香港偉建工程顧問有限公司
Wai Kin (HK) Consultants Ltd.

Hydrotech

MPS System Installation
at Tin Ka Ping Lecture Theatre
Hong Kong Institute of Education
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1.0 Introduction

Hydrotech Asia Limited herein referred to as "Hydrotech" has been appointed by Wai Kin (HK) Consultants herein referred to as "Consultant" to undertake water leakage treatment using MPS System at Tin Ka Ping Lecture Theatre and Battery Rooms.

Hydrotech was given 15 calendar days to mobilise and complete the entire works from 17 to 31 August 2009. The Consultants instruction was to complete the MPS Installation before the opening of school year starting September 2009.

Tin Ka Ping Lecture Theatre is situated at D1-LP-02 Block D within the vicinity of the Hong Kong Institute of Education.

2.0 General Description of Tin Ka Ping Lecture Theatre

The Tin Ka Ping Lecture Theatre is a conventional reinforced concrete column to beam type of framing construction with floor to ceiling height of approximately 3.3 to 4.0 metres. The total area of the lecture theatre including the two battery rooms is approximately 350 sqm and has a sitting capacity of approx 250 persons.

3.0 Problem Statement

The Theatre was completed in 2004 and suffers from severe water ingress from the lowest level of floor slab through the body of the concrete lining and from the construction joints.

Existing 80mm thick cement/sand screeding layer laid on top of the structural floor slab was observed to be deteriorating. Visible cracks appeared on the surface and de-bonding was observed. Based on the conclusion of Hydrotech's investigation and recommendations, all screeding layers must be removed, MPS system will be install at the structural layer and screeding will be reinstated with the same thickness and specifications, refer to photos on the following page.








4.0 Hydrotech's Scope of Works

- Provide a comprehensive MPS System design to cater for the existing site condition.
- Supply all materials for the MPS System including control units, junction box, titanium wire, cathodes, feeder wires and connectors necessary to complete the installation.
- Provide all the necessary tools for the installation.
- Supervise the installation of the MPS System.
- Determine the extent of cracks and supervise the crack remedial works.
- Test and commission the MPS System.

5.0 MPS System Design for Tin Ka Ping Lecture Theatre

The MPS System design was catered to its site water ingress conditions. Based on site visits conducted by Hydrotech engineers, it was found that water ingress was coming up underneath the structural floor slab. This flow of water was visible inside the existing sump pit located at the Battery Room 1 and it was observed in one occasion during continuous heavy rains.

Titanium anode wires are strategically installed into the structural floor slab both in the Theatre and the two Battery Rooms. Additionally, anodes was also installed on the walls of the battery rooms, refer to the layout presented in Appendices.

6.0 MPS System Performance Monitoring

MPS System performance are based on electrical current readings and Relative Humidity (RH) probes installed at selected locations, refer to Appendices.

Current readings of each circuit are taken in the junction box using a multi-meter or ammeter testing equipment whilst the RH probe readings are taken using a device called “Reader”, which is inserted on each permanent probes and humidity levels are recorded.

The MPS System installed at Tin Ka Ping Lecture Theatre and Battery Rooms has been tested and commissioned on 8 October 2009 witnessed by the Consultant and a representative from the Hong Kong Institute of Education. The electrical current and RH readings are included in this report; refer to Appendices.

7.0 Performance Monitoring Schedule

Electrical current and RH probe readings have been taken on the following dates.

8 October 2009, 3 December 2009, 22 December 2009, 11 February 2010, 3 March 2010, 12 April 2010, 12 July 2010.

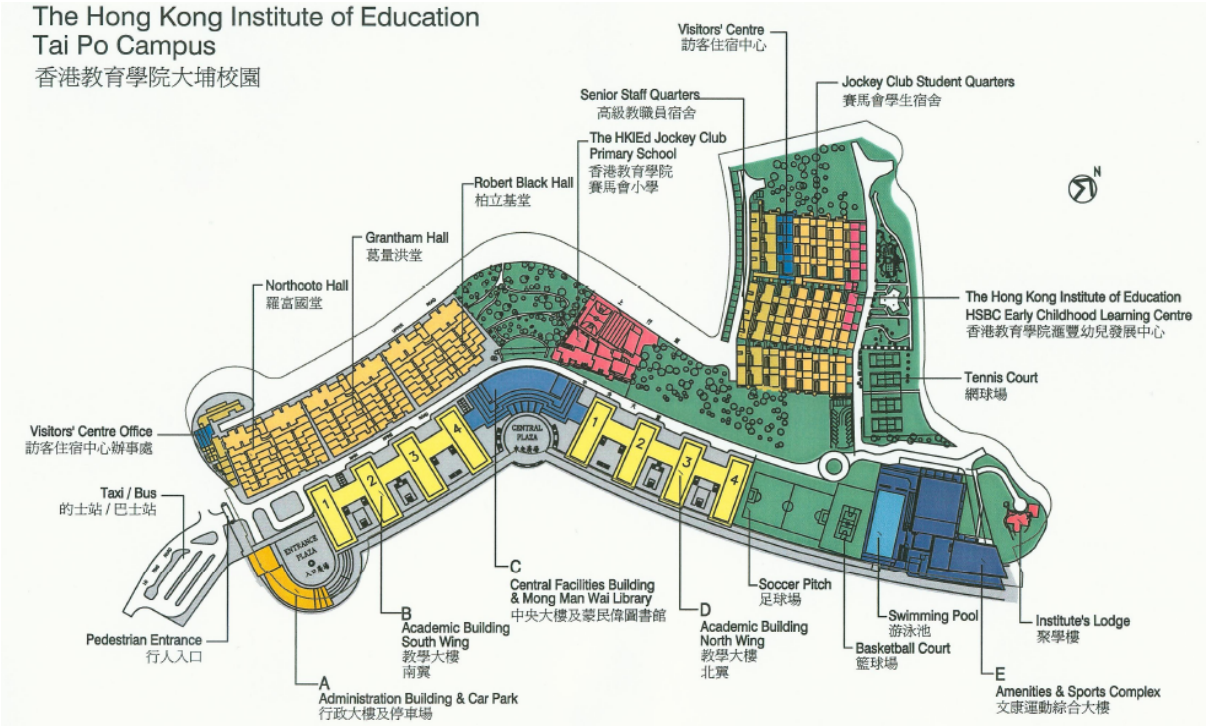
8.0 Conclusion

Based on the results of the Relative Humidity (RH) readings; the lowest RH levels recorded is 64% and the highest is 80% which is below the level set-forth in the BS Standard (BS 6150:2006 Table 16).

