

Ocean Park Corporation, Hong Kong

Repositioning and Long Term  
Operation Plan of Ocean Park:  
*Noise Mitigation and Audit Plan for  
Phase 2*

August 2014

**Environmental Resources Management**

16/F Berkshire House

25 Westlands Road

Quarry Bay

Hong Kong

Telephone: (852) 2271 3000

Facsimile: (852) 2723 5660

E-mail: [post.hk@erm.com](mailto:post.hk@erm.com)

<http://www.erm.com>

Ocean Park Corporation, Hong Kong

Repositioning and Long Term  
Operation Plan of Ocean Park:  
*Noise Mitigation and Audit Plan for  
Phase 2*

August 2014

Reference 0238176

|  |
|--|
| For and on behalf of<br>ERM-Hong Kong, Limited   |
| Approved by: <u>Frank Wan</u>  |
| Signed: <u></u> |
| Position: <u>Partner</u>   |
| Date: <u>25 August 2014</u>  |

This report has been prepared by ERM-Hong Kong, Limited with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

**Ocean Park Master Redevelopment Project**

**Environmental Permit No. EP-249/2006/D - Condition 2.25**

**Noise Mitigation and Audit Plan for the Operation of the Project  
outside 0900 to 2300 hours**

**Submitted by ERM-Hong Kong, Limited dated 25-08-2014**

**This is to verify that**

**Noise Mitigation and Audit Plan for the Operation of the Project  
outside 0900 to 2300 hours**

**Submitted by ERM-Hong Kong, Limited**

**dated 25-08-2014**

**Has been verified by the undersigned.**

Signed



\_\_\_\_\_  
Ir Eric Ching  
Independent Environmental Checker (IEC)  
Retained by Ocean Park Corporation  
pursuant to Environmental Permit No. EP-249/2006/D

Date

\_\_\_\_\_  
26 August 2014

## **Ocean Park Master Redevelopment Project**

**EP-249/2006/D - Condition 2.25**

**Noise Mitigation and Audit Plan for the Operation of  
the Project outside 0900 to 2300 hours**

**August 2014**



**Certified by** \_\_\_\_\_ **on 26-August-2014**  
Winnie Ko (ETL)

Verified by Independent Environmental Checker on 26 August 2014  
IEC Certificate attached in the submission? Yes

## CONTENTS

|            |  |           |
|------------|--|-----------|
| <b>1</b>   | <b>INTRODUCTION</b>                                  | <b>1</b>  |
| <b>1.1</b> | <b>BACKGROUND</b>                                    | <b>1</b>  |
| <b>1.2</b> | <b>PURPOSES OF THIS PLAN</b>                         | <b>1</b>  |
| <b>2</b>   | <b>PROPOSED MEASUREMENT METHODOLOGY</b>              | <b>2</b>  |
| <b>2.1</b> | <b>FIXED PLANT AND PA SYSTEM</b>                     | <b>2</b>  |
| <b>2.2</b> | <b>TEMPORARY INDOOR ATTRACTION AND OPEN AIR SHOW</b> | <b>9</b>  |
| <b>2.3</b> | <b>NOISE MONITORING DURING SPECIAL EVENTS</b>        | <b>16</b> |
| <b>2.4</b> | <b>NOISE AUDIT</b>                                   | <b>16</b> |
| <b>3</b>   | <b>MEASUREMENT INSTRUMENTS</b>                       | <b>18</b> |

## LIST OF ANNEXES

|                 |  |  |
|-----------------|--|--|
| <b>ANNEX A</b>  | <b>FIGURES FOR FIXED PLANT</b>   |  |
| <b>ANNEX A1</b> | <b>LOCATION OF FIXED PLANT</b>   |  |
| <b>ANNEX A2</b> | <b>PROPOSED MEASUREMENT LOCATION FOR PA SYSTEM AT ENTRY PLAZA (WF04)</b>                 |  |
| <b>ANNEX A3</b> | <b>PROPOSED MEASUREMENT LOCATION FOR PA SYSTEM AT AQUA CITY (WF05)</b>                   |  |
| <b>ANNEX A4</b> | <b>PROPOSED MEASUREMENT LOCATION FOR SPLIT-TYPE A/C UNIT AT CORAL BUILDING (WF06)</b>    |  |
| <b>ANNEX A5</b> | <b>PROPOSED MEASUREMENT LOCATION FOR SPLIT-TYPE AC UNIT AT WEST RETAIL (WF08)</b>        |  |
| <b>ANNEX A6</b> | <b>PROPOSED MEASUREMENT LOCATION FOR COOLING TOWERS AT OLD HONG KONG (WF23)</b>          |  |
| <b>ANNEX A7</b> | <b>RELOCATED POSITION OF THE COMPRESSORS CLUSTER AT WEST RETAIL (WF27)</b>               |  |
| <b>ANNEX A8</b> | <b>PROPOSED MEASUREMENT LOCATION FOR FAN ROOM AT WEST RETAIL (WF30)</b>                  |  |
| <b>ANNEX A9</b> | <b>PROPOSED MEASUREMENT LOCATION FOR CHILLER AT GIANT PANDA ADVENTURE (WF29)</b>         |  |
| <b>ANNEX B</b>  | <b>FIGURES FOR TEMPORARY INDOOR ATTRACTIONS AND OPEN AIR SHOW</b>                        |  |
| <b>ANNEX B1</b> | <b>PROPOSED MEASUREMENT LOCATIONS FOR TEMPORARY INDOOR ATTRACTIONS AT THE WATERFRONT</b> |  |

*ANNEX B1A SECTION A*

*ANNEX B1B CANTILEVERED NOISE BARRIER FOR MOVIE STUDIO AC PLANT AREA*

*ANNEX B1C MEASUREMENT POINT FOR DORAEMON ATTRACTION (PLAN VIEW)*

*ANNEX B2 LOCATIONS OF TEMPORARY INDOOR ATTRACTIONS AT THE SUMMIT*

*ANNEX B2A SECTIONS C TO G*

*ANNEX B3A PROPOSED MEASUREMENT LOCATION FOR CHINESE FOREST AND  
ULTIMATE AT THE SUMMIT*

*ANNEX B3B PROPOSED MEASUREMENT LOCATION FOR RIGOR MORTIS,  
JAPANESE EVIL AND CHINESE MEDICAL AT THE SUMMIT*

*ANNEX B4 LOCATION OF THE OPEN AIR SHOW AT THE SUMMIT*

*ANNEX C STC RATING OF 18MM PLYWOOD*

*ANNEX D SPECIFICATION OF BARRIER MAT FOR ROOF OF MOVIE STUDIO*

*ANNEX E EQUIPMENT IN FAN ROOM*

*ANNEX F1 LAYOUT OF MOVIE STUDIO*

*ANNEX F2 LAYOUT OF DORAEMON ATTRACTION*

*ANNEX F3 LAYOUT OF CHINESE FOREST*

*ANNEX F4 LAYOUT OF ULTIMATE*

*ANNEX F5 LAYOUT OF RIGOR MORTIS*

*ANNEX F6 LAYOUT OF JAPANESE EVIL*

*ANNEX F7 LAYOUT OF CHINESE MEDICAL*

*ANNEX G PROPOSED AUDIT POSITION FOR SPECIAL EVENTS DURING 23:00 TO  
01:00 HRS THE NEXT DAY*

*ANNEX H CALIBRATION CERTIFICATES*

# 1 INTRODUCTION

## 1.1 BACKGROUND

Following the approval of the Repositioning and Long Term Operation Plan of Ocean Park (the Project) Environmental Impact Assessment (EIA) report (Register No.: AEIAR-101/2006) (hereafter referred to as the approved EIA Report), an Environmental Permit (EP) (EP-249/2006) was granted for the Project in July 2006 and amendments to the EP were approved in October 2006, November 2010 and December 2013. To update the opening hours of the Ocean Park (the Park) and the layout plans for the Waterfront and Summit, an application for Variation of EP (VEP) was submitted to the EPD and new EP (EP-249/2006/D) was issued on 02 July 2014.

In accordance with Condition 2.25 of the EP-249/2006/D, the Permit Holder shall deposit with the Director four hard copies and one electric copy of Noise Mitigation and Audit Plan(s) (NMAP), no later than two weeks before the noise measurement and audit works are carried out. The Permit Holder shall carry out noise measurement and audit works according to the Noise Mitigation and Audit Plan(s) (NMAP) and submit a *Report on Commissioning Test Results* to the Director for approval, prior to the implementation of the specified periods of the proposed extension of opening hours.

## 1.2 PURPOSES OF THIS PLAN

If the results of the commissioning test demonstrate that the mitigation measures have achieved the required Sound Power Levels, the extension of the opening hours will be implemented in three phases, as follows:

- Phase 1 - extension of the opening hours of the Park from 10:00 to 09:00 hours and from 22:00 to 23:00 hours (excluding the Sky Fair Plaza Performance Venue and attractions for special events);
- Phase 2 - extension of the opening hours of the Park during Special Events to 01:00 hours and extension of opening hours of Restaurants and Retail Shops from 09:00 to 08:00 hours and from 23:00 to 02:00 hours of the next day (excluding the Sky Fair Plaza Performance Venue); and
- Phase 3 - operation of the Sky Fair Plaza Performance Venue.

This *Plan* presents the proposed noise measurement methodology for the commissioning test for Phase 2 in accordance with Conditions 2.28, 2.29 and 2.30 of the EP-249/2006/D.

### 2.1 FIXED PLANT AND PA SYSTEM

A-weighted equivalent continuous noise level ( $L_{Aeq}$ ) will be measured at specified distances from the plant items and will be compared with the commissioning requirements given in *Table 2.1*. For fixed plant items that generate relatively continuous and steady noise, such as the split-type AC unit, AC plant, chiller, cooling tower, fan room, and ventilation fan, the noise measurement will be over a 1-minute period. For the PA system at Aqua City and Entry Plaza, the measurement will be over a 5-minute period. For each items, three sets of measurement data will be taken.

The background noise will be measured in terms of  $L_{Aeq, (1 \text{ min})}$  at the same measurement point when the concerned plant item is switched off. At each location, one set of background noise data will be taken. If any abnormal intrusive noise exists during background noise measurement, the measurement data will be discarded. The measured noise levels will be subject to background noise correction in accordance with standard acoustical principles.

The measurement distance of each plant item is proposed based on the standard acoustical principles. The proposed measurement locations are presented in *Annex A*.

The mitigation measures that will be implemented and details of measurement parameters and measurement distances for each of the plant items for Phase 2 are summarised in *Table 2.1*.

If no further noise mitigation measure is provided for the fixed plant items or the PA systems after the commissioning test for Phase 1, sound power levels obtained from Phase 1 will be adopted for Phase 2 and re-measurement for the same item is considered not necessary. If the fixed plant items cannot achieve the commissioning requirement, it will not be operated during Phase 2.

If results of measurement reveal that difference in noise levels measured at far field with and without operation of fixed plan item is less than 3.0 dB(A), noise measurement will be conducted at near field in accordance with latest edition of ISO3746.

On the other hand, if the difference between the noise level measured at 1m from the surface of the noise source and the background noise level is less than 3.0 dB, it will not be necessary to measure the operational noise levels at a smaller distance from the source surface for the purpose of the commissioning test as noise from the source concerned will not be a significant component of the overall noise.

All noise measurement will be supervised and endorsed by a qualified person possessing at least seven years of noise control experience and a corporate membership of Hong Kong Institute of Acoustics or equivalent.

**Table 2.1 Mitigation Measures that will be Implemented for Phase 2 and Details of Measurement Parameters and Distance for each Plant Items**

| Fixed Plant Item                   | Dimension (L x W x H), m | Measurement Parameter   | Measurement distance from the plant items, m   | Measurement Required (Measured in Phase 1/ Yes/ No) | Commissioning Requirements   | Mitigation Measures that will be Implemented   |
|------------------------------------|--------------------------|-------------------------|--|---|--|--|
| 1. Sea Life Carousel (LNR7)        | -                        | -                       | -  | No  | -  | The Sea Life Carousel will not be operated during Phase 2.                                     |
| 2. PA system at Entry Plaza (WF04) | ~0.65 x 0.3 x 0.4        | L <sub>Aeq</sub> (5min) | 3.0 (see Annex A2)<br>(The microphone will be pointed toward the principle axis of a loudspeaker)<br><br>Prior to the commissioning test, screening noise measurement will be carried out for sound track with background music and announcement separately to determine which sound track will generate a higher noise level. The sound track with higher L <sub>Aeq</sub> (1min) will be chosen for the noise measurement. | Yes   | L <sub>Aeq</sub> (5 min) measured at 3m away from 1 PA cluster should not exceed 55dB(A). Such that the total SWL of 15 PA cluster will not exceeded SWL of 85dB(A). | Implementation of computerised volume control for the PA system at Entry Plaza during Phase 2. |

| Fixed Plant Item                                | Dimension (L x W x H), m   | Measurement Parameter   | Measurement distance from the plant items, m   | Measurement Required (Measured in Phase 1/ Yes/ No)                         | Commissioning Requirements  | Mitigation Measures that will be Implemented   |
|---|--|-------------------------|--|---|---|--|
| 3. PA system at Aqua City (WF05)                | ~0.65 x 0.3 x 0.4  | L <sub>Aeq</sub> (5min) | 3.0 (see Annex A3)<br>(The microphone will be pointed toward the principle axis of a loudspeaker)<br><br>Prior to the commissioning test, screening noise measurement will be carried out for sound track with background music and announcement separately to determine which sound track will generate a higher noise level. The sound track with higher L <sub>Aeq</sub> (1min) will be chosen for the noise measurement. | Measured in Phase 1   | L <sub>eq</sub> (5 min) measured at 3m away from 1 PA cluster should not exceed 56dB(A). Such that total SWL of 40 PA cluster will not exceeded SWL of 90 dB(A).  | Implementation of computerised volume control for the PA system in Aqua City during Phase 2.   |
| 4. Split-type A/C unit at Coral Building (WF06) | Various type of split-type A/C unit will be used, the largest one is ~1.1m x 0.3m x 0.5m | L <sub>Aeq</sub> (1min) | 2.5 (see Annex A4)   | Measured in Phase 1 (10 split-type A/C units will be measured individually) | Maximum 10 split-type A/C unit will be operated in Phase 2. The number of operating unit may be reduced subject to measurement result. Such that the total SWL of 10 operating split-type A/C units will not exceed 81 dB(A). | Implementation of timer system to reduce operation units during Phase 2.<br><br>10 or less nos. of split-type A/C units will be turned on during operation of Phase 2 subject to the measurement result. |

| Fixed Plant Item   | Dimension (L x W x H), m  | Measurement Parameter   | Measurement distance from the plant items, m | Measurement Required (Measured in Phase 1/ Yes/ No)        | Commissioning Requirements   | Mitigation Measures that will be Implemented  |
|--|---|-------------------------|--|--|--|---|
| 5. Split-type A/C unit at West Retail (WF08)             | Various type of split-type A/C unit will be used, the largest one is ~1.2m x 0.8m x 1.5m        | L <sub>Aeq</sub> (1min) | 3.0 (see Annex A5)                           | Yes (5 split-type A/C units will be measured individually) | L <sub>eq</sub> (1 min) measured at 3m from each split-type A/C unit should not exceed 59 dB(A). The number of operating unit may be reduced subject to measurement result. Such that total SWL of 5 split-type A/C units will not exceed SWL of 84 dB(A). | Implementation of timer system to reduce operation units during Phase 2.  |
| 6. Split-type A/C unit at Administration Building (WF17) | Various type of split-type A/C unit will be used, the largest one will be 0.85m x 0.33m x 0.88m | L <sub>Aeq</sub> (1min) | 2.0  | Yes  | Maximum 10 split-type AC units will be operated in Phase 2. The number of operating unit may be reduced subject to measurement result. The total SWL of all operating split-type A/C unit should not exceed 81 dB(A).                                      | This building is under renovation. Relevant commissioning requirements have been included in the specification for the renovation works. NMAR will be submitted to EPD for approval upon the completion of the renovation and will be operated during Phase 2 |
| 7. A/C plant at West Retail (WF19)                       | -   | -                       | -  | No   | -  | Implementation of timer system to shut down all of the AC plant during Phase 2.   |
| 8. AC Plant at East Retail (WF20)                        | -   | -                       | -  | No   | -  | Implementation of timer system to shut down all of the AC plant during Phase 2.   |

| Fixed Plant Item                               | Dimension (L x W x H), m | Measurement Parameter    | Measurement distance from the plant items, m | Measurement Required (Measured in Phase 1/ Yes/ No)                    | Commissioning Requirements   | Mitigation Measures that will be Implemented  |
|--|--------------------------|--------------------------|--|--|--|---|
| 9. Cooling Towers at Old Hong Kong (WF23)      | ~3.0 x 2.3 x 3.0         | L <sub>Aeq</sub> (1 min) | 6.0 (see <i>Annex A6</i> )                   | Measured in Phase 1 (Two cooling towers will be measured individually) | L <sub>eq</sub> (1 min) measured at 6m from each of the cooling tower should not exceed 60 dB(A). Such that the SWL of a cooling tower will not exceed SWL of 84 dB(A). Measurement should be carried out at the location facing the nearest NSR (The Hazelton). | Old plant items have been replaced with new equipment. Only 1 set of cooling tower will be in operation at any time in Phase 2.   |
| 10. AC plant at Panda Café (WF24)              | -                        | -                        | -  | No   | -  | Implementation of timer system to shut down all of the AC plant during Phase 2  |
| 11. Cooling Tower at The Grand Aquarium (WF26) | -                        | -                        | -  | No   | -  | Implementation of timer system to shut down all of the cooling towers during Phase 2.   |
| 12. Compressors Cluster at West Retail (WF27)  | -                        | -                        | -  | No   | -  | The compressor cluster was relocated to indoor and other locations where there is no direct line of sight to the nearby noise sensitive receivers (see <i>Annex A7</i> ). |

| Fixed Plant Item                            | Dimension (L x W x H), m          | Measurement Parameter    | Measurement distance from the plant items, m | Measurement Required (Measured in Phase 1/ Yes/ No)               | Commissioning Requirements   | Mitigation Measures that will be Implemented  |
|---|-----------------------------------|--------------------------|--|---|--|---|
| 13. Fan Room at West Retail (WF30)          | Range from 3.0 x 2.5 to 4.0 x 3.0 | L <sub>Aeq</sub> (1 min) | 10 (see <i>Annex A8</i> )                    | Measured in Phase 1 (Fan Rooms will be measured individually)     | Total SWL of the Fan Rooms should not exceed SWL of 86dB(A). Measurement should be carried out at the location facing the noisiest part of the equipment/ at the direction toward Police Training School.                      | Acoustic louvers and panels have been installed to replace the original louver.<br><br>A fan (KEF-EP-08) in the Fan Room A and a PAU ( COND-PAU-EP-M03) in the Fan Room C will not be operated during Phase 2 and during the commissioning test (see <i>Annex E</i> ) |
| 14. Ventilation Fan at West Retail (WF32)   | -                                 | -                        | -  | No  | -  | Implementation of timer system to shut down the ventilation fan during Phase 2.   |
| 15. Ventilation Fan at Panda Café (WF35)    | -                                 | -                        | -  | No  | -  | Implementation of timer system to shut down the ventilation fan during Phase 2.   |
| 16. Chiller at Giant Panda Adventure (WF29) | ~ 5.0 x 1.5x 2                    | L <sub>Aeq</sub> (1 min) | 10 (see <i>Annex A9</i> )                    | Measured in Phase 1 (Four chillers will be measured individually) | L <sub>eq</sub> (1 min) measured at 10m from a chiller should not exceed 58dB(A). Such that the total SWL of a chiller will not exceed 86dB(A). Measurement should be carried out at the location facing toward Country Villa. | Noise barrier (~3mhigh) will be installed.<br>Only 1 chiller will be in operation during Phase 2  |

## 2.2

### TEMPORARY INDOOR ATTRACTION AND OPEN AIR SHOW

As per the design information provided by OPC, there is a total of 7 temporary indoor attractions and 1 open air show at the Park for the coming special event, as summarized in *Table 2.2*.

