18.11.2023

CORRIGENDUM-05

Name of the work: **Design and Construction of 100 Seats Government Medical College, 500 Bedded Hospital and allied Buildings at Alibag, Maharashtra on EPC Basis Including Defect Notification Period of 60 Months.**

Tender no. HITES/IDS/DMER-M/ALIBAG/23/15 (e-tender ID: 2023_HITE_167760_1) dated 11.10.2023

The Corrigendum-05 shall be treated as part of e-tender to be uploaded online duly signed and stamped along with e-tender:

The INTERIM SOIL INVESTIGATION REPORT is attached as Annexure

Important Note:

1. The above Corrigendum shall form part of the Tender Document and is to be submitted duly signed & stamped by the applicants along with their Application.
2. All other terms & condition of Tender document remains unchanged.
3. Prospective bidders are advised to regularly scan through https://etenders.gov.in/eprocure/app and HITES website tender page for corrigendum/amendments etc. and separate advertisement will not be made for this.

VP (ID), HITES South Operations
HITES

END OF CORRIGENDUM-05

GEOTECHNICAL INVESTIGATION REPORT

INTERIM GEOTECHNICAL INVESTIGATION REPORT FOR PROPOSED INSTITUTIONAL BUILDING AT USAR VILLAGE, ALIBAUG, RAIGAD, MAHARASHTRA

SUBMITTED TO:
HLL INFRATECH SERVICES LTD.

NOVEMBER 2023

THE EXPERT YOU NEED

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INTERIM GEOTECHNICAL INVESTIGATION REPORT FOR PROPOSED INSTITUTIONAL BUILDING AT USAR VILLAGE, ALIBAUG, RAIGAD, MAHARASHTRA FOR HLL INFRATECH SERVICES LTD.

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INTERIM GEOTECHNICAL INVESTIGATION REPORT FOR PROPOSED INSTITUTIONAL BUILDING AT USAR VILLAGE, ALIBAUG, RAIGAD, MAHARASHTRA FOR HLL INFRATECH SERVICES LTD.

1.0 INTRODUCTION

HLL Infratech Services Ltd. Plans Construction of an Institutional Building in Alibaug, Raigad. The Proposed Building will consist of Single Basement + Ground + 6Upper Floors. The work of Geotechnical Investigation was awarded to Perfect Geotechnics Pvt. Ltd. The field work for the Geotechnical Investigation was completed by Perfect Geotechnics Pvt. Ltd in November 2023. This Interim report prepared by Perfect Geotechnics Pvt. Ltd. presents results of the Geotechnical Investigation along with foundation recommendations for proposed building.

2.0 EXPLORATION PROGRAM

2.1 Exploration Scope

Two boreholes (BH-01& BH-03) were completed for the project as illustrated on the Borehole Location Plan in the Annexure.

2.2 Subsurface Conditions

Subsurface profile at this site generally consists of black cotton soil overlying completely weathered rock underlain by hard basalt bedrock. Encountered soil/rock layers are described below;

LAYER I: BLACK COTTON SOIL

Black Cotton Soil was encountered at ground surface in the boreholes. These black soils are potentially expansive. The lower boundary of this layer was encountered at depths of 0.2m to 1.5m below ground surface.

LAYER II: COMPLETELY WEATHERED ROCK (CWR)

Completely weathered rock was encountered at a depth of 1.5m below ground surface in the boreholes. This layer is formed by the complete in-place disintegration of parent bedrock material, but still partially retains the original rock mass structure. SPT tests conducted in this layer encountered refusals. Core recoveries were less than 35%. The lower boundary of this layer was encountered at a depth of 4.5m below ground surface.

LAYER III: HARD BASALT BEDROCK

Greyish hard basalt bedrock was encountered at depths of 0.2m to 4.5m below ground surface. The bedrock was moderately weathered to sound. Core Recoveries varied from72% to 99%, while Rock Quality Designation (RQD) ranged from50% to95%.Compressive strength of rock samples ranged from 206.71 kg/cm^2 to378.18kg/cm^2. The boreholes were terminated in this layer at a depth of 10.0m below ground surface.

2.3 Ground Water Levels

Groundwater accumulation in boreholes was monitored during and after completion of drilling activities. Groundwater was observed in boreholes at depths of 2.5m to 2.8m below ground level. Seasonal and annual fluctuations in ground water levels can be expected.

3.0 FOUNDATION RECOMMENDATIONS

Hard bedrock was encountered at depths of 0.2m to 4.5m below ground surface in the boreholes. Spread foundations for proposed building with single basement supported on this hard bedrock can be designed for a maximum net allowable bearing capacity of 100 t/m^2.Hard rock founding strata can be identified as it offers complete refusal to bucket excavators. Depths to CWR &hard rock are given in Table A below.

TABLE A
DEPTHS TO HARD ROCK

Borehole Numbers	Ground Reduced Level	Depths to CWR	Depths to hard Rock
BH-01	+98.49m	0.2m	0.2m
BH-03	+97.34m	1.5m	4.5m

Slow progress and higher costs should be anticipated in excavation of hard rock at this site.

