The Government of the Hong Kong Special Administrative Region

Civil Engineering and Development Department

Agreement No. CE 24/2012 (GE)
Landslip Prevention and Mitigation Programme, 2012, Package A
Landslip Prevention and Mitigation Works -
Investigation, Design and Construction

Project Profile
for
Landslip Prevention and Mitigation Works at Feature Nos. 11SW-A/R94 and 11SW-A/FR218, Caine Lane, Mid-Levels

June 2016

AECOM Asia Co. Ltd.

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1 BASIC INFORMATION

1.1 Project Title

1.1.1.1. Landslip Prevention and Mitigation Works at Feature Nos. 11SW-A/R94 and 11SW-A/FR218, Caine Lane, Mid-Levels (hereinafter referred to as "the Project") is under Agreement No. CE 24/2012 (GE) - Landslip Prevention and Mitigation Programme, 2012, Package A, Landslip Prevention and Mitigation Works.

1.2 Purpose and Nature of the Project

1.2.1.1. The Government has commissioned the *Post-2010 Landslip Prevention and Mitigation* (LPMit) Programme on a rolling basis with the annual target of upgrading 150 substandard Government man-made slopes, completing safety-screening studies of 100 private man-made slopes in the *Catalogue of Slopes* and implementing risk mitigation works for 30 natural hillside catchments. The aim is to further reduce the landslide risk posed by substandard man-made slopes and vulnerable natural hillside catchments to the community.

1.2.1.2. Civil Engineering and Development Department (CEDD) Agreement No. CE 24/2012 (GE) is part of the targets to annually upgrade 150 substandard Government man-made slopes and mitigate natural terrain hazards for 30 natural hillside catchments under the LPMit Programme. It is envisaged that a total of 25 substandard Government man-made slopes would be upgraded under the Agreement. Feature Nos. 11SW-A/R94 and 11SW-A/FR218 (hereinafter referred to as "the Features") are two of the substandard Government man-made slopes with detailed design and upgrading works to be carried out under Agreement No. CE 24/2012 (GE).

1.2.1.3. Apart from ensuring public safety, upgrading works at the Features would also protect the structures of the Declared Monument from potential damages arising from failure of the Features due to close proximity of the Features and Main Building and Annex Block of the Hong Kong Museum of Medical Sciences.

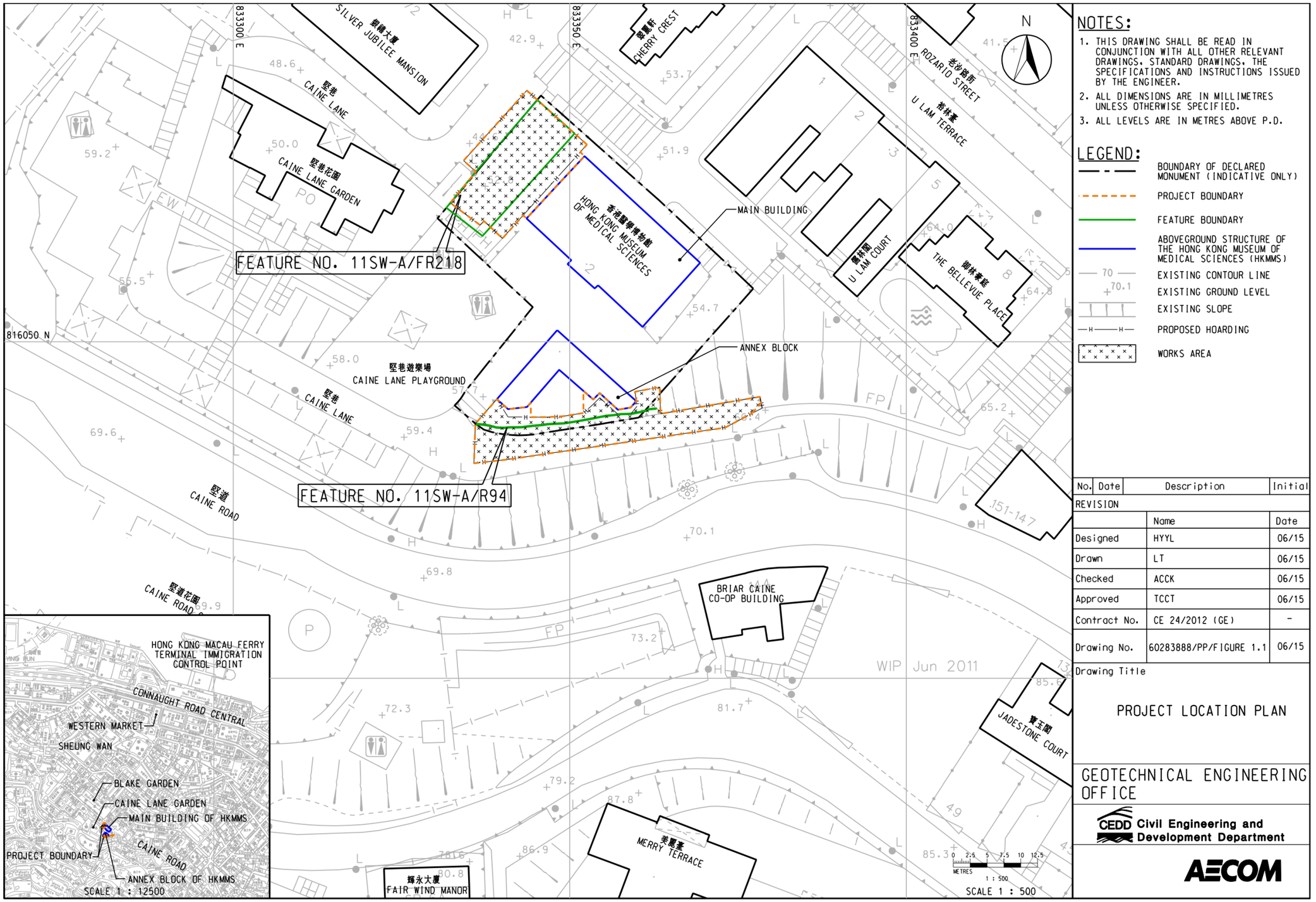
1.3 Name of Project Proponent

1.3.1.1. Civil Engineering and Development Department (CEDD) is the project proponent of the Project.

1.4 Location and Scale of Project and History of Site

1.4.1.1. The Project comprises Feature Nos. 11SW-A/R94 and 11SW-A/FR218 which respectively located at the south of the Hong Kong Museum of Medical Sciences (HKMMS) and the northwest of HKMMS, Caine Lane, Mid-Levels. They are located within a "Government, Institution or Community" (G/IC) zone on the Sai Ying Pun & Sheung Wan Outline Zoning Plan (OZP) No. S/H3/29. The location of the Project is shown in **Figure 1.1**. Photographs of the Features are shown in **Figures 1.2** to **1.4** and **5.2**.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



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LEGEND:

- BOUNDARY OF DECLARED MONUMENT (INDICATIVE ONLY)
- PROJECT BOUNDARY
- FEATURE BOUNDARY
- ABOVEGROUND STRUCTURE OF THE HONG KONG MUSEUM OF MEDICAL SCIENCES (HKMMS)
- 70 EXISTING CONTOUR LINE
- 70.1 EXISTING GROUND LEVEL
- EXISTING SLOPE
- PROPOSED HOARDING
- WORKS AREA

No.	Date	Description	Initial
REVISION			

	Name	Date
Designed	HYYL	06/15
Drawn	LT	06/15
Checked	ACCK	06/15
Approved	TCCT	06/15
Contract No.	CE 24/2012 (GE)	-
Drawing No.	60283888/PP/FIGURE 1.1	06/15

Drawing Title

PROJECT LOCATION PLAN

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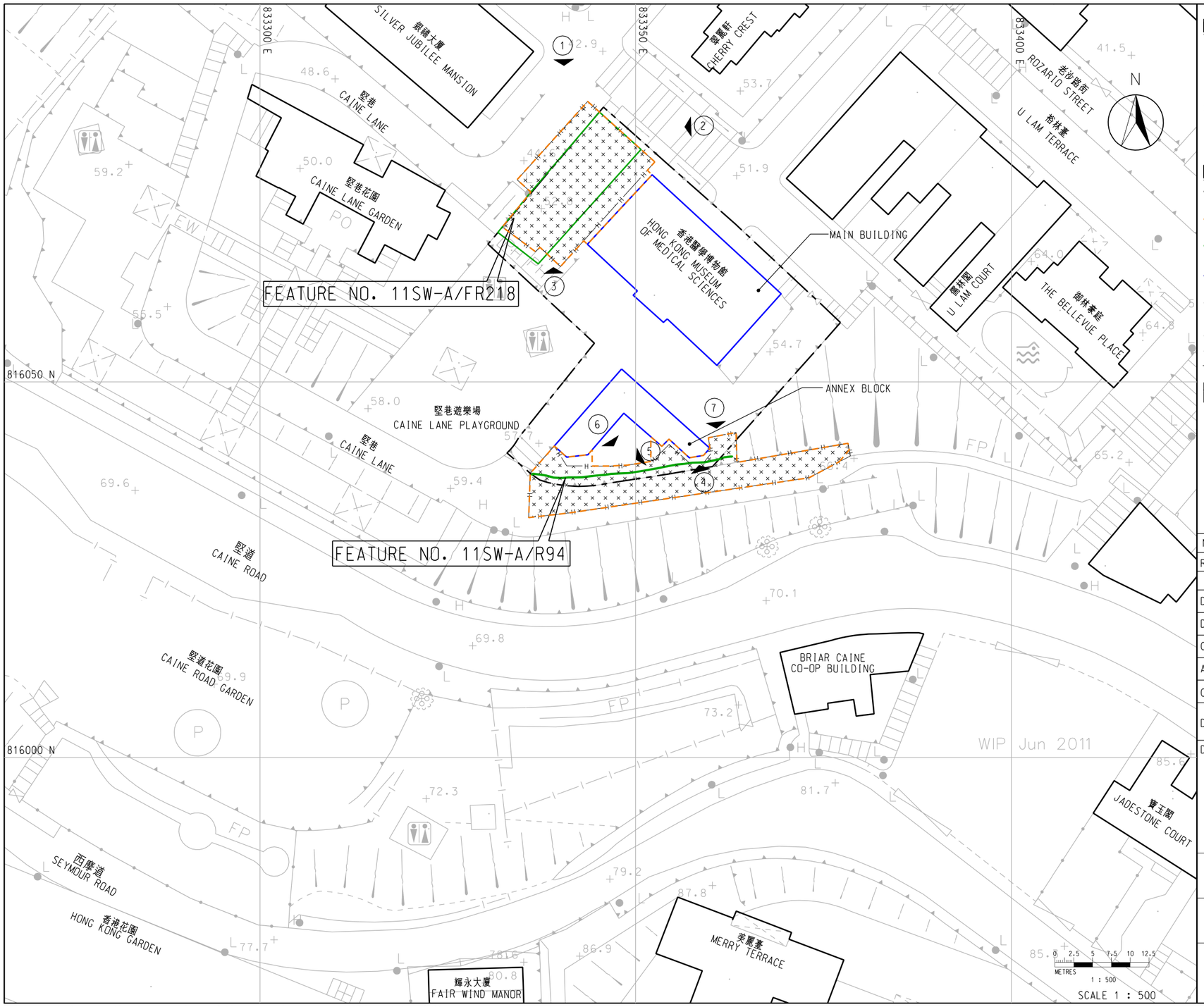
Figure 1.1 Project Location Plan

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



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- WORKS AREA
- (1) PHOTOGRAPH ID AND LOCATION TAKEN

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Drawing No.	60283888/PP/FIGURE 1.2	06/15

Drawing Title

PHOTOGRAPHS OF THE WORKS AREAS

SHEET 1 OF 3

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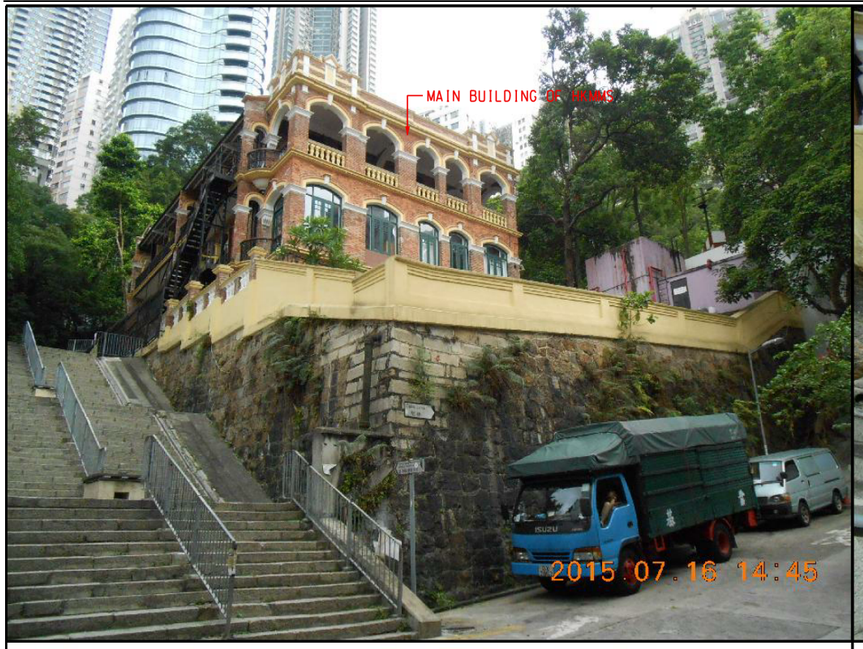
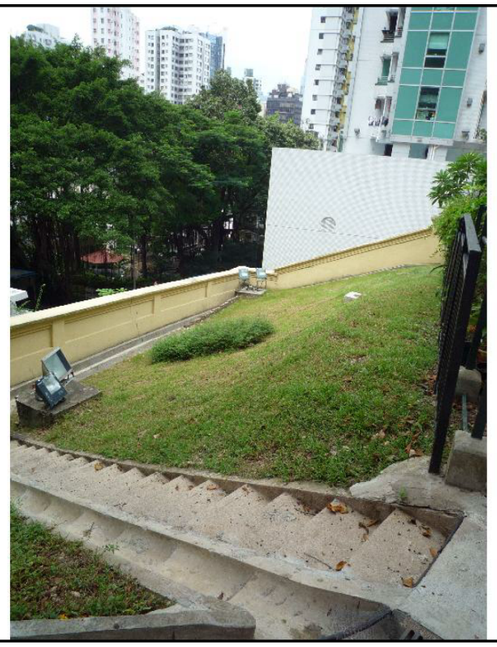
Figure 1.2 Photographs of the Works Areas (Sheet 1 of 3)