Simulated sound track (including background music and noise from visitors, eg chatting, screaming, etc) will be played during noise measurements for temporary indoor attraction and open air show. For the five temporary indoor attractions at the Summit, simulated sound track will be played with all A/C operating during the noise measurement.

**Table 2.2** *List of Temporary Indoor Attractions and Open Air Show for the coming Special Event*

| Location at the Park | Temporary Indoor Attractions / Open Air Show | Attraction   |
|----------------------|--|--|
| The Waterfront       | Temporary Indoor Attractions                 | Movie Studio<br>Doraemon Attraction  |
| The Summit           | Temporary Indoor Attractions                 | Chinese Forest<br>Ultimate<br>Rigor Mortis<br>Japanese Evil<br>Chinese Medical |
|                      | Open Air Show                                | Open Air Show  |

### 2.2.1

#### *Movie Studio*

Plywood of 18mm thick with surface density of 10kg/m<sup>2</sup> and sound transmission class (STC) of 23 is provided for the exterior walls of the Movie Studio (*Annex C*). Acoustics barrier mat with same rating of STC23 is provided for the roof (*Annex D*). There are 2 openings for this attraction, ie entrance and exit. External noise sources include 2 AHUs and 1 chiller which are located within an AC plant area. Cantilevered noise barrier is erected to enclose the AC plant area (*Annex B1b*).

Simulated sound track (including background music and noise from visitors, eg chatting, screaming, etc) will be played during the commissioning test. Three sets of 5 minutes A-weighted equivalent continuous noise level ( $L_{Aeq, 5min}$ ) will be measured at the potential leakage location of the temporary indoor attraction (ie entrance and exit). Sound Power Level (SWL) of the AC plant will be determined individually. Three sets of 1 minute A-weighted equivalent continuous noise level ( $L_{Aeq, 1min}$ ) will be measured at the specific distance determined in accordance with standard acoustical principles.

### 2.2.2

#### *Doraemon Attraction*

The wall and roof the Doraemon Attraction is enclosed by Vinyl banner. There are 4 air conditioners located inside the attraction and 4 units installed

at outdoor area of this attraction. During the commissioning test measurement, simulated sound track (including background music and noise from visitors, eg chatting, screaming, etc) will be played and all air conditioners and outdoor units will be turned on. The measurement method will be in accordance with the latest edition of ISO 3746.  $L_{eq(1min)}$  will be measured at all the measurement points and the measurement distance will be 2m from the reference box.

### **2.2.3 *Temporary Indoor Attractions at the Summit***

There are 5 temporary indoor attractions at the Summit. Construction details of those temporary indoor attractions are shown in *Table 2.3*. Three sets of 5 minutes A-weighted equivalent continuous noise level ( $L_{Aeq}$ ) will be measured at twice of the largest dimension of each of the attraction. If results of measurement reveal that difference in noise levels measured at far field with and without operation of temporary indoor attraction is less than 3 dB(A), noise measurement will be conducted at near field in accordance with latest edition of ISO3746. During the noise measurement, simulated sound track (including background music and noise from visitors, eg chatting, screaming, etc) will be played and all A/C will be operating.

The direct lines of sight between the all temporary indoor attractions at the Summit and the nearest NSR Broadview Court are screened by the terrain of Nam Long Shan (See *Annexes B2 and B2a*). A barrier effect of 10dB(A) has been included, such that the maximum allowable sound power level is increased by 10 dB(A).

### **2.2.4 *Open Air Show at the Summit***

For the open air show, there are four sets of loudspeakers provided for the show, three sets of 5 minutes A-weighted equivalent continuous noise level ( $L_{Aeq}$ ) will be measured at 3m from each set of the loudspeaker. During the noise measurement, simulated sound track (including background music and noise from visitors, eg chatting, screaming, etc) will be played. The SWL of each set of loudspeaker will be determined individually.

### **2.2.5 *Background Noise Measurement***

The background noise will be measured in terms of  $L_{Aeq, (1 min)}$  at the same measurement point when all noise sources from the temporary indoor attraction and AC units are switched off. At each location, one set of background noise data will be taken. If any abnormal intrusive noise exists during background noise measurement, the measurement data will be discarded. The measured noise levels will be subject to background noise correction in accordance with standard acoustical principles.

**Table 2.3 Mitigation Measures that will be Implemented at Temporary Indoor Attractions for Phase 2 and Details of Measurement Parameters and Distance**

| Temporary indoor attraction/ Open air show | Dimension (L x W x H), m         | Measurement Parameter   | Measurement distance, m  | Measurement Required (Yes/No) | Commissioning Requirements                                       | Mitigation Measures that will be Implemented  |
|--|----------------------------------|---|--|-------------------------------|--|---|
| 1. Movie Studio (see Annex F1)             | Entrance and exit: ~1.2 x 2 each | L <sub>Aeq</sub> (5 min) for the measurement of Background music at 4m from the entrance and exit | 4m from the entrance and exit of the attraction (See Annex B1) | Yes                           | The total SWL of the attraction should not exceed SWL of 80dB(A) | Implementation of computerised volume control for the loudspeaker system of the attraction <sup>(a)</sup> .<br><br>Wall: 18mm thick plywood with surface density of 10kg/m <sup>2</sup> and STC 23 (See Annex C)<br>Roof: acoustic barrier mat with STC 23 (See Annex D).   |
|  | AC plant area: ~8 x 5 x 2.5      | L <sub>Aeq</sub> (1 min) for the measurement of AC plants at 16m from the AC plant area           | 16m from the AC plant area (See Annex B1)                      | Yes                           |  | The direct lines of sight between the AC plant area and NSRs in the north-east are screened by the temporary indoor attraction itself, the cable car station, the Sky Fair Plaza Performance Venue and the Giant Panda Adventure (See Annex B1).<br><br>The direct line of sight between the AC plant area and the nearest NSR Manly Villa is totally screened by the Ocean Express Station (See Annex B1a).<br><br>Cantilevered Noise barrier (3+0.5)m of 1.2mm thick steel plate is erected to enclose the AC plant area (see Annex B1b). |

| Temporary indoor attraction/ Open air show | Dimension (L x W x H), m                            | Measurement Parameter    | Measurement distance, m  | Measurement Required (Yes/No) | Commissioning Requirements  | Mitigation Measures that will be Implemented   |
|--|---|--------------------------|--|-------------------------------|---|--|
| 2. Doraemon Attraction (see Annex F2)      | 21 x 18 x 4 (including 2 marquee and outdoor units) | L <sub>Aeq</sub> (1 min) | 2 (Measurement method will be in accordance with latest edition ISO 3746, See Annex B1c) | Yes                           | The total SWL of the attraction should not exceed SWL of 80dB(A).   | Implementation of computerised volume control for the loudspeaker system of the attraction <sup>(a)</sup> .<br>The attraction is constructed with 2 marquee roof, ie 12m x 10m & 12m x 8m, and side wall enclosed by Vinyl banner  |
| 3. Chinese Forest (see Annex F3)           | ~18 x 21 x 4 (including outdoor units)              | L <sub>Aeq</sub> (5 min) | 42 (See Annex B3a)   | Yes                           | L <sub>eq</sub> (5 min) measured at 55m from the centre of attraction (42 + 13 (edge to centre)) should not exceed 55dB(A). The total SWL of the attraction will not exceed SWL of 88dB(A) <sup>(b)</sup> . | Implementation of computerised volume control for the loudspeaker system of the attraction <sup>(a)</sup> .<br>The attraction is constructed with 18m x 19m marquee roof and side wall enclosed by Canvas banner.<br>The direct line of sight between the temporary indoor attraction and the nearest NSR Broadview Court is screened by the terrain of Nam Long Shan (See Annex B2a). |

| Temporary indoor attraction/ Open air show | Dimension (L x W x H), m                 | Measurement Parameter    | Measurement distance, m | Measurement Required (Yes/No) | Commissioning Requirements   | Mitigation Measures that will be Implemented   |
|--|--|--------------------------|-------------------------|-------------------------------|--|--|
| 4. Ultimate<br>(see Annex F4)              | 23 x 17 x 4                              | L <sub>Aeq</sub> (5 min) | 46<br>(see Annex B3a)   | Yes                           | L <sub>eq</sub> (5 min) measured at 59m from centre of the attraction (46 + 13 (edge to centre)) should not exceed 54dB(A). The total SWL of the attraction will not exceed SWL of 88dB(A) <sup>(b)</sup> .      | <p>Implementation of computerised volume control for the loudspeaker system of the attraction<sup>(a)</sup>.</p> <p>Wall: enclosed by wooden board<br/>Roof: existing concrete structure.</p> <p>Chiller type AC system for Ultimate is shared with the Chinese Forest (which is located next to Ultimate).</p> <p>The direct line of sight between the temporary indoor attraction and the nearest NSR Broadview Court is screened by the terrain of Nam Long Shan (See Annex B2a).</p> |
| 5. Rigor Mortis<br>(see Annex F5)          | 26 x 18 x 4<br>(including outdoor units) | L <sub>Aeq</sub> (5 min) | 52<br>(see Annex B3b)   | Yes                           | L <sub>eq</sub> (5 min) measured at 65m from the centre of the attraction ((52 + 13 (edge to centre)) should not exceed 54dB(A). The total SWL of the attraction will not exceed SWL of 88dB(A) <sup>(b)</sup> . | <p>Implementation of computerised volume control for the loudspeaker system of the attraction<sup>(a)</sup>.</p> <p>Marquee roof and side wall are enclosed by Canvas banners (2 sets of 10m x 10m + 2 sets of 8m x 9m).</p> <p>The direct line of sight between the temporary indoor attraction and the nearest NSR Broadview Court is screened by the terrain of Nam Long Shan (See Annex B2a).</p>  |

| Temporary indoor attraction/ Open air show | Dimension (L x W x H), m  | Measurement Parameter    | Measurement distance, m | Measurement Required (Yes/No) | Commissioning Requirements  | Mitigation Measures that will be Implemented   |
|--|---|--------------------------|-------------------------|-------------------------------|---|--|
| 6. Japanese Evil<br>(see Annex F6)         | 20 x 18 x 4<br>(including existing structure, associated marquee and outdoor units) | L <sub>Aeq</sub> (5 min) | 40<br>(see Annex B3b)   | Yes                           | L <sub>eq</sub> (5 min) measured at 54m from the centre of the attraction (40 + 14 (edge to centre)) should not exceed 55dB(A). The total SWL of the attraction will not exceed SWL of 88dB(A) <sup>(b)</sup> .     | Implementation of computerised volume control for the loudspeaker system of the attraction <sup>(a)</sup> .<br><br>Wall: wooden board<br>Roof: existing concrete structure<br>Associated marquee: 13m x 5m enclosed by Canvas<br><br>The direct line of sight between the temporary indoor attraction and the nearest NSR Broadview Court is screened by the terrain of Nam Long Shan (See Annex B2a). |
| 7. Chinese Medical<br>(see Annex F7)       | 18 x 16 x 4<br>(including outdoor units)  | L <sub>Aeq</sub> (5 min) | 36<br>(see Annex B3b)   | Yes                           | L <sub>eq</sub> (5 min) measured at 49m from the centre of the the attraction (36 + 13 (edge to centre)) should not exceed 56dB(A). The total SWL of the attraction will not exceed SWL of 88dB(A) <sup>(b)</sup> . | Implementation of computerised volume control for the loudspeaker system of the attraction <sup>(a)</sup> .<br><br>Wall: wooden board<br>Roof: existing concrete structure<br><br>The direct line of sight between the temporary indoor attraction and the nearest NSR Broadview Court is screened by the terrain of Nam Long Shan (See Annex B2a).  |

| Temporary indoor attraction/ Open air show | Dimension (L x W x H), m                   | Measurement Parameter    | Measurement distance, m | Measurement Required (Yes/No) | Commissioning Requirements  | Mitigation Measures that will be Implemented                                      |
|--|--|--------------------------|-------------------------|-------------------------------|---|---|
| 8. Open air show in Summit (see Annex B4)  | Size of the loudspeakers: ~0.2 x 0.2 x 1.2 | L <sub>Aeq</sub> (5 min) | 3                       | Yes                           | <p><b><u>During 09:00 – 23:00 hrs:</u></b><br/>L<sub>eq</sub> (5 min) measured at 3m from the each loudspeaker for open-air show should not exceed 86dB(A). Such that the total SWL of 4 loudspeakers will not exceed SWL of 110dB(A).</p> <p><b><u>During 23:00 – 02:00 hrs:</u></b><br/>No show</p> | Implementation of computerised volume control for the show music <sup>(a)</sup> . |

**Notes:**

- (a) The simulated sound track will be pre-set as the show level that will be the highest setting during special events. OPC confirm that the computerised volume control will be capped at that show level which is the same as that adopted in the noise commissioning test.
- (b) A barrier effect of 10dB(A) has been included as the direct line of sight between the NSRs and noise source is screened by noise barriers, existing structures or terrain of Nam Long Shan, such that the maximum allowable sound pressure level at specific distance is increased by 10 dB(A).
- (c) Noise measurement will be taken with doors of entrance and exit open, if doors are installed for the temporary indoor attraction.

## 2.3

### *NOISE MONITORING DURING SPECIAL EVENTS*

Noise monitoring will be undertaken for temporary indoor attractions during special events from 23:00 to 01:00 hrs the next day. OPC will appoint an appropriate person to conduct noise monitoring once a week during special events. Noise measurement will be conducted at locations as indicated in *Table 2.4* and the measurement results will be compared with the requirements also given in *Table 2.4*. For each measurement location, one set of measurement data will be taken.

The background noise level will be measured in terms of  $L_{Aeq, 1 \text{ min}}$  at the each measurement point with loudspeaker system and all other supporting AC units switching off. At each location, one set of background noise data will be taken. Any abnormal intrusive noise during the measurement will be recorded on the field record sheet and the measurement data will be discarded. The measured noise levels will be subject to background noise correction in accordance with standard acoustical principles.

The appropriate person should provide feedback to OPC for immediate action (eg adjustment of the speaker output level) if the noise from the attractions exceed the monitoring requirements given in *Table 2.4*. The measurement result should be recorded properly. OPC will provide the measurement results to EPD upon request for any necessary follow up investigation, if required.

## 2.4

### *NOISE AUDIT*

Noise audit will be carried out once a week at Shouson Hill Road near Country Villa to check any audible entertainment noise due to the operation of the special events from 23:00 to 01:00 hrs the next day. The entertainment noise from the attractions should not be audible at the audit position. The proposed audit position is presented in *Annex G*.

The audit person should provide feedback to OPC for immediate action (eg adjustment of the speaker output level) if the noise from the attractions is audible at the audit position. The audit records should be recorded properly. OPC will provide the audit records to EPD upon request for any necessary follow up investigation, if required.

**Table 2.4 Requirements for Noise Monitoring during Special Events from 23:00 to 01:00 hrs the next day**

| Temporary indoor attraction | Measurement Parameter   | Measurement location, m   | Specific Noise Level   |
|-----------------------------|---|---|--|
| 1. Movie Studio             | $L_{Aeq}$ (5 min) for the measurement of noise from the marquee       | 4m from the entrance and exit of the attraction (see <i>Annex B1</i> )  | $L_{Aeq}$ (5min) should not exceed the commissioning test result.  |
|                             | $L_{Aeq}$ (1 min) for the measurement of noise from the AC plant area | 16m from the AC plant area (see <i>Annex B1</i> )   | $L_{Aeq}$ (1min) should not exceed the commissioning test result.  |
| 2. Doraemon Attraction      | $L_{Aeq}$ (1 min)   | 2m from the attraction at Point 10 (one of the nearest point towards NSR and relatively far away from the crowd around the attraction (hence, influence of the noise from the crowd around the attraction can be minimized, see <i>Annex B1c</i> )) | $L_{Aeq}$ (1 min) measured at Point 10 should not exceed the noise level measured at Point 10 in the commissioning test. |
| 3. Chinese Forest           | $L_{Aeq}$ (5 min)   | 42 (see <i>Annex B3a</i> )  | $L_{eq}$ (5 min) should not exceed 55dB(A)   |
| 4. Ultimate                 | $L_{Aeq}$ (5 min)   | 46 (see <i>Annex B3a</i> )  | $L_{eq}$ (5 min) should not exceed 54dB(A)   |
| 5. Rigor Mortis             | $L_{Aeq}$ (5 min)   | 52 (see <i>Annex B3b</i> )  | $L_{eq}$ (5 min) should not exceed 54dB(A).  |
| 6. Japanese Evil            | $L_{Aeq}$ (5 min)   | 40 (see <i>Annex B3b</i> )  | $L_{eq}$ (5 min) should not exceed 55dB(A).  |
| 7. Chinese Medical          | $L_{Aeq}$ (5 min)   | 36 (see <i>Annex B3b</i> )  | $L_{eq}$ (5 min) should not exceed 56dB(A).  |

The instruments that will be used for the noise measurements shall comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1).

Before and after each series of measurements, a sound calibrator will be applied to each microphone to verify the calibration of the measuring system. The difference between the readings made before and after each series of measurements shall be less than or equal to 0.5 dB. If this value is exceeded, the results of this series of measurements shall be discarded.

The sound calibrator will be calibrated at intervals not exceeding 1 year and the compliance of the sound level meters with the requirements of IEC 61672-1 verified at intervals not exceeding 2 years. Sound level meters and calibrator to be used are listed in the *Table 3.1*. The equipment calibration certificates are shown in *Annex H*. For the above-mentioned requirement, reference was made to an approved EM&A plan for other theme park (ie Section 5.3 of EM&A Plan (Revision H) prepared under EP-01/059/2000/C<sup>(1)</sup>) and relevant ISO standard (ie ISO 3746-2010, Section 5.2, 3rd paragraph).

**Table 3.1** *Noise Measurement Equipment*

| Equipment         | Model         | Serial Number     |
|-------------------|---------------|-------------------|
| Sound Level Meter | 01dB - Solo   | 65225             |
|                   | 01dB - Solo   | 65226             |
| Calibrator        | Svantek SV30A | No.7971           |
|                   | 01dB - CAL 21 | No.34113609(2011) |

The measurement parameter will be set to A-weighted sound pressure level and the time weighting will be set in fast response.

All noise measurement will be supervised and endorsed by a qualified person possessing at least seven years of noise control experience and a corporate membership of Hong Kong Institute of Acoustics or equivalent.