Maximum settlement of foundations will be less than 12mm. A Modulus of subgrade reaction of 8300 t/m^3 can be utilized for design of foundations.

3.1 Basement Consideration

Excavation sides should be sloped at a maximum slope of 1:1 (Horizontal: Vertical) or flatter within top 0.2m to 1.5m thick overburden soils and 1:2 (Horizontal: Vertical) below this depth

Basement floors and walls should be adequately water-proofed. Adequate uplift resistance in the form of dead weight should be provided. An allowable grout/rock bond stress of 30 t/m^2 can be utilized for design of rock anchors. Maximum groundwater table for uplift design should be taken at ground surface.

Slow progress and difficulties should be anticipated in excavation of hard rock mentioned in Table A.

3.2 Lateral Earth Pressures

Basement walls will be subjected to lateral earth pressures. Lateral earth pressure parameters for design of basement walls are given in Tables B below. Hydrostatic pressures and surcharge pressures, if any, should also be considered.

TABLE B
LATERAL EARTH PRESSURE PARAMETERS
FOR DESIGN OF BASEMENT WALLS

Depth	Soil Type	Unit weight	At rest earth pressure coefficient
0.0m – 1.5m	Black cotton soil	1.8 t/m^3	0.50
1.5m – 4.5m	CWR	2.1 t/m^3	0.22
Below 4.5m	Hard Basalt Bedrock	2.4 t/m^3	1

CWR: Completely Weathered Rock

3.3 Foundation Protection

Results of chemical analysis on soil and groundwater samples enclosed in the Annexure, indicate that the site falls under Class 1 for sulphate concentrations and chloride concentrations (As per IS456 and as per CIRIA Sp. Publication No. 31). A 'Moderate' Exposure Condition was assigned to this site. Therefore following precautions are recommended to protect subsurface concrete and reinforcement.

Type of Cement:	OPC or PPC
Minimum Grade of Reinforced Concrete:	M25
Minimum Cement Content for Spread Foundation:	300 kg/m^3
Maximum Water Cement Ratio:	0.50
Minimum Cover to Reinforcement:	50mm

4.0 FIELD EXPLORATION PROCEDURES

The sub-surface investigation was completed generally as per IS: 1892-1979. The field investigation was carried out using rotary rigs (Calyx, 8 HP, Engine). Casing was used to support sides of borehole until sufficiently stiff strata was encountered. Standard Penetration Tests (i.e. SPT) were carried out at every 1.5m vertical interval up to bedrock, in accordance with IS 2131-1981. Using this procedure, a 5 cm outside diameter split-barrel sampler is driven into the soil by 63.5 kg. weight falling through 75 cm height. After an initial set of 15cm, the number of blows required to drive the sampler an additional 30 cm, is known as the "penetration resistance" or "N value".

After SPT refusal was obtained, NX sized rock coring was done in maximum of 1.5m runs, using diamond bit and double tube core barrel. Percent Rock Core Recovery and percent Rock Quality Designation (%RQD) were determined. % RQD = 100 x Sum of length of rock pieces in cms, each having lengths greater than 10cms/Total length of core run in cms.

Sincerely,

PERFECT GEOTECHNICS PVT.LTD.

JaydeepWagh
B.E., M.S., P.E. (Geotechnical)

REFERENCES AND CALCULATIONS

REFERENCES

1) Foundation Analysis and Design, J.E. Bowles, McGraw Hill Publication, 5th Edition, 1996.

2) Canadian Foundation Engineering Manual.

3) Soil Mechanics in Engineering Practice, 2nd Edition, Terzaghi K. and Peck R. B., John Willey and Sons, 1967.

4) Foundation Design Manual, N. V. Nayak, 5th Edition, 1996.

5) IS:6403-1981, Code of Practice for Design and Construction of Shallow Foundations on Soils.

6) IS 12070: 1987, Code of Practice for Design and Construction of Shallow Foundations on Rocks.

SAMPLE CALCULATION OF ALLOWABLE BEARING CAPACITY FOR FOUNDATIONS ON HARD BEDROCK

Allowable bearing capacity = (Nj) x Qu (Ref. 6, Clause 6.2, pg. 7)

Where,
Nj = Joint condition factor = 0.1 to 0.4 (Ref. 6, Table 4, clause 6.2, pg. 9)
Assumed as 0.1 for hard rock

Qu = Rock Compressive strength = minimum of 1240 t/m^2(Annexure, Laboratory Test Result)

Therefore, Allowable Bearing Capacity = 0.1x 2067 = 206 t/m^2

Restricted to 100 t/m^2

CALCULATION OF SETTLEMENTS OF SPREAD FOUNDATIONS (3m x 3m) EXERTING PRESSURE OF 100 t/m^2:

$$\text{Settlement} = S = q_0 B' \frac{1-\mu^2}{E_s} m I_s I_f$$

Where,
q_0 = Footing Pressure = 100 t/m^2
B' = B/2 (Where B is the width of pressure distribution
μ = Poisson's ratio = 0.25
E = Modulus of Elasticity
I_s = Influence Factor (Obtained from Table 5-2, Reference No. 1)
I_f = Depth Factor (Obtained from Figure 5-7, Reference No. 1)
m = 4 for center of footing