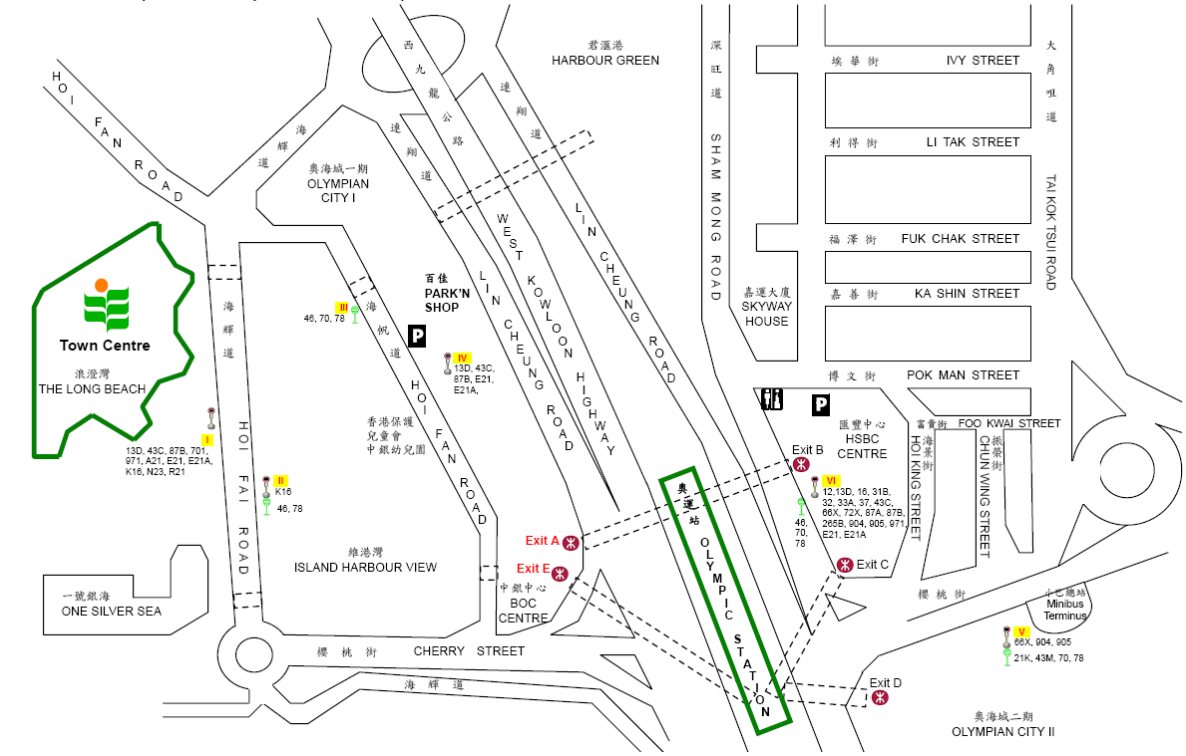
We therefore conclude that the MPS installation at Tin Ka Ping Lecture theatre is satisfactory.