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



PHOTOGRAPH 1
TAKEN ON 16 JULY 2015

PHOTOGRAPH 2
TAKEN ON 16 JULY 2015



PHOTOGRAPH 3
TAKEN ON 16 JULY 2015

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Drawing No.	60283888/PP/FIGURE 1.3	06/15

Drawing Title

PHOTOGRAPHS OF THE
WORKS AREAS

SHEET 2 OF 3

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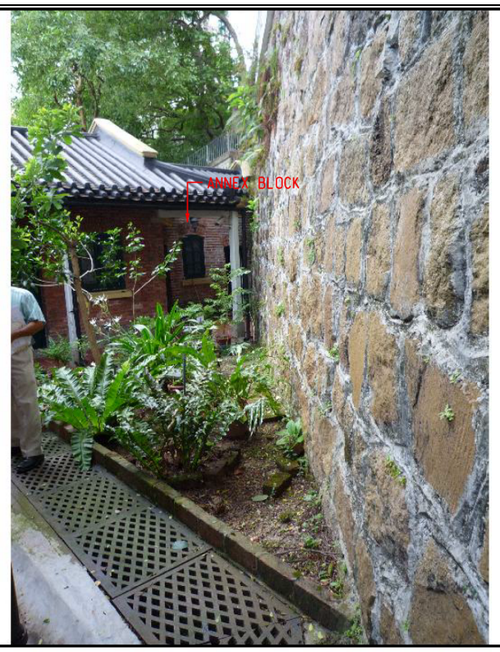
Figure 1.3 Photographs of the Works Areas (Sheet 2 of 3)

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

PHOTOGRAPH 4
TAKEN ON 16 JULY 2015



PHOTOGRAPH 5
TAKEN ON 16 JULY 2015

PHOTOGRAPH 6
TAKEN ON 16 JULY 2015

PHOTOGRAPH 7
TAKEN ON 16 JULY 2015

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Drawing Title

PHOTOGRAPHS OF THE WORKS AREAS

SHEET 3 OF 3

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Figure 1.4 Photographs of the Works Areas (Sheet 3 of 3)

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

1.4.1.2. Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of HKMMS and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of HKMMS and Kui In Fong. The Features are identified as substandard man-made slopes by CEDD. All the construction works of the Project would be conducted within the project boundary as indicated in **Figure 1.1**.

1.5 Numbers and Types of Designated Projects to be Covered by this Project Profile

1.5.1.1. The Project involves the upgrading of two substandard Government man-made slopes, Feature Nos. 11SW-A/R94 and 11SW-A/FR218. The Features are partly inside the Hong Kong Museum of Medical Sciences (HKMMS), also known as Old Pathological Institute, which is a Declared Monument under Antiquities and Monuments Ordinance (Cap. 53). Since the Project is partly inside a site of cultural heritage, it is classified as a Designated Project (DP) under Q.1 of Part I, Schedule 2 of the *Environmental Impact Assessment Ordinance* (EIAO) (Cap. 499) (i.e. "*All projects including…earthworks… partly or wholly in… a site of cultural heritage…*").

1.5.1.2. This Project Profile is prepared in accordance with Annex 1 of the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) under Section 16 of EIAO to seek permission to apply directly for an Environmental Permit for the construction and operation of the Project under Section 5(11) of the EIAO.

1.6 Name and Telephone Number of Contact Person(s)

Mr. SHUM Wan Kuen, Joel

(Engr / Consultant Mgt 72)

Civil Engineering and Development Department

Geotechnical Engineering Office

Landslip Preventive Measures Division 3

Consultant Management Section 7

LG1, Civil Engineering and Development Building

101 Princess Margaret Rd, Homantin, Kowloon

Tel: 2760 5748

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Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

2.1.1.1. The Consultants, which was engaged by the Geotechnical Engineering Office (GEO) of CEDD, would carry out the design and construction supervision of the Project. The Hong Kong Museum of Medical Sciences Society (HKMMS Society) would be responsible for routine maintenance of the completed works.

2.1.1.2. Feature No. 11SW-A/R94 is approximately 28 m long × maximum 6.7 m high while Feature No. 11SW-A/FR218 is approximately 21 m long × maximum 5.7 m high. The main scope of works for the Features comprises the following:

Feature No. 11SW-A/R94

- Temporary removal of the existing masonry stone facing
- Soil nail works, including:
  - Drilling of soil nail holes
  - Fixing and installation of soil nail bars
  - Grouting of soil nails
  - Construction of soil nail heads
- Reinstatement of the existing masonry stone facing

Feature No.11SW-A/FR218

- Manual pit by pit excavation
- Laying of blinding at the bottom of the excavated pits
- Installation of dowel bars at the back of the existing masonry wall
- Backfilling of the excavated pits by concrete
- Backfilling of top soil
- Landscape works (Planter wall, shrubs and hydroseeding)

2.1.1.3. The photographs of the Features are shown in **Figures 1.2** to **1.4** and **5.2**. The wall size of the Features, the proposed number of the soil nails / dowel bars, and the proposed size of wall thickening are shown in **Figures 2.1** to **2.4**. The proposed clearance of soil nails to the structure of the Annex Block for Feature No. 11SW-A/R94 is shown in **Figure 2.5**.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