E value for Basalt bedrock = 17,00,000 t/m^2 (Reference No. 1)
Using 1/10th of this value, E = 1,70,000 t/m^2

L' =3/2 =1.5, B' = 3/2 = 1.5, H=10m, and D=4.5m
Therefore, M=L/B=1; and N=H/B'=6.67 and D/B=1.5
Corresponding, I_s = 0.53, Conservative I_f = 1.0 (From Table 5-2, Reference 1)

Settlement of Layer = $S_1 = 100x1.5x\frac{1-0.25^2}{1,70,000}x4x0.53x1.0$ = 0.002m = 2mm

BORE LOGS

CLIENT : HILL INFRATECH SERVICES LTD. (HITES)

PROJECT: Geotechnical Investigation work for proposed Institutional Building (G+6) With Single Basement at Usar, Village Alibag, Dist: Raigad

BORE HOLE NO.	: BH-1	SHEET NO.	: 1
LOCATION	: Usar Village, Alibag, Dist: Raigad,Maharashtra	DATE	: 06/11/23 TO 11/11/23
		METHOD	: ROTARY DRILLING
GROUND R. L.	: +98.491M	CASING	: 0.20 MTR BGL
GROUND W. T.	: 2.50 MBGL	JOB NO.	: 3168

DEPTH (m.)	DIA. OF BORE HOLE	LOG	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
EGL	100MM		Black Cotton Soil	0.00									
				0.20									
			Greyish Brown Brown Weathered Basalt Rock								72	50	
1.00				1.00									
											87	73	
2.00													
				2.50									
3.00											93	93	
4.00				4.00									
	NX										93	82	
5.00			Greyish Basalt Rock										
				5.50									
6.00											91	78	
7.00				7.00									
											95	95	
8.00				8.50									
											97	79	
9.00			Brownish Grey White Infilling Basalt Rock										
10.00				10.00									

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY R = Refusal (N>100) | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BOREHOLE TERMINATED AT 10.00M BGL.

NOT TO SCALE

PERFECT GEOTECHNICS PVT. LTD. NAVI MUMBAI

CLIENT : HILL INFRATECH SERVICES LTD. (HITES)

PROJECT: Geotechnical Investigation work for proposed Institutional Building (G+6) With Single Basement at Usar, Village Alibag, Dist: Raigad

BORE HOLE NO. : BH-3	SHEET NO. : 1
LOCATION : Usar Village, Alibag, Dist: Raigad, Maharashtra	DATE : 08/11/23 TO 13/11/23
	METHOD : ROTARY DRILLING
GROUND R. L. : +97.345M	CASING : 1.50 MTR BGL
GROUND W. T. : 2.80 MBGL	JOB NO. : 3168

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
EGL	100MM		Black Cotton Soil	0.00									
				0.30									
1.00			Brownish Completely Weathered Rock with Black Cotton Soil										
				1.50	SPT-1								
				1.55		52	X	X	X	R			
2.00			Reddish Brown Highly Weathered Basalt Rock								22	NIL	
3.00				3.00									
			Brownish Highly Weathered Basalt Rock								33	NIL	
4.00													
				4.50									
5.00			Greyish Brown Weathered Basalt Rock								73	60	
6.00	NX			6.00									
			Greyish Quartz Basalt Rock								97	87	
7.00													
				7.50									
8.00			Greyish Basalt Rock								99	83	
9.00				9.00									
											95	95	
10.00				10.00									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY R = Refusal (N>100)
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

REMARKS : BOREHOLE TERMINATED AT 10.00M BGL.