9.0 Appendices

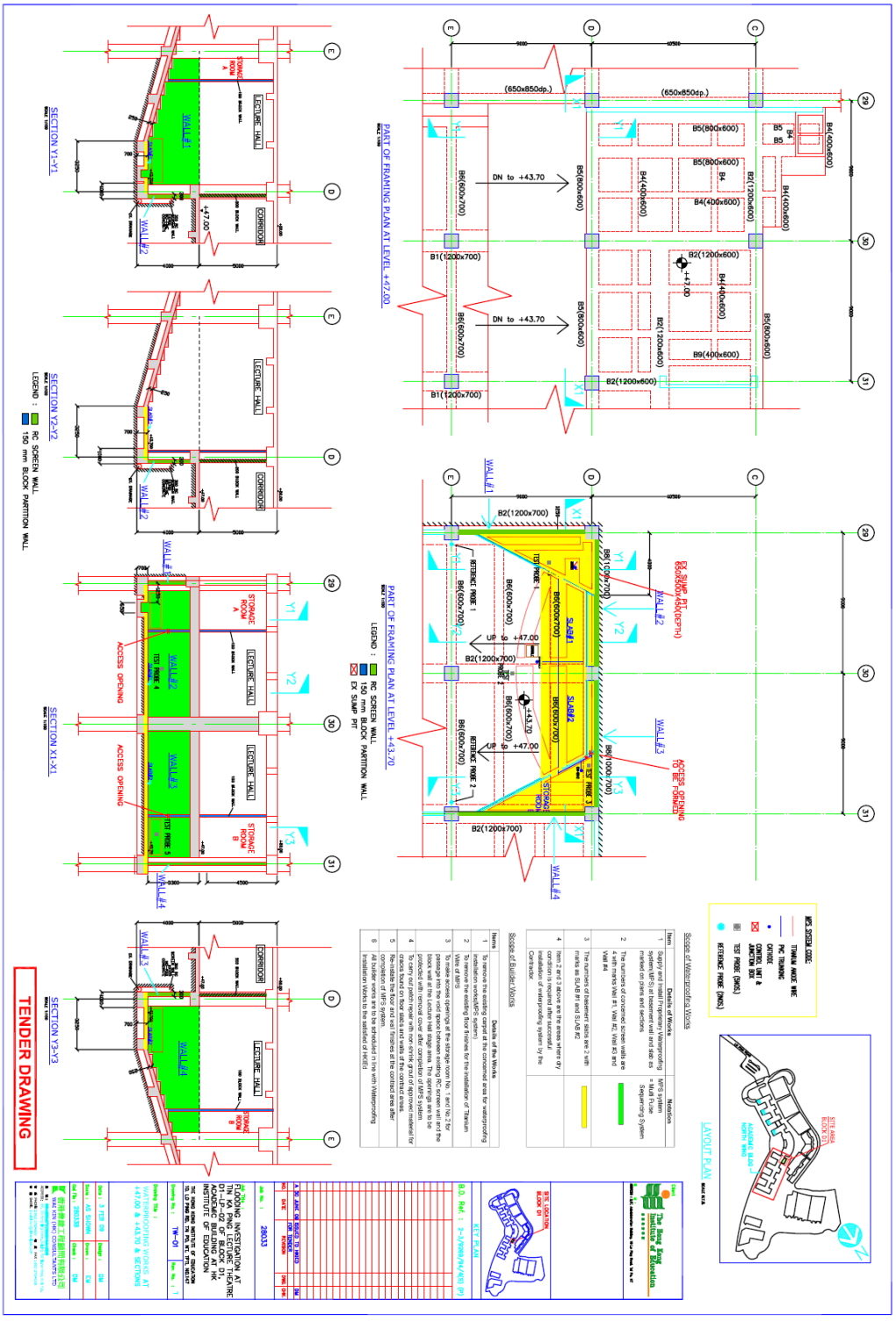
9.1 Project Location Map & Campus Map



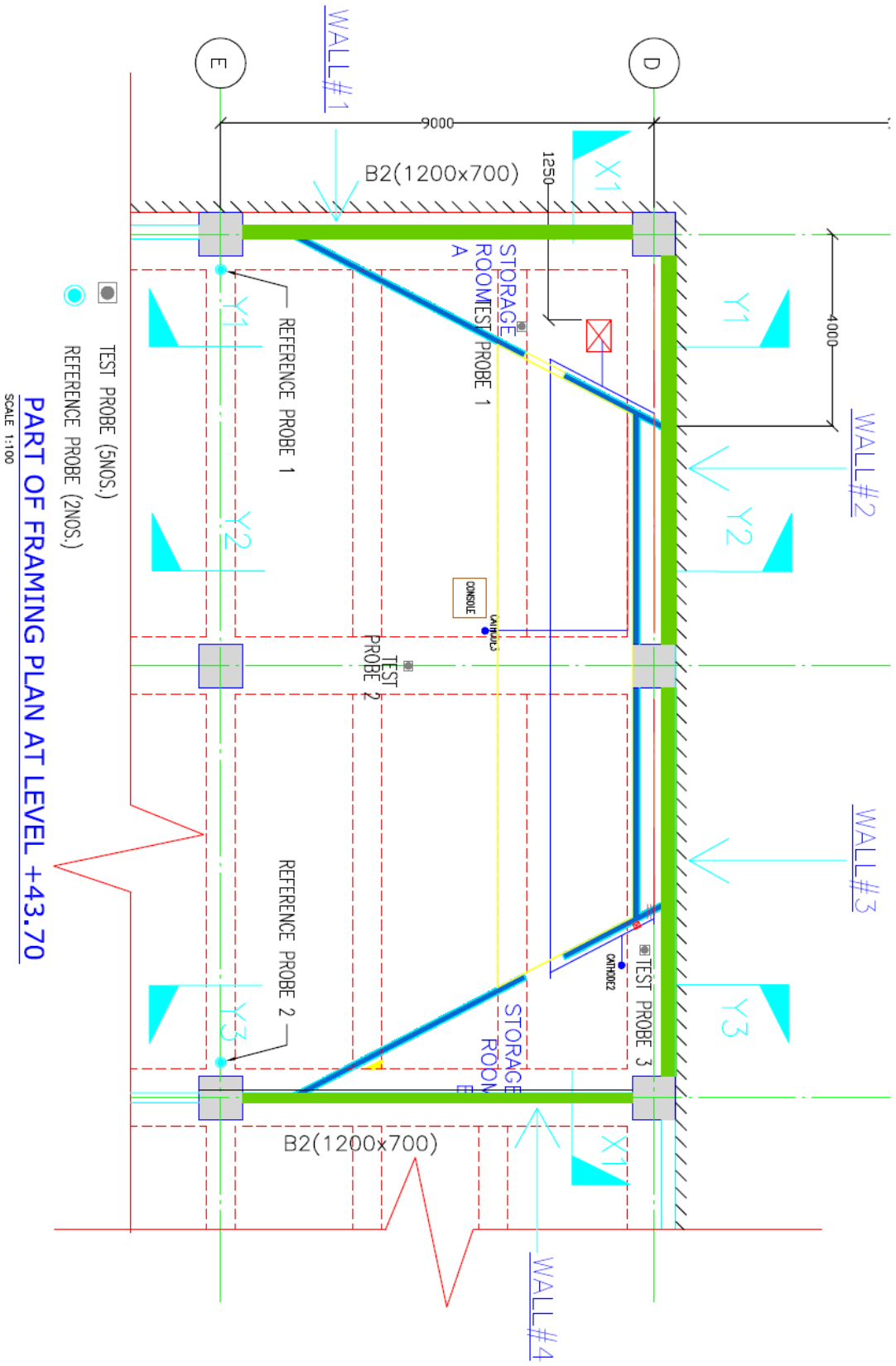
市區分校位置圖 (Location Map of Town Centre)



