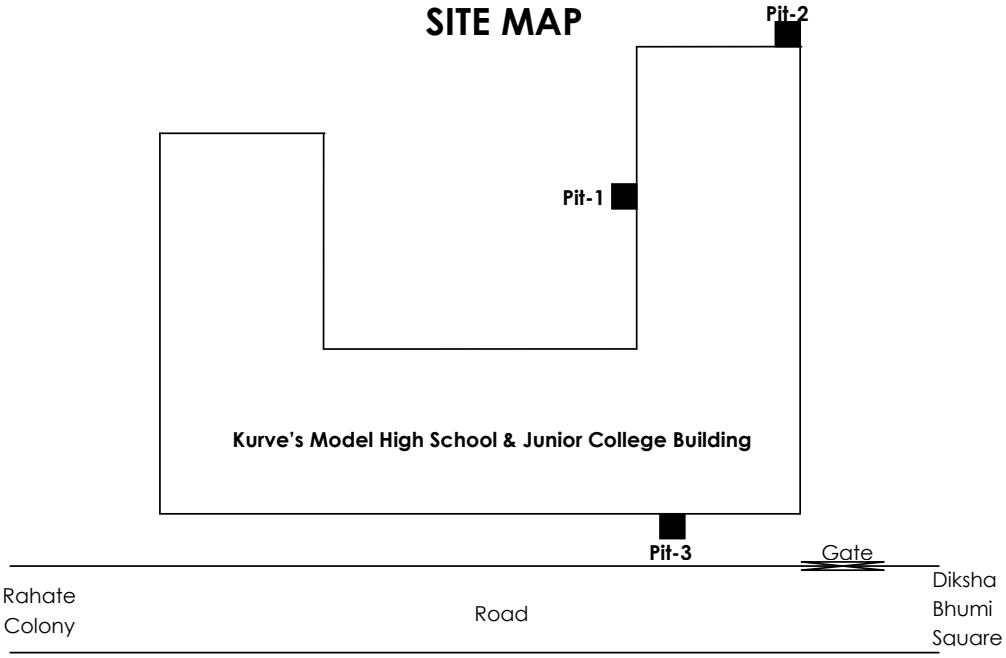
Location	Avg.brick strength In MPa	Compressive stress for masonry for mortar class M1 (N/mm^2) (1)	Masonry thickness in mm (2)	Stress reduction factor for slenderness and eccentricity (Clause 5.4.1.1) (3)	**Load carrying capacity in tons/meter (1x2x3)**
Ground Floor	3.5	0.35	355	0.89	**11.05**
First Floor	3.5	0.35	355	0.89	**11.05**

7. BEARING CAPACITY FOR FOUNDATION

7.1 Investigation

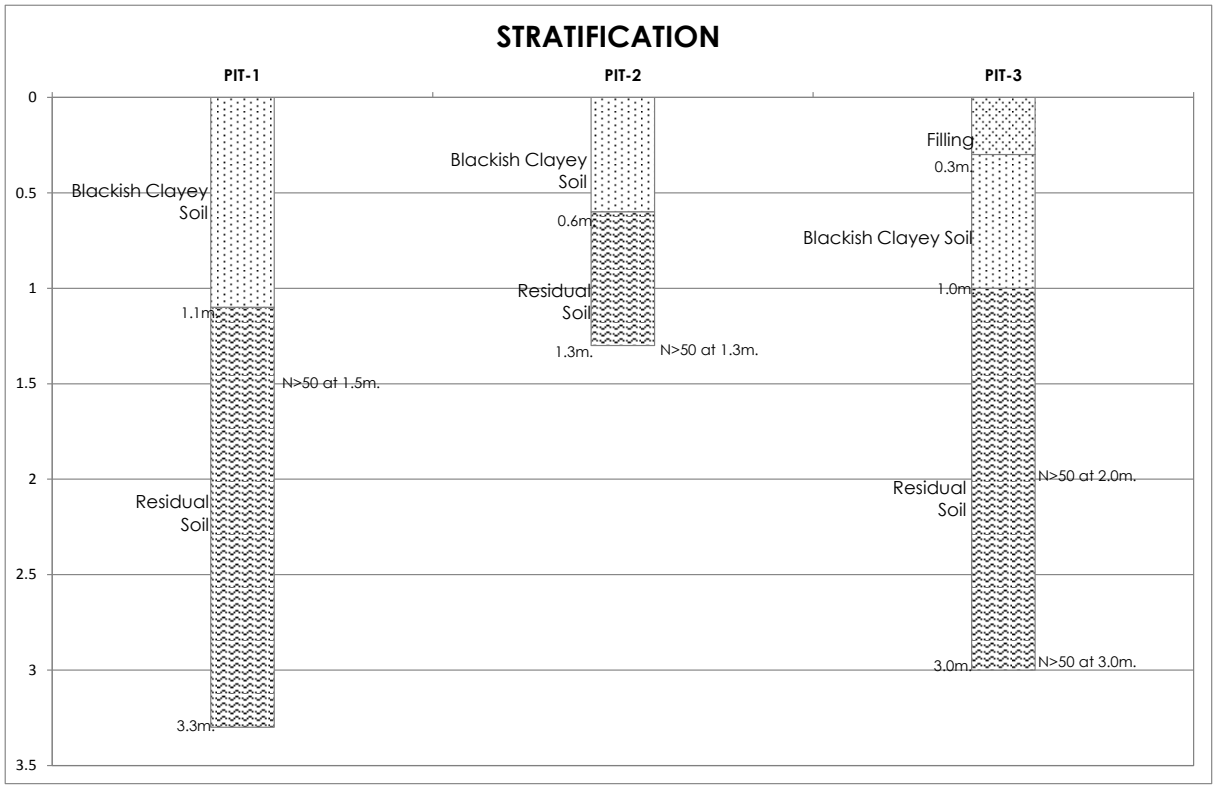
To assess the stability of foundation and to determine the allowable bearing capacity, three open trial pits are excavated up to foundation depth at location as indicated in site-map. Standard Penetration Tests (SPT) as per IS: 2131was conducted at founding depth. Disturbed and undisturbed soil samples are collected from these pits for laboratory tests.