NOT TO SCALE

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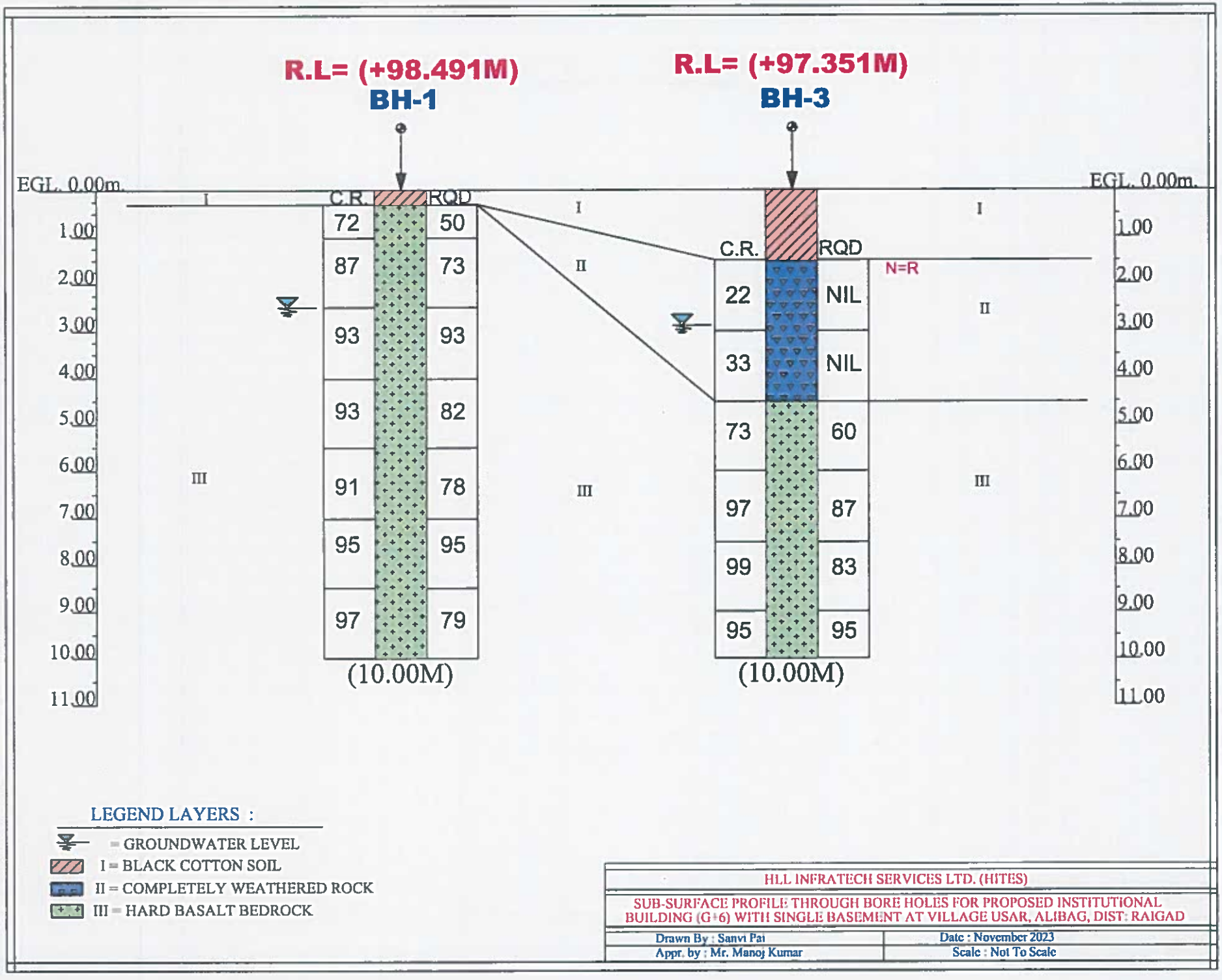
R.L= (+98.491M)
BH-1
R.L= (+97.351M)
BH-3
EGL. 0.00m.
EGL. 0.00m.
C.R
RQD
C.R.
RQD
N=R
72
50
87
73
93
93
93
82
91
78
95
95
97
79
22
NIL
33
NIL
73
60
97
87
99
83
95
95
I
II
III
(10.00M)
(10.00M)
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
LEGEND LAYERS :
= GROUNDWATER LEVEL
I = BLACK COTTON SOIL
II = COMPLETELY WEATHERED ROCK
III = HARD BASALT BEDROCK
HLL INFRATECH SERVICES LTD. (HITES)
SUB-SURFACE PROFILE THROUGH BORE HOLES FOR PROPOSED INSTITUTIONAL BUILDING (G+6) WITH SINGLE BASEMENT AT VILLAGE USAR, ALIBAG, DIST: RAIGAD
Drawn By : Sanvi Pai
Appr. by : Mr. Manoj Kumar
Date : November 2023
Scale : Not To Scale

LABORATORY TEST REPORT

PERFECT GEOTECHNICS PVT. LTD.
24,25, Maruti Paradise, Sector-15, CBD Belapur, Navi Mumbai-400614.
Email : manoj@perfectgeotechnics.com
Web : www.perfectgeotechnics.com
Tel:022 - 27570146
Fax:022-27570147