<sup>(1)</sup> <http://www.epd.gov.hk/eia/register/english/permit/vep3782012/documents/emarp/pdf/emarp.pdf>

Annex A

## Figures for Fixed Plant Items



Annex A1

Location for Fixed Plant Items (Phase 2 commissioning test)

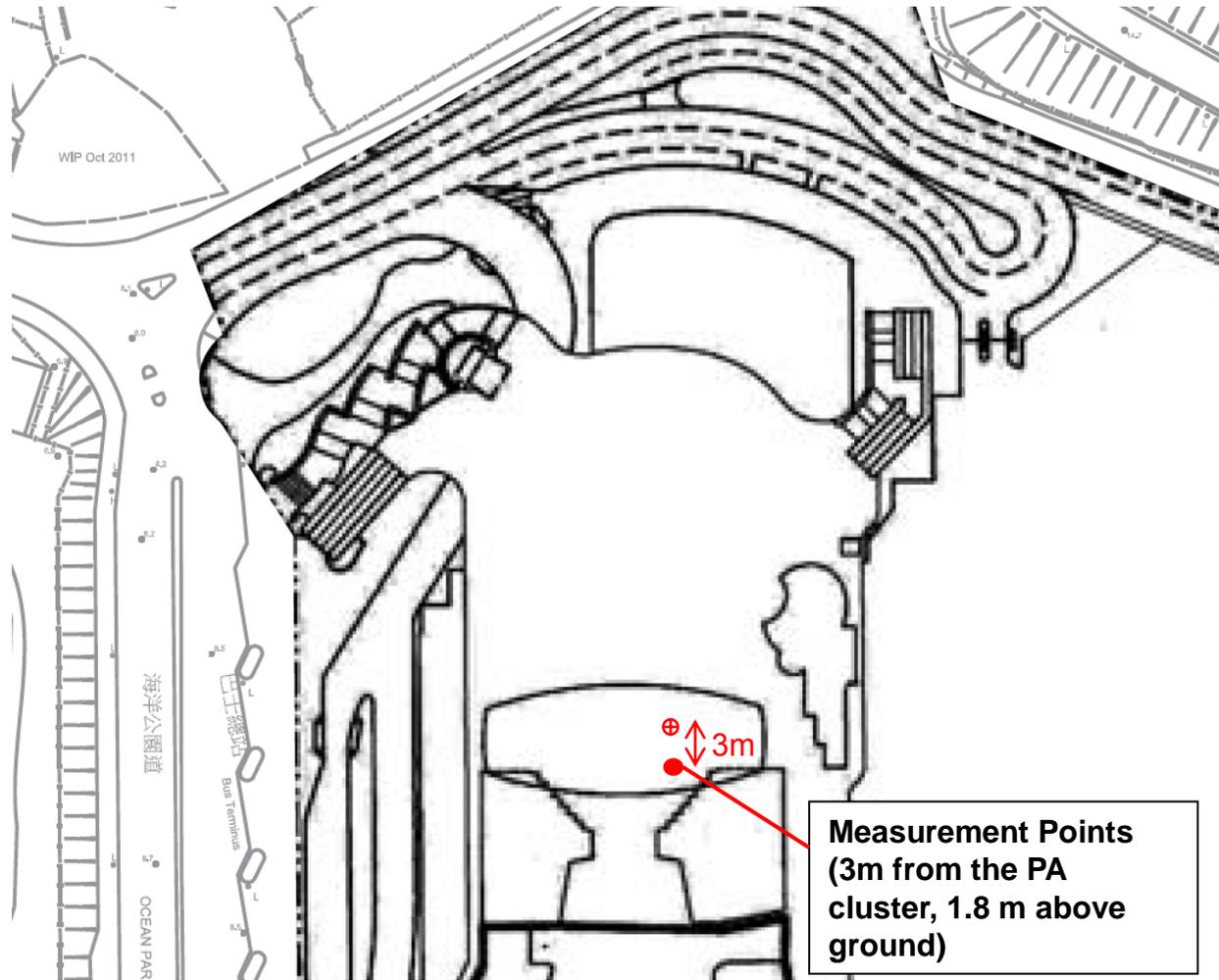
FILE: 0238176d  
DATE: 31/07/2014

Environmental  
Resources  
Management



Key

- Fixed Plant Noise Sources
- ⊕ Noise Measurement Point



Measurement Points  
(3m from the PA  
cluster, 1.8 m above  
ground)

PA cluster



Key

- Fixed Plant Noise Sources
- ⊕ Noise Measurement Point



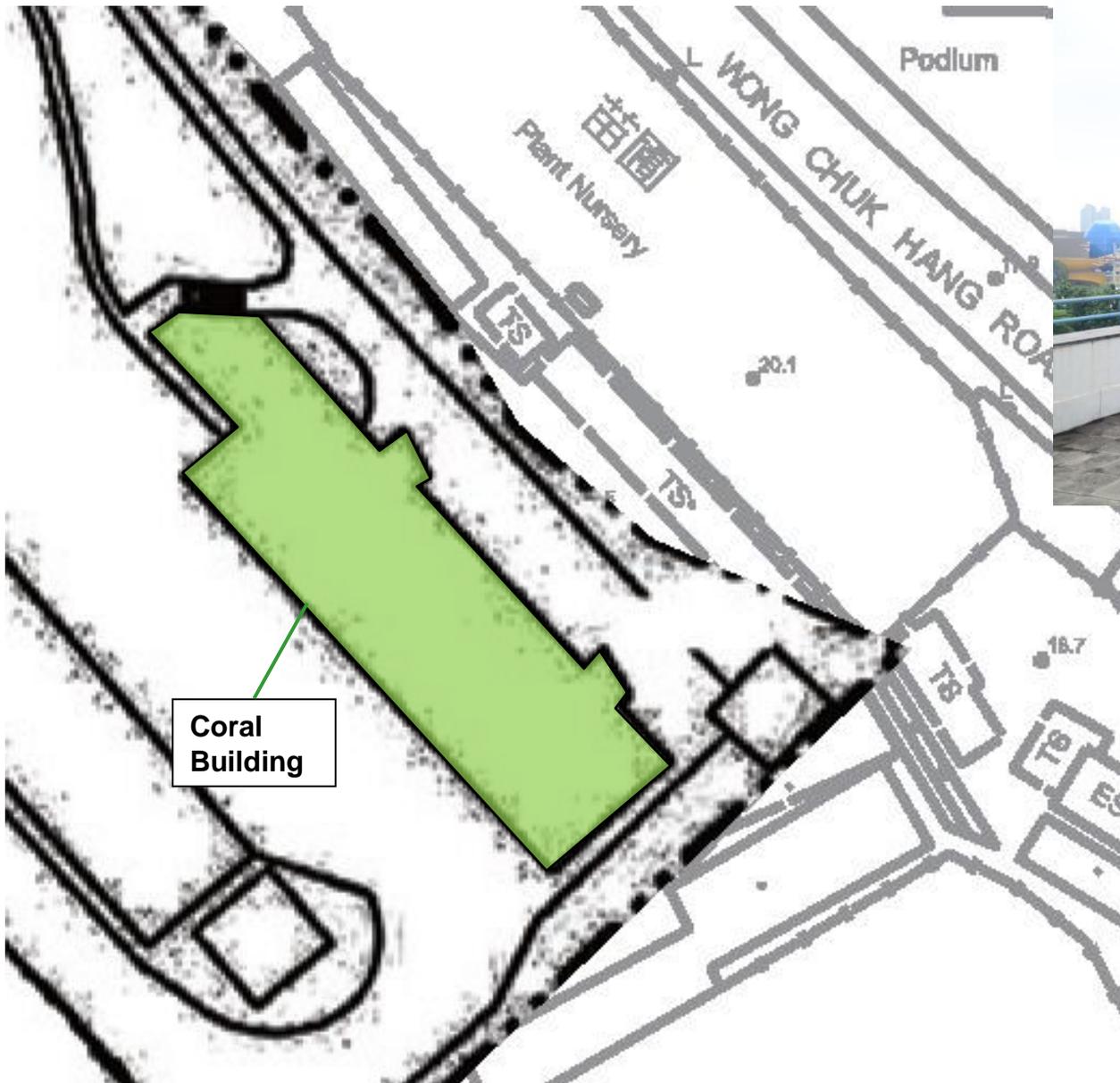
PA Cluster

Measurement Point  
(3m from a PA Cluster,  
2m above ground)

PA Cluster (WF05)

The Hong Kong Jockey Club Sichuan Treasures

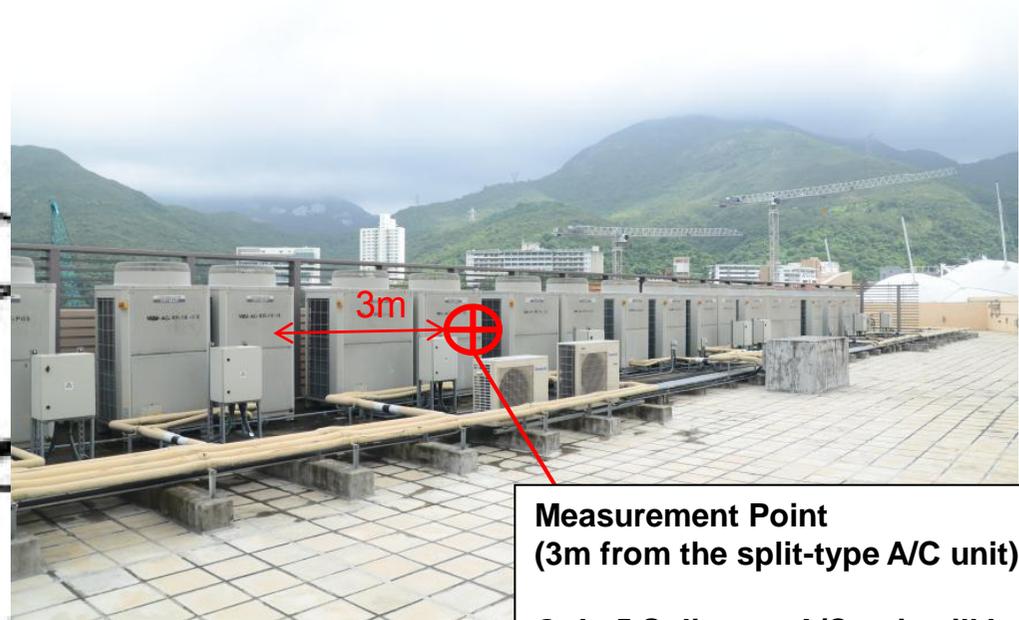
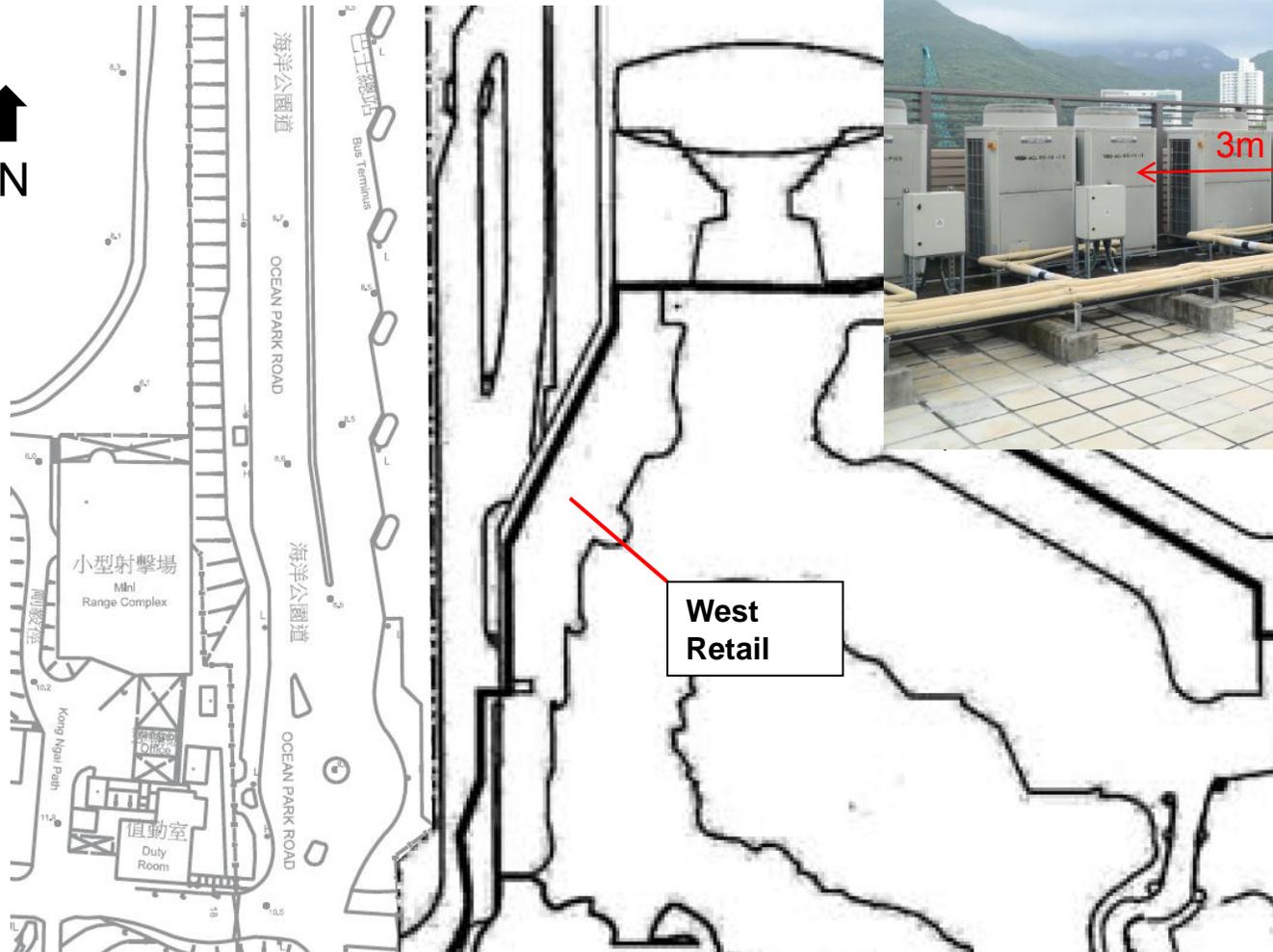




Split-type A/C unit

Measurement Point  
(2.5m from the split-type A/C unit)

Only 10 Split-type A/C unit will be measured.



**Measurement Point  
(3m from the split-type A/C unit)**

**Only 5 Split-type A/C unit will be measured.**

**West Retail**

**Key**

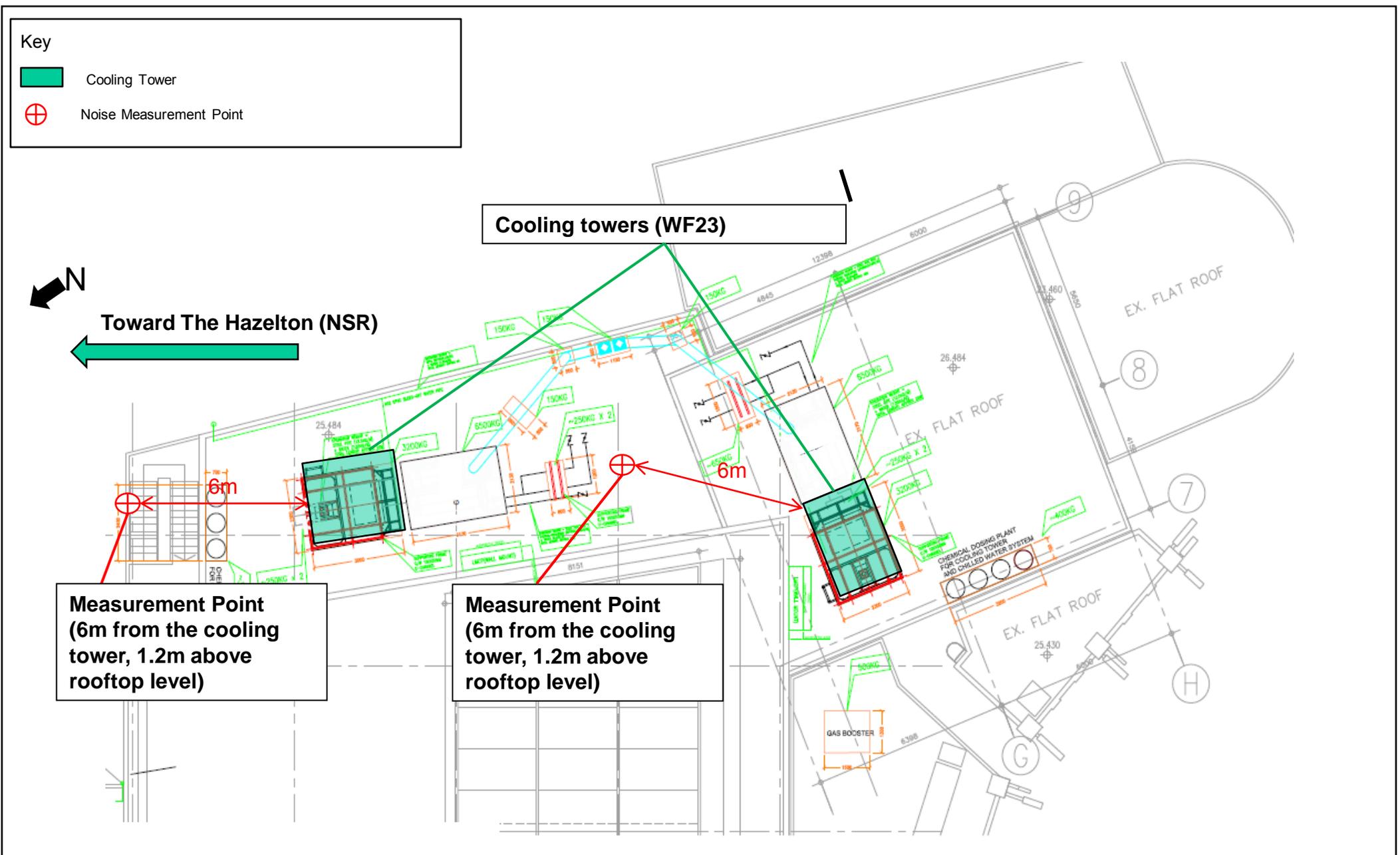
-  Cooling Tower
-  Noise Measurement Point

**N**  
  
**Toward The Hazelton (NSR)**  


**Cooling towers (WF23)**

**Measurement Point  
 (6m from the cooling tower, 1.2m above rooftop level)**

**Measurement Point  
 (6m from the cooling tower, 1.2m above rooftop level)**





Some of the compressors had been relocated behind this façade, no direct line of sight to the police training school



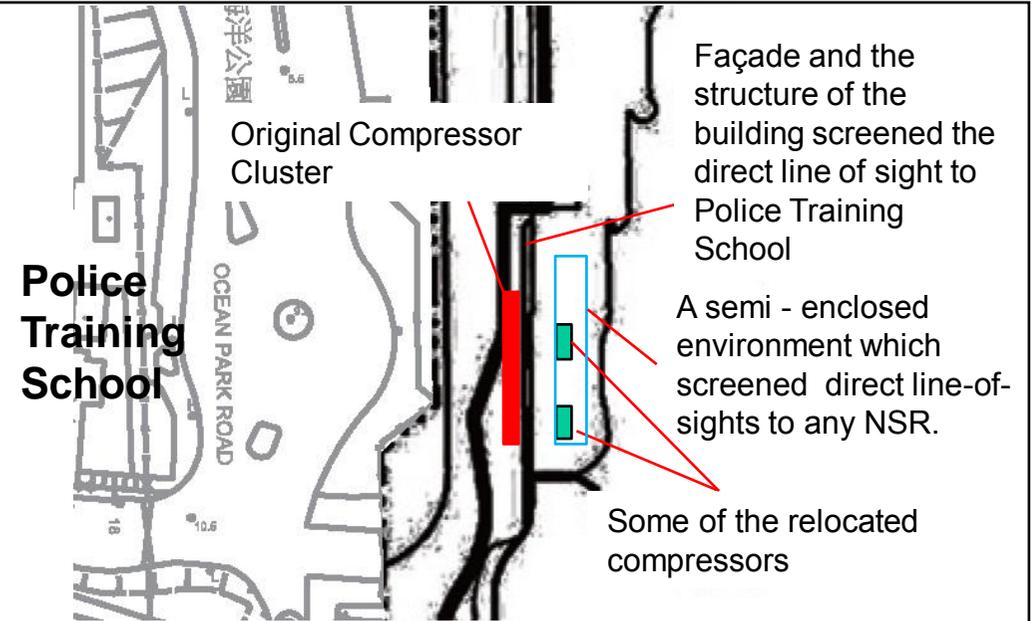
All compressors were removed from the façade of West Retail



The relocated location semi enclosed environment which do not have direct line-of-sights to any NSR