Soil samples collected from field are tested for Engineering Classification(IS : 1498), i.e. sieve analysis (IS:2720 part 4), natural moisture content & density (IS:2720 part 29), liquid and plastic limits (IS:2720 part 5),free swell index (IS:2720 part 40).



7.2 Soil Profile

Laboratory test results and Stratification indicate that top layer of 0.6m to 1.0 m consist of Blackish Clayey Soil, followed by **Clayey Sand-Silty Sand: SC-SM** up to the depth of investigation. The Stratification and test results are presented below.



LABORATORY TEST RESULTS

Properties	Sample Identifications & Test Results		
Pit No.	Pit-1	Pit-2	Pit-3
Depth – meter	1.5	1.3	2.0
Moisture Content - %	14.28	18.36	12.11
Gravel - %	10.88	20.21	35.11
Sand - %	71.56	58.92	50.18
Silt & Clay -%	17.56	20.87	14.71
Liquid Limit - %	38.2	42.3	37.5
Plastic Limit - %	Non-Plastic	27.1	Non-Plastic
P I value - %	Non-Plastic	15.2	Non-Plastic
Engineering Classification	SM	SC	SM

*** SC-Clayey Sand *SM- Silty Sand**

STANDARD PENETRATION TEST RESULTS

Standard penetration tests are conducted at different depth (Informed by client) of pits. The number of blows required to penetrate 30 cms is denoted as 'N'. The blows required in the pits at final depth are as under.

Pit No.	Depth - Meter	Penetration -cm	N Value	Stratum
Pit-1	1.5	22	>50 (refusal)	Highly Weathered Rock
Pit-2	1.3	19	>50 (refusal)	Completely Weathered Rock
Pit-3	2.0	19	>50 (refusal)	Highly Weathered Rock
	3.0	6	>50 (refusal)	

7.3. Foundation and Bearing Capacity

Considering the stratification and the characteristics of soil, bearing capacities are worked out at founding level of 1.2 to 1.5 m. SBC is worked out using the SPT N Value. The N value is observed 50. (N = 50), angle of internal friction ϕ for the layer is 41Deg (as per Fig.1 of IS:6403-1981).

The bearing capacity is calculated as least of –

a. Net Safe Bearing Capacity from shear failure consideration, and
b. Permissible Bearing Pressure from settlements consideration

A Net Safe Bearing Capacity

Existing Building have foundation width 0.6 m (load bearing structure). Bearing capacity is worked out at same depth below ground level. Considering the strip foundation, possibility of local shear is considered.

As per IS: 6403-1981, for local shear failure the ultimate bearing capacity is given as;

Qd = (Nq - 1) Sqdqiq + ½ B y NySydyiy

Where

Qd	Net ultimate bearing capacity
Ø	Angle of Int.Friction, = 30 Degrees (considering local shear)
y	Average Density Of Overburden = 1.9 t/cu.m.
Nq,Ny	Bearing capacity factors based on Ø = (18.4 , 22.4 resp.)
Sq,Sy	Shape factors (1 for strip foundation)
dq,dy	Depth factors (1 for strip foundation)
iq,ig	Inclination Factors 1 each (for vertical Loads)
q	Effective surcharge at 1.5 m. below GL. 1.2 x 1.9 = 2.28 tons/Sq.m.
B	Width of footing 0.6 m. assumed

Hence

Qd = 2.28 x (18.4 - 1) + 0.5 x 0.6 x 1.9 x 22.4

Qd = 65.7 Tons/sq.m.