NABL ACCREDITED LABORATORY TC 7148

TEST RESULT OF ROCK CORES

PROJECT: PROPOSED INSTITUTIONAL BUILDING (G+6) WITH SINGLE BASEMENT AT USAR VILLAGE, ALIBAG, RAIGAD, MAHARASHTRA

ADDRESS OF SITE: USAR VILLAGE, ALIBAG, DIST: RAIGAD, MAHARASHTRA — **JOB NO: 3168**

CLIENT: HLL INFRATECH SERVICES LTD. (HITES) — **DATE: 14.11.2023**

SN.	BORE HOLE	DEPTH (m)	CORE DIA (cm)	HEIGHT (cm)	UCS kg/ cm² (IS:9143)	POROSITY % (IS: 13030)	WATER ABSORPTION % (IS: 13030)	DRY DENSITY gm/cm³ (IS: 13030)	SPECIFIC GRAVITY (IS: 1122)
1	BH1	0.20-1.00	5.40	10.90	254.27	1.20	0.44	2.71	2.74
2	BH1	1.00-2.50	5.40	10.80	325.29	0.81	0.29	2.78	2.80
3	BH1	8.50-10.00	5.41	11.02	378.18	0.39	0.14	2.81	2.83
4	BH2	4.50-6.00	5.38	10.85	206.71	1.22	0.46	2.67	2.69
5	BH2	6.00-7.50	5.40	10.80	298.55	0.81	0.29	2.75	2.78
6	BH2	9.00-10.00	5.41	11.02	315.77	0.39	0.14	2.82	2.85

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Tel :022 - 27570146
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TC 7148

POINT LOAD TEST RESULT OF ROCK SAMPLES
(IS: 8764)

PROJECT: PROPOSED INSTITUTIONAL BUILDING (G+6) WITH SINGLE BASEMENT AT USAR VILLAGE, ALIBAG, RAIGAD, MAHARASHTRA

ADDRESS OF SITE: USAR VILLAGE, ALIBAG, DIST: RAIGAD, MAHARASHTRA | **JOB NO: 3168**

CLIENT: HLL INFRATECH SERVICES LTD. (HITES) | **DATE: 14.11.2023**

S. N.	BORE HOLE	DEPTH BGL. (M)	POINT LOAD	
			Load In (KN.)	Point Load Index (Kg./cm^2)
1	BH3	1.50-3.00	1.5	5.55
2	BH3	3.00-4.50	2.0	7.40

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Tel :022 - 27570146
Fax.022-27570147

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TC 7148

CHEMICAL ANALYSIS OF WATER

PROJECT: PROPOSED INSTITUTIONAL BUILDING (G+6) WITH SINGLE BASEMENT AT USAR VILLAGE, ALIBAG, RAIGAD, MAHARASHTRA

ADDRESS OF SITE: USAR VILLAGE, ALIBAG, DIST: RAIGAD, MAHARASHTRA — **JOB NO: 3161**

CLIENT: HLL INFRATECH SERVICES LTD. (HITES) — **DATE: 01.11.2023**

S.NO.	BH	PH VALUE	CL mg/lit	SO4 mg/lit
1	1	7.53	204.76	98.00
2	3	7.55	214.70	102.00
REFRENCE: IS 456-2000		(PERMISSIBLE LIMIT 6 TO 9)	AS PER IS 456-2000 MAX 2000 FOR PLAIN CONCRETE AND 500 FOR REINFORCED CONCRETE	AS PER IS 456-2000 MAX 400