Some compressors were relocated to indoor



**Key**

- Fixed Plant Noise Sources
- ⊕ Noise Measurement Point



**Police Training School**

**Fan Rooms**

**Point 3**  
(10m slant distance from the fan room louver, 1.2m above ground)

**Point 2**  
(10m slant distance from the fan room louver, 1.2m above ground)

**Point 1**  
(10m slant distance from the fan room louver, 1.2m above ground)

**Slant: 10 m**

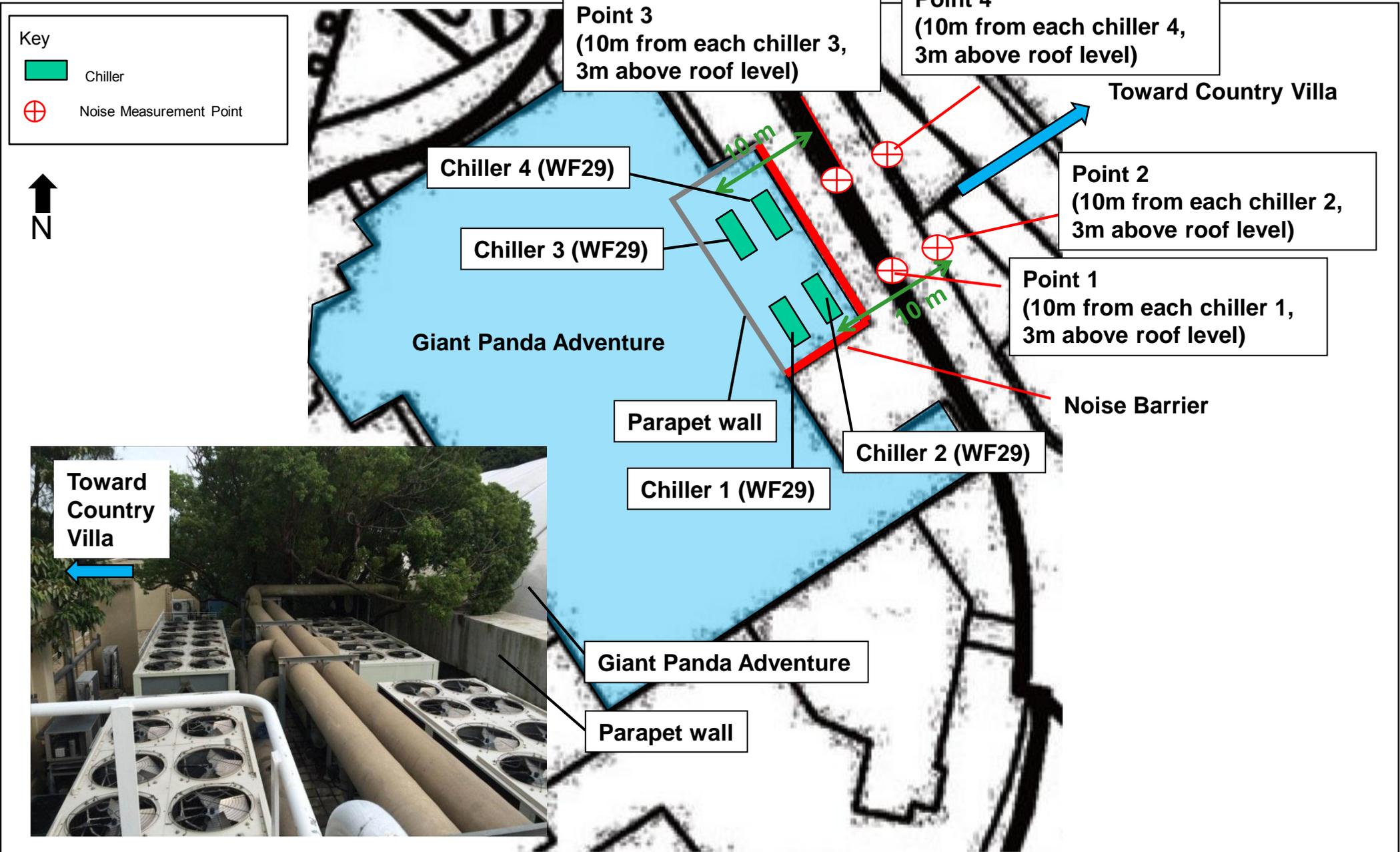
**West Retail**

**Fan Room C (WF30)**

**Fan Room B (WF30)**

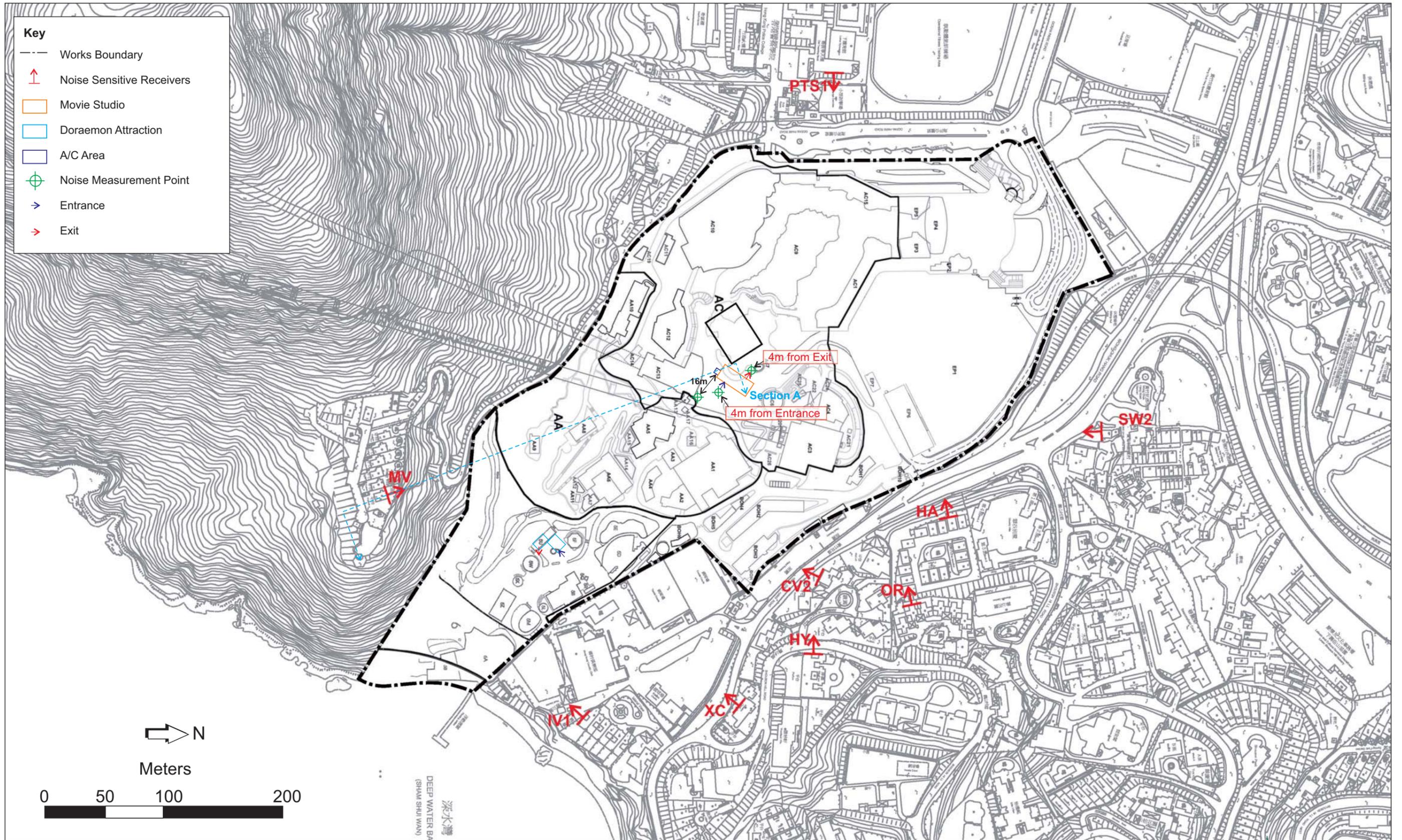
**Fan Room A (WF30)**





Annex B

## Figures for Temporary Indoor Attractions and Open Air Show



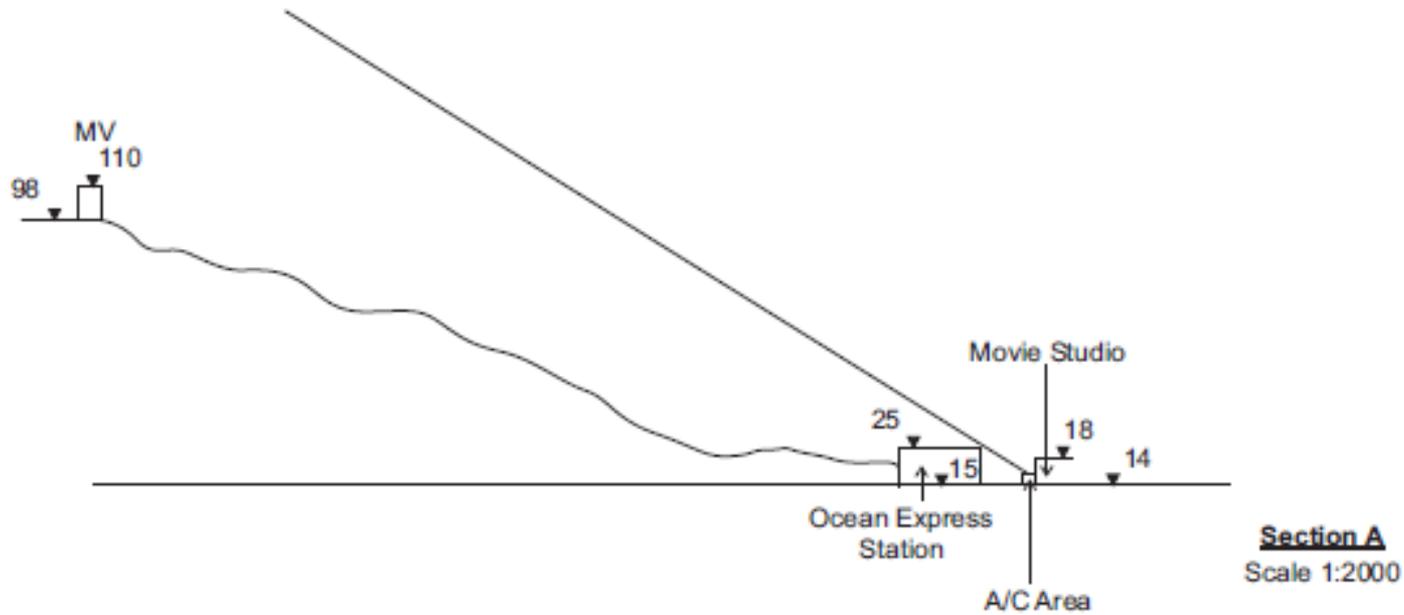
Annex B1

Proposed Measurement Locations for Temporary Indoor Attractions at the waterfront

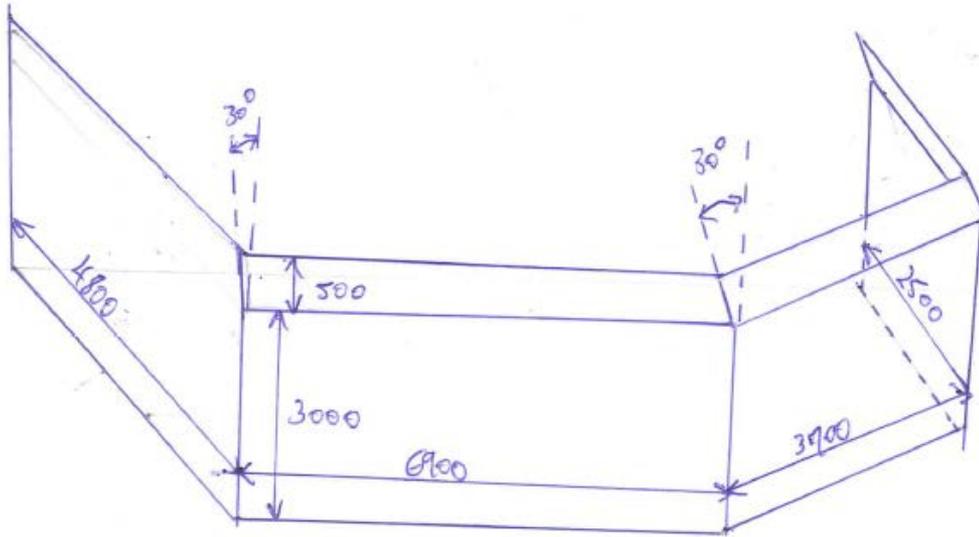
FILE: 0238176k  
DATE: 18/08/2014

Environmental  
Resources  
Management





## Annex B1b



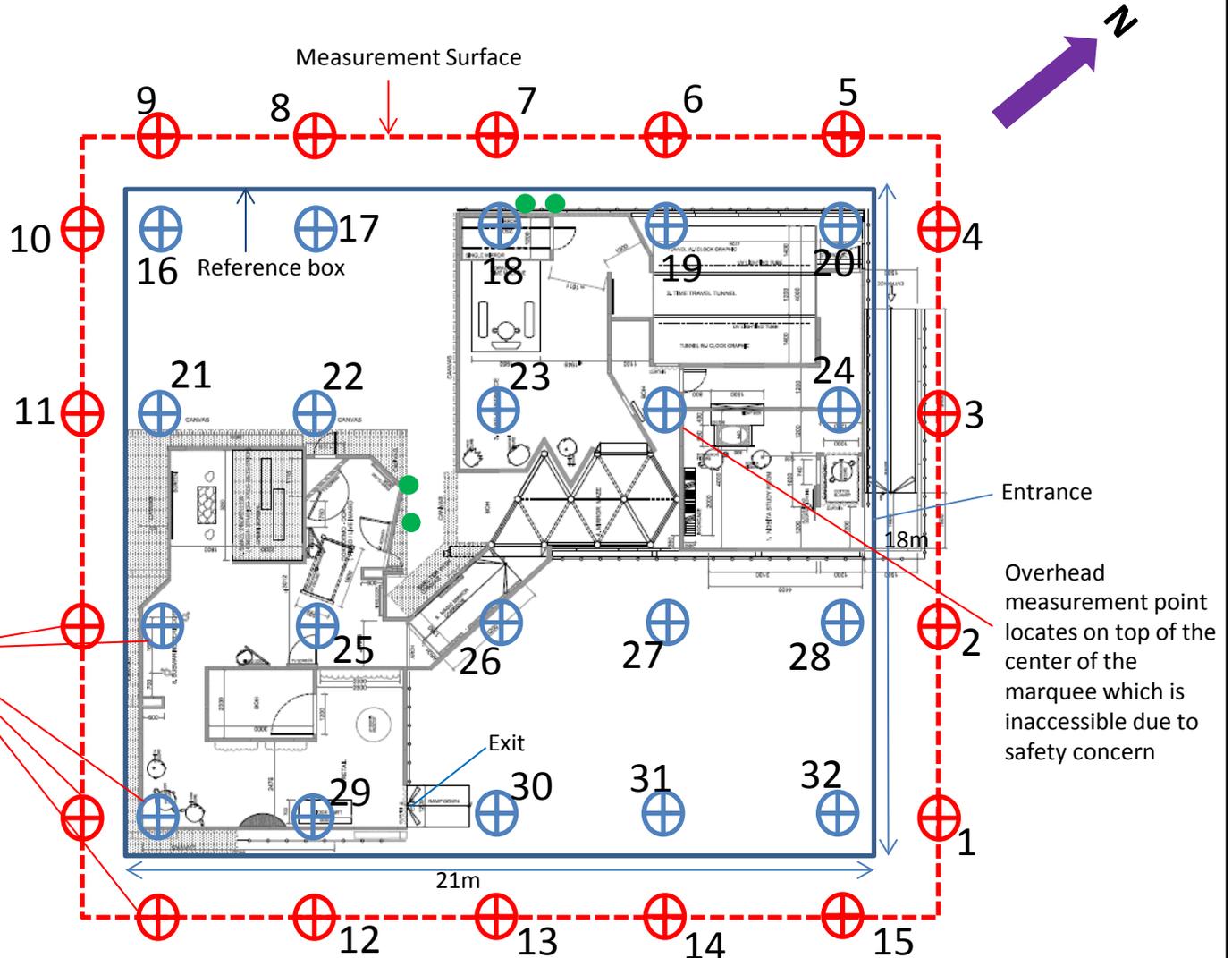
50 x 50 GMS hollow section frame

1.2 mm thick Galvanized steel sheet surface panel ( $9.62 \text{ kg/m}^2$ )

**CANTILEVERED NOISE BARRIER FOR MOVIE STUDIO AC PLANT AREA**

Key

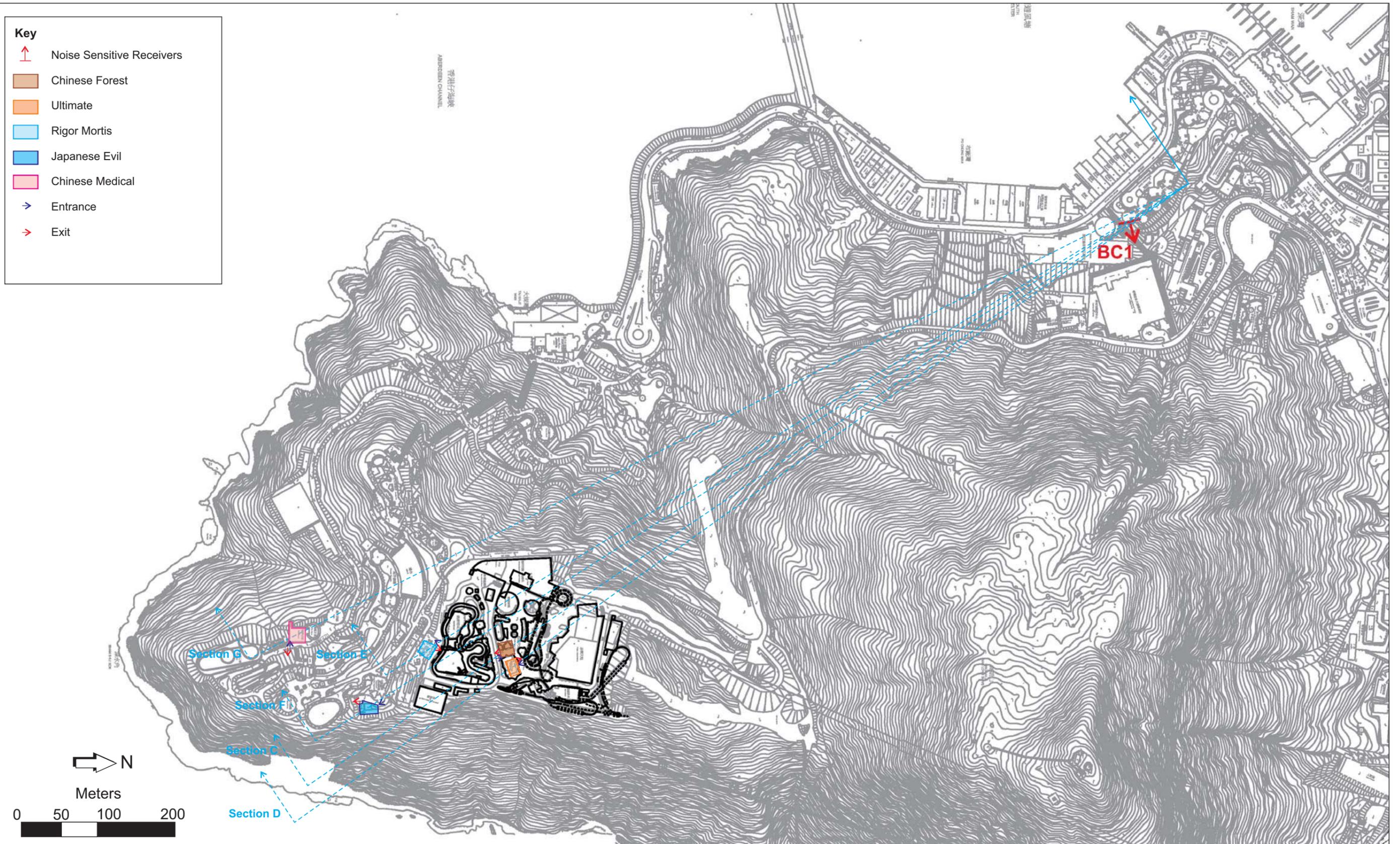
-  Measurement Point (side face, 3m above ground)
-  Measurement Point (top face, 6m above ground)
-  Split type AC unit