9.2 MPS Design Drawings

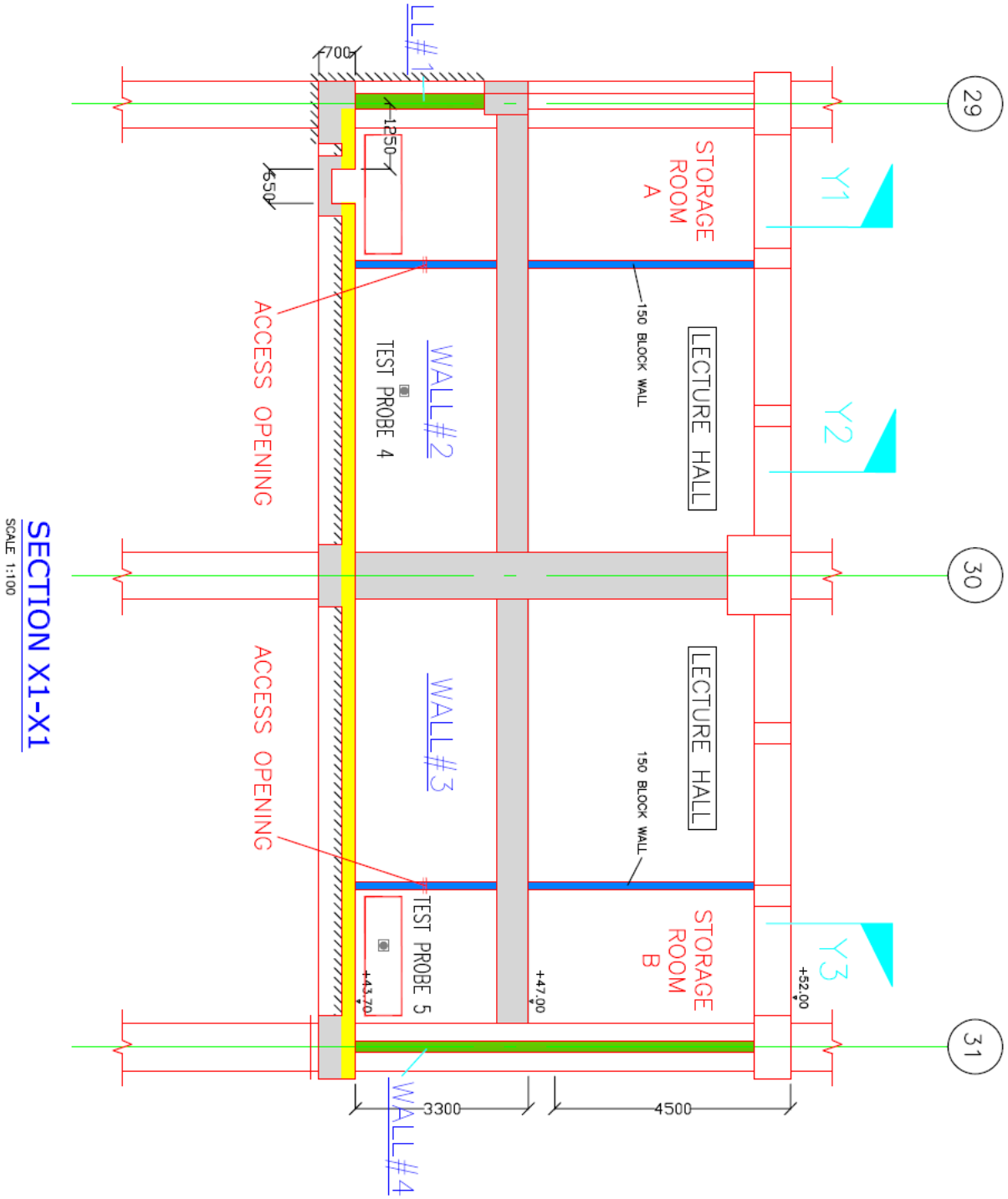


9.3 MPS Monitoring Points – Locations of RH Probes



PART OF FRAMING PLAN AT LEVEL +43.70

SCALE 1:100



SECTION X1-X1
SCALE 1:100

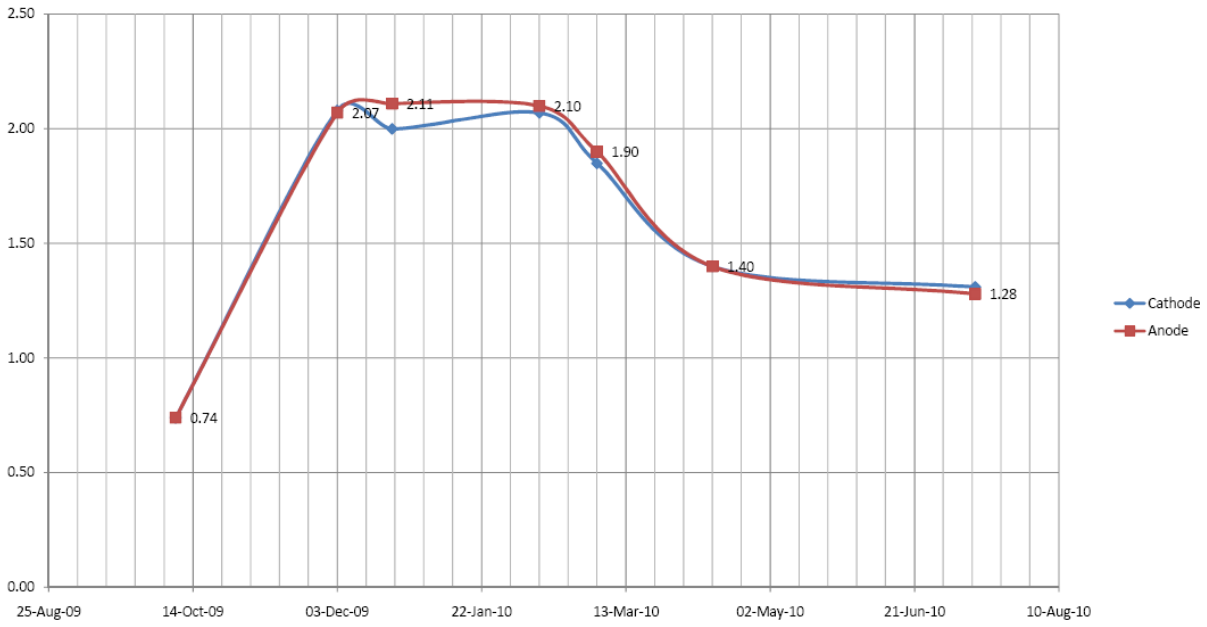
9.4 Electrical Current and RH Readings

Performance Monitoring of MPS System at Hong Kong Institute of Education

Location: Lecture Theatre and Battery Rooms 1 and 2

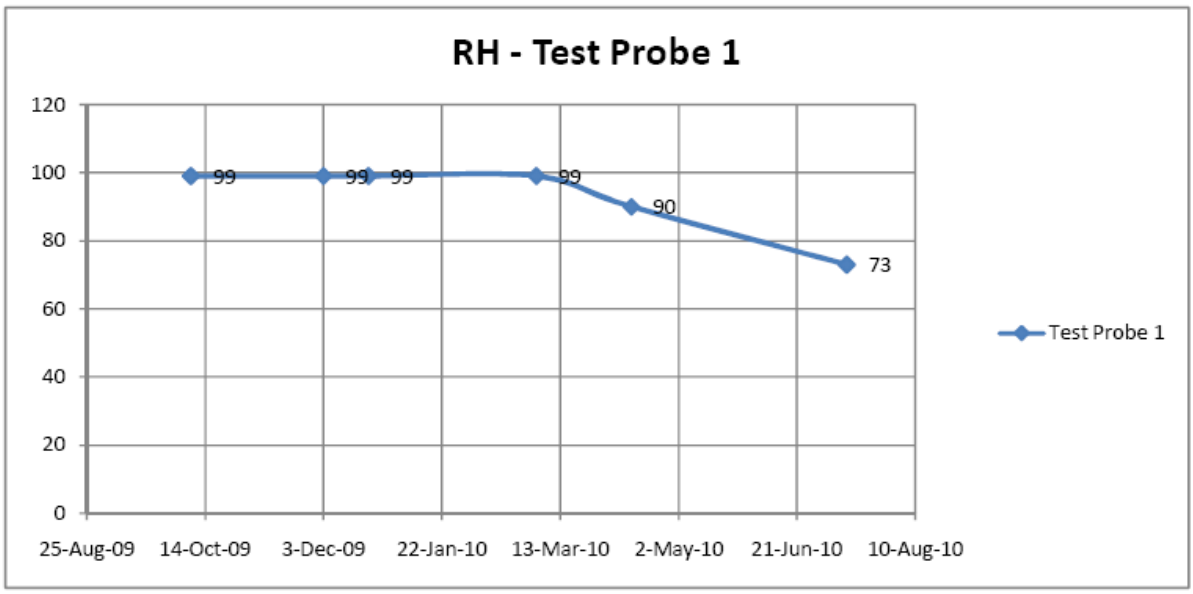
Hydrotech

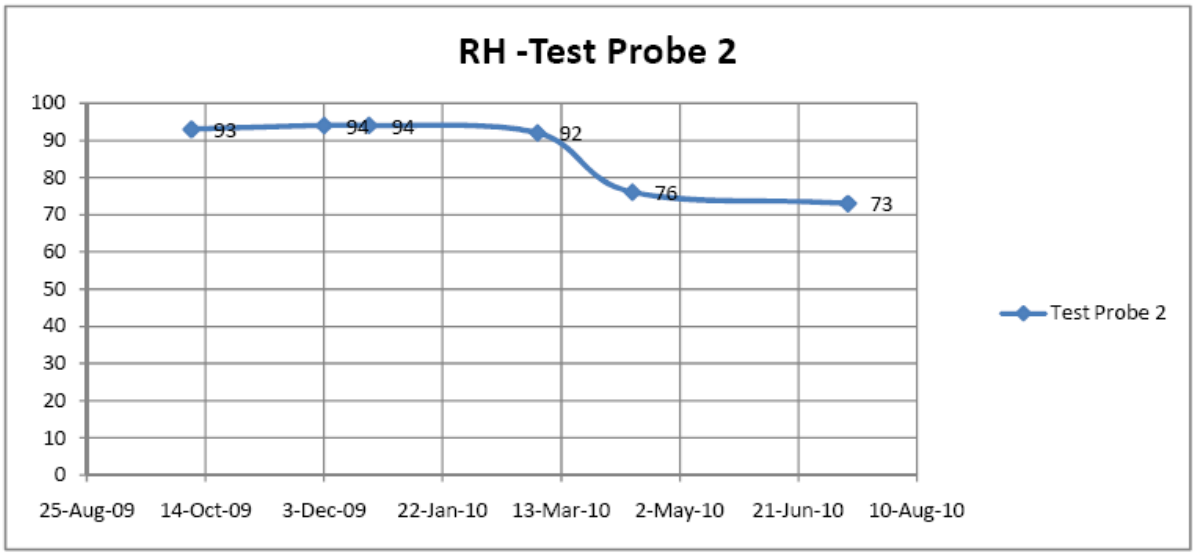
	Date of Commissioning :	8 Oct 09						
	Date of site visit:	08-Oct-09	3-Dec-09	22-Dec-09	11-Feb-10	3-Mar-10	12-Apr-10	12-Jul-10
	Weather:	Fine & Dry	cool & dry	sunny	Sunny	Cloudy	Cloudy	Fine
	Temperature:	25 deg	21 deg	20.6	21 deg	20 deg	20 deg	29 deg
	LCD Reading:	9% - 10%	20%	20%	19%	19%	19%	18%
No.	**Anode - WALLS**	Amps	Amps	Amps	Amps	Amps	Amps	Amps