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Fax:022-27570147

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TC 7148

CHEMICAL ANALYSIS OF SOIL

PROJECT: PROPOSED INSTITUTIONAL BUILDING (G+6) WITH SINGLE BASEMENT AT USAR VILLAGE, ALIBAG, RAIGAD, MAHARASHTRA

ADDRESS OF SITE: USAR VILLAGE, ALIBAG, DIST: RAIGAD, MAHARASHTRA — **JOB NO: 3168**

CLIENT: HLL INFRATECH SERVICES LTD. (HITES) — **DATE: 14.11.2023**

S.NO.	BH	DEPTH (m)	PH VALUE	CL %	SO4 %
1	1	0.00/0.20 (DS-1)	7.06	0.250	0.122
2	2	0.00/0.30 (DS-1)	7.04	0.256	0.132

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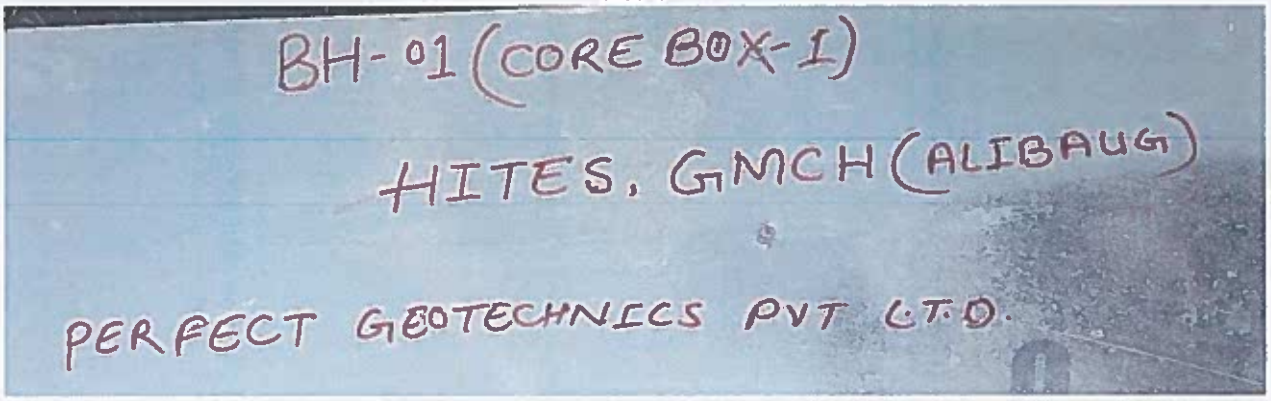
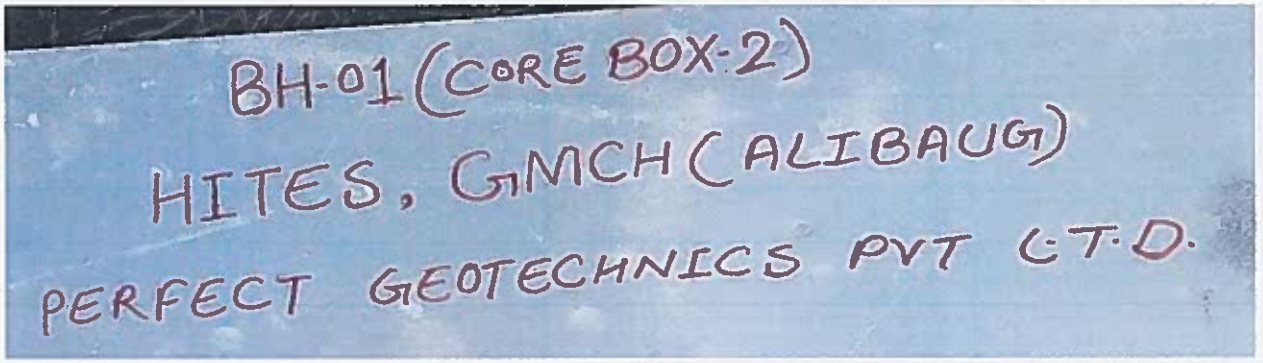
PHOTOGRAPH OF CORE SAMPLES

CLIENT: HLL INFRATECH SERVICES LTD. (HITES)

SITE ADD.: Village-Usar, Alibaug, Dist: Raigad, Maharashtra

BH-1



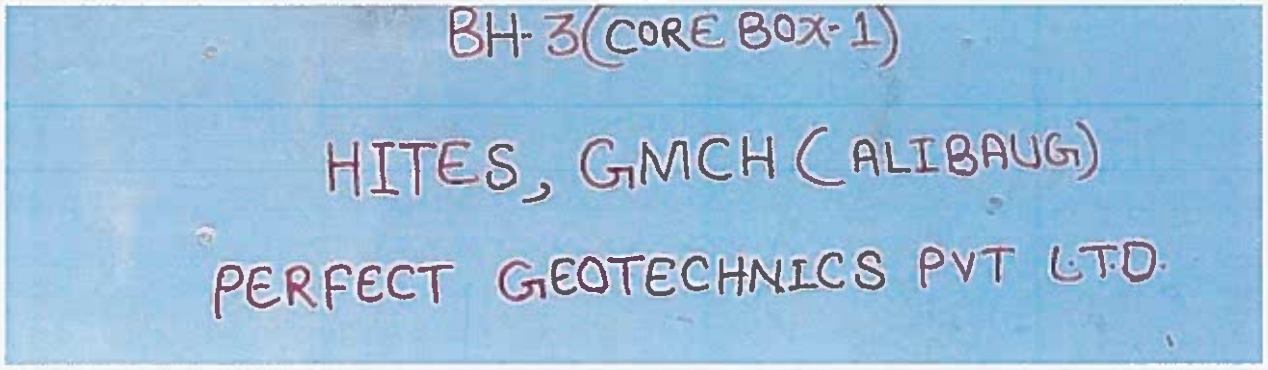


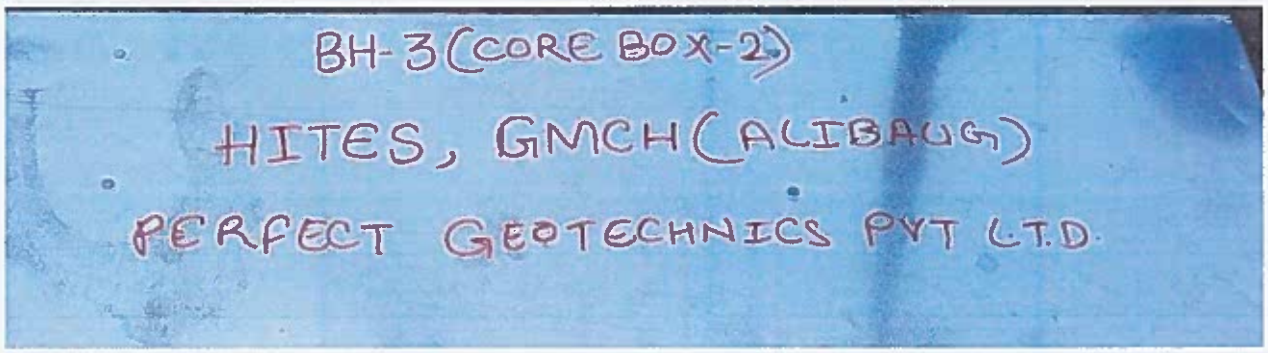
PERFECT GEOTECHNICS PVT. LTD., NAVI MUMBAI