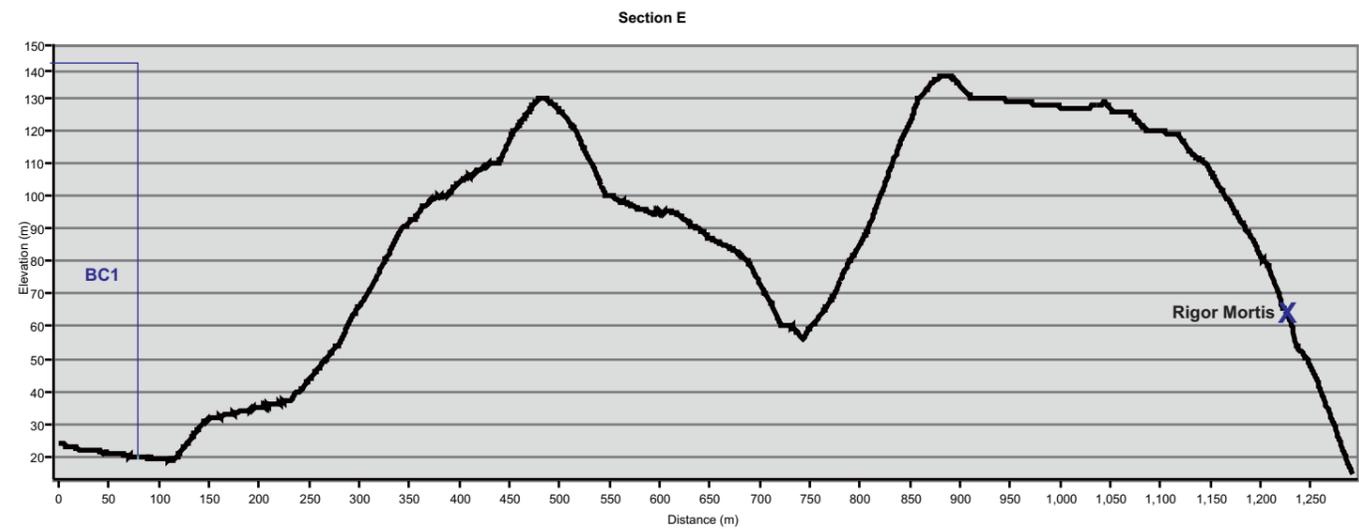
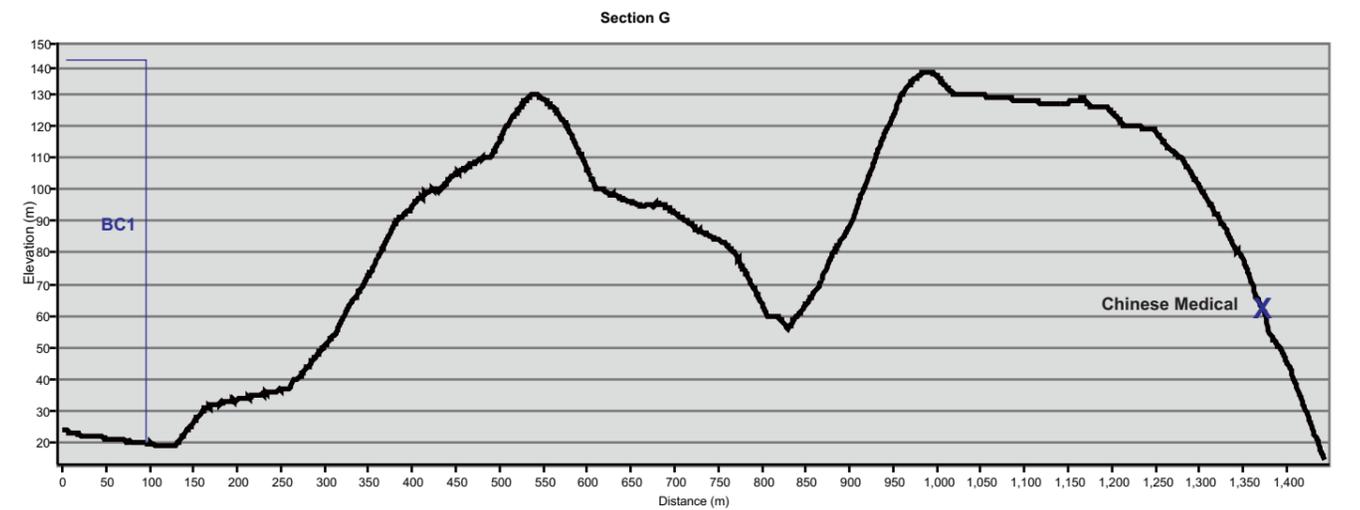
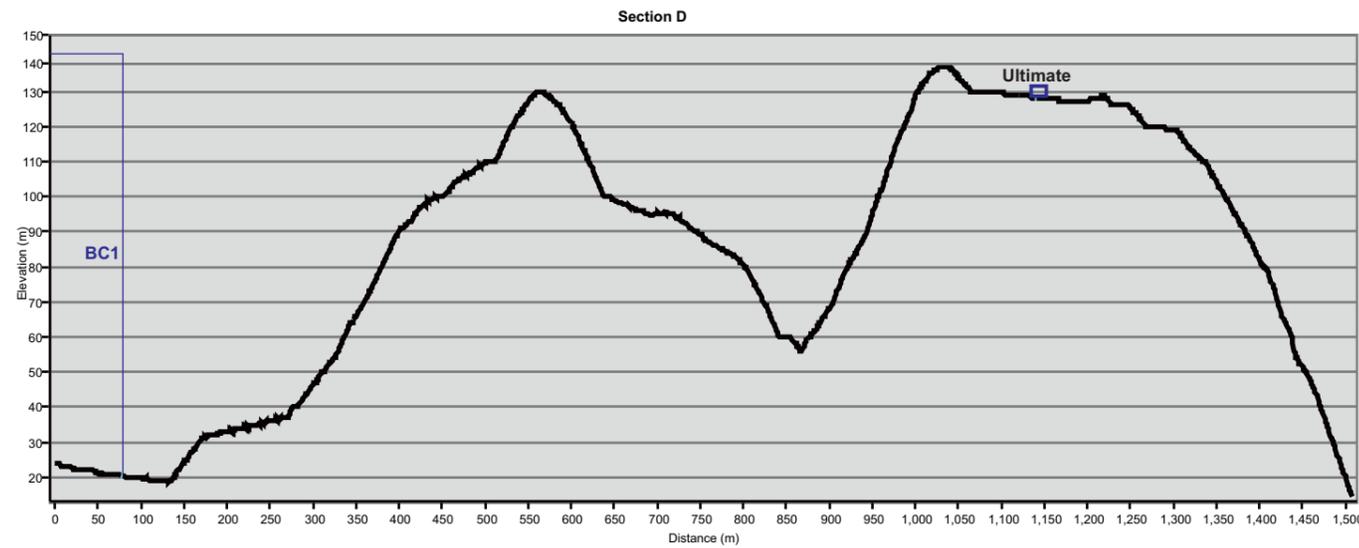
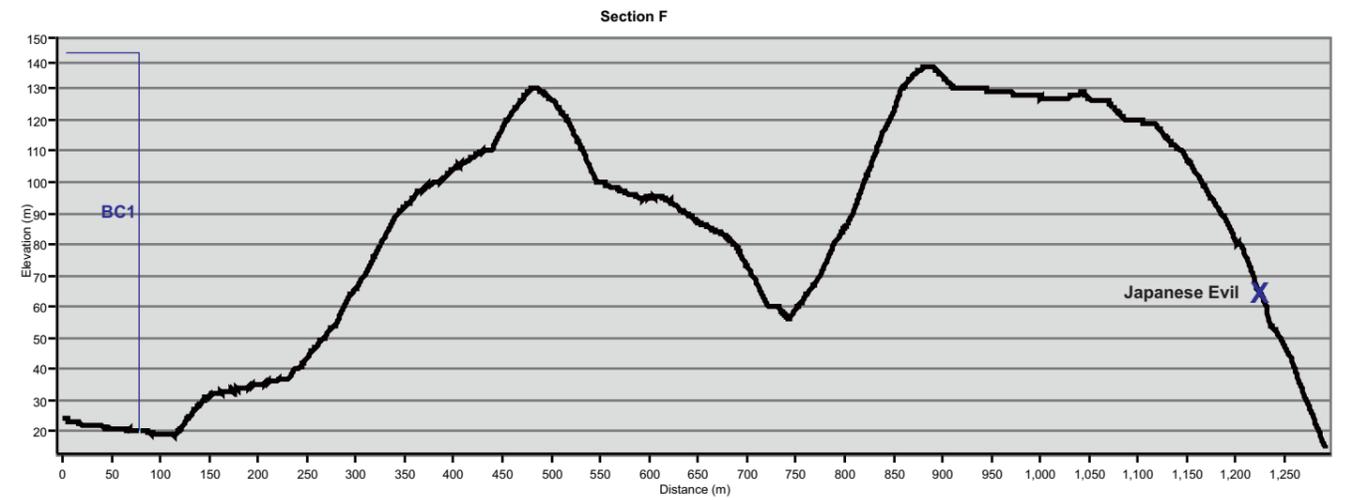
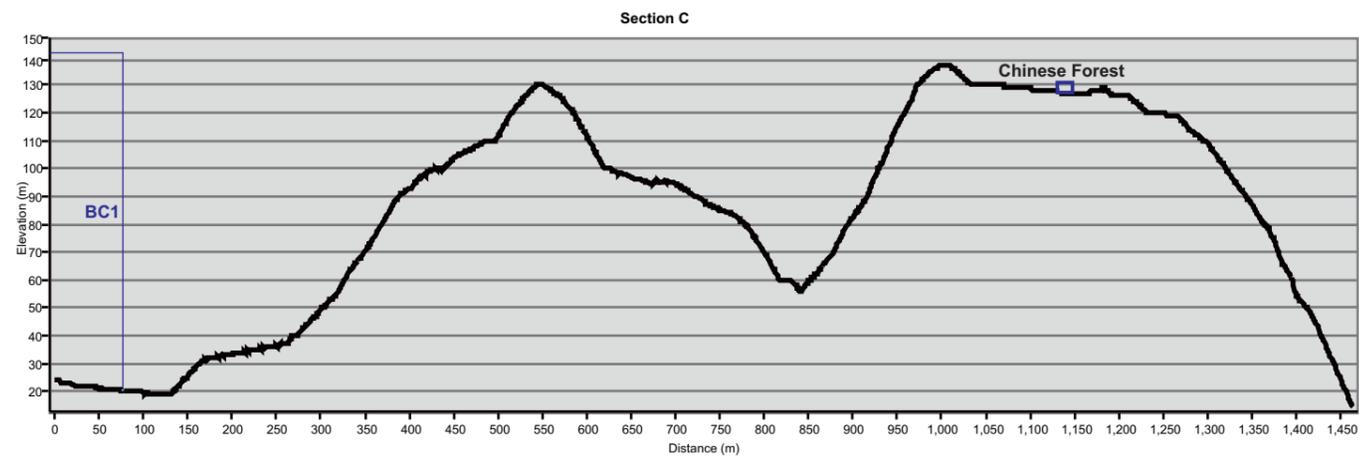


Measurement points are inaccessible due to site constraint (near hillside, no access path available)

Overhead measurement point locates on top of the center of the marquee which is inaccessible due to safety concern

\* Remark: If measurement point is inaccessible due to site constraint or safety reason, such measurement can be omitted.

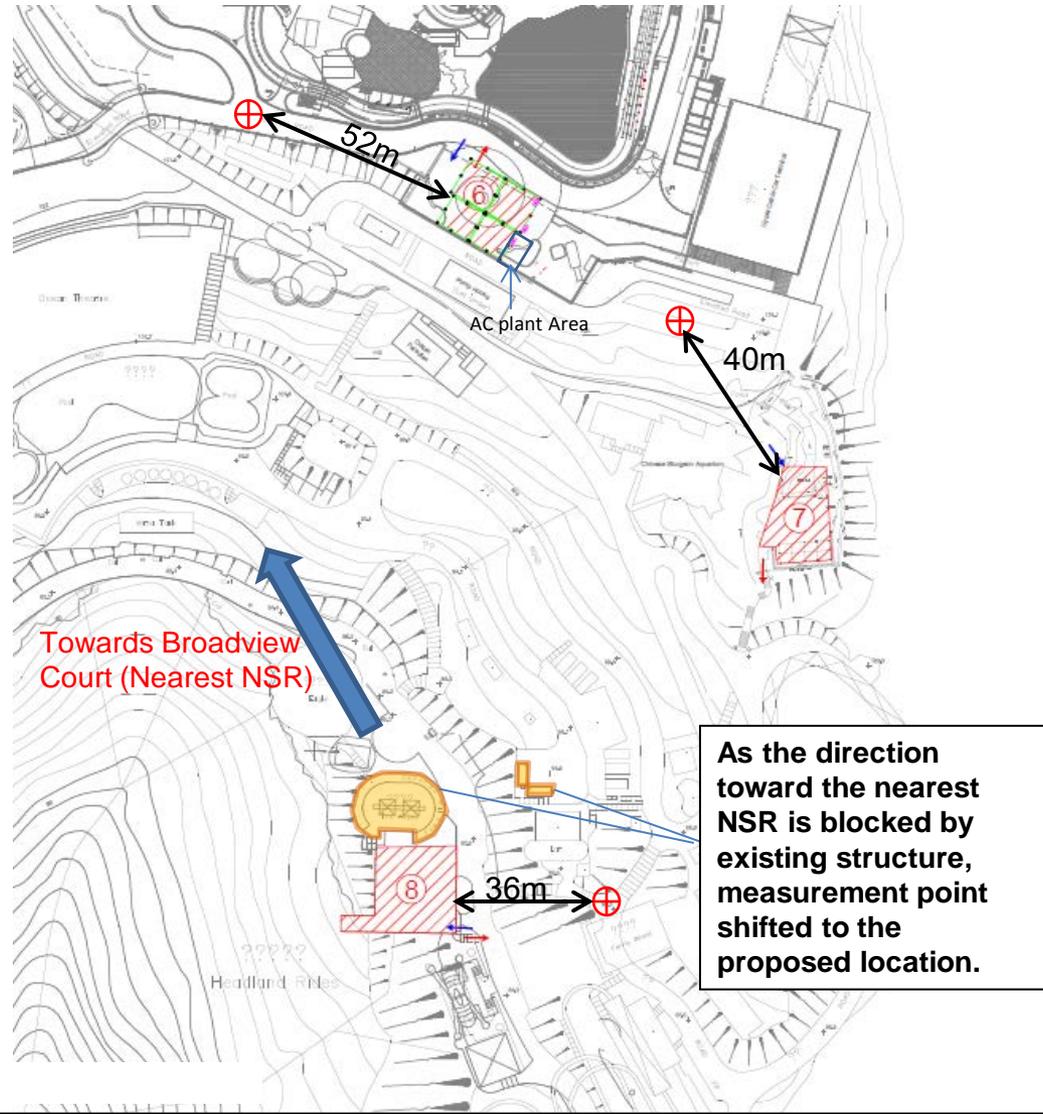


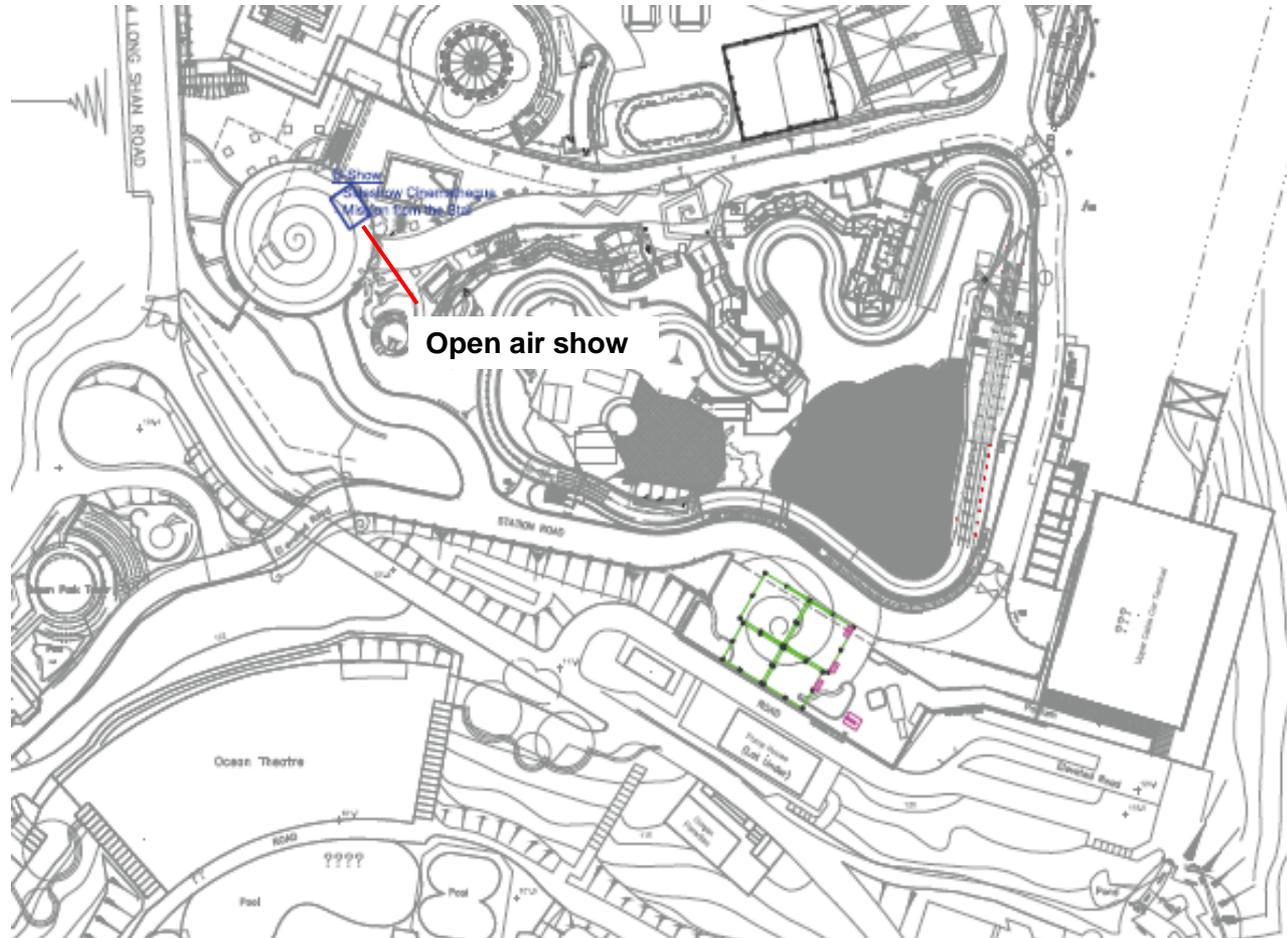




Key

- ⊕ Noise Measurement Point (1.2m above ground)
- ⑥ Rigor Mortis
- ⑦ Japanese Evil
- ⑧ Chinese Medical





Annex B4

Location of the open air show in the Summit

DATE: 23/06/2014

Environmental  
Resources  
Management



Annex C

STC rating of 18mm  
Plywood

# Sound Insulation Prediction (v6.4.12)

Program copyright Marshall Day Acoustics 2010



Microsoft - Key No. 1378

Margin of error is generally within STC +/- 3 dB

Job Name:

Notes:

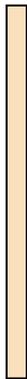
Job No.:

Page No.:

Date: 14 八月 14

Initials:echeng

File Name: insul



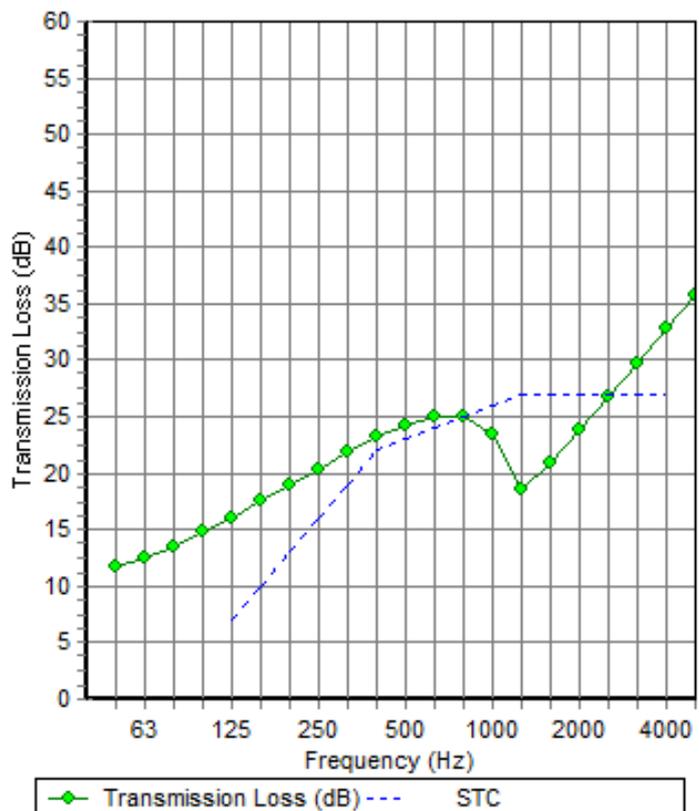
STC 23  
OITC 21

## System description

Panel 1 Outer layer: 1 x 18.0 mm Plyw ood- (m=10.1 kg/m<sup>2</sup>, f<sub>c</sub>=1290 Hz, damping=0.01)