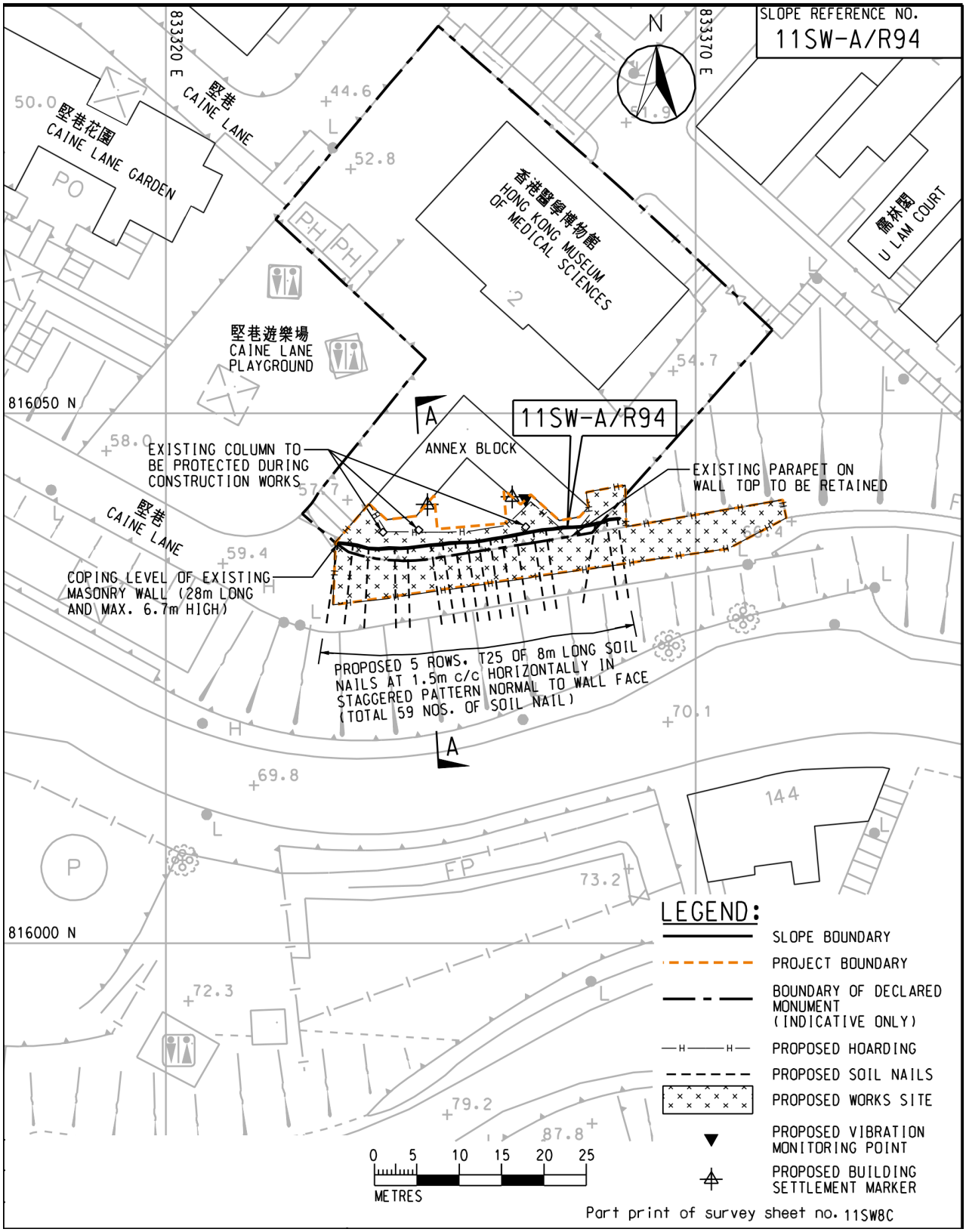


Figure 2.1 Layout of Feature No. 11SW-A/R94

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

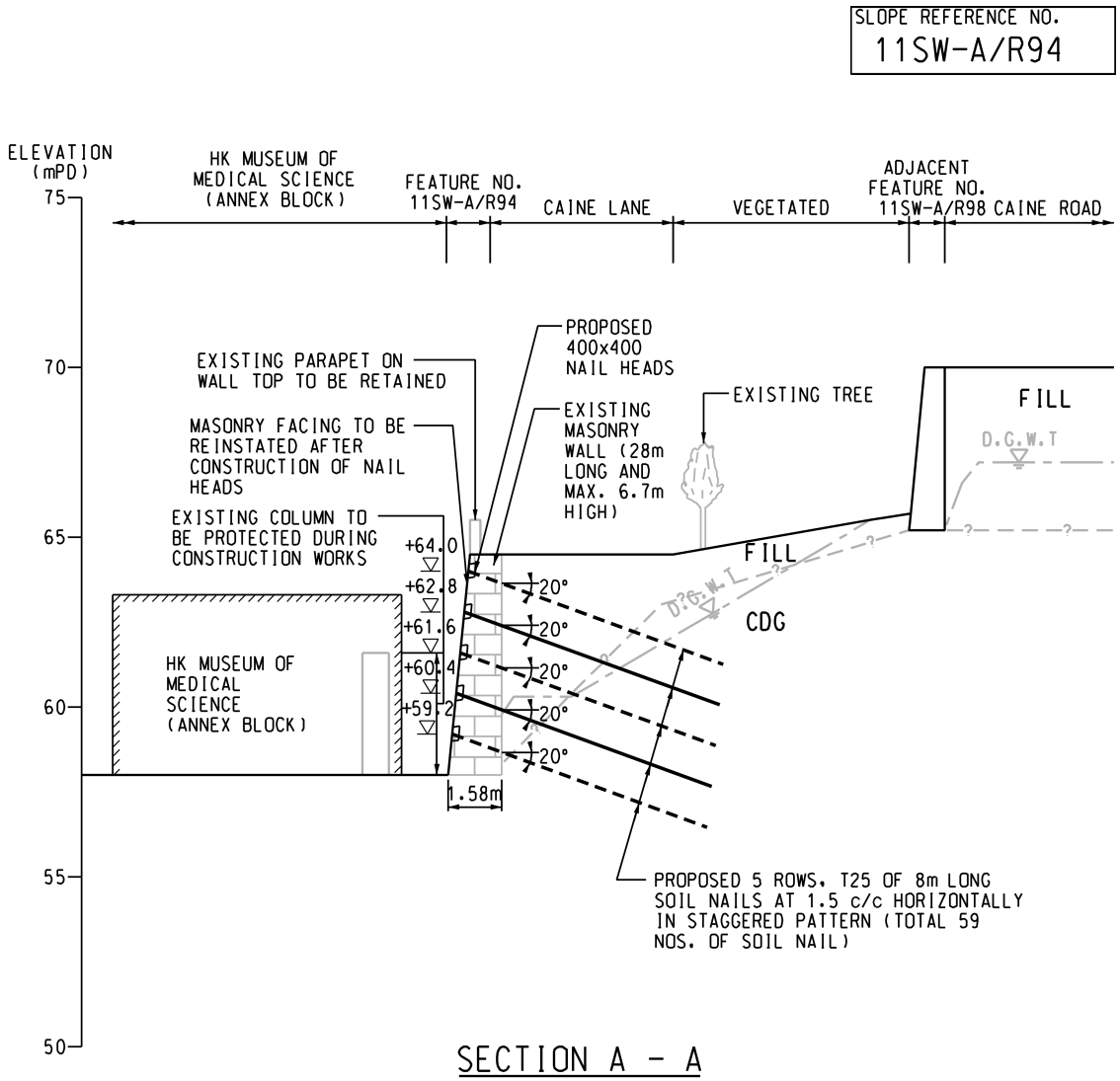


Figure 2.2 Elevation of Feature No. 11SW-A/R94

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

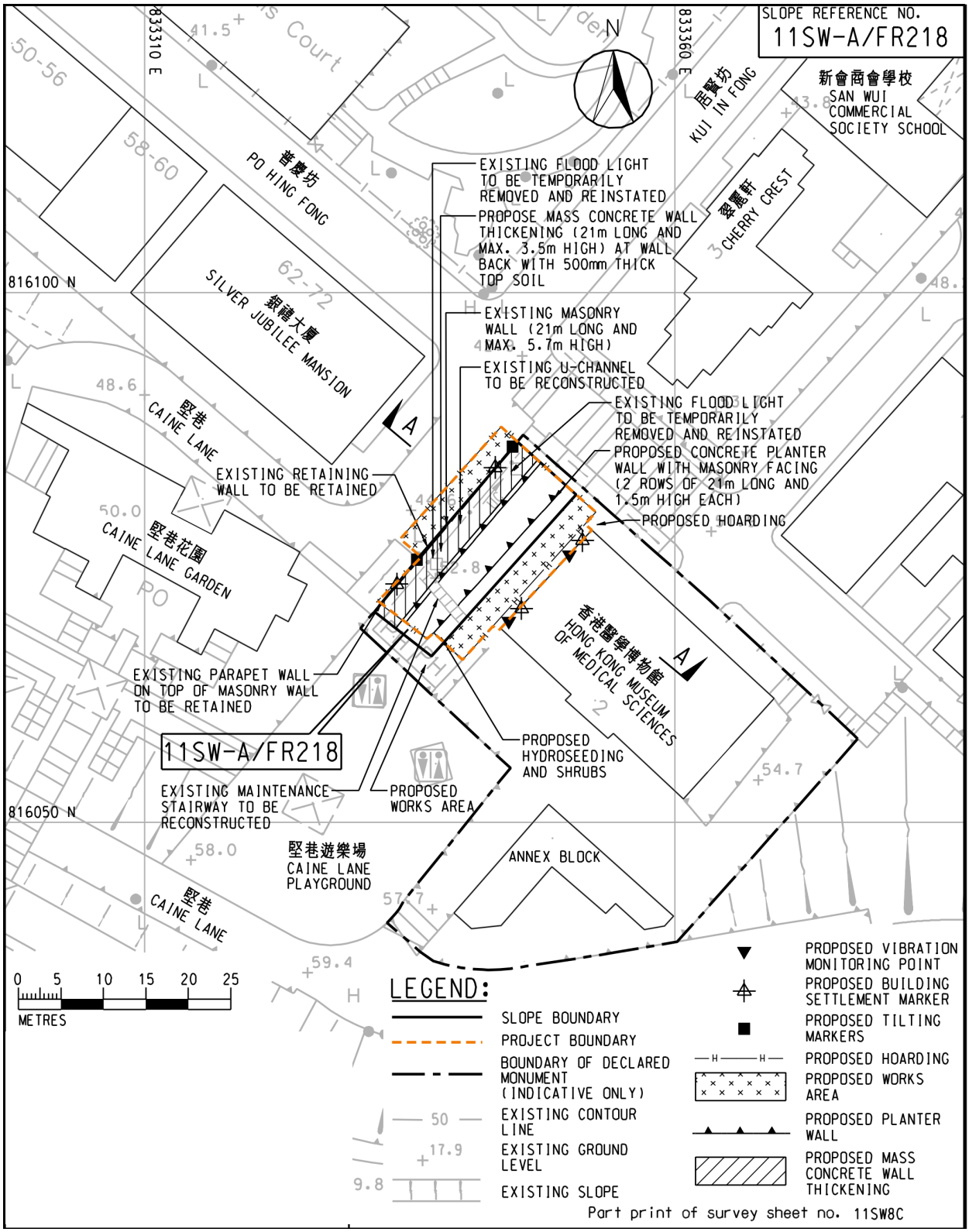
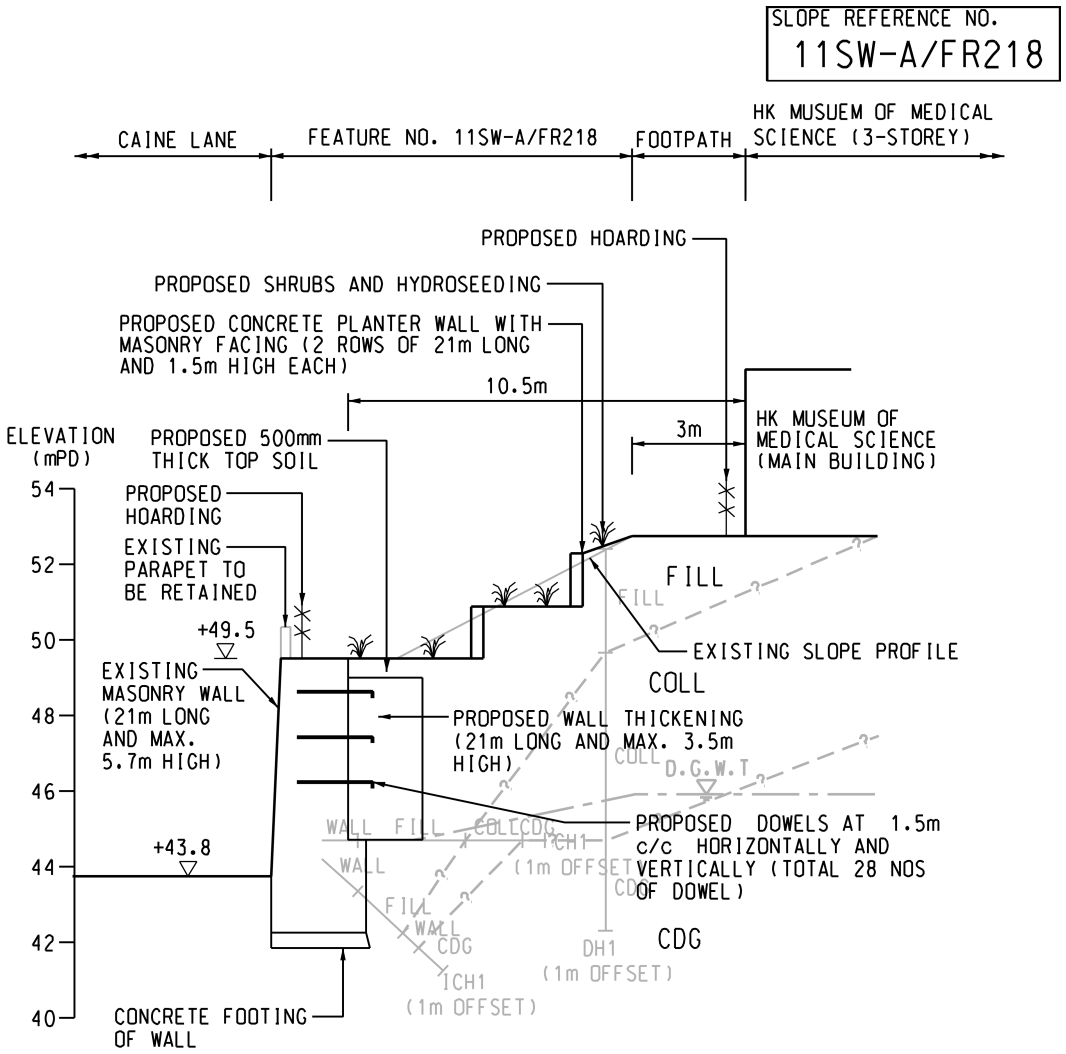


Figure 2.3 Layout of Feature No. 11SW-A/FR218

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



SECTION A - A

Figure 2.4 Elevation of Feature No. 11SW-A/FR218

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

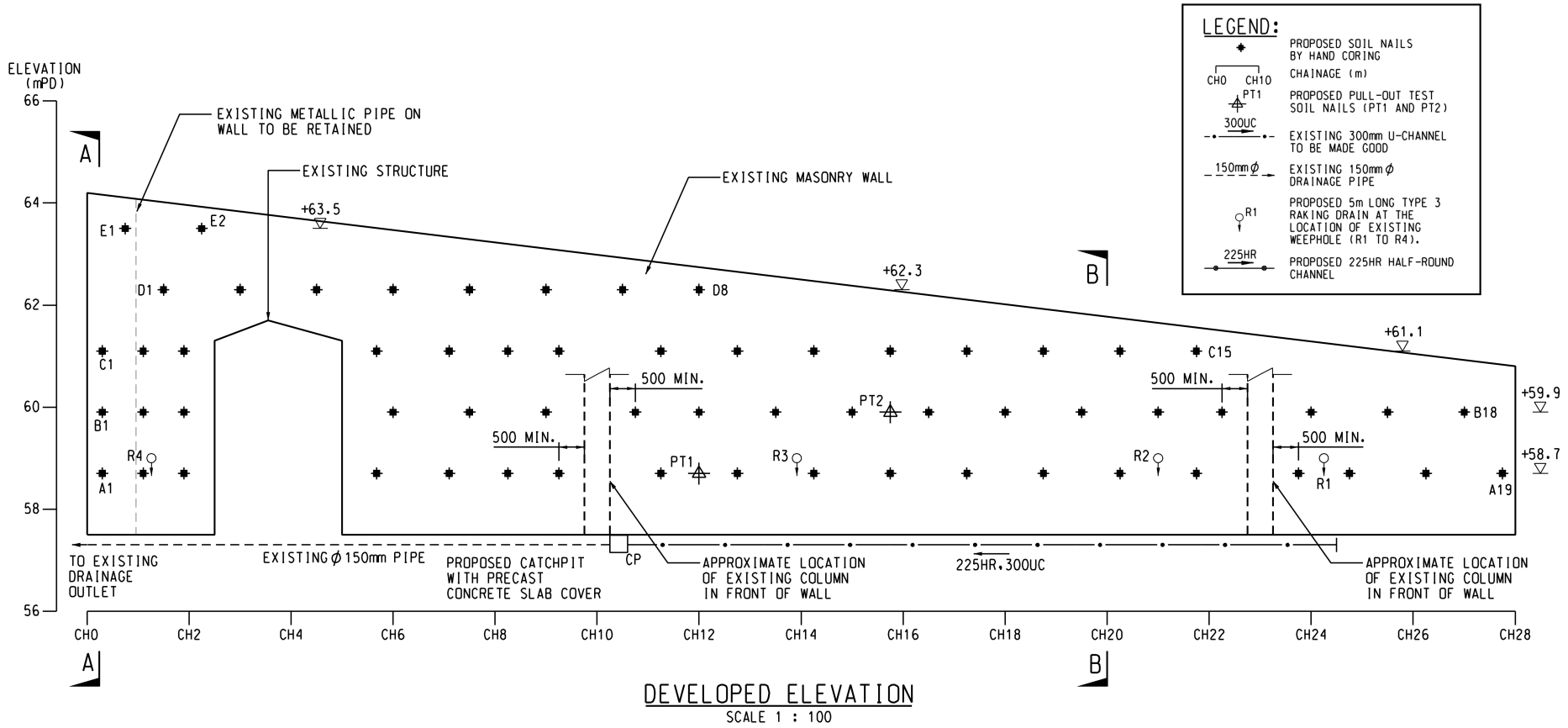


Figure 2.5 Proposed Clearance of Soil Nails to the Structure of the Annex Block for Feature No. 11SW-A/R94

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

2.2 Project Timeline

2.2.1.1. Construction of the Project is scheduled to commence in September 2016 for completion in May 2017. The tentative construction programmes for the Features are shown in **Appendix A**. The construction works for the Features would be conducted concurrently.

2.3 Interactions with Other Projects

2.3.1.1. Based on the latest available information at the time of preparing this Project Profile, there is no other concurrent project identified in the vicinity of the Project.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 General

3.1.1.1. The Features are located within a “Government, Institution or Community” (G/IC) zone on the Sai Ying Pun & Sheung Wan Outline Zoning Plan (OZP) No. S/H3/29. The Features are partly inside the boundary of the Declared Monument, the Old Pathological Institute also known as Hong Kong Museum of Medical Sciences (HKMMS). Feature No. 11SW-A/R94 is at the south of HKMMS along Caine Lane. The masonry stone façade of Feature No. 11SW-A/R94 faces the Annex Block and is partly anchored to it. Feature No. 11SW-A/FR218 is at the northwest of HKMMS along Kui In Fong. It is topped with grasses with a masonry stone façade facing Kui In Fong. The Features are in a developed area, and surrounded by Caine Lane Garden, Caine Road and urban residential developments. Photographs of the Features are shown in **Figures 1.2** to **1.4** and **5.2**.