CLIENT: HLL INFRATECH SERVICES LTD. (HITES)

SITE ADD.: Village-Usar, Alibaug, Dist. Raigad, Maharashtra

BH-3





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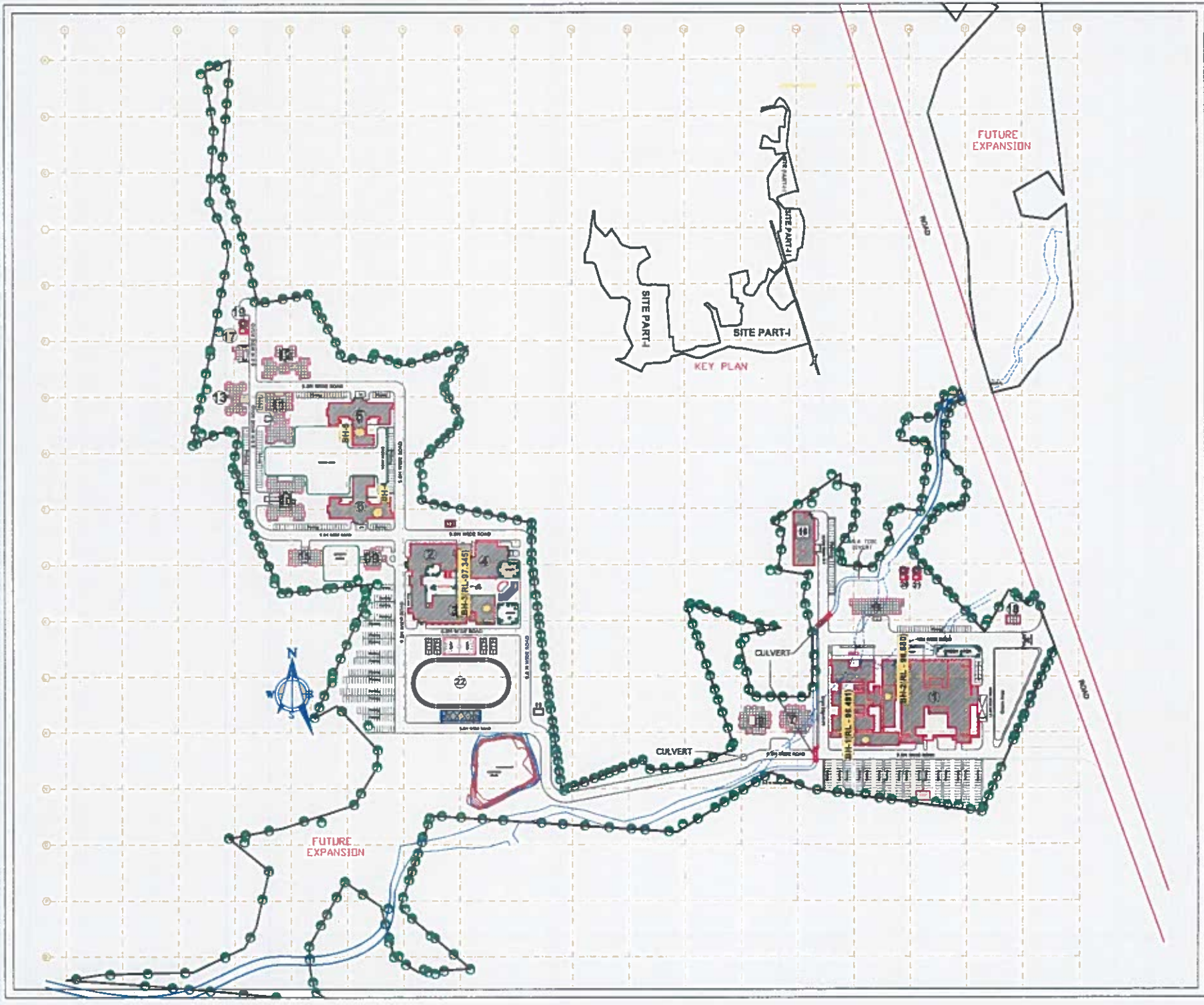
BORE HOLE LOCATION PLAN



PROPOSED MEDICAL COLLEGE COLLEGE, At-ALIBAUG,MAHARASHTRA.