Panel Size 2.7x4 m

| frequency (Hz) | TL(dB) | TL(dB) |
|----------------|--------|--------|
| 50             | 12     |        |
| 63             | 12     | 12     |
| 80             | 14     |        |
| 100            | 15     |        |
| 125            | 16     | 16     |
| 160            | 18     |        |
| 200            | 19     |        |
| 250            | 20     | 20     |
| 315            | 22     |        |
| 400            | 23     |        |
| 500            | 24     | 24     |
| 630            | 25     |        |
| 800            | 25     |        |
| 1000           | 24     | 21     |
| 1250           | 19     |        |
| 1600           | 21     |        |
| 2000           | 24     | 23     |
| 2500           | 27     |        |
| 3150           | 30     |        |
| 4000           | 33     | 32     |
| 5000           | 36     |        |

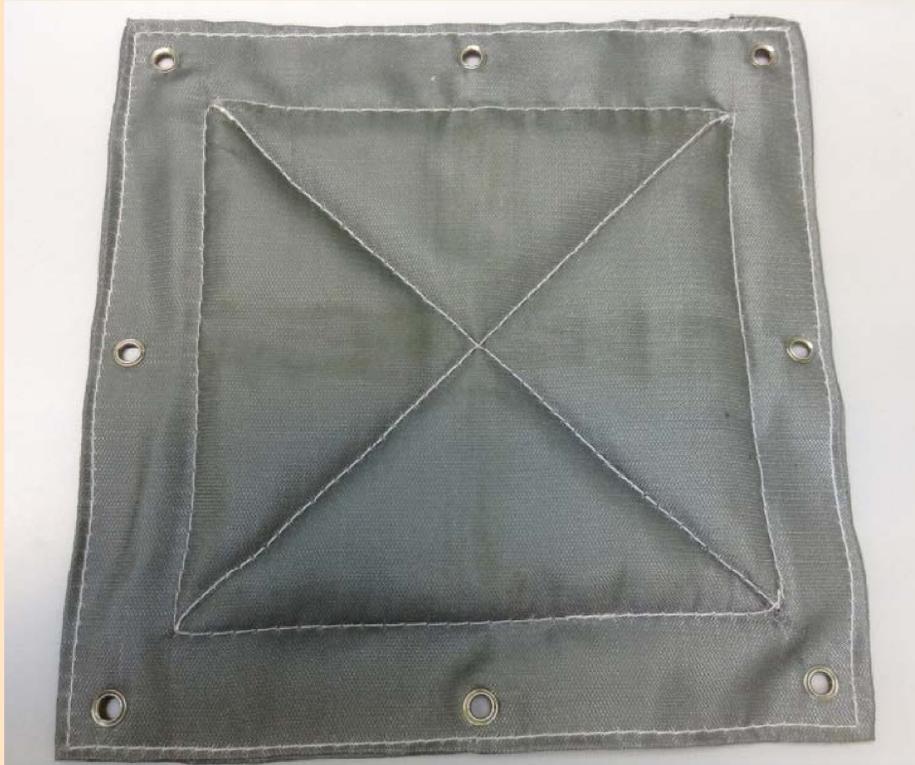


Annex D

## Specification of Barrier mat for Roof of Movie Studio

# CDL Acoustic Barrier Mat

CDL acoustic Barrier Mat is flexible and is easy to install, proved high noise insulation; is absolutely suitable for noise control in construction site or for outdoor applications. It's at low cost and easy to form a temporary noise barrier to isolate the noise source with high efficiency.



This product composes of high weathering resistance canvas and covered of high density polyethylene mat. The tensile strength of this product is excellent. It is provided of grommet at edge and can hang as a curtain, supported at top side and in a span of several meters height. It can provide tailor made size and fit to the site condition.



Acoustic performance:

| <u>125Hz</u> | <u>250Hz</u> | <u>500Hz</u> | <u>1kHz</u> | <u>2kHz</u> | <u>4kHz</u> | <u>STC</u> |
|--------------|--------------|--------------|-------------|-------------|-------------|------------|
| 15           | 20           | 23           | 20          | 22          | 33          | 23         |

Acoustic Test Standard Reference: ASTM E 90-04 / ASTM E413 -04

**CDL Studio Limited**

Unit 5N, Century Centre, 33 Au Pui Wan Street, Fo Tan, Shatin, HK

Tel: (852) 3590 2408 Fax: (852) 3013 9667

E-mail: info@CDL.hk Web site: www.CDL.hk

studio

Annex E

## Equipment in Fan Room



Annex F1

## Layout of Movie Studio

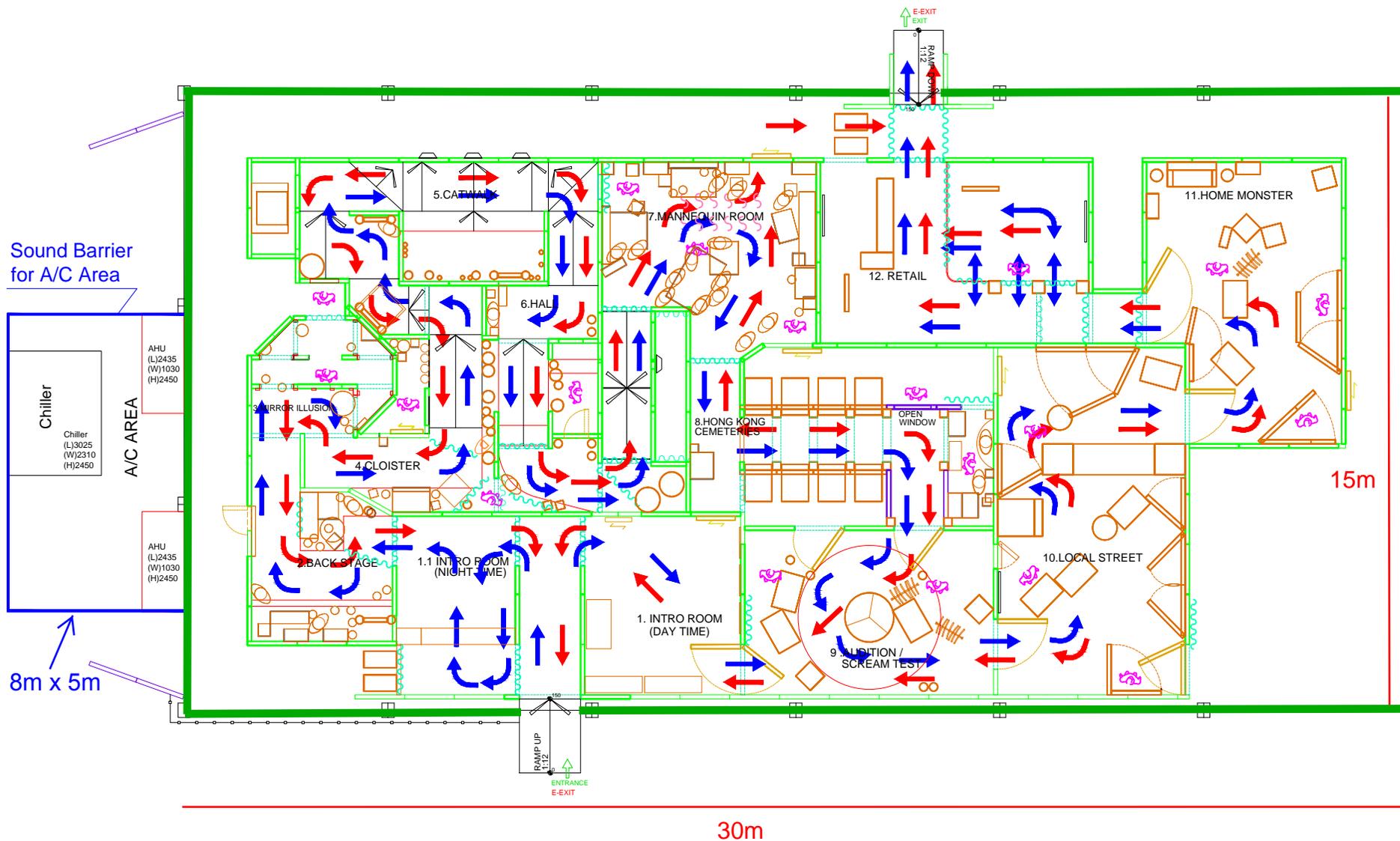
DO NOT TAKE MEASUREMENTS DIRECTLY FROM THE DRAWING.

CHECK AND VERIFY ALL DIMENSIONS ON SITE.

18mm thick Plywood Panel

| Item:    | Code No. / Symbol |
|----------|-------------------|
| 4' Panel | 2450 (H)          |
|          | 3000 (L)          |
|          | 3600 (L)          |
|          | 4200 (L)          |

E-Exit Flow →  
 Guest Flow →



REVISION ISSUE

The drawing is the Property and Copyright of Ocean Park Hong Kong and must not be re-issued, copied or reproduced without written consent

ISSUED BY



OCEAN PARK HONG KONG

OCEAN PARK ABERDEEN HONG KONG

Events and Entertainment Department

PROJECT Halloween Fest 2014

DRAWING TITLE Movie Studio

SCALE NTS DATE Aug 2014

DRAWN CHKD

CAD REF. NO.

CONTRACTOR

CONSULTANT

DRG NO.

Annex F2

## Layout of Doraemon Attraction

DO NOT TAKE MEASUREMENTS DIRECTLY FROM THE DRAWING.

CHECK AND VERIFY ALL DIMENSIONS ON SITE.

Key:

| Item:        | Code No. / Symbol   |
|--------------|---|
| 4' Panel     | 2100 (FR)<br>2400 (BR)<br>2800 (GR)<br>3000 (OR)<br>3600 (LR) |
| Scenic       | SN  |
| Flooring     | F   |
| Ceiling      | C   |
| Set dressing | SD  |
| Animatronics | A   |
| Doorway      | DR  |
| Audio        | S   |
| Lighting     | L   |
| Performer    | CH  |
| Dummy        | D   |
| Plants       |   |

REVISION ISSUE

The drawing is the Property and Copyright of Ocean Park Hong Kong and must not be re-issued, copied or reproduced without written consent.

ISSUED BY

OCEAN PARK HONG KONG

OCEAN PARK ABERDEEN HONG KONG

Events and Entertainment Department

PROJECT Doraemon Halloween 2014

DRAWING TITLE

SCALE 1:75 DATE April 2014

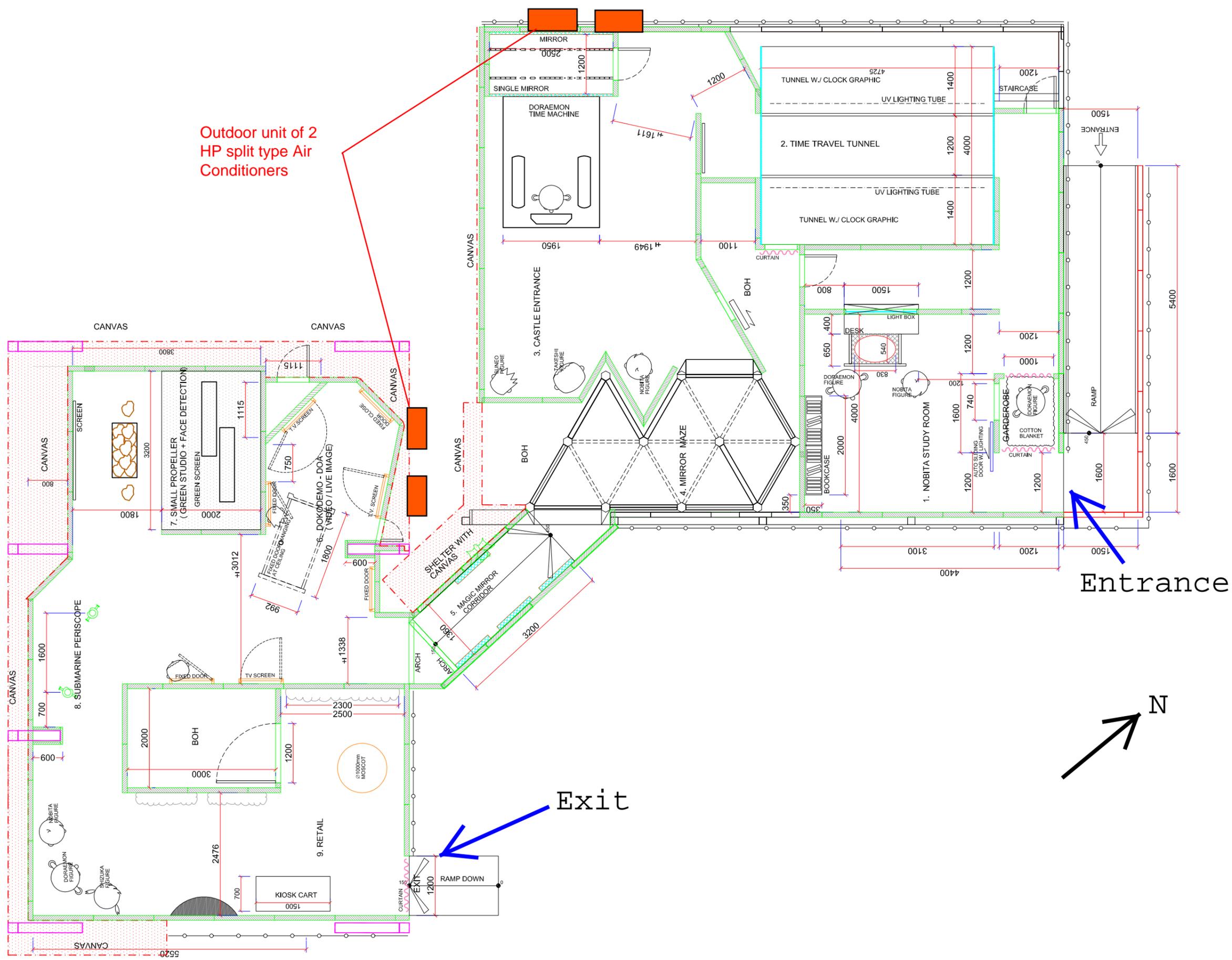
DRAWN CHKD

CAD REF. NO.

CONTRACTOR

CONSULTANT

DRG NO.



Annex F3

## Layout of Chinese Forest

DO NOT TAKE MEASUREMENTS DIRECTLY FROM THE DRAWING.  
CHECK AND VERIFY ALL DIMENSIONS ON SITE.

**Key:**

| Item:       | Code No. / Symbol   |
|-------------|---|
| 4' Panel    |  2400 (8H) |
| Performer   | CH         |
| E-exit flow |            |
| Guest flow  |            |

REVISION ISSUE  
The drawing is the Property and Copyright of Ocean Park Hong Kong and must not be re-issued, copied or reproduced without written consent

ISSUED BY

OCEAN PARK HONG KONG  
OCEAN PARK ABERDEEN HONG KONG  
Events and Entertainment Department

PROJECT  
Halloween Fest 2014

DRAWING TITLE  
4. Chinese Forest (TPPEL)

|                |                      |
|----------------|----------------------|
| SCALE<br>1:100 | DATE<br>11 June 2014 |
|----------------|----------------------|

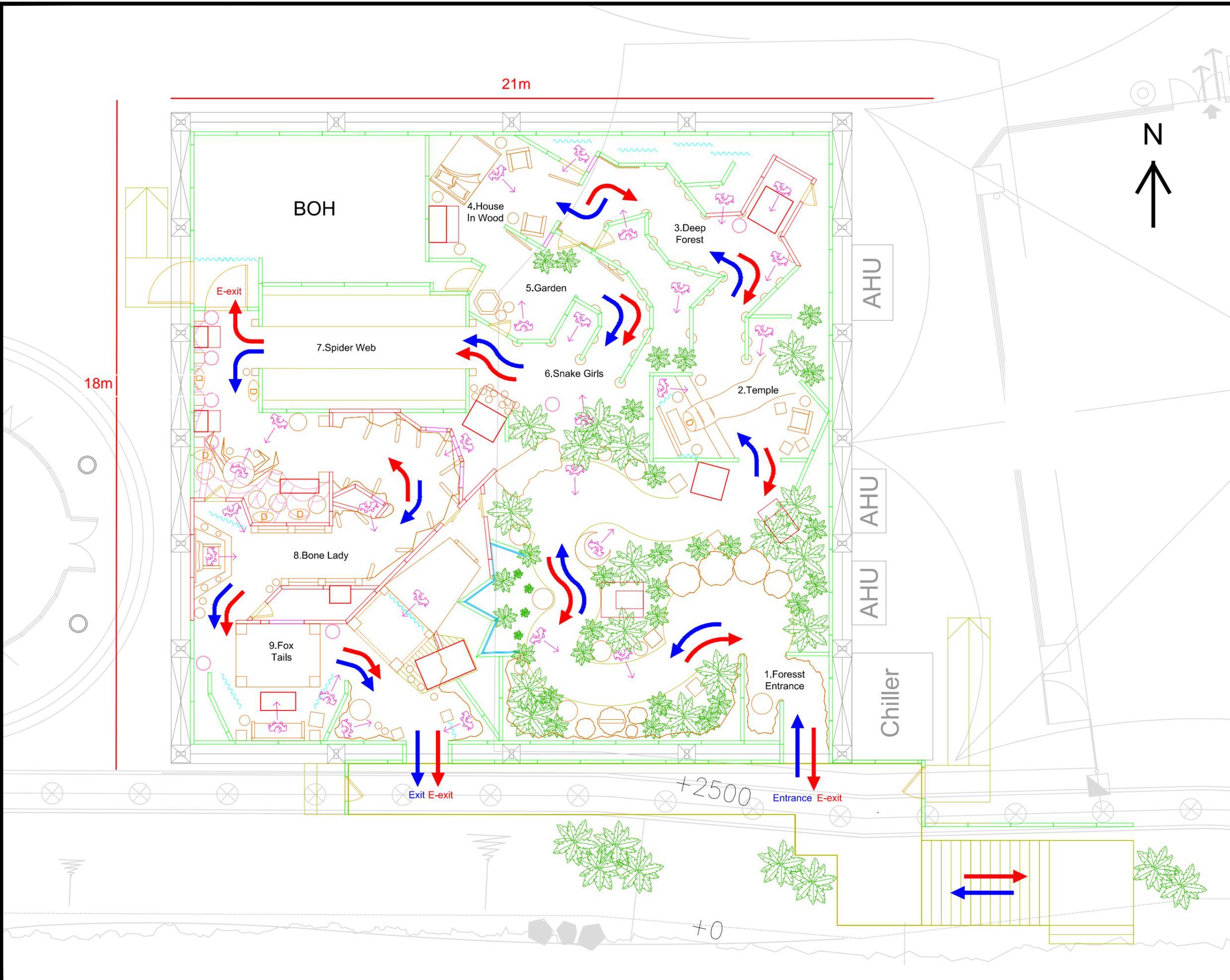
|       |      |
|-------|------|
| DRAWN | CHKD |
|-------|------|

CAD REF. NO.

CONTRACTOR

CONSULTANT

DRG NO.  
Version 1



Annex F4

## Layout of Ultimate

23m

DO NOT TAKE MEASUREMENTS DIRECTLY FROM THE DRAWING.