3.2 Air Quality

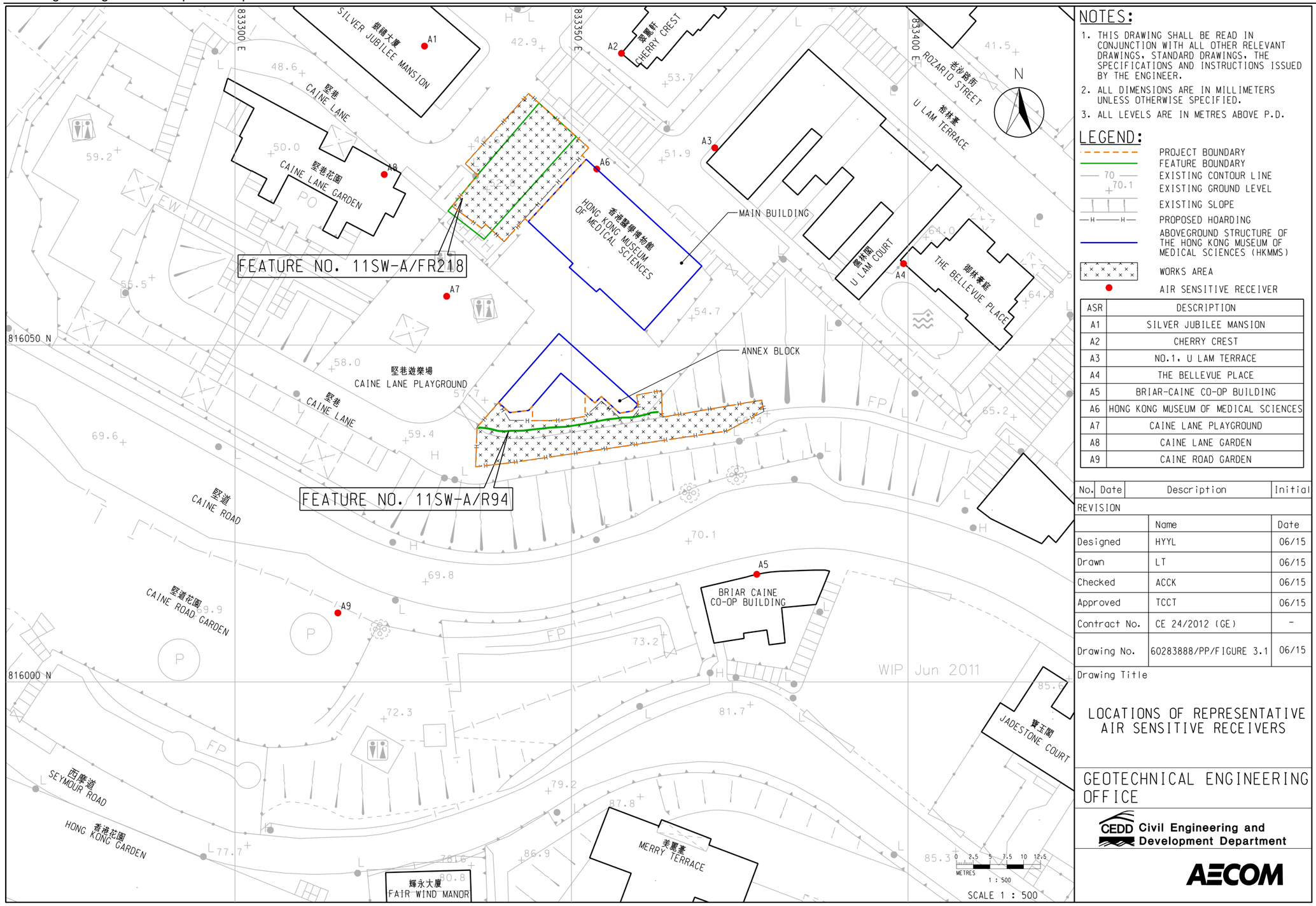
3.2.1.1. The identified nearest air sensitive receivers (ASRs) in the vicinity of the Project are listed in **Table 3.1**, their locations are indicated in **Figure 3.1** and their photographs are shown in **Appendix F**. As agreed with HKMMS Society, no construction works would be active when the Annex Block is in use, in which the construction progress would not be affected. Therefore, it is not considered as an ASR during the construction of the Project.

Table 3.1 Representative Air Sensitive Receivers

ASR	Description	Land Use	Number of Floors	Approximate Distance From the Nearest Site Boundary, m
A1	Silver Jubilee Mansion	Residential	22	16
A2	Cherry Crest	Residential	32	19
A3	No.1, U Lam Terrace	Residential	5	18
A4	The Bellevue Place	Residential	24	29
A5	Briar-Caine Co-Op Building	Residential	5	22
A6	Hong Kong Museum of Medical Sciences(1)	Recreational	3	5
A7	Caine Lane Playground	Recreational	-	12
A8	Caine Lane Garden	Recreational	-	11
A9	Caine Road Garden	Recreational	-	30

Note:
(1) Fresh air intake location was observed to be located on the second floor.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



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LEGEND:

- PROJECT BOUNDARY
- FEATURE BOUNDARY
- EXISTING CONTOUR LINE (70)
- EXISTING GROUND LEVEL (70.1)
- EXISTING SLOPE
- PROPOSED HOARDING
- ABOVEGROUND STRUCTURE OF THE HONG KONG MUSEUM OF MEDICAL SCIENCES (HKMMS)
- WORKS AREA
- AIR SENSITIVE RECEIVER

ASR	DESCRIPTION
A1	SILVER JUBILEE MANSION
A2	CHERRY CREST
A3	NO.1, U LAM TERRACE
A4	THE BELLEVUE PLACE
A5	BRIAR-CAINE CO-OP BUILDING
A6	HONG KONG MUSEUM OF MEDICAL SCIENCES
A7	CAINE LANE PLAYGROUND
A8	CAINE LANE GARDEN
A9	CAINE ROAD GARDEN

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Approved	TCCT	06/15
Contract No.	CE 24/2012 (GE)	-
Drawing No.	60283888/PP/FIGURE 3.1	06/15

Drawing Title

LOCATIONS OF REPRESENTATIVE AIR SENSITIVE RECEIVERS

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Figure 3.1 Locations of Representative Air Sensitive Receivers

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

3.2.1.2. The major existing source of air emission in the vicinity of the Project is traffic emission from Caine Road.

3.2.1.3. Central / Western air quality monitoring station is the nearest EPD monitoring station to the project site. The annual average concentrations of respirable particulate matter (RSP / PM_{10}) and fine particulate matter (FSP / $PM_{2.5}$) measured at EPD's Central / Western air quality monitoring station for the latest five years (2010 – 2014) are presented in **Table 3.2**. As shown in **Table 3.2**, the annual average concentrations of RSP and FSP complied with the respective AQOs of 50 µg/m^3 for RSP and 35 µg/m^3 for FSP.

Table 3.2 Annual Average Concentrations of Air Pollutants at EPD's Central / Western Air Quality Monitoring Station (2010 – 2014)

Pollutant	Annual Average Concentration, µg/m^3				
	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014
RSP	47	50	46	49	44
FSP	- (1)	41(2)	29	33	28

Notes:
(1) FSP data are not available for 2010.
(2) The FSP annual average for year 2011 contains November and December data only.

3.3 Noise

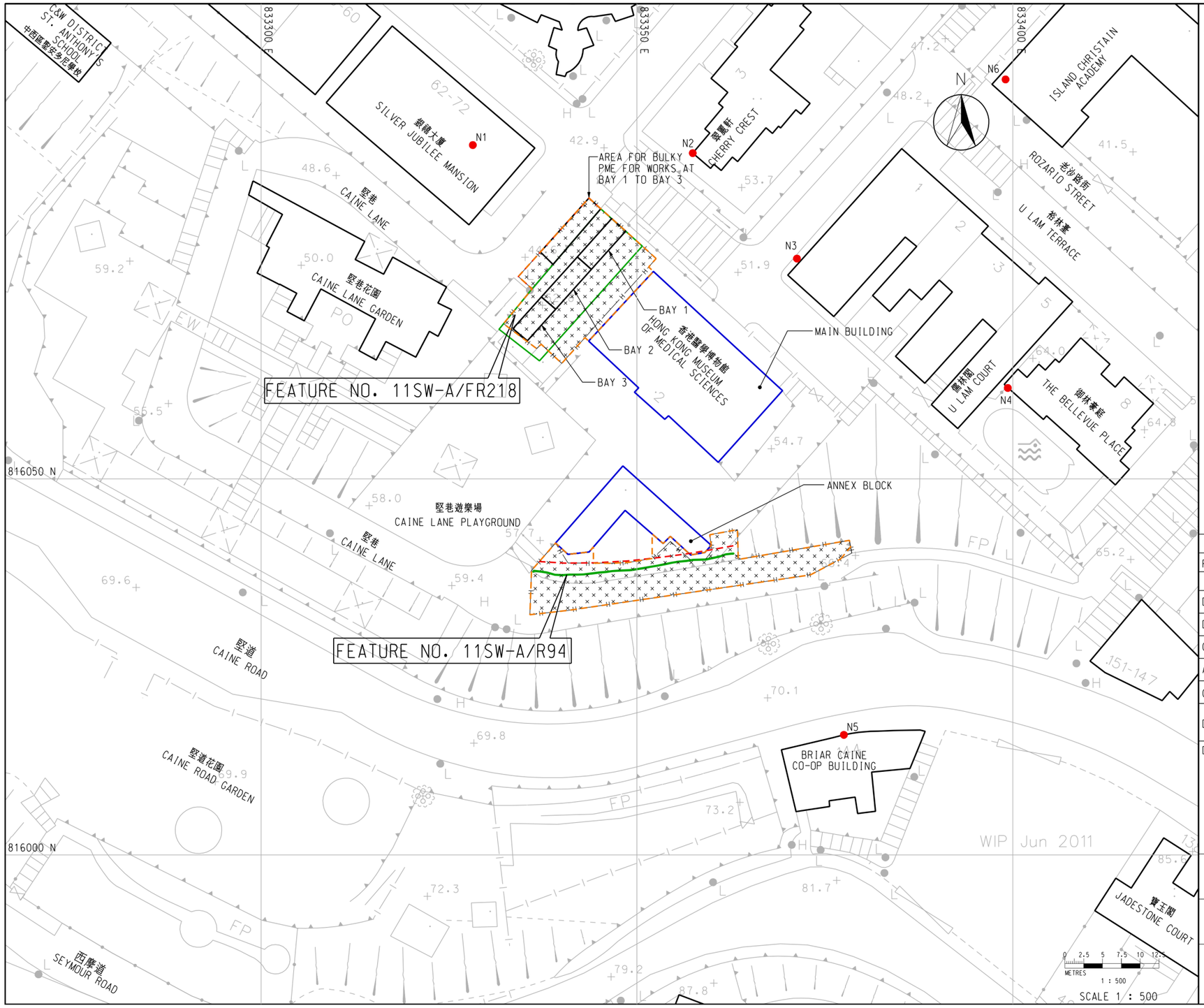
3.3.1.1. The first layer of identified noise sensitive receivers (NSRs) facing the works areas were selected as the representative NSRs. They are listed in **Table 3.3**, their locations are indicated in **Figure 3.2** and their photographs are shown in **Appendix F**. Only the first layer of NSRs were selected for the assessment because they are closest to the works areas, thus indicating the worst-case scenario. The mitigation measures proposed based on the worst-case scenario should provide adequate protection for the other NSRs within the 300 m study area which are further away from the works areas, shielded from the works areas by the first layer of NSRs, and have no direct line of sight to the works areas. Since the main building of Hong Kong Museum of Medical Sciences has been provided with air-conditioners and does not rely on opened windows for ventilation, no adverse airborne noise impact arising from the proposed works on it is anticipated. As agreed with HKMMS Society, no construction works would be active when the Annex Block is in use, in which the construction progress would not be affected. Therefore, it is not considered as an airborne or structural-borne NSR during the construction of the Project. As shown in **Figures 2.2** and **2.4**, the works areas of the proposed landslip prevention and mitigation works consist of mainly soil materials (fill, Completely Decomposed Granite (CDG) and Colluvium (COLL)). Noise transmitted through the soil would be insignificant and hence no adverse structural-borne noise impact on the Hong Kong Museum of Medical Sciences would be expected. It is noted that the HKMMS is closed every Monday. Where practicable, works involving the use of breaker would be scheduled to be conducted on Monday when the HKMMS is closed to minimise any structural-borne noise impacts on it.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

Table 3.3 Representative Noise Sensitive Receivers

NSR	Description	Land Use	Number of Floors	Approximate Horizontal Distance From the Nearest Site Boundary, m
N1	Silver Jubilee Mansion	Residential	22	16
N2	Cherry Crest	Residential	32	14
N3	No.1, U Lam Terrace	Residential	5	18
N4	The Bellevue Place	Residential	24	29
N5	Briar-Caine Co-Op Building	Residential	5	22
N6	Island Christian Academy	Educational Institution	6	52

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



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2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. ALL LEVELS ARE IN METRES ABOVE P.D.

LEGEND:

- PROJECT BOUNDARY
- FEATURE BOUNDARY
- EXISTING CONTOUR LINE
- EXISTING GROUND LEVEL
- EXISTING SLOPE
- PROPOSED HOARDING
- MOVABLE NOISE BARRIER
- ABOVEGROUND STRUCTURE OF THE HONG KONG MUSEUM OF MEDICAL SCIENCES (HKMMS)
- WORKS AREA
- NOISE SENSITIVE RECEIVER

NSR	DESCRIPTION
N1	SILVER JUBILEE MANSION
N2	CHERRY CREST
N3	NO.1, U LAM TERRACE
N4	THE BELLEVUE PLACE
N5	BRIAR-CAINE CO-OP BUILDING
N6	ISLAND CHRISTAIN ACADEMY

No.	Date	Description	Initial
REVISION			

	Name	Date
Designed	HYYL	06/15
Drawn	LT	06/15
Checked	ACCK	06/15
Approved	TCCT	06/15
Contract No.	CE 24/2012 (GE)	-
Drawing No.	60283888/PP/FIGURE 3.2	06/15

Drawing Title

LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS

GEOTECHNICAL ENGINEERING OFFICE

CEDD Civil Engineering and Development Department

AECOM

Figure 3.2 Locations of Representative Noise Sensitive Receivers

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

3.4 Water Quality

3.4.1.1. No water quality sensitive receiver has been identified in the vicinity of the Project. The closest water sensitive receiver is Victoria Harbour, which is more than 500 m away from the Project boundary.

3.5 Ecology

3.5.1.1. The Project site and the vicinity of the Project comprise developed area habitat dominated by common and widespread tree species and herb species. No sites of ecological importance and species of conservation importance were identified within the Project site and its vicinity.