1	**ALL**	0.74	2.07	2.11	2.10	1.90	1.40	1.28
2	**All Wall**	0.19	0.59	0.23	0.61	0.55	0.45	0.22
3	**W1**	0.60	0.90	0.09	0.73	0.68	0.45	0.39
4	**W2**	0.53	0.61	0.04	0.45	0.32	0.26	0.23
5	**W3**	0.32	0.30	0.03	0.25	0.22	0.15	0.11
6	**W4**	0.62	1.00	0.07	0.79	0.56	0.49	0.48
7	**W5**	0.53	0.51	0.04	0.42	0.34	0.24	0.21
8	**W6**	0.72	1.79	0.37	1.69	1.23	1.08	1.05
9	**All F**	0.47	1.26	1.71	1.31	1.23	0.95	1.08
10	**F1**	0.62	1.31	0.65	1.15	1.08	0.70	0.68
11	**F2**	0.72	1.44	0.81	1.26	1.05	0.82	0.80
12	**F3**	0.71	1.83	1.45	1.80	1.48	1.12	1.02
13	**F4**	0.77	1.98	1.55	1.89	1.69	1.17	1.13
14	**F5**	0.50	0.59	0.18	0.45	0.37	0.26	0.23
	Cathode							
15	**ALL C**	0.74	2.08	2.00	2.07	1.85	1.40	1.31
16	**C1**	0.22	0.55	0.58	0.56	0.48	0.43	0.38
17	**C2**	0.17	0.94	0.70	1.00	0.88	0.75	0.68
18	**C3**	0.44	0.87	0.82	0.77	0.64	0.54	0.53
	Reading taken by:	EC	EC	JC	EC	EC	EC	EC