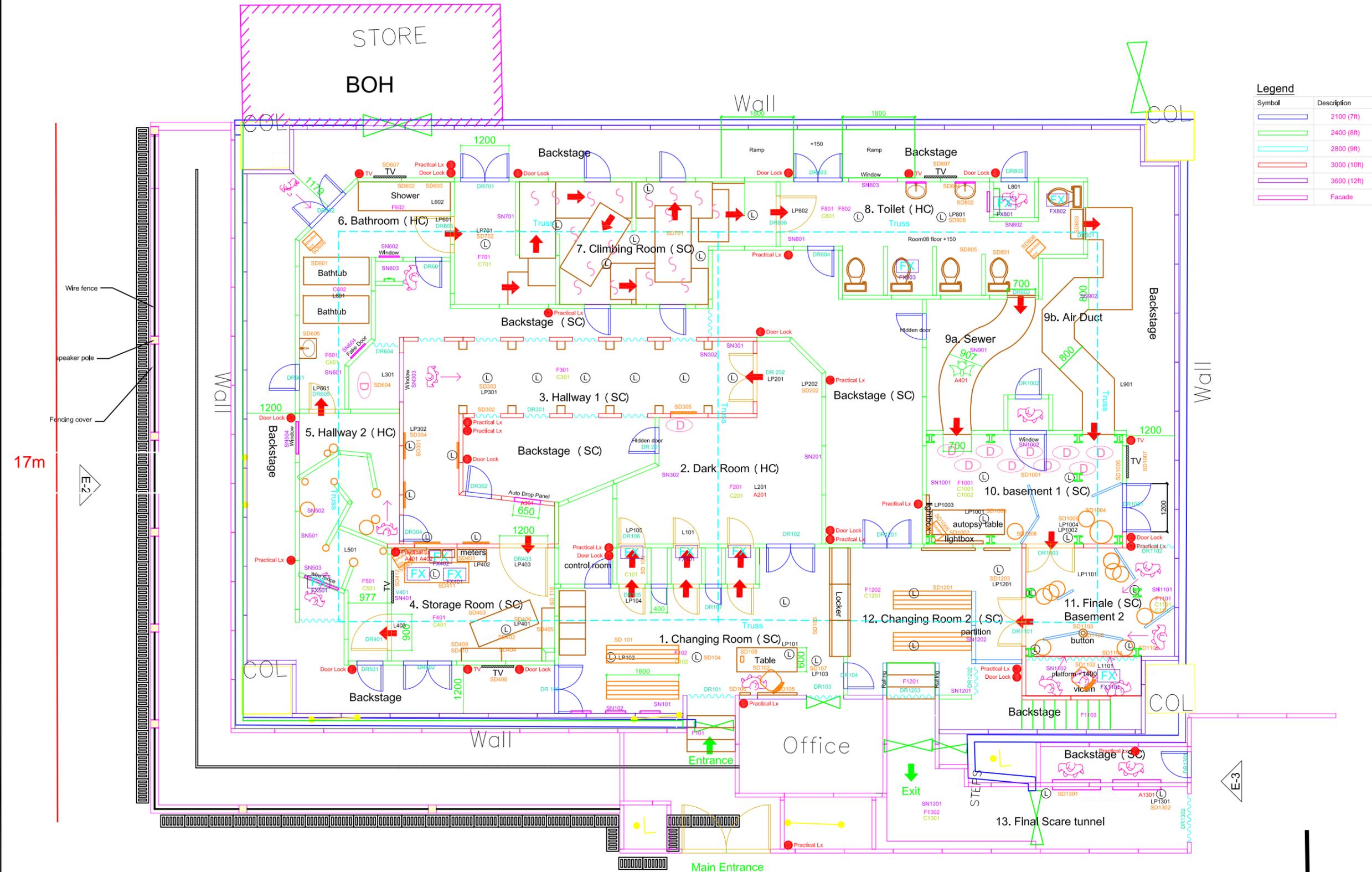
CHECK AND VERIFY ALL DIMENSIONS ON SITE.

Key:

| Item:        | Code No. / Symbol  |
|--------------|--|
| 4' Panel     | 2100 (7ft)<br>2400 (8ft)<br>2800 (9ft)<br>3000 (10ft)<br>3600 (12ft) |
| Scenic       | SN   |
| Flooring     | F  |
| Ceiling      | C  |
| Set dressing | SD   |
| Animatronics | A  |
| Doorway      | DR   |
| Audio        | S  |
| Lighting     | L  |
| Performer    | CH   |
| Dummy        | D  |
| Plants       |  |

Legend

| Symbol        | Description |
|---------------|-------------|
| [Blue line]   | 2100 (7ft)  |
| [Green line]  | 2400 (8ft)  |
| [Cyan line]   | 2800 (9ft)  |
| [Orange line] | 3000 (10ft) |
| [Purple line] | 3600 (12ft) |
| [Pink line]   | Facade      |



# Bumper Blaster - Ultimate Haunted House

REVISION ISSUE

The drawing is the Property and Copyright of Ocean Park Hong Kong and must not be re-issued, copied or reproduced without written consent.

ISSUED BY

OCEAN PARK HONG KONG

OCEAN PARK ABERDEEN HONG KONG

Events and Entertainment Department

PROJECT Halloween Fest 2014

DRAWING TITLE Asylum Extreme (Layout)

SCALE 1:100 DATE 11 July 2014

DRAWN CHKD

CAD REF. NO.

CONTRACTOR

CONSULTANT

DRG NO.

Annex F5

## Layout of Rigor Mortis

DO NOT TAKE MEASUREMENTS DIRECTLY FROM THE DRAWING.

CHECK AND VERIFY ALL DIMENSIONS ON SITE.

**Key:**

| Item:       | Code No. / Symbol  |
|-------------|--|
| 4' Panel    | 2400 (BH)  |
| Performer   | CH  |
| E-exit flow |     |
| Guest flow  |     |

REVISION ISSUE

The drawing is the Property and Copyright of Ocean Park Hong Kong and must not be re-issued, copied or reproduced without written consent

ISSUED BY

OCEAN PARK HONG KONG

OCEAN PARK  
ABERDEEN  
HONG KONG

Events and Entertainment Department

PROJECT  
Halloween Fest 2014

DRAWING TITLE  
6. Rigor Mortis (TPPEL)

|                |                     |
|----------------|---------------------|
| SCALE<br>1:100 | DATE<br>11 Jun 2014 |
|----------------|---------------------|

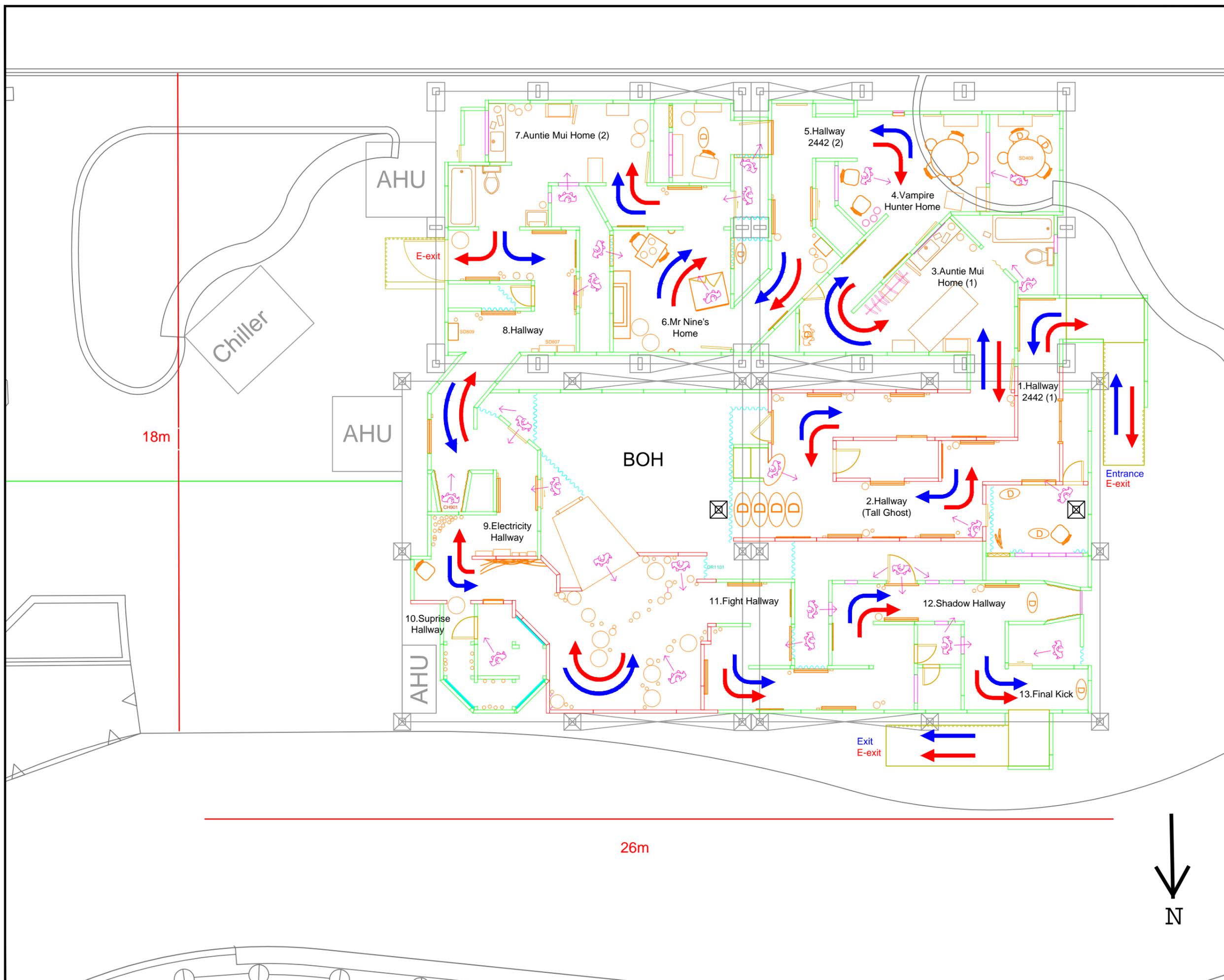
|       |      |
|-------|------|
| DRAWN | CHKD |
|-------|------|

CAD REF. NO.

CONTRACTOR

CONSULTANT

DRG NO.  
Version 1



18m

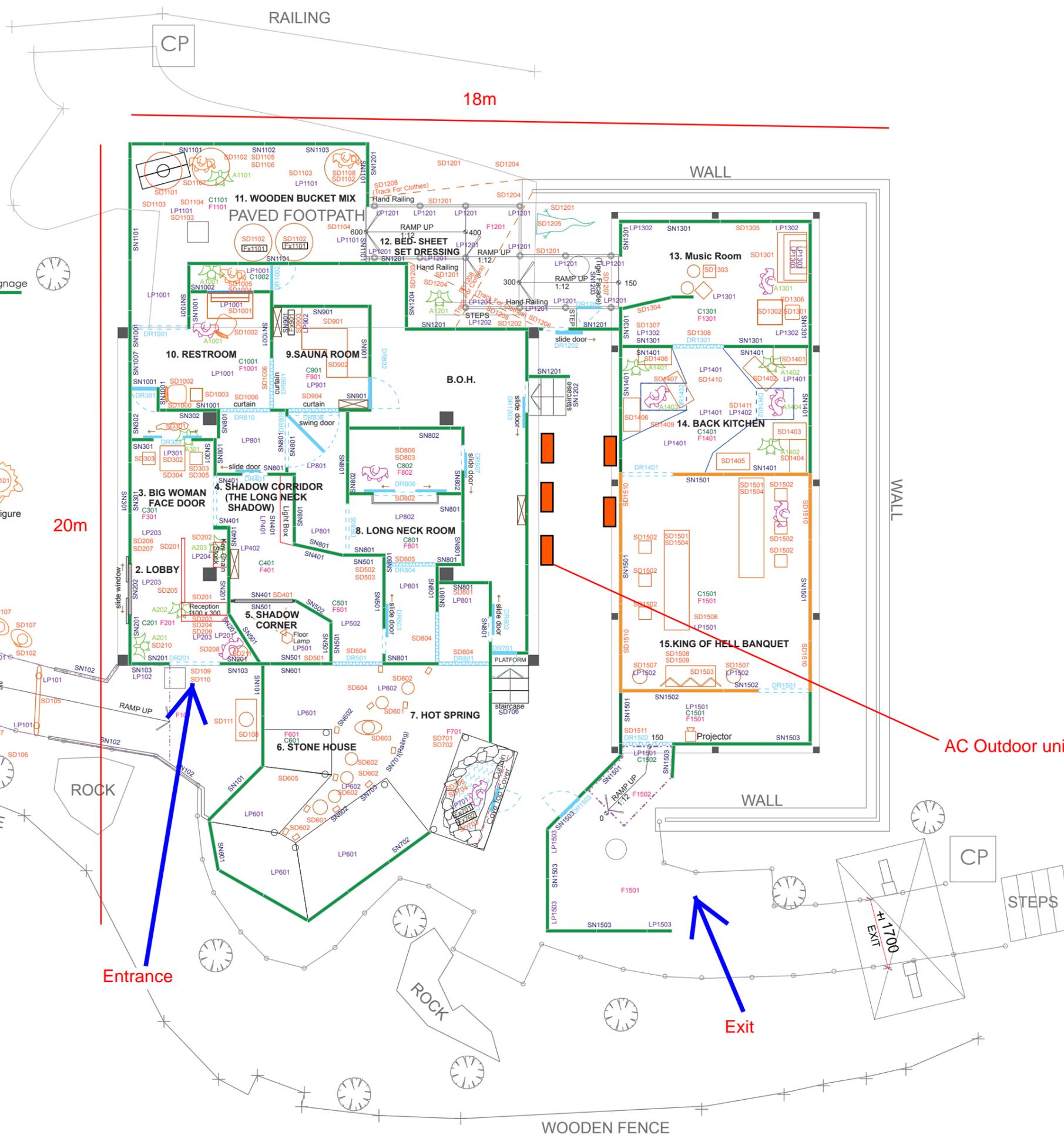
26m



Annex F6

## Layout of Japanese Evil

1:100



- Panel (2440h)
- Panel (3000h)
- Performer
- Dummy
- Animatronics
- Set Dressing
- Scenic
- Flooring
- Ceiling
- Doorway
- Lighting
- Effect
- Air Conditioner

AC Outdoor unit

Entrance

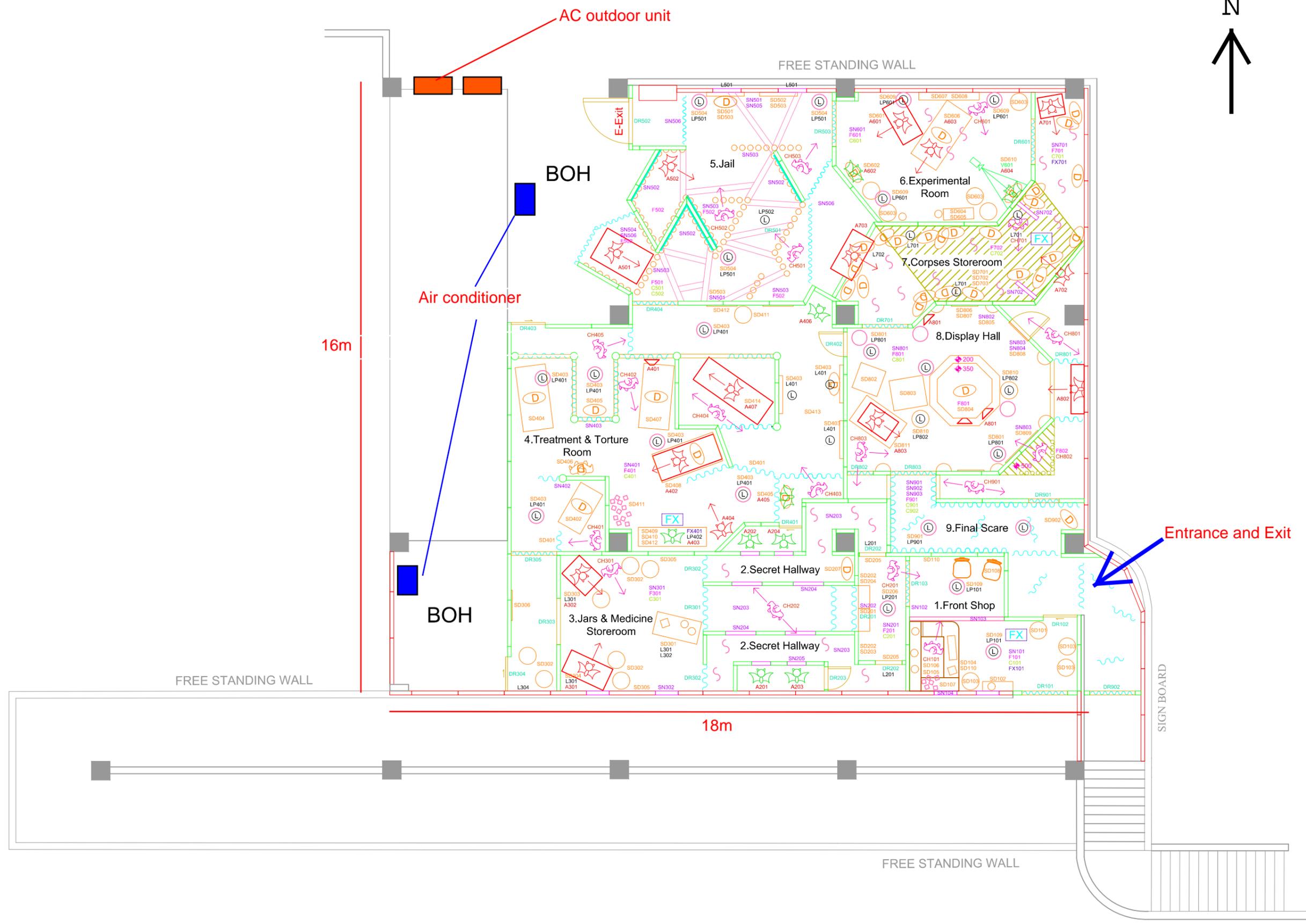
Exit

Annex F7

## Layout of Chinese Medical

DO NOT TAKE MEASUREMENTS DIRECTLY FROM THE DRAWING.

CHECK AND VERIFY ALL DIMENSIONS ON SITE.



**Key:**

| Item:        | Code No. / Symbol |
|--------------|-------------------|
| 4' Panel     | 1900(6R)          |
|              | 2100(7H)          |
|              | 2400 (8R)         |
|              | 2800(9R)          |
|              | 3000(10R)         |
|              | 3600(12R)         |
| Scenic       | SN                |
| Flooring     | F                 |
| Ceiling      | C                 |
| Set dressing | SD                |
| Animatronics | A                 |
| Doorway      | DR                |
| Audio        | S                 |
| Lighting     | L                 |
| Performer    | CH                |
| Dummy        | D                 |
| Plants       |                   |

REVISION ISSUE

The drawing is the Property and Copyright of Ocean Park Hong Kong and must not be re-issued, copied or reproduced without written consent

ISSUED BY

OCEAN PARK HONG KONG

OCEAN PARK  
ABERDEEN  
HONG KONG

Events and Entertainment Department

PROJECT  
Halloween Bash 2014

DRAWING TITLE  
Chinese Medical

|                |                     |
|----------------|---------------------|
| SCALE<br>1:100 | DATE<br>16 May 2014 |
|----------------|---------------------|

|       |      |
|-------|------|
| DRAWN | CHKD |
|-------|------|

CAD REF. NO.