3.6 Cultural Heritage

3.6.1.1. Part of the Project site falls within the boundary of a Declared Monument site in which the Old Pathological Institute was gazetted under the *Antiquities and Monuments Ordinance* (Cap. 53) in 1990. The Monument was revitalised as the Hong Kong Museum of Medical Sciences (HKMMS) in 1996 and most of the Monument's original external and internal features were retained besides necessary repairs.

3.6.1.2. Surrounded by outdoor landscape features, the Monument includes the Main Building and an Annex Block of the Old Pathological Institute. The boundary of the Monument is shown in **Figure 3.3**.

3.6.1.3. No visible crack or damage was seen on the exterior of the Main Building but minor cracks were found on floor tiles, ceiling and walls inside the Main Building during recent site inspection (See **Appendix D**).

3.6.1.4. Minor building and fence walls cracks and small settlement cracks were observed in the eastern side of the Annex Block and the areas enclosed by Feature No. 11SW-A/R94 and the Annex Block (See **Appendix D**).

3.6.1.5. Minor cracks were observed on the fence wall of Feature No. 11SW-A/FR218 south to the lawn behind the Main Building. The upper compartment of the western stone gate post was observed to be slightly dislocated from its original location while the edge of the upper compartment of the eastern stone gate post was slightly damaged or eroded (See **Appendix D**).

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

ANTIQUITIES AND MONUMENTS ORDINANCE (CAP. 53)

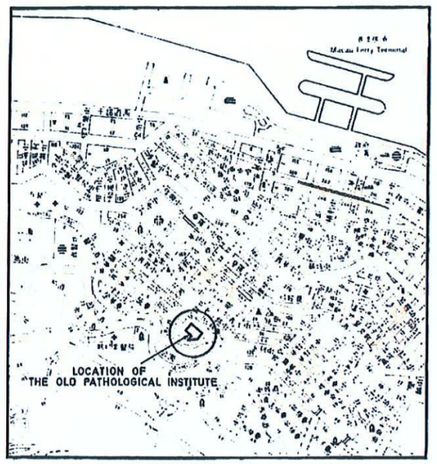
PLAN OF THE OLD PATHOLOGICAL INSTITUTE IN CAINE LANE, HONG KONG ISLAND

DEPOSITED IN THE LAND OFFICE, VICTORIA, UNDER SEC. 3 (4)

SERIAL No. HKM 19

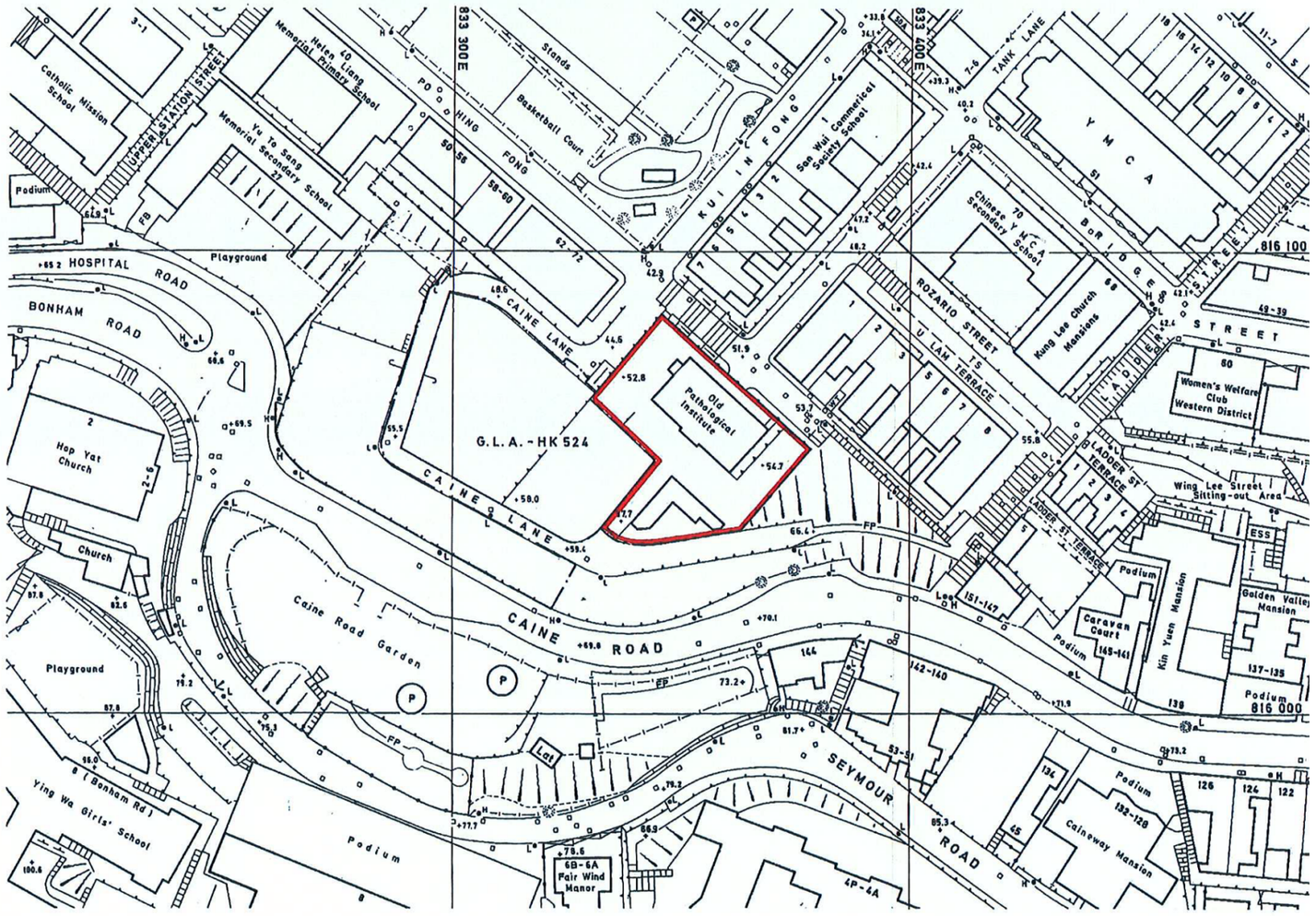
N

LOCATION



SCALE 1:12 500

EDGED RED AREA 1 310 m² (ABOUT)



SCALE 1:1 000

METRES 20 0 20 40 60 80 100 METRES

Pursuant to GR 475, this plan has been prepared by the District Survey Office, Hong Kong, Survey and Mapping Office, Buildings and Lands Department, under the Authority of the Government Land Surveyor.

(A.K. CHUI)
SECRETARY FOR RECREATION & CULTURE
DATE 13 June 1990

(113) in BLD 401/HMS/63 A III

Figure 3.3 Statutory Plan of the Boundary of the Old Pathological Institute in Caine Lane, Hong Kong Island

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

3.7 Landscape and Visual

3.7.1.1. Feature No. 11SW-A/R94 is a masonry wall located within HKMMS supporting a vehicular road, Caine Lane. The masonry stones of the retaining wall are in a random pattern. Grasses grow from the cement mortar joints between the masonry stones. While an individual of mature tree occurs on the east of Feature No. 11SW-A/R94, this tree individual would not be encroached in the plan of works. Feature No. 11SW-A/FR218 is a masonry wall facing Kui In Fong and a slope adjacent to the HKMMS. Similar to Feature No. 11SW-A/R94, the retaining wall is comprised of masonry stones. The slope is covered by grasses. No special species of vegetation is present on the slope.

3.7.1.2. No trees are present within the works area and project boundary for Feature Nos. 11SW-A/R94 and 11SW-A/FR218. No tree felling would be involved within the project boundary. Since no construction works would be carried out outside the project boundary and works area, all trees would be preserved. The location and photos of existing trees in the vicinity of the Features are shown in **Appendix E**.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

4 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Possible Environmental Impacts during Construction Phase

4.1.1 Air Quality

4.1.1.1. During construction, fugitive dust emissions would be generated from construction activities including site formation, drilling, and wind erosion of the excavated areas. However, in view of the limited site area for the Project, the potential air quality impact would be limited and could be well controlled through the dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* (Cap. 311R) of *Air Pollution Control Ordinance* (APCO) (Cap. 311) and good site practices. With the implementation of the dust suppression measures, adverse air quality impact due to the construction of the Project is not anticipated.

4.1.2 Noise

4.1.2.1. The major source of construction noise would be the use of powered mechanical equipment (PME) for the construction activities. The construction activities would be conducted 9 hours a day and 6 days a week. No construction activities would be conducted during restricted hours, i.e. the time between 1900 and 0700 hours on all days, and any time on general holidays, including Sundays. Construction activities at the Features would be conducted concurrently. As advised by Island Christian Academy (N6), there would be an international school assessment held between mid-September and early October 2016. The international school assessment has been considered as examination in the noise assessment.

4.1.2.2. The proposed PME inventory and their corresponding sound power levels (SWL) for the construction activities of the Project are given in **Appendix B**. CEDD has confirmed the PME inventory (including % on-time) as being reasonable, feasible and practicable in the context of the construction programme (**Appendix A**). Construction noise levels at the representative NSRs were calculated following the assessment methodology outlined in the *Technical Memorandum on Noise from Construction Work other than Percussive Piling* (GW-TM) issued under the *Noise Control Ordinance* (NCO) (Cap. 400). Sound power levels (SWLs) of the equipment were taken from Table 3 of the GW-TM. Where no SWL is provided in the GW-TM, reference was made to "Sound Power Levels of Other Commonly Used PME" and the "Quality PME" list documented by EPD, or other previous similar studies at other sites in Hong Kong. A positive 3 dB(A) façade correction was added to the predicted noise levels in order to account for the facade effect at each noise assessment point. Results of the predicted noise levels for both unmitigated and mitigated scenarios are summarised in **Table 4.1**. Details of the construction noise calculation are presented in **Appendix C**.

4.1.2.3. As shown in **Table 4.1**, the unmitigated construction noise levels were predicted to range from 72 to 83 dB(A) at the representative residential NSRs (N1 to N5) and 70 to 75 dB(A) at the representative educational NSR (N6), exceeding the EIAO-TM noise criteria. As such, noise mitigation measures as described in **Section 5.1.2** are recommended to alleviate the potential noise impact to acceptable levels. With proper implementation of the recommended noise mitigation measures, the mitigated noise levels at all the representative NSRs would comply with the EIAO-TM noise criteria.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

Table 4.1 Summary of Construction Noise Levels at Representative NSRs

NSR	Description		Predicted Construction Noise Levels, dB(A)[1]		EIAO-TM Noise Criteria, dB(A)
			Unmitigated Scenario	Mitigated Scenario[3]	
N1	Silver Jubilee Mansion		**79** - **83**	64 - 73	75
N2	Cherry Crest		**79** - **83**	65 - 73	75
N3	No.1, U Lam Terrace		**77** - **81**	67 - 72	75
N4	The Bellevue Place		72 - **79**	62 - 70	75
N5	Briar-Caine Co-Op Building		73 - **82**	64 - 73	75
N6	Island Christian Academy	Non-exam period	**72** - **75**	60 - 66	70
		Exam period [2]	**70** - **75**	62 - 64	65

Notes:
(1) Bold values denote exceedance of the EIAO-TM construction noise criteria.
(2) As advised by the school, an international school assessment would be held between mid-September and early October 2016, which is considered as an examination in this assessment.
(3) Predicted mitigated noise levels with the implementation of the recommended noise mitigation measures in **Section 5.1.2**.

4.1.3 Water Quality

4.1.3.1. Potential impacts would arise from uncontrolled surface runoff and erosion of exposed soil, earthworks and stockpiles during storm events. Muddy water may also be generated from the construction activities such as dust suppression sprays, dewatering during excavation and washing of construction equipment. Nevertheless, in view of the limited scale of the Project and with the implementation of proper mitigation measures and good site practices as per *Professional Persons Environmental Consultative Committee Practice (ProPECC) Note PN 1/94 "Construction Site Drainage"*, adverse water quality impact during construction phase is not anticipated.

4.1.4 Waste Management

4.1.4.1. Construction and demolition (C&D) materials and wastes such as excavated spoil (soil and rock), unusable concrete and grout, wood, metal scraps, equipment parts, packaging materials, general refuse from workers and chemical waste from maintenance of the plant and equipment would be generated.

4.1.4.2. It is expected that about 132 m^3 of C&D materials would be generated and about 2 m^3 of the C&D materials would be reused on site. The remaining C&D materials would be disposed of at Tseung Kwan O Area 137 Fill Bank. The details of the C&D materials to be generated are listed in **Table 4.2**.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

Table 4.2 Estimated Volume of Different Types of C&D Materials

Type of C&D Materials	Estimated Volume, m^3		
	Feature No. 11SW-A/R94	Feature No. 11SW-A/FR218	Total
All C&D materials	12	120	132
All inert C&D materials	11	108	119
Inert C&D materials to be reused on site as backfilling materials	0	2	2
Inert C&D materials to be disposed of at Tseung Kwan O Area 137 Fill Bank	11	106	117
Non-inert C&D materials to be reused, recycled or disposed of at landfill	1	12	13

4.1.4.3. The two Features were man-made slopes on natural terrains. No potential contaminating land use was identified within the works areas. As such, no land contamination issue is anticipated.

4.1.4.4. Small amount of chemical waste may also be generated from the maintenance of equipment. Provided the chemical waste is handled and disposed of in accordance with the *Code of Practice on the Packaging Labelling and Storage of Chemical Wastes*, adverse environmental impacts would not be anticipated. In view of the small scale and limited construction activities for the Project, it is expected that insignificant amount of general refuse would be generated from the construction workforce.