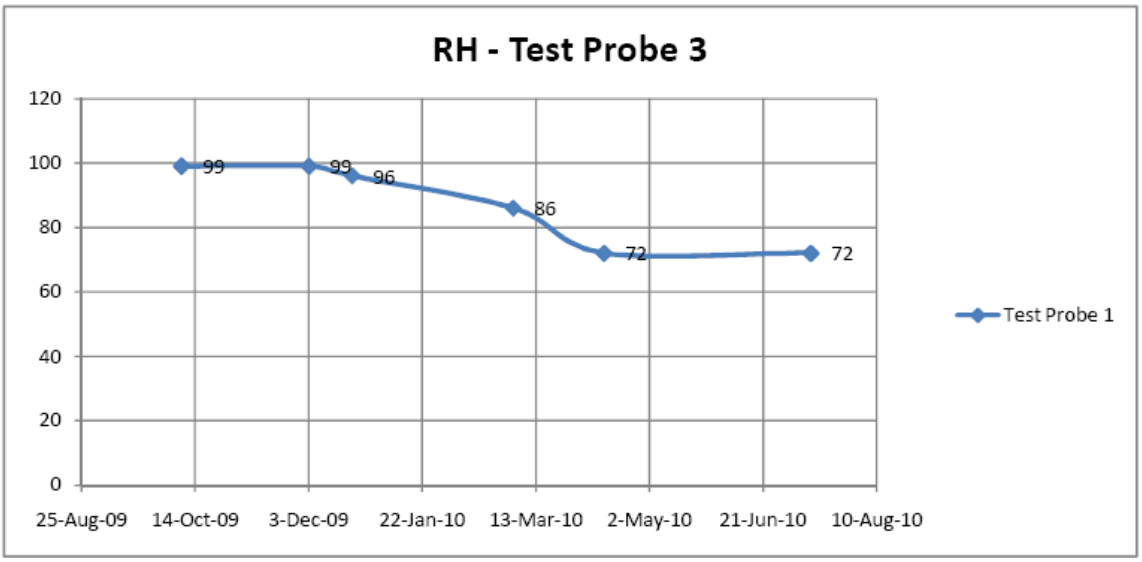


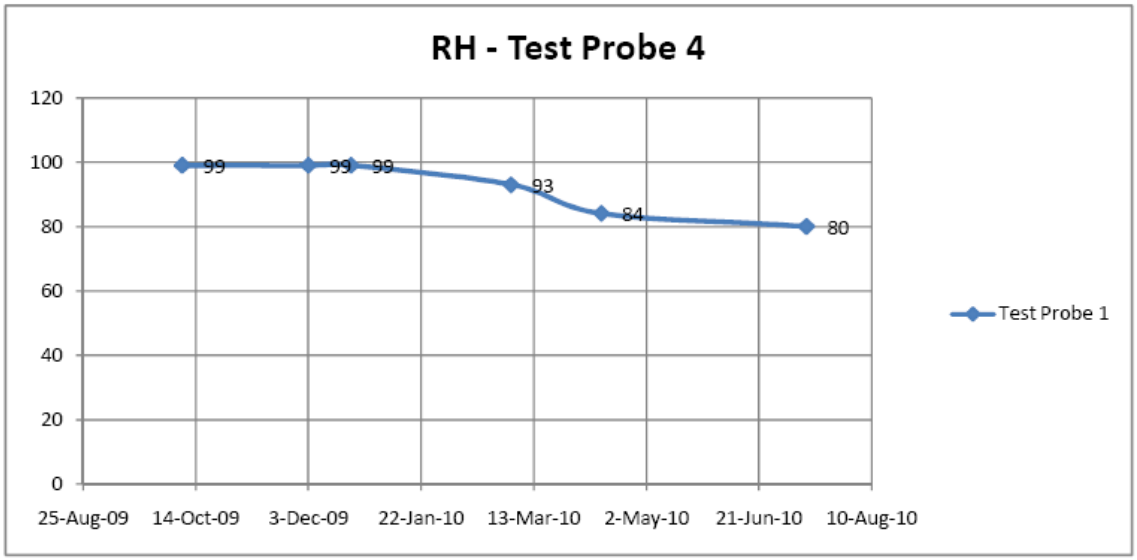
9.5 Relative Humidity (RH) Readings

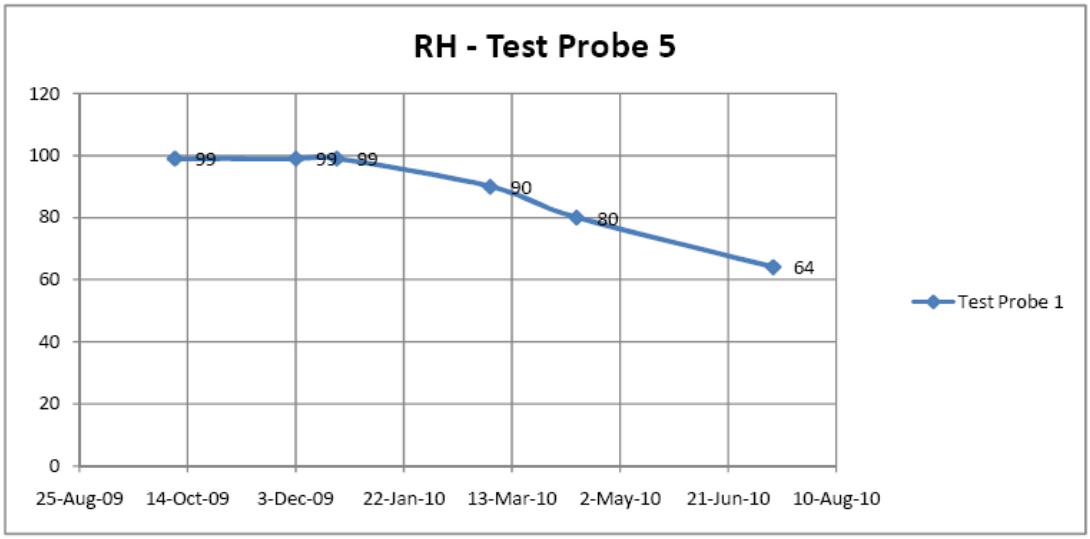
	8-Oct-09	3-Dec-09	22-Dec-09	3-Mar-10	12-Apr-10	12-Jul-10
Test Probe 1	99	99	99	99	90	73
Test Probe 2	93	94	94	92	76	73
Test Probe 3	99	99	96	86	72	72
Test Probe 4	99	99	99	93	84	80
Test Probe 5	99	99	99	90	80	64
Test Probe 6	99	99	99	92	81	67
Test Probe 7	99	99	96	89	78	72