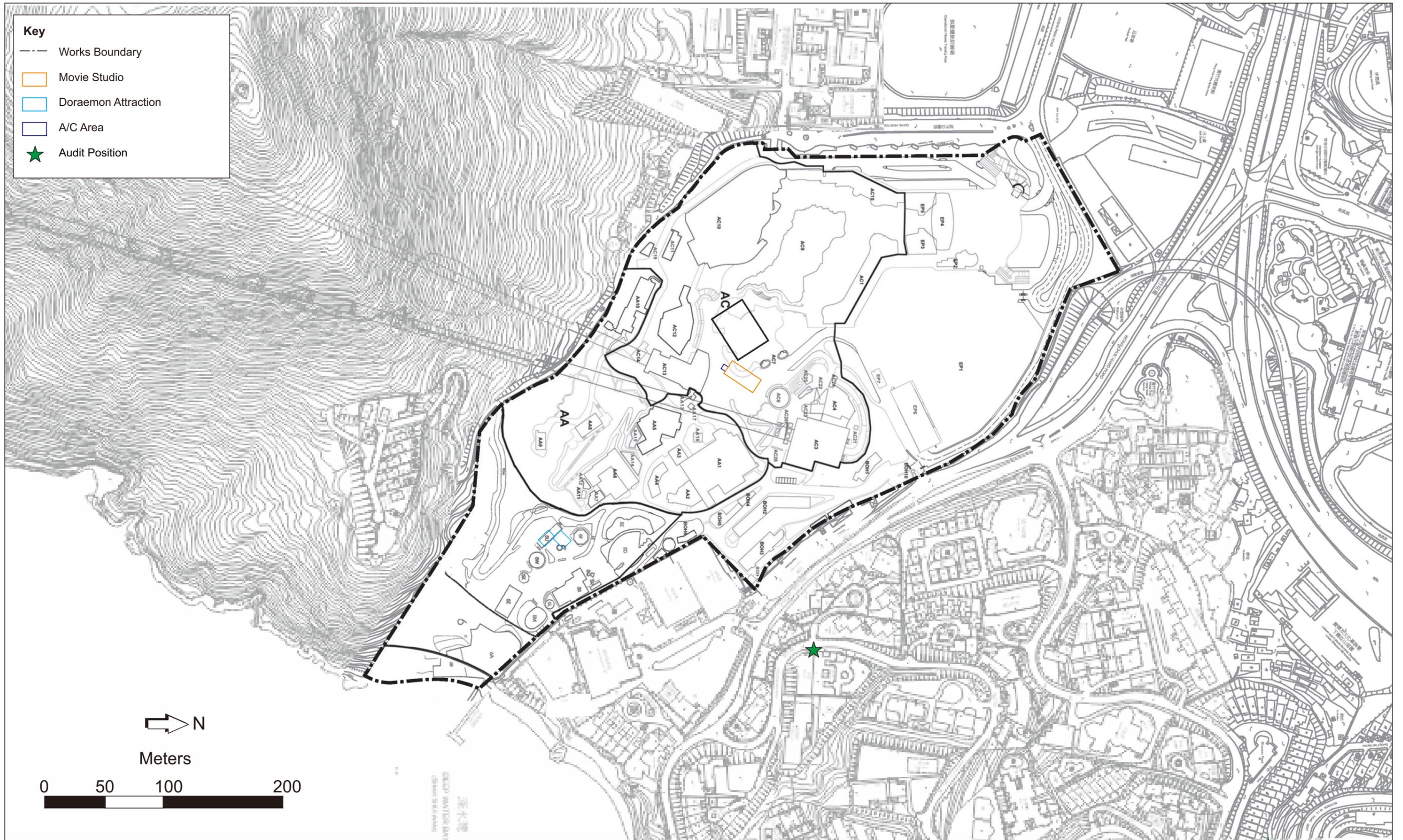
CONTRACTOR

CONSULTANT

DRG NO.

Annex G

Proposed Audit Position for  
Special Events from 23:00 to  
01:00 hrs the Next Day



Annex G

Proposed Audit Position for Special Events during 23:00 to 01:00 hrs the next day

FILE: 0238176k  
DATE: 18/08/2014

Environmental  
Resources  
Management



Annex H

## Calibration Certificates



# Calibration Certificate

Certificate No. **34249**

Page 1 of 3 Pages

**Customer :** Environmental Resources Management

**Address :** 21/F, Lincoln House, 979 King's Road, Taikoo Place, Island East, Hong Kong.

**Order No. :** Q31652

**Date of receipt :** 24-Jun-13

## Item Tested

**Description :** Sound Level Meter

**Manufacturer :** Solo

**Model :** 01dB

**Serial No. :** 65225

## Test Conditions

**Date of Test :** 5-Jul-13

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Calibration procedure : Z01.

## Test Results

All results were within the IEC 651 Type1, IEC 804 Type1 and IEC 1260 Class1 specification.

The results are shown in the attached page(s).

Test equipment used:

| <u>Equipment No.</u> | <u>Description</u>       | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|--------------------------|------------------|---------------------|
| S017                 | Multi-Function Generator | C127181          | SCL-HKSAR           |
| S024                 | Sound Level Calibrator   | 30620            | NIM-PRC & SCL-HKSAR |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Liam Wong

**Approved by :**   
Dorothy Cheuk

**Date:** 5-Jul-13



# Calibration Certificate

Certificate No. 34249

Page 2 of 4 Pages

Results :

## 1. SPL Accuracy

| Level Range | UUT Setting   |          |             | Applied Value (dB) | UUT Reading (dB) |       |
|-------------|---------------|----------|-------------|--------------------|------------------|-------|
|             | Octave Filter | Weight   | Time Const. |                    |                  |       |
| 20 – 140 dB | OFF           | A        | Fast        | 94.0               | 93.7             |       |
|             |               |          | Slow        |                    | 93.7             |       |
|             |               | C        | Fast        |                    | 93.7             |       |
|             |               | ON (1/1) | --          |                    | Fast             | 93.7  |
|             |               | ON (1/3) | --          |                    | Fast             | 93.7  |
|             |               | OFF      | A           |                    | Fast             | 114.0 |
|             |               |          | Slow        | 113.7              |                  |       |
|             |               | C        | Fast        | 113.7              |                  |       |
|             | ON (1/1)      | --       | Fast        | 113.7              |                  |       |
|             | ON (1/3)      | --       | Fast        | 113.7              |                  |       |
|             |               |          |             |                    |                  |       |

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.2$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.1$  dB

## 3. Linearity

| UUT Range (dB) | Applied Value (dB) | UUT Reading (dB) | Variation (dB) | IEC 651 Type 1 Spec. |
|----------------|--------------------|------------------|----------------|----------------------|
| 20 – 140 dB    | 84.0               | 83.8             | +0.1           | $\pm 0.4$ dB         |
|                | 94.0               | 93.7 (Ref.)      | --             |                      |
|                | 95.0               | 94.7             | 0.0            | $\pm 0.2$ dB         |



# Calibration Certificate

Certificate No. 34249

Page 3 of 4 Pages

## 4. Frequency Weighting

A weighting

| Frequency | Attenuation (dB) | IEC 651 Type 1 Spec.          |
|-----------|------------------|-------------------------------|
| 31.5 Hz   | -39.2            | - 39.4 dB, $\pm 1.5$ dB       |
| 63 Hz     | -25.9            | - 26.2 dB, $\pm 1.5$ dB       |
| 125 Hz    | -16.0            | - 16.1 dB, $\pm 1$ dB         |
| 250 Hz    | -8.5             | - 8.6 dB, $\pm 1$ dB          |
| 500 Hz    | -3.1             | - 3.2 dB, $\pm 1$ dB          |
| 1 kHz     | 0.0 (Ref.)       | 0 dB, $\pm 1$ dB              |
| 2 kHz     | +1.2             | + 1.2 dB, $\pm 1$ dB          |
| 4 kHz     | +0.9             | + 1.0 dB, $\pm 1$ dB          |
| 8 kHz     | -1.7             | - 1.1 dB, + 1.5 dB ~ - 3 dB   |
| 16 kHz    | -12.1            | - 6.6 dB, + 3 dB ~ - $\infty$ |

Uncertainty :  $\pm 0.1$  dB

## 5. Time Averaging

| Applied Burst duty Factor | Applied Leq Value (dB) | UUT Reading (dB) | IEC 804 Type 1 Spec. |
|---------------------------|------------------------|------------------|----------------------|
| continuous                | 40.0                   | 40.0             | --                   |
| 1/10                      | 40.0                   | 40.0             | $\pm 0.5$ dB         |
| 1/10 <sup>2</sup>         | 40.0                   | 40.0             |                      |
| 1/10 <sup>3</sup>         | 40.0                   | 40.0             | $\pm 1.0$ dB         |
| 1/10 <sup>4</sup>         | 40.0                   | 40.0             |                      |

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 34249

Page 4 of 4 Pages

## 6. Filter Characteristics

### 6.1 1/1 – Octave Filter

| Frequency   | Attenuation (dB) | IEC 1260 Class 1 (dB) |
|-------------|------------------|-----------------------|
| 125 Hz      | -74.4            | < - 61                |
| 250 Hz      | -55.0            | < - 42                |
| 500 Hz      | -24.4            | < - 17.5              |
| 707 Hz      | -3.0             | - 2 ~ - 5             |
| 1 kHz (Ref) | --               | --                    |
| 1.414 kHz   | -2.8             | - 2 ~ - 5             |
| 2 kHz       | -18.3            | < - 17.5              |
| 4 kHz       | -83.6            | < - 42                |
| 8 kHz       | -84.5            | < - 61                |

Uncertainty :  $\pm 0.25$  dB

### 6.2 1/3 – Octave Filter

| Frequency   | Attenuation (dB) | IEC 1260 Class 1 (dB) |
|-------------|------------------|-----------------------|
| 326 Hz      | -69.1            | < - 61                |
| 530 Hz      | -59.8            | < - 42                |
| 772 Hz      | -28.4            | < - 17.5              |
| 891 Hz      | -3.4             | + 0.3 ~ - 5.0         |
| 1 kHz (Ref) | --               | --                    |
| 1.122 kHz   | -3.7             | + 0.3 ~ - 5.0         |
| 1.296 kHz   | -31.5            | < - 17.5              |
| 1.887 kHz   | -66.8            | < - 42                |
| 3.070 kHz   | -80.7            | < - 61                |

Uncertainty :  $\pm 0.25$  dB

Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1001 hPa.

----- END -----



# Calibration Certificate

Certificate No. **32987**

Page 1 of 3 Pages

**Customer :** Environmental Resources Management

**Address :** 21/F, Lincoln House, 979 King's Road, Taikoo Place, Island East, Hong Kong.

**Order No. :** Q31162

**Date of receipt :** 3-May-13

## Item Tested

**Description :** Sound Level Meter

**Manufacturer :** Solo

**Model :** 01dB

**Serial No. :** 65226

## Test Conditions

**Date of Test :** 21-May-13

**Supply Voltage :** --

**Ambient Temperature :**  $(23 \pm 3)^{\circ}\text{C}$

**Relative Humidity :**  $(50 \pm 25) \%$

## Test Specifications

Calibration check.

Calibration procedure : Z01.

## Test Results

All results were within the IEC 651 Type1, IEC 804 Type1 and IEC 1260 Class1 specification.

The results are shown in the attached page(s).

Test equipment used:

| <u>Equipment No.</u> | <u>Description</u>       | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|--------------------------|------------------|---------------------|
| S017                 | Multi-Function Generator | C127181          | SCL-HKSAR           |
| S024                 | Sound Level Calibrator   | 30620            | NIM-PRC & SCL-HKSAR |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by :

  
Liam Wong

Approved by :

  
Dorothy Cheuk

Date: 21-May-13

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

The copyright of this certificate is owned by Hong Kong Calibration Ltd.. It may not be reproduced except in full.

E



# Calibration Certificate

Certificate No. **32987**

Page 2 of 4 Pages

Results :

## 1. Accuracy Check

| UUT Setting |          |                | Applied Value (dB) | UUT Reading (dB) |
|-------------|----------|----------------|--------------------|------------------|
| Range (dB)  | Response | Weighting      |                    |                  |
| 20 - 140    | Fast     | L <sub>A</sub> | 94.0               | 93.8             |
|             | Slow     |                |                    | 93.8             |
|             | Fast     | L <sub>C</sub> |                    | 93.9             |
|             | Slow     |                |                    | 93.9             |
|             | Fast     | L <sub>A</sub> | 114.0              | 113.9            |
|             | Slow     |                |                    | 113.9            |
|             | Fast     | L <sub>C</sub> |                    | 113.9            |
|             | Slow     |                |                    | 113.9            |

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.1$  dB

## 3. Linearity

Differential level linearity

| UUT Range | Applied Value (dB) | UUT Reading (dB) | Variation (dB) | IEC 651 Type 1 Spec. |
|-----------|--------------------|------------------|----------------|----------------------|
| 140       | 84.0               | 83.8             | 0.0            | $\pm 0.4$ dB         |
|           | 94.0               | 93.8 (Ref.)      | --             |                      |
|           | 95.0               | 94.8             | 0.0            | $\pm 0.2$ dB         |

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 32987

Page 3 of 4 Pages

## 4. Frequency Weighting

A weighting

| Frequency | Attenuation (dB) | IEC 651 Type 1 Spec.        |
|-----------|------------------|-----------------------------|
| 31.5 Hz   | -39.5            | - 39.4 dB, $\pm 1.5$ dB     |
| 63 Hz     | -26.1            | - 26.2 dB, $\pm 1.5$ dB     |
| 125 Hz    | -16.1            | - 16.1 dB, $\pm 1$ dB       |
| 250 Hz    | -8.6             | - 8.6 dB, $\pm 1$ dB        |
| 500 Hz    | -3.3             | - 3.2 dB, $\pm 1$ dB        |
| 1 kHz     | 0.0 (Ref.)       | 0 dB, $\pm 1$ dB            |
| 2 kHz     | +1.2             | + 1.2 dB, $\pm 1$ dB        |
| 4 kHz     | +0.8             | + 1.0 dB, $\pm 1$ dB        |
| 8 kHz     | -1.8             | - 1.1 dB, + 1.5 dB ~ - 3 dB |
| 16 kHz    | -12.1            | - 6.6 dB, + 3 dB ~ $\infty$ |

Uncertainty :  $\pm 0.1$  dB

## 5. Time Averaging

| Applied Burst duty Factor | Applied Leq Value (dB) | UUT Reading (dB) | IEC 804 Type 1 Spec. |
|---------------------------|------------------------|------------------|----------------------|
| continuous                | 40.0                   | --               | --                   |
| 1/10                      | 40.0                   | 40.0             | $\pm 0.5$ dB         |
| 1/10 <sup>2</sup>         | 40.0                   | 39.9             | $\pm 1.0$ dB         |
| 1/10 <sup>3</sup>         | 40.0                   | 39.9             |                      |
| 1/10 <sup>4</sup>         | 40.0                   | 39.9             |                      |

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 32987

Page 4 of 4 Pages

## 6. Filter Characteristics

### 6.1 1/1 – Octave Filter

| Frequency   | Attenuation (dB) | IEC 1260 Class 1 (dB) |
|-------------|------------------|-----------------------|
| 125 Hz      | -74.8            | < - 61                |
| 250 Hz      | -55.0            | < - 42                |
| 500 Hz      | -24.4            | < - 17.5              |
| 707 Hz      | -3.0             | - 2 ~ - 5             |
| 1 kHz (Ref) | --               | --                    |
| 1.414 kHz   | -2.8             | - 2 ~ - 5             |
| 2 kHz       | -48.3            | < - 17.5              |
| 4 kHz       | -88.6            | < - 42                |
| 8 kHz       | -89.0            | < - 61                |

Uncertainty :  $\pm 0.25$  dB

### 6.2 1/3 – Octave Filter

| Frequency   | Attenuation (dB) | IEC 1260 Class 1 (dB) |
|-------------|------------------|-----------------------|
| 326 Hz      | -68.4            | < - 61                |
| 530 Hz      | -58.4            | < - 42                |
| 772 Hz      | -28.4            | < - 17.5              |
| 891 Hz      | -3.5             | + 0.3 ~ - 5.0         |
| 1 kHz (Ref) | --               | --                    |
| 1.122 kHz   | -3.7             | + 0.3 ~ - 5.0         |
| 1.296 kHz   | -31.5            | < - 17.5              |
| 1.887 kHz   | -66.5            | < - 42                |
| 3.070 kHz   | -90.0            | < - 61                |

Uncertainty :  $\pm 0.25$  dB

- Remarks :
1. UUT : Unit-Under-Test
  2. The uncertainty claimed is for a confidence probability of not less than 95%.
  3. Atmospheric Pressure : 996 hPa.

----- END -----



# Calibration Certificate

Certificate No. 404228

Page 1 of 2 Pages

**Customer :** Environmental Resources Management

**Address :** 16/F DCH Commercial Centre 25 Westlands Road Quarry Bay Hong Kong

**Order No. :** Q41594

**Date of receipt :** 20-Jun-14

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** 01dB-Stell

**Model :** CAL21

**Serial No. :** 34113609(2011)

## Test Conditions

**Date of Test :** 23-Jun-14

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Calibration procedure : Z02, IEC 942.

## Test Results

All results were within the IEC 942 Class 2 specification.

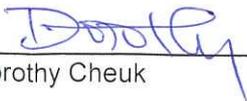
The results are shown in the attached page(s).

Main Test equipment used:

| <u>Equipment No.</u> | <u>Description</u>          | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|-----------------------------|------------------|---------------------|
| S205                 | Ref. Sound Level Calibrator | PHCO40002        | SCL-HKSAR           |
| S041                 | Universal Counter           | 34621            | SCL-HKSAR           |
| S206                 | Sound Level Meter           | 36203            | SCL-HKSAR           |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Dorothy Cheuk

**Approved by :**   
Steve Kwan

**Date:** 23-Jun-14

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 404228

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

| UUT Nominal Value (dB) | Measured Value (dB) | IEC 942 Class 1 Spec. |
|------------------------|---------------------|-----------------------|
| 94                     | 93.98               | $\pm 0.3$ dB          |

Uncertainty :  $\pm 0.2$  dB

## 2. Frequency

| UUT Nominal Value | Measured Value | IEC 942 Class 1 Spec. |
|-------------------|----------------|-----------------------|
| 1 kHz             | 1.008 kHz      | $\pm 2$ %             |

Uncertainty :  $\pm 3.6 \times 10^{-6}$

## 3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. :  $\pm 0.1$  dB

Uncertainty :  $\pm 0.1$  dB

## 4. Total Harmonic Distortion : $< 1.6$ %

IEC 942 Class 1 Spec. :  $< 3$  %

Uncertainty :  $\pm 2.3$  % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurement.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 991 hPa.

----- END -----



# Calibration Certificate

Certificate No. **404229**

Page 1 of 2 Pages

**Customer :** Environmental Resources Management

**Address :** 16/F DCH Commercial Centre 25 Westlands Road Quarry Bay Hong Kong

**Order No. :** Q41594

**Date of receipt :** 20-Jun-14

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** Svantek

**Model :** SV30A

**Serial No. :** 7971

## Test Conditions

**Date of Test :** 23-Jun-14

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

## Test Results

All results were within the IEC 942 Class 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

| <u>Equipment No.</u> | <u>Description</u>          | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|-----------------------------|------------------|---------------------|
| S014                 | Spectrum Analyzer           | 35730            | NIM-PRC & SCL-HKSAR |
| S205                 | Ref. Sound Level Calibrator | PHCO40002        | SCL-HKSAR           |
| S041                 | Universal Counter           | 34621            | SCL-HKSAR           |
| S206                 | Sound Level Meter           | 36203            | SCL-HKSAR           |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Dorothy Cheuk

**Approved by :**   
Steve Kwan

**Date:** 23-Jun-14

This Certificate is issued by:  
Hong Kong Calibration Ltd  
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. **404229**

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

| UUT Nominal Value (dB) | Measured Value (dB) | IEC 942 Class 1 Spec. |
|------------------------|---------------------|-----------------------|
| 94                     | 94.15               | ± 0.3 dB              |
| 114                    | 114.17              |                       |

Uncertainty : ± 0.2 dB

## 2. Frequency

| UUT Nominal Value | Measured Value | IEC 942 Class 1 Spec. |
|-------------------|----------------|-----------------------|
| 1 kHz             | 1.000 kHz      | ± 2 %                 |

Uncertainty : ± 3.6 x 10<sup>-6</sup>

## 3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

## 4. Total Harmonic Distortion : < 0.8 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurements.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 991 hPa.

----- END -----