4.1.4.5. With the implementation of the mitigation measures in **Section 5.1.4**, adverse environmental impact arising from the storage, handling and transportation of wastes generated during construction phase is not anticipated.

4.1.5 Ecology

4.1.5.1. The site comprises developed area habitat dominated by common tree species and herb species. No area of ecological importance (e.g. woodland and natural stream) and species of conservation importance were identified within or in the vicinity of the site. As such, no adverse ecological impact is expected.

4.1.6 Cultural Heritage

4.1.6.1. During the construction, the ground-borne vibration from the use of PME may indirectly impact the historic features mentioned in **Section 3.6**. The vibration may cause the extension of existing cracks on the structures within the Monument or the dislocation of the roof tiles on the Main Building and Annex Block. All cracks identified during site inspection are shown in **Appendix D**. Also, the Annex Block is in close proximity to the construction works on Feature No. 11SW-A/R94 and may be damaged through contact with construction machinery. However, in light of the overall healthy condition of the building structure, and with the implementation of the recommended mitigation measures mentioned in **Section**

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5.1.6 and good site practices, no adverse impact on the cultural heritage from the Project is envisaged.

4.1.7 Landscape and Visual

4.1.7.1. During construction, the grasses on the slope of Feature No. 11SW-A/FR218 would be temporarily affected by pit excavation on slope. The masonry stones on the retaining wall of Feature No. 11SW-A/R94 would be temporarily taken down for installation of soil nails and construction of soil nail heads. The mature tree, T14 as shown in **Figure 5.2** and **Appendix E**, on the east of Feature No. 11SW-A/R94 would not be affected by the construction.

4.2 Possible Environmental Impacts during Operational Phase

4.2.1.1. No adverse environmental impact associated with the proposed landslip prevention and mitigation works is expected during the operational phase. Thus, no mitigation measure is deemed necessary.

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5 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE CONSTRUCTION AND ANY FURTHER ENVIRONMENTAL IMPLICATION

5.1 Construction Phase

5.1.1 Air Quality

5.1.1.1. Dust control and suppression measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* (Cap. 311R) should be implemented to control the dust emissions from the site. The implementation of mitigation measures including regular water spraying of exposed surfaces, wheel washing and covering dusty material stockpiles with nylon or tarpaulin sheet, and provision of covers for all trucks would minimise dust emissions. The drilling rig to be used should be rigidly fixed onto the working platform with tarpaulin erected at the back of drilling rig to prevent "shot out" of drilled particles.

5.1.1.2. With the implementation of appropriate mitigation measures, potential dust impact would be controlled to within the acceptable levels.

5.1.2 Noise

5.1.2.1. Noise mitigation measures including the use of quieter PME, full enclosure and use of movable noise barrier and noise insulating fabric for certain PME are recommended for the construction activities. The use of standard enclosure with surface density no less than 10kg/m² has been considered in this assessment to shelter relatively static plant such as air compressor and generator. These enclosures can provide about 10 dB noise reduction. Movable noise barriers that can be placed close to the construction equipment and moved along with the PME are effective for screening noise from NSRs. A typical design which has been used locally is a wooden framed barrier with a cantilevered upper portion of superficial density no less than 10kg/m² on a skid footing with internal sound absorptive lining. This measure is particularly effective for low level zone of NSRs. A longer cantilevered top cover would be required to achieve screening benefits at upper floors of NSRs. The contractor shall be responsible for the design and actual position of the movable noise barriers with due consideration given to the position and size of the PME, and the requirement of intercepting the line-of-sight from the NSRs to the PME, as well as ensuring that the barriers should have no opening and gap. It is anticipated that properly designed noise barriers can achieve a 5 dB(A) reduction for mobile PME and a 10 dB(A) reduction for static PME. Considering that the Project site would be close to the NSRs, only 5 dB(A) reduction was assumed for both mobile and static PME in this assessment as a conservative approach. Noise insulating fabric is proposed for drill rig and a noise reduction of 10 dB(A) is expected. The indicative designs of the enclosure and noise barrier are shown in **Appendix C**.

5.1.2.2. With the adoption of the recommended noise mitigation measures, the mitigated noise levels were predicted to range from 62 to 73 dB(A) at the representative residential NSRs (N1 to N5) and 60 to 66 dB(A) at the representative educational NSR (N6), complying with the EIAO-TM daytime noise criteria (**Appendix C**). Although no exceedance of EIAO-TM noise criterion for educational institution during examination at N6 was predicted, the contractor should closely liaise with the school to avoid noisy works and use of PME such as drill rigs, grout pumps, concrete lorry mixers and hand-held breakers when the international school

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assessment takes place.

5.1.2.3. In addition to the abovementioned mitigation measures, noise mitigation measures stipulated in EPD's "Recommended Pollution Control Clauses for Construction Contracts" and the following good site practices should be implemented during the construction phase:

- Only well-maintained construction equipment should be operated on-site and the construction equipment should be serviced regularly.
- Silencers or mufflers on construction equipment, if applicable, should be utilised and should be properly maintained.
- Construction equipment that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.
- Construction equipment known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
- Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.

5.1.3 Water Quality

5.1.3.1. The site practices outlined in *ProPECC PN 1/94 "Construction Site Drainage"* should be implemented in order to minimise surface runoff and the chance of erosion. The following measures should be implemented to ensure all construction runoff are well controlled so as to minimise water quality impacts arising from the construction of the Project.

Construction Site Runoff

- Runoff from the construction site should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand/silt traps and sediment basins to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance (Cap. 358).
- All vehicles and plant should be cleaned before leaving the construction site to ensure no earth, mud, debris and the like is deposited outside the construction works areas.
- Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.
- Good site practices should be adopted to remove rubbish and litter from construction site so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.

Sewage from Construction Workforce

- Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor would be responsible for appropriate disposal of waste matter and maintenance of these facilities.
- Notices should be posted at conspicuous locations to remind the workers not

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to discharge any sewage or wastewater into the nearby environment.

5.1.4 Waste Management

5.1.4.1. Although only minimal amount of waste would be generated from the construction activities, good waste management plan and practices should be implemented to ensure proper handling and disposal of waste and minimise the quantity of waste generated. Disposal of C&D materials should be managed in accordance with the *Development Bureau Technical Circular (Works) DEVB TC(W)) No. 6/2010 "Trip Ticket System for Disposal of Construction & Demolition Materials"*. Mitigation measures are recommended as follow to reduce impacts arising from the Project.

Good Site Practices and Waste Reduction Measures

- Train site personnel in site cleanliness, proper waste management and chemical handling procedures
- Provide sufficient waste disposal points
- Collect waste regularly
- Adopt a regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors
- Segregate and store different types of wastes in labelled containers or stockpiles to enhance reuse or recycling of materials and their proper disposal
- Plan and stock construction materials carefully to minimise waste generation and avoid unnecessary waste generation
- Adopt proper storage and site practices to minimise the potential for damage or contamination of construction materials.
- Provide workers training about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle

Storage, Collection and Transportation of Waste

- Maintain and clean storage areas routinely
- Provide covers and, if necessary, water spraying system, to waste storage areas to prevent materials from wind-blown or being washed away
- Cover the wastes while transferring to avoid wind-blown
- Designate different locations to stock each material to enhance reuse where applicable
- Wash the trucks before they leave the works area to reduce the introduction of dust to the public road network

5.1.4.2. All C&D materials arising from or in connection with the works would be sorted on site to inert or non-inert materials. The frequency of disposal is subject to the amount of C&D materials generated on site which depends on the progress of works. If the amount of C&D materials is less than one truckload, the C&D materials should be stored at designated storage area for temporary stockpiling and properly covered with tarpaulin sheet. The amount of C&D materials to be stored should not

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be more than one truckload. The site supervision staff should regularly check the amount of stored C&D materials and the condition of storage area.

5.1.4.3. The C&D materials should be transported to the designated disposal facilities by dump trucks. When each truck carrying C&D materials leaves the site, the truck shall be checked by site supervision staff and recorded with photo to ensure the dump truck is not overloaded and the C&D materials are properly covered by mechanical cover. It is predicted that the number of dump truck arriving the site should not exceed one per week.

5.1.4.4. The construction waste generated on-site should be transported to the designated disposal facilities managed by EPD or CEDD. Monitoring of the contractor's compliance with the requirements of the trip ticket system should be carried out to ensure that the waste actually reaches the intended disposal facility and the correct procedures are being followed at all times.

5.1.4.5. All chemical wastes from equipment maintenance should be handled, stored and disposed of properly and in accordance with the requirements for *Waste Disposal (Chemical Waste) Regulation* (Cap. 354C).

5.1.4.6. General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical wastes. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes, on a daily or every second day basis to minimise odour, pest and litter impacts.

5.1.4.7. **Table 5.1** provides a summary of the various types of wastes likely to be generated during the construction phase of the Project, together with the recommended handling and disposal methods.

Table 5.1 Summary of Waste Handling Procedures and Disposal Routes

Waste Type	Handling	Disposal
Construction		
C&D materials	Where possible should be reused on-site. If off-site disposal required, separate into: • Non-inert C&D materials • Inert C&D materials: concrete, rock and soil	• Strategic Landfill • Public filling area
Chemical wastes	To be collected and disposal of by licensed companies. Stored in compatible containers in designed area on site	Chemical Waste Treatment Centre
General refuse	Provided on-site refuse collection facilities	• Refuse transfer station for compaction & containerization and then to Strategic Landfill • Private hygiene company

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5.1.5 Ecology

5.1.5.1. Since no ecological impact is expected during the construction phase of the Project, mitigation measure is considered not necessary.

5.1.6 Cultural Heritage

5.1.6.1. Condition survey at the existing components of the Monument should be conducted prior to the commencement of the construction works to inspect the structural integrity of the HKMMS. Protective measures shall be provided to the structure of HKMMS subject to results of condition survey. Should any critical problems be identified, appropriate mitigation measures, such as amendments on the construction methods, should be considered. Tarpaulin curtain should be provided to protect the Annex Block during the construction phase as shown in **Figure 5.2**. Detailed photographic and cartographic recording of Feature No. 11SW-A/FR218 should be conducted to the satisfaction of AMO before the affected masonry work is temporarily removed for the slope works. The recording should also be updated if there are new findings during the removal works. When new cracks which are not covered in the condition survey are discovered during construction stage, AMO should be notified immediately.

5.1.6.2. During the active construction period, ground settlement markers, tilting monitoring markers and vibration monitoring points should be installed around the construction site and readings should be obtained at a daily interval. Consensus from Architectural Services Department (ArchSD), Government Property Agency (GPA), Antiquities and Monuments Office (AMO) and property occupant (i.e. HKMMS Society) should be sought for the types, numbers and actual locations of such monitoring points before installation. Seismographs (similar to the one as shown in **Figure 5.1**) should be adopted for vibration monitoring. The locations of the monitoring points should also avoid any features of heritage significance of the site. In order to minimise the potential damages to the building structure and the masonry walls, the building settlement, ground settlement, wall settlement and differential settlement levels, as well as ground-borne vibration and tilting caused by the work should follow the limiting criteria in **Table 5.2**. The indicative locations of the proposed ground settlement markers, tilting monitoring markers and vibration monitoring points are shown in **Figures 2.1, 2.3** and **5.2**.

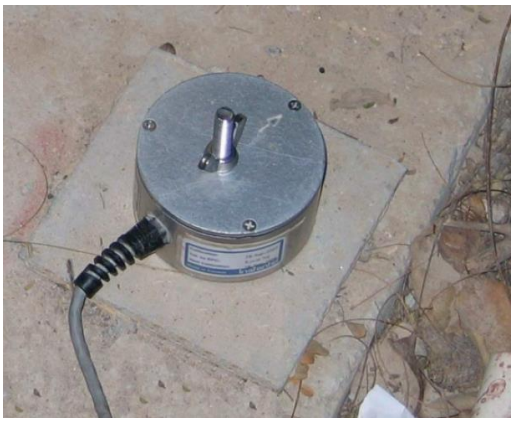

Figure 5.1 Seismograph for vibration monitoring

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Table 5.2 Limiting Criteria for Settlement, Tilting and Vibration Level Monitoring During Construction

Monitoring Type	Action Level	Alarm Level	Alert Level
Building Structure			
Building settlement	10 mm	8 mm	6 mm
Ground settlement	25 mm	20 mm	15 mm
Differential ground settlement	1/750	1/1000	1/1500
Tilting	1/1000	1/1500	1/2000
Vibration (PPVC)	3 mm/s	2.5 mm/s	2 mm/s
Vibration (amplitude)	0.2 mm		
Masonry Walls			
Vibration (ppv)	5 mm/s	4 mm/s	3 mm/s
Wall settlement	20 mm	16 mm	12 mm
Wall tilting	1/500	1/750	1/1000

5.1.6.3. The monitoring readings should be taken by the contractor's staff. If there are any readings exceeding the proposed limiting criteria, staff of the Consultant should be notified as soon as practicable. The respective actions if monitoring results exceed the proposed limiting criteria as stipulated in the following section should be implemented. The monitoring readings should be checked by Independent Environmental Checker (IEC) for any non-compliance in bi-weekly basis.

5.1.6.4. If any monitoring results exceed the alert level, the monitoring frequency for the affected area should be increased to twice a day. More monitoring points should be added as necessary. If the alarm level is exceeded, design of the construction should be amended to reduce the settlement of the adjacent ground and building. All works should be stopped, and the design and construction method should be reviewed if the action level is reached. Remediation should be implemented before resuming the works.

5.1.6.5. A Heritage Impact Assessment is not necessary for the construction works. However, application to AMO for a permit granted by the Authority under section (6) of Antiquities and Monuments Ordinance (Cap. 53) before the commencement of the proposed works would be required. The proposed works details of the planter, tarpaulin, protective measures, sample masonry finish, species of plants and photo montage should be provided to support the application. Photos showing the condition of affected areas before and after the works should also be provided to AMO for their record. Likewise, the HKMMS, the occupier of the Monument, should be liaised with the proposed schedule of works and site arrangement to minimise the inconvenience which may be caused to the daily operation of HKMMS.