Allowing a Factor of Safety of 3 the SBC will be 21.9 tons/sq.m.

B Permissible Bearing Pressure

Permissible bearing pressure is the maximum allowable load intensity on foundation under which the settlement are within limits. As per IS: 1904, the permissible settlement on foundations resting on cohesion less layer is 50 mm. for isolated footings

Total foundation settlement in clayey Sand layer comprise of immediate settlement only. As per figure 9 of IS: 8009 Part 1, for N = 50, the settlement of foundation under 10 tons/sq.m. is 5.8 mm. Allowing for water table, the corrected settlement will be 11.6 mm.

Hence, for a 50 mm. allowable settlement, the foundation pressure would be 50 x 10/11.6 = 43.1 tons/sq.m.

Considering variation in stratum, loose pockets, variation in degree of weathering, permissible bearing pressure of **40 tons/sq.m.**can be considered.

C Allowable Bearing Capacity

- *For an isolated footing the **net safe bearing capacity** considering**Shear Failure is** calculated **21.9 tons/sq.m.***
- ***Permissible bearing pressure** on foundation is **40 tons/sq.m.***
- *Hence, least of the two i.e. **Allowable Bearing Capacity shall be: 21.9 tons/sq.m.***

For the proposed expansion, the allowable bearing capacity of **20 tons/sq.m.** can be considered.

8. RECOMMENDATIONS

- The concrete for all the tested beams & columns for new and old structure is **GOOD** in terms of quality and homogeneity.
- The strength of the tested concrete by rebound hammer test, indicated a strength of grade **M25**.
- The bearing stress of the masonry of both the floors, calculated from the compressive strength of the bricks, is**11 tons/ running meter**.
- Bearing capacity of the soil stratum at which the old load bearing and the new framed structure is placed, is **20 tons /m^2.**

For **GEOTECH SERVICES**

SudhirLadkhedkar
GM (Tech)

- *The above result relates only to the location(s) were the test(s) has been conducted.*
- *No report shall be reproduced in part, except in full, without written approval of this laboratory.*
- *Any query regarding report may be reported immediately.*

ANNEXURE

NDT Test Results:

	Member	Point ID	Rebound Hammer (R-Avg.)	Strength from R-value In MPA	UPV (m/sec) Direct	UPV (m/sec) Semi-direct
Old portion	Beam (Room 1) at Corridor 1	A	36	35	3733	
		B	40	42		
		C	37	37	2048	
	Beam (Room 2) at Corridor 1	A	40	42	3699	
		B	39	40		
		C	32	30	3104	
	Beam (Room 3) at Corridor 1	A	31	28	3709	
		B	43	47	3613	
		C	38	38	3820	
	Beam-01 at Corridor 1	A	31	28	3698	
		B	34	32	3944	
	Beam-02 at Corridor 1	A	36	35	3931	
		B	35	34	3125	
	Beam (Room 2) at Corridor 2	A	33	31	2843	
		B	27	23	2132	
		C	37	37	2751	
	Beam (Room 3) at Corridor 2	A	33	31	2745	
		B	28	24	2665	
		C	27	23	2768	
	Beam-01 (Room 4) at Corridor 2	A	33	31	2401	
		B	32	30	2678	
	Beam-02 (Room 4) at Corridor 2	A	32	30	3019	
		B	33	31	2651	
	Beam at Corridor 2	A	33	31	3214	
		B	35	34	3715	
	Column-01 at Corridor 3	A	44	48		3672
		B	41	43	3319	

Location	Member	Point ID	Rebound Hammer (R-Avg.)	Strength from R-value In MPA	UPV (m/sec) Direct	UPV (m/sec) Semi-Direct
Old portion	Column-02 at Corridor 3	A	41	43	3533	
		B	41	43	3295	
	Column-03 at Corridor 3	A	47	53	3577	
		B	38	39	3560	
	Column-04 at Corridor 3	A	43	46	3241	
		B	38	39	3846	
	Column-05 at Corridor 3	A	37	37		3490
		B	35	33		3983
New portion	Beam-01 (Room 4) at Corridor 1	A	45	50		4222
		B	42	45		3982
		C	46	52		4172
	Beam-02 (Room 4) at Corridor 1	A	42	45		3672
		B	43	47		4224
	Beam (Room 5) at Corridor 1	A	45	50		4075
		B	40	42		4278
	Column-01 (Room 4) at Corridor 1	A	45	50		3807
		B	38	39		2809
		C	30	26		2634
	Column-02 (Room 4) at Corridor 1	A	33	31	3992	
		B	36	35	3992	
		C	34	33	3842	
	Column03 (Room 4) at Corridor 1	A	32	30	3910	
		B	32	29	4224	
		C	31	29	4094	
	Column (Room 5) at Corridor 1	A	30	26	3972	
		B	28	24	3953	
		C	29	25	3992	