01	-HOSPITAL WITH SERVICES	(G+6)
02	-MEDICAL COLLEGE	(G+7)
03	-ADMINISTRATION, LIBRARY & LECTURE HALLS	(G+5)
04	-MULTIPURPOSE EXAMINATION HALL	(G+1)
05	-BOYS HOSTEL & INTERN HOSTEL	(G+3)
06	-GIRLS HOSTEL & INTERN HOSTEL	(G+3)
07	- JUNIOR & SENIOR RESIDENT	
08	- Nurses Hostel	
09	- DIRECTOR RESIDENCE	
10	- RESIDENCE TYPE- V	
11	- RESIDENCE TYPE- IV	
12	- RESIDENCE TYPE- III	
13	-RESIDENCE TYPE- II	
14	- RAIN BASERA / Shopping Center	
15	- GUEST HOUSE	
16	- MORTUARY / AUTOPSY/CENTRAL Workshop/L GAS Plant	
17	- WASTE MANAGEMENT BUILDING	
18	- SUB STATION /Chiller plant	(G)
19	- PUMP ROOM	(G)
20	- STP	
21	- ETP	
22	- SPORT FACILITY	

EXISTING NALA

RELOCATE / EXISTING NALA

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PHASE-I

PHASE-II

PROPOSAL DRAWING

SITE PLAN

REFERENCE NO.	AF-1635-E-04
SHEET NO. :	AR -SP-01
SCALE :	1:300
DATE	JUNE, 2023
DRAWN BY :	Ar.Santosh Yadav
ARCHITECT	

CONVERSION TABLES

PRESSURE

To convert...	into...	Multiply by:
atm	bar	1.01325
	kg/cm²	1.0332
	PSI	14.696
	MPa	0.101325
	KPa	101.325
bar	atm	0.98692
	kg/cm²	1.01971
	PSI	14.504
	MPa	0.1
	KPa	100
kg/cm²	atm	0.96784
	bar	0.98067
	PSI	14.223
	MPa	0.098067
	KPa	98.0665
MPa	atm	9.869232
	bar	10
	kg/cm²	10.1971
	PSI	145.04
	KPa	1,000
KPa	atm	0.009869
	bar	0.01
	kg/cm²	0.010197
	PSI	0.145037
	MPa	0.001
PSI	atm	0.068046
	bar	0.068947
	kg/cm²	0.070307
	MPa	0.0068948
	KPa	6.89475

LINEAR

To convert...	into...	Multiply by:
cm	ft	0.032808
	in	0.3937
	metres	0.01
	microns	10,000
	mm	10
ft	cm	30.48
	in	12
	metres	0.3048
	microns	304,800
	mm	304.8
in	cm	2.54
	ft	0.08333
	metres	0.0254
	microns	25,400
	mm	25.4
metres	cm	100
	ft	3.28083
	in	39.37
	microns	1,000,000
	mm	1,000
microns	cm	0.0001
	ft	0.000003281
	in	0.00003937
	metres	0.000001
	mm	0.001
mm	cm	0.1
	ft	0.003281
	in	0.03937
	metres	0.001
	microns	1000

VOLUME

To convert...	into...	Multiply by:
cc	ft³	0.00003531
	in³	0.06102
	litre	0.001
	m³	0.000001
	US quart	0.0010567
	US Gallon	0.0002642
ft³	cc	28,317
	in³	1728
	litre	28.317
	m³	0.028317
	US quart	29.92
	US Gallon	7.4805
in³	cc	16.387
	ft³	0.0005787
	litre	0.016387
	m³	0.0000163
	US quart	0.01732
	US Gallon	0.004329
litre	cc	1,000
	ft³	0.03531
	in³	61.023
	m³	0.001
	US quart	1.057
	US Gallon	0.2642
m³	cc	1,000,000
	ft³	35.31
	in³	61,023
	litre	1,000
	US quart	1056.8
	US Gallon	264.2
US quart	cc	946.25
	ft³	0.03342
	in³	57.75
	litre	0.9463
	m³	0.0009463
	US Gallon	0.25
US Gallon	cc	3,785
	ft³	0.1337
	in³	231
	litre	3.785
	m³	0.003785
	US quart	4

FLOW

To convert...	into...	Multiply by:
cc/min	ft³/min	0.0000353145
	gal/min US	0.0002642
	in³/min	0.061
	L/min	0.001
ft³/min	cc/min	28,320
	gal/min US	7.48
	in³/min	1728
	L/min	28.32
gal/min US	cc/min	3785.4
	ft³/min	0.1337
	in³/min	231
	L/min	3.7854
in³/min	cc/min	16.39
	ft³/min	0.00057
	L/min	0.016
	gal/min US	0.004
L/min	cc/min	1,000
	ft³/min	0.03531
	in³/min	61.02
	gal/min US	0.26417

AREA

To convert...	into...	Multiply by:
cm²	ft²	0.0010764
	in²	0.155
	m²	0.0001
	mm²	100
ft²	cm²	929.0304
	in²	144
	m²	0.092903
	mm²	92903.04
in²	cm²	6.4516
	ft²	0.006944
	m²	0.0006451
	mm²	645.16
m²	cm²	10,000
	ft²	10.76391
	in²	1,550
	mm²	1,000,000
mm²	cm²	0.01
	ft²	0.000010764
	in²	0.00155
	m²	0.000001

TEMPERATURE

deg F = (deg C x 1.8) + 32
deg C = (deg F – 32) / 1.8