5.1.6.6. Portable equipment, e.g. hand-held breakers, should be adopted for dismantling of masonry facing at Feature No. 11SW-A/R94. Drilling process should be operated manually and under full-time supervision of experienced works supervisor, who possesses at least two years of geotechnical experience, at least one year experience in site supervision of soil nailing and wall thickening and approved by Geotechnical Engineering Office of Civil Engineering and Development Department. Clearance distance should be reserved between the proposed soil nails and the Annex Block (including the columns in front of the masonry wall) for the protection of the Monument.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

5.1.6.7. In order to preserve the appearance of existing masonry wall of Feature No. 11SW-A/R94, the masonry facing should be reinstated after the upgrading works.

5.1.6.8. Manual pit by pit excavation should be adopted at Feature No. 11SW-A/FR218 to minimise the impact to the main building of HKMMS. The extent of concrete backfilling should be limited to the back of the retaining wall. For the slope portion, trimming of existing slope should be adopted instead of replacement of existing soil by no-fines concrete in order to preserve the existing nature of the soil slope.

5.1.6.9. Non-excavation type of hoardings shall be adopted during the construction phase in order to avoid damage to the main building during construction of hoardings. Protective measures to existing monument building should be submitted with regard to the results and recommendations of condition survey which should be carried out upon commencement of works.

5.1.6.10. The schematic designs of the Landslip Prevention and Mitigation Works at the Features in line with the abovementioned heritage protection measures are enclosed in **Figures 2.1** to **2.4** under **Section 2.1.1.3**. The proposed works at the Features and the nearby existing trees, noise sensitive receivers and air sensitive receivers is enclosed in **Figure 5.2**.

5.1.7 Landscape and Visual

5.1.7.1. Two rows of 1.5 m high, 20 m long planter walls would be constructed on the slope of Feature No. 11SW-A/FR218. The excavated pits which are to be filled by concrete would be covered by 500 mm thick top soil for hydroseeding and planting of shrubs. Shrubs should be planted in front of the planter walls to minimise the visual impact of the planter walls. Granite facing should also be provided to minimise the impact of the proposed planter walls. The masonry stones on wall of Feature No. 11SW-A/R94 should be reinstated after installation of soil nails and construction of recessed soil nail heads. The appearance of the masonry wall is expected to remain the same as prior to construction.

5.2 Environmental Monitoring and Audit

5.2.1.1. With the implementation of recommended mitigation measures, no adverse environmental impacts are anticipated and hence no environmental monitoring is considered necessary. Environmental site audit should be conducted by Independent Environmental Checker (IEC) during the construction phase to ensure the recommended mitigation measures be implemented properly and confirm full compliance through monthly report to EPD during and upon completion of the construction work.

5.2.1.2. The following monitoring procedures should be adopted and AECOM as the Engineer would be responsible for the monitoring operations:

- to ensure that the conservation aspects of the Project are carried out to the highest possible standard, with the co-operation of the Heritage Consultant;
- to ensure that the general aspects of environmental quality will comply with the project requirements;
- to ensure that precautionary measures will be implemented to protect the HKMMS from damage under the supervision of the Heritage Consultant;

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

- to supervise the Contractor to ensure that the requirements in the Project Profile are fully complied with;
- to instruct the Contractor when action is required to reduce or prevent any impacts;
- to effectively and speedily deal with any complaints on environmental performance; and
- to prepare a summary of the environmental performance of the Contractor on completion of the Project.

5.3 Severity, Distribution and Duration of Environmental Effects

5.3.1.1. In view of the nature and small scale of the Project, the associated environmental impacts would be small scale, localised and temporary. With the implementation of the recommended mitigation measures, no adverse residual impact is anticipated.

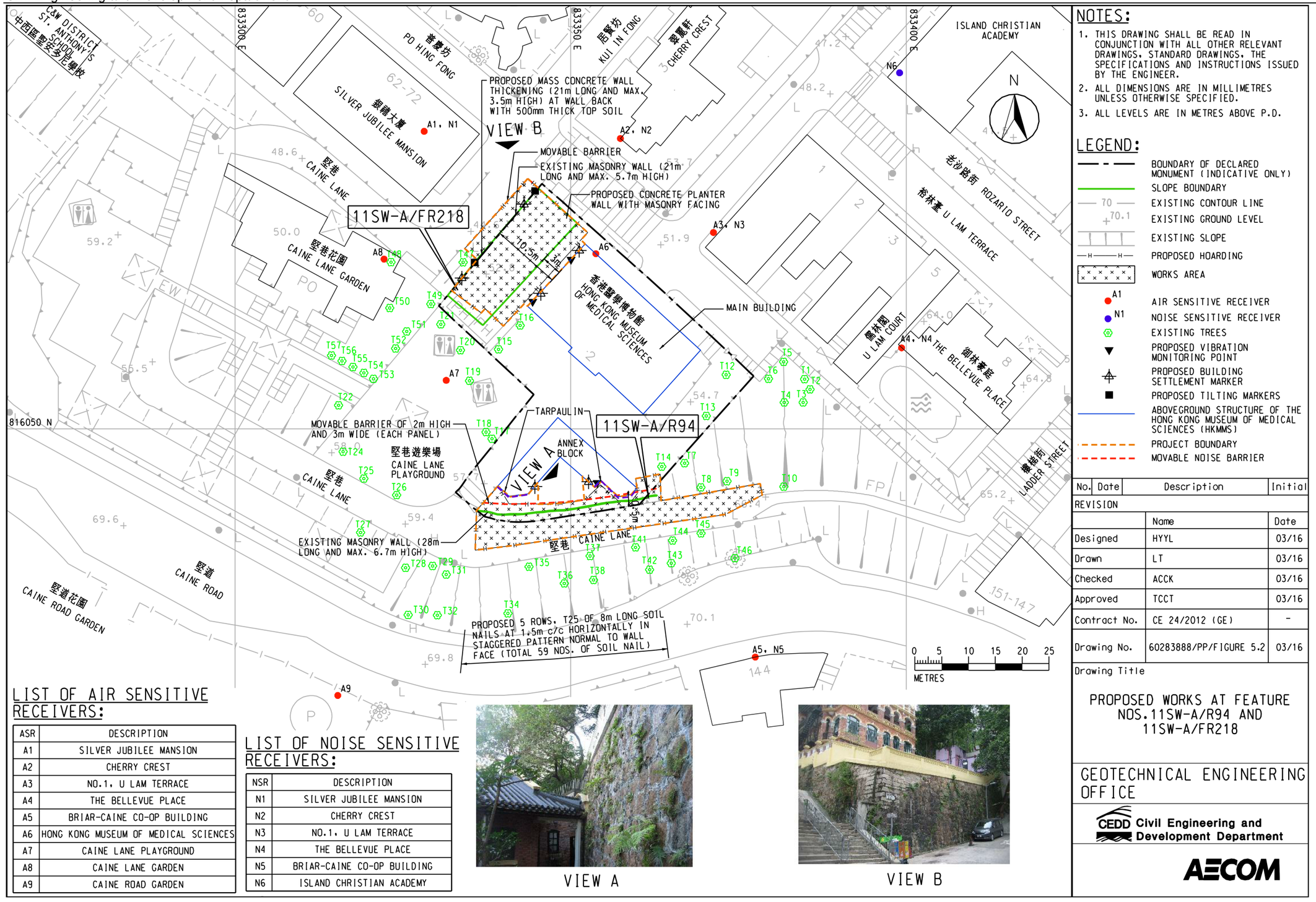
5.4 Further Implications

5.4.1.1. No further environmental implication is anticipated with the implementation of the recommended mitigation measures.

5.5 History of Similar Projects

5.5.1.1. There is no project of similar nature under the EIAO in the past.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.



LIST OF AIR SENSITIVE RECEIVERS:

ASR	DESCRIPTION
A1	SILVER JUBILEE MANSION
A2	CHERRY CREST
A3	NO.1, U LAM TERRACE
A4	THE BELLEVUE PLACE
A5	BRIAR-CAINE CO-OP BUILDING
A6	HONG KONG MUSEUM OF MEDICAL SCIENCES
A7	CAINE LANE PLAYGROUND
A8	CAINE LANE GARDEN
A9	CAINE ROAD GARDEN

LIST OF NOISE SENSITIVE RECEIVERS:

NSR	DESCRIPTION
N1	SILVER JUBILEE MANSION
N2	CHERRY CREST
N3	NO.1, U LAM TERRACE
N4	THE BELLEVUE PLACE
N5	BRIAR-CAINE CO-OP BUILDING
N6	ISLAND CHRISTIAN ACADEMY

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, STANDARD DRAWINGS, THE SPECIFICATIONS AND INSTRUCTIONS ISSUED BY THE ENGINEER.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
3. ALL LEVELS ARE IN METRES ABOVE P.D.

LEGEND:

- BOUNDARY OF DECLARED MONUMENT (INDICATIVE ONLY)
- SLOPE BOUNDARY
- EXISTING CONTOUR LINE
- EXISTING GROUND LEVEL
- EXISTING SLOPE
- PROPOSED HOARDING
- WORKS AREA
- AIR SENSITIVE RECEIVER
- NOISE SENSITIVE RECEIVER
- EXISTING TREES
- PROPOSED VIBRATION MONITORING POINT
- PROPOSED BUILDING SETTLEMENT MARKER
- PROPOSED TILTING MARKERS
- ABOVEGROUND STRUCTURE OF THE HONG KONG MUSEUM OF MEDICAL SCIENCES (HKMMS)
- PROJECT BOUNDARY
- MOVABLE NOISE BARRIER

No.	Date	Description	Initial
REVISION			

	Name	Date
Designed	HYYL	03/16
Drawn	LT	03/16
Checked	ACCK	03/16
Approved	TCCT	03/16
Contract No.	CE 24/2012 (GE)	-
Drawing No.	60283888/PP/FIGURE 5.2	03/16

Drawing Title

PROPOSED WORKS AT FEATURE NOS.11SW-A/R94 AND 11SW-A/FR218

GEOTECHNICAL ENGINEERING OFFICE

CEDD Civil Engineering and Development Department

AECOM

Figure 5.2 Proposed Works at Feature Nos. 11SW-A/R94 and 11SW-A/FR218

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

6 USE OF PREVIOUSLY APPROVED EIA REPORTS

6.1.1.1. No previous EIA Report or Project Profile for application for permission to apply directly for an Environmental Permit (EP) was approved or submitted for the Projects adopting soil nailing and wall thickening in the vicinity of a site of cultural heritage.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

7 CONCLUSION

7.1.1.1. The potential environmental impacts arising from the Project have been assessed, including air quality, noise, water quality, waste management, ecology, cultural heritage, and landscape and visual aspects.

7.1.1.2. Based on the findings of the assessed aspects, with proper implementation of the recommended mitigation measures given in **Section 5**, no adverse environmental impact is anticipated during the construction phase of the Project.

7.1.1.3. The potential environmental impacts arising from the construction of the Project and proposed mitigation measures are summarised in **Table 7.1**.

Table 7.1 Summary of the Potential Environmental Impacts and Proposed Mitigation Measures

Potential Environmental Impacts	Proposed Mitigation Measures
Air Quality	
• Fugitive dust emissions from construction activities including site formation, drilling, and wind erosion of the excavated areas	• Dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* (Cap. 311R) of *Air Pollution Control Ordinance* (APCO) (Cap. 311) • Good site practices
Noise	
• Construction noise from the use of powered mechanical equipment (PME) for the construction activities	• Use of quieter PME • Use of noise enclosure • Use of movable noise barrier • Use of noise insulating fabric for certain PME • Good site practices
Water Quality	
• Water pollution from uncontrolled surface runoff and erosion of exposed soil, earthworks and stockpiles during storm events • Muddy water from construction activities such as dust suppression sprays, dewatering during excavation and washing of construction equipment	• Good site practices as per *Professional Persons Environmental Consultative Committee Practice (ProPECC) Note PN 1/94 "Construction Site Drainage"*
Waste Management	
• 132 m^3 of C&D materials from construction works	• Good waste management plan, practices and waste reduction measures • Disposal of C&D materials should be managed in accordance with the *Development Bureau Technical Circular (Works) DEVB TC(W)) No. 6/2010 "Trip Ticket System for Disposal of Construction & Demolition Materials".*

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

Potential Environmental Impacts	Proposed Mitigation Measures
	• Proper storage, collection and transportation to designated destination of waste, including C&D materials, general refuse and chemical wastes • On-site sorting of all C&D materials to inert or non-inert
Ecology	
• No adverse ecological impact is expected.	• Not required
Cultural Heritage	
• Indirect impact to the historic feature, such as extension of existing cracks on the structures within the Monument or the dislocation of the roof tiles on the Main Building and Annex Block, by ground-borne vibration from the use of PME	• Conduct condition survey at the existing components of the Monument prior to the commencement of the construction work • Provide protective measures to the structure of HKMMS subject to results of condition survey • Provide tarpaulin curtain to protect the Annex Block during the construction phase • Conduct detailed photographic and cartographic recording of Feature No. 11SW-A/FR218 to the satisfaction of AMO before the affected masonry work is temporarily removed for the slope works • Install ground settlement markers, tilting monitoring markers and vibration monitoring points during the active construction period and obtain readings at a daily interval • Operate drilling process manually under full-time supervision of experienced works supervisor at Feature No. 11SW-A/R94 • Reserve clearance distance between the proposed soil nails at Feature No. 11SW-A/R94 and the Annex Block (including the columns in front of the masonry wall) • Reinstate the masonry wall of the Feature No. 11SW-A/R94 after the upgrading works • Adopt Manual pit by pit excavation • Adopt non-excavation type of hoardings at Feature No. 11SW-A/FR218

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

Potential Environmental Impacts	Proposed Mitigation Measures
	• Limit the extent of concrete backfilling to the back of the retaining wall at Feature No. 11SW-A/FR218 • Adopt trimming of existing slope instead of replacement of existing soil by no-fines concrete at Feature No. 11SW-A/FR218
Landscape and Visual	
• The grasses on the slope of Feature No. 11SW-A/FR218 would be temporarily affected by pit excavation on slope. • The masonry stones on the retaining wall of Feature No. 11SW-A/R94 would be temporarily taken down for installation of soil nails and construction of soil nail heads	• Reinstate the masonry wall of the Feature No. 11SW-A/R94 after the upgrading works • Provide granite facing to minimise the impact of the proposed planter walls

Note:
A permit granted by the Authority under section (6) of Antiquities and Monuments Ordinance (Cap. 53) would be applied before the commencement of the proposed works.