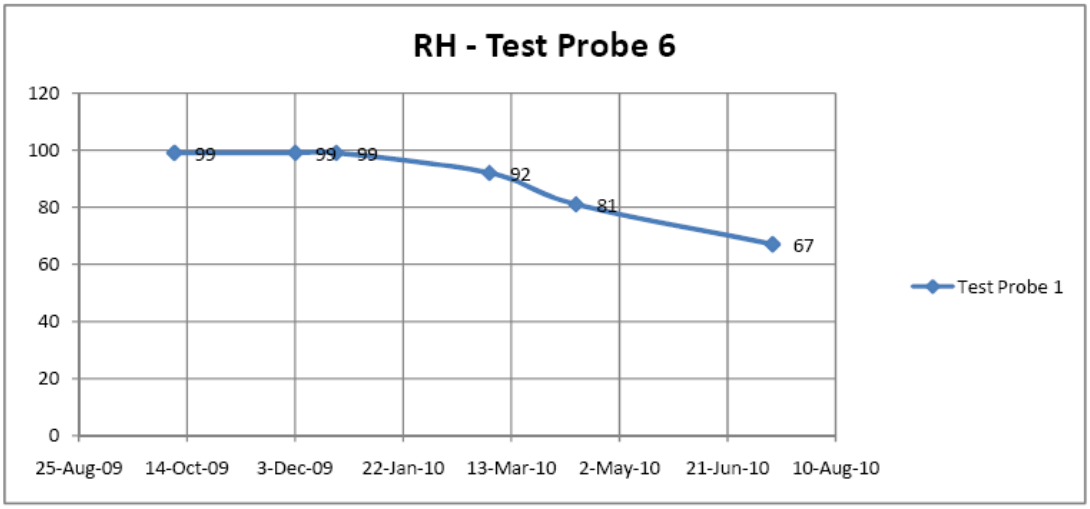


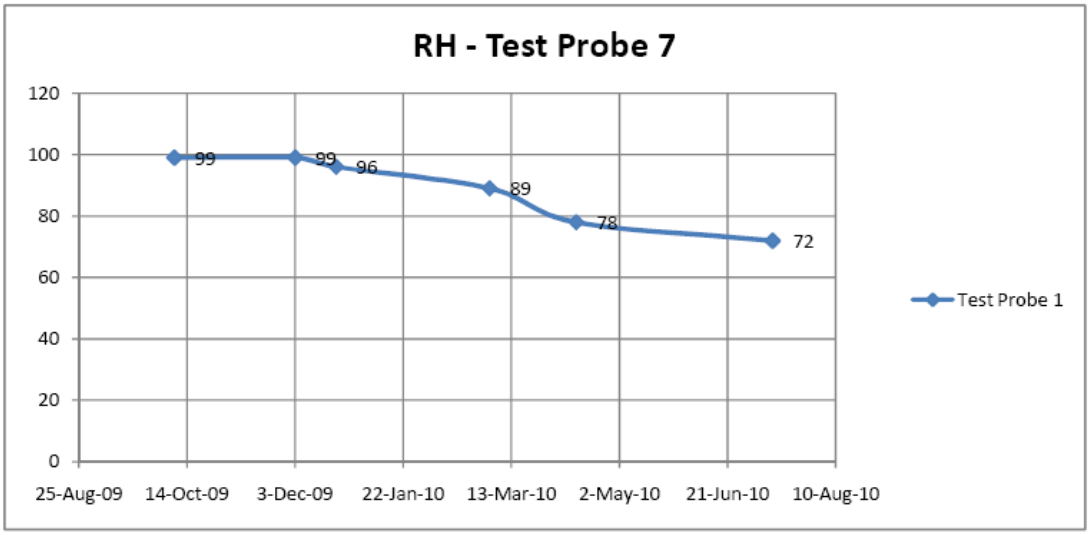



RH - Test Probe 3
120
100
80
60
40
20
0
99
99
96
86
72
72
25-Aug-09
14-Oct-09
3-Dec-09
22-Jan-10
13-Mar-10
2-May-10
21-Jun-10
10-Aug-10
Test Probe 1

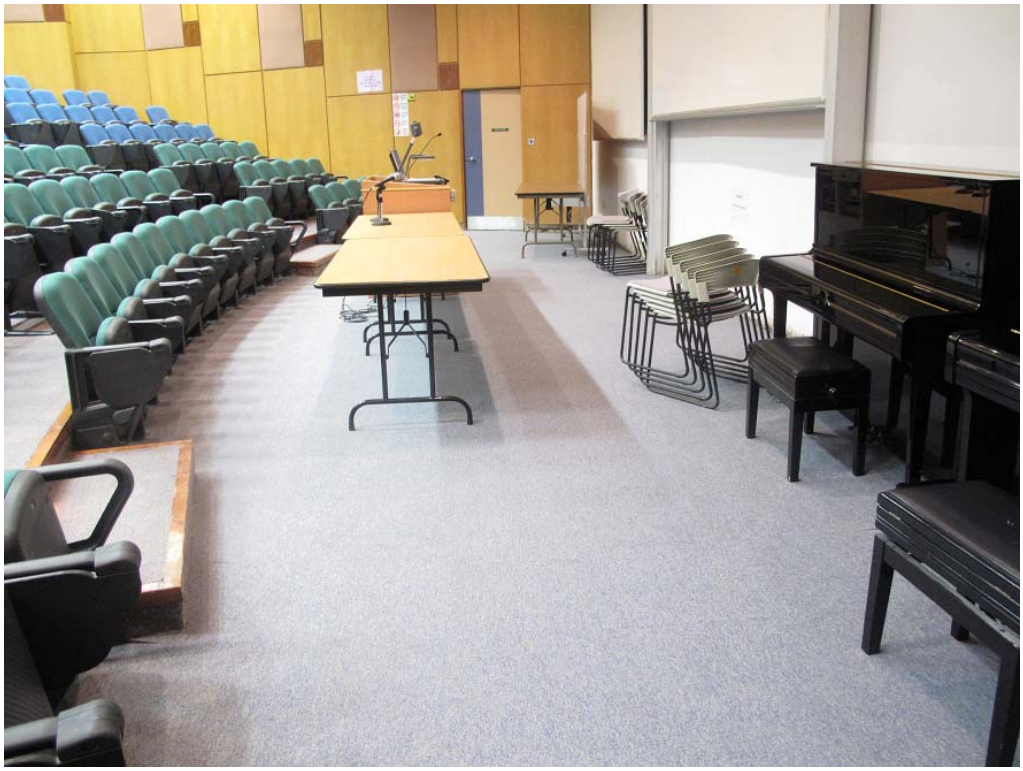

RH - Test Probe 4
120
100
80
60
40
20
0
99
99
99
93
84
80
25-Aug-09
14-Oct-09
3-Dec-09
22-Jan-10
13-Mar-10
2-May-10
21-Jun-10
10-Aug-10
Test Probe 1


RH - Test Probe 5
120
100
80
60
40
20
0
99
99
99
90
80
64
25-Aug-09
14-Oct-09
3-Dec-09
22-Jan-10
13-Mar-10
2-May-10
21-Jun-10
10-Aug-10
Test Probe 1


RH - Test Probe 6
120
100
80
60
40
20
0
99
99
99
92
81
67
25-Aug-09
14-Oct-09
3-Dec-09
22-Jan-10
13-Mar-10
2-May-10
21-Jun-10
10-Aug-10
Test Probe 1


RH - Test Probe 7
120
100
80
60
40
20
0
99
99
96
89
78
72
25-Aug-09
14-Oct-09
3-Dec-09
22-Jan-10
13-Mar-10
2-May-10
21-Jun-10
10-Aug-10
Test Probe 1

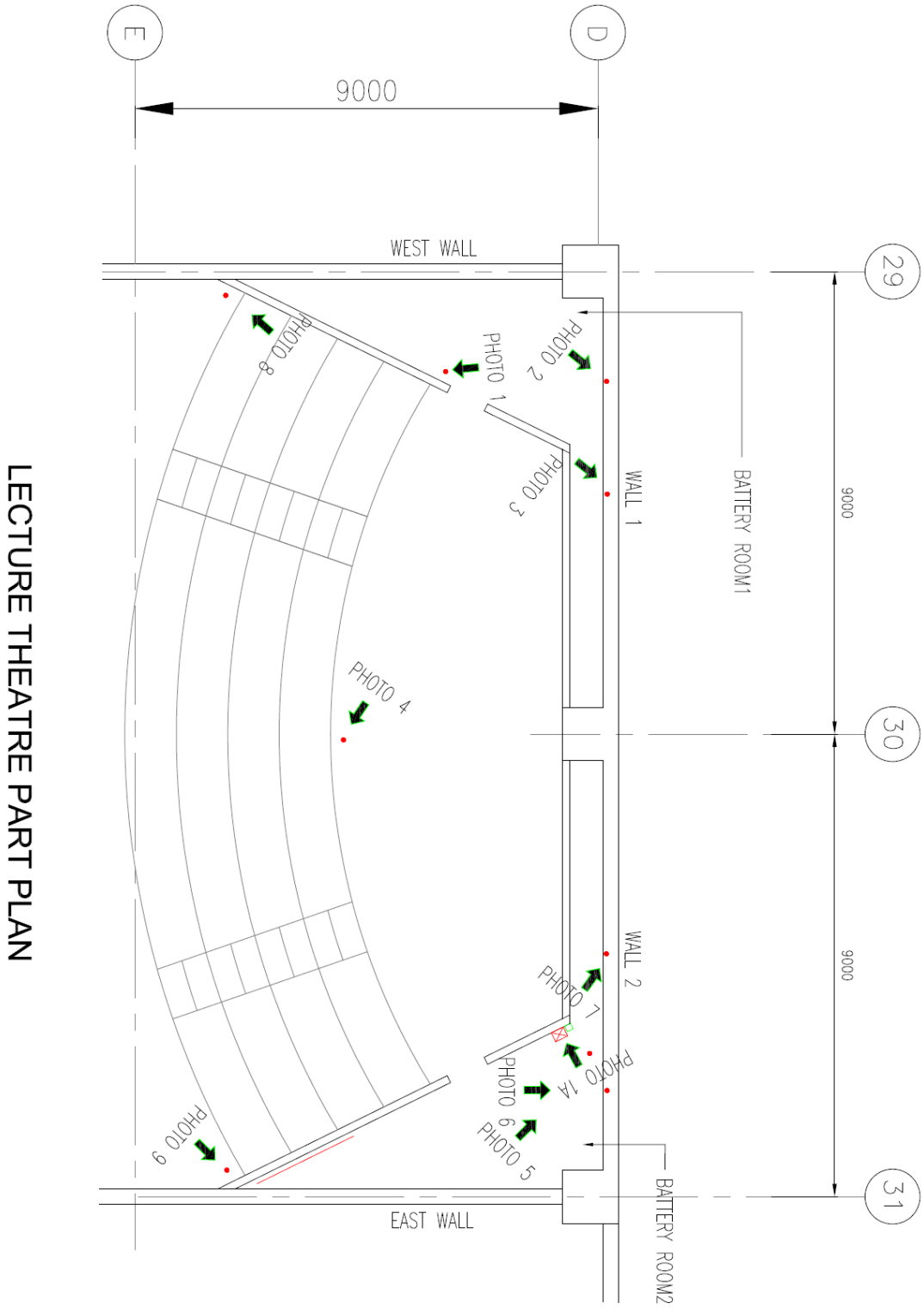
9.6 Site Photos (at present)



The Lecture Theatre is in a very Dry Condition


Both Battery Rooms 1 & 2 are in a very Dry Condition

9.70 Location of Probes



LECTURE THEATRE PART PLAN

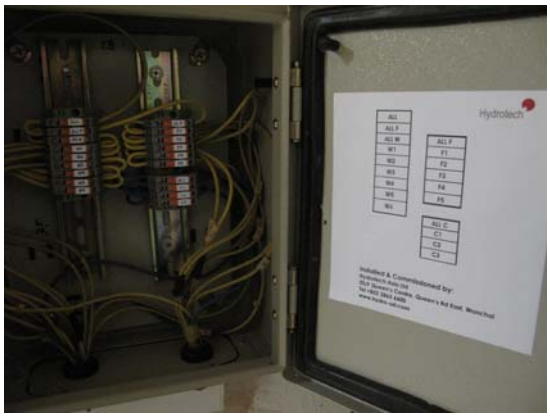


Photo No. 1A, MPS Control Unit & junction box installed in Battery Room 2

Photo No. 1, Test Probe 1 – Installed on floor located at Battery Room 1

Photo No. 2, Test Probe 2 – Installed on wall located at Battery Room 1

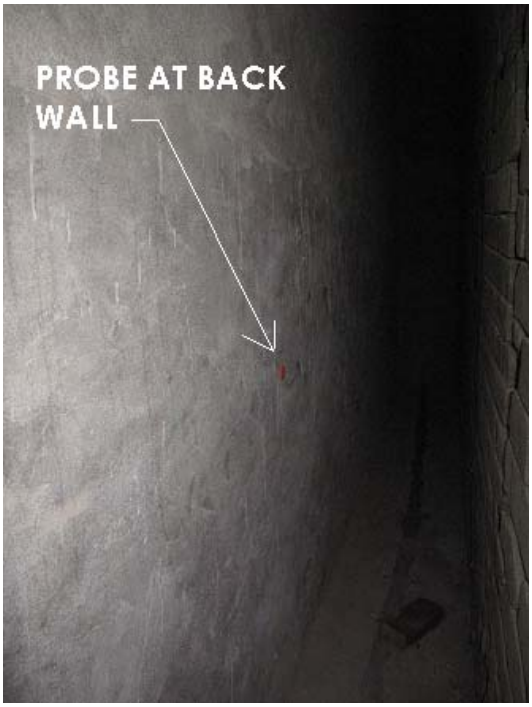


Photo No. 3, Test Probe 3 – Installed at the back of block wall located at Battery Room 1

Photo No. 4, Test Probe 4 – Installed at the floor slab of the lecture theatre

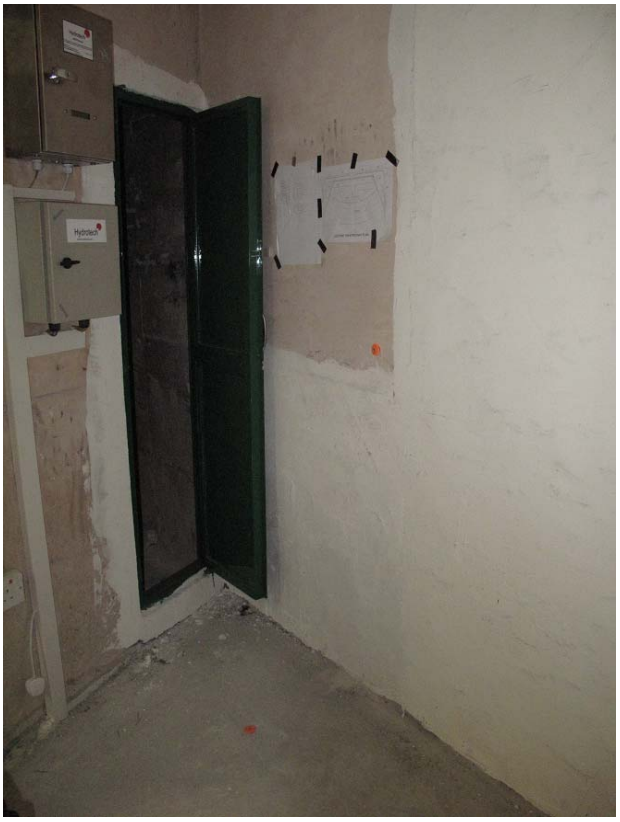


Photo No. 5, Test Probe 5 – Installed at the floor slab of Battery Room 2

Photo No. 6, Test Probe 6 – Installed at the wall of Battery Room 2

Photo No. 7, Test Probe 7 – Installed at the back of block wall located at Battery Room 2

Photo No. 8, Reference Probe 1 – Installed at the floor slab of the lecture theatre

Photo No. 9, Reference Probe 2 – Installed at the floor slab of the lecture theatre