7.1.1.4. The contractor should strictly comply with the requirements specified in the permit issued under section (6) of the Antiquities and Monuments Ordinance by the Antiquities Authority.

7.1.1.5. The Project would protect the structures of Declared Monument from potential damages arising from failure of the Features due to close proximity of the Features and Main Building and Annex Block of the Hong Kong Museum of Medical Sciences.

Note: Feature No. 11SW-A/R94 is the masonry wall situated between Annex Block of Hong Kong Museum of Medical Sciences and Caine Lane. Feature No. 11SW-A/FR218 is the masonry wall and slope situated between Main Building of Hong Kong Museum of Medical Sciences and Kui In Fong.

APPENDIX A

Tentative Construction Programme

Appendix A Tentative Construction Programme

Act No.	Main Construction Elements	Consturction Period (Tentative)								
		2016				2017				
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
		1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94 (next to Annex Block)										
1	Site clearance, UU detection and preparation									
2	Initial survey and erection of hoarding									
3	Ground investigation works									
4	Take off existing masonry stone facing									
5	Installation of soil nails and raking drains									
6	Construction of soil nail head									
7	Reinstatement of existing masonry stone facing									
8	Site clearance and dismantle of hoarding									
Feature No. 11SW-A/FR218 (next to Main Building)										
1	Site clearance, UU detection and preparation									
2	Initial survey and erection of hoarding									
3	Excavation works (Bay 1 & Bay 3)									
4	Installation of dowel bars and concrete works									
5	Pit by pit excavation works (Bay 2)									
6	Installation of dowel bars and concrete works									
7	Back filling of top soil									
8	Construction of concrete staircase									
9	Landscape works									
10	Site clearance and dismantle of hoarding									

APPENDIX B

Proposed Construction Plant Inventory

Appendix B Proposed Construction Plant Inventory
Unmitigated Scenario
Feature No. 11SW-A/R94

1 Site clearance, UU detection and preparation

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	0	103
					Total	**103**

2 Initial survey and erection of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	80%	0	107
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	0	103
Welding set	EIA Ref. 1	1	78	80%	0	77
					Total	**108**

3 Ground investigation works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	80%	0	107
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	0	103
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	80%	0	107
					Total	**111**

4 Take off existing masonry stone facing

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	100%	0	108
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	100%	0	108
					Total	**111**

5 Installation of soil nails and raking drains

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	100%	0	108	-
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104	-
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104	-
Air compressor, air flow > 10m^3/min and ≤ 30m^3/min	CNP002	1	102	100%	0	102	-
Drill rig, rotary type (diesel)	OCNP	1	110	100%	0	110	-
Concrete lorry mixer	CNP044	1	109	80%	0	-	108
Grout mixer	OCNP	1	90	100%	0	90	-
Grout pump	OCNP	1	105	80%	0	-	104
					Total	**114**	**109**
					Maximum	**114**	

Appendix B Proposed Construction Plant Inventory
Unmitigated Scenario
Feature No. 11SW-A/R94

6 Construction of soil nail head

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	100%	0	108	-
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104	-
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104	-
Air compressor, air flow > $10m^3$/min and ≤ $30m^3$/min	CNP002	1	102	100%	0	102	-
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	100%	0	108	-
Concrete lorry mixer	CNP044	1	109	80%	0	-	108
Grout mixer	OCNP	1	90	100%	0	90	-
Grout pump	OCNP	1	105	80%	0	-	104
Saw, circular, wood	CNP201	1	108	80%	0	107	-
					Total	**114**	**109**
					Maximum	**114**	

7 Reinstatement of existing masonry stone facing

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	100%	0	108
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	100%	0	108
				Total	**Total**	**111**

8 Site clearance and dismantle of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	100%	0	108
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104
Welding set	EIA Ref. 1	1	78	100%	0	78
					Total	**111**

Notes:
[1] CNP – Table 3, Technical Memorandum on Noise from Construction Work Other than Percussive Piling (GW-TM)
OCNP – Other PME documented by the Noise Control Authority
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)
EIA Ref. 1 – Approved Sheung Shui to Lok Ma Chau Spur Line Environmental Impact Assessment Report (Register No.: AEIAR-052/2002)
[2] PME in different groups will not be in use concurrently. The group with higher SWL has been adopted in the assessment for the worst case scenario.

Appendix B Proposed Construction Plant Inventory
Unmitigated Scenario
Feature No. 11SW-A/FR218

1 Site clearance, UU detection and preparation

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	0	103
					Total	**103**

2 Initial survey and erection of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	80%	0	107
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	0	103
Welding set	EIA Ref. 1	1	78	80%	0	77
					Total	**108**

3 Excavation works (Bay 1 & Bay 3)

3.1 PME will be in use in Bay 1 & Bay 3

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Welding set	EIA Ref. 1	1	78	100%	0	78
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	50%	0	105
					Total	**105**

3.2 PME will operate at "area for bulky PME for works at Bay 1 to Bay 3" [3]

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	100%	0	-	108
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	50%	0	-	102
Saw, circular, wood	CNP201	1	108	50%	0	-	105
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	0	103	-
					Total	**103**	**110**
					Maximum	**110**	

4 Installation of dowel bars and concrete works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	100%	0	108	-
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	100%	0	108	-
Concrete lorry mixer	CNP044	1	109	80%	0	-	108
Saw, circular, wood	CNP201	1	108	100%	0	108	-
					Total	**113**	**108**
					Maximum	**113**	

5 Pit by pit excavation works (Bay 2)

5.1 PME will be in use in Bay 2

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Welding set	EIA Ref. 1	1	78	100%	0	78
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	60%	0	106
					Total	**106**

5.2 PME will operate at "area for bulky PME for works at Bay 1 to Bay 3" [3]

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	100%	0	-	108
Saw, circular, wood	CNP201	1	108	60%	0	-	106
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	50%	0	-	102
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104	-
					Total	**104**	**111**
					Maximum	**111**	

Appendix B Proposed Construction Plant Inventory
Unmitigated Scenario
Feature No. 11SW-A/FR218

6 Installation of dowel bars and concrete works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	80%	0	107	-
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	80%	0	107	-
Concrete lorry mixer	CNP044	1	109	60%	0	-	107
Saw, circular, wood	CNP201	1	108	50%	0	105	-
					Total	**111**	**107**
					Maximum	**111**	

7 Back filling of top soil

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	100%	0	108
					Total	**108**

8 Construction of concrete staircase

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	CNP101	1	108	100%	0	-	108
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	-	104
Breaker, hand-held, mass > 10kg and < 20kg	CNP024	1	108	100%	0	-	108
Concrete lorry mixer	CNP044	1	109	60%	0	107	-
Saw, circular, wood	CNP201	1	108	80%	0	107	-
					Total	**110**	**112**
					Maximum	**112**	

9 Landscape works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	100%	0	108
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104
					Total	**109**

10 Site clearance and dismantle of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	CNP101	1	108	100%	0	108
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	0	104
Welding set	EIA Ref. 1	1	78	100%	0	78
					Total	**111**

Notes:
[1] CNP – Table 3, Technical Memorandum on Noise from Construction Work Other than Percussive Piling (GW-TM)
OCNP – Other PME documented by the Noise Control Authority
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)
EIA Ref. 1 – Approved Sheung Shui to Lok Ma Chau Spur Line Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-052/2002)
[2] PME in different groups will not be in use concurrently. The group with higher SWL has been adopted in the assessment for the worst case scenario.
[3] Due to the gradient and limited area of Bay 1 to Bay 3, bulky PME such as generators and trucks will be placed and operate at the "area for bulky PME for works at Bay 1 to Bay 3" as shown in **Figure 3.2**.

Appendix B Proposed Construction Plant Inventory
Mitigated Scenario
Feature No. 11SW-A/R94

1 Site clearance, UU detection and preparation

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	-5*	98
					Total	**98**

2 Initial survey and erection of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	80%	-10***	80
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	-5*	98
Welding set	EIA Ref. 1	1	78	80%	0	77
					Total	**98**

3 Ground investigation works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	80%	-10***	80
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	-5*	98
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	80%	-5*	94
					Total	**99**

4 Take off existing masonry stone facing

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	100%	-10***	81
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	100%	-5*	95
					Total	**95**

5 Installation of soil nails and raking drains

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	100%	-10***	81	-
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99	-
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99	-
Air compressor, air flow > 10m^3/min and ≤ 30m^3/min	CNP002	1	102	100%	-10***	92	-
Drill rig, rotary type (diesel)	OCNP	1	110	100%	-10**	100	-
Concrete lorry mixer	CNP044	1	109	80%	-5*	-	103
Grout mixer	OCNP	1	90	100%	0	90	-
Grout pump	OCNP	1	105	80%	-5*	-	99
					Total	**105**	**104**
					Maximum	**105**	

Appendix B Proposed Construction Plant Inventory
Mitigated Scenario
Feature No. 11SW-A/R94

6 Construction of soil nail head

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	100%	-10***	81	-
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99	-
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99	-
Air compressor, air flow > $10m^3$/min and ≤ $30m^3$/min	CNP002	1	102	100%	-10***	92	-
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	100%	-5*	95	-
Concrete lorry mixer	CNP044	1	109	80%	-5*	-	103
Grout mixer	OCNP	1	90	100%	0	90	-
Grout pump	OCNP	1	105	80%	-5*	-	99
Saw, circular, wood	EIA Ref. 2	1	103	80%	-5*	97	-
					Total	**104**	**104**
					Maximum	**104**	

7 Reinstatement of existing masonry stone facing

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	100%	-10***	81
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	100%	-5*	95
				Total	**Total**	**95**

8 Site clearance and dismantle of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	100%	-10***	81
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99
Welding set	EIA Ref. 1	1	78	100%	0	78
					Total	**102**

Notes:
[1] CNP – Table 3, Technical Memorandum on Noise from Construction Work Other than Percussive Piling (GW-TM)
OCNP – Other PME documented by the Noise Control Authority
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)
EIA Ref. 1 – Approved Sheung Shui to Lok Ma Chau Spur Line Environmental Impact Assessment Report (Register No.: AEIAR-052/2002)
EIA Ref. 2 – Approved Development of Anderson Road Quarry site - Road Improvement Works Environmental Impact Assessment Report (Register No.: AEIAR-195/2016)
QPME - Quality PME by EPD (http://www.epd.gov.hk/cgi-bin/npg/qpme/search_gen.pl?lang=eng&st=sim&valid=Y)
[2] PME in different groups will not be in use concurrently. The group with higher SWL has been adopted in the assessment for the worst case scenario.
* Movable noise barrier is proposed and it is assumed a 5 dB(A) reduction for all PME as a conservation approach.
For movable noise barrier, a typical design which has been used locally is a wooden framed barrier with a cantilevered upper portion of superficial density no less than $10kg/m^2$ on a skid footing with 25mm thick internal sound absorptive lining.
** Noise insulating fabric is proposed and it is assumed a 10 dB(A) reduction for drill rig.
*** Full noise enclusure with surface density no less than $10kg/m^2$ is proposed and it is assumed a 10 dB(A) reduction for generator and air compressor.

Appendix B Proposed Construction Plant Inventory
Mitigated Scenario
Feature No. 11SW-A/FR218

1 Site clearance, UU detection and preparation

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	-5*	98
					Total	**98**

2 Initial survey and erection of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	80%	0	90
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	-5*	98
Welding set	EIA Ref. 1	1	78	80%	0	77
					Total	**98**

3 Excavation works (Bay 1 & Bay 3)

3.1 PME will be in use in Bay 1 & Bay 3

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Welding set	EIA Ref. 1	1	78	100%	0	78
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	50%	0	97
					Total	**97**

3.2 PME will operate at "area for bulky PME for works at Bay 1 to Bay 3" [3]

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	100%	-10***	-	81
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	50%	-5*	-	97
Saw, circular, wood	EIA Ref. 2	1	103	50%	-5*	-	95
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	60%	-5*	98	-
					Total	**98**	**99**
					Maximum	**99**	

4 Installation of dowel bars and concrete works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	100%	-10***	81	-
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	100%	0	100	-
Concrete lorry mixer	CNP044	1	109	80%	-5*	-	103
Saw, circular, wood	EIA Ref. 2	1	103	100%	-5*	98	-
					Total	**102**	**103**
					Maximum	**103**	

5 Pit by pit excavation works (Bay 2)

5.1 PME will be in use in Bay 2

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Welding set	EIA Ref. 1	1	78	100%	0	78
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	60%	0	98
					Total	**98**

5.2 PME will operate at "area for bulky PME for works at Bay 1 to Bay 3" [3]

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	100%	-10***	-	81
Saw, circular, wood	EIA Ref. 2	1	103	60%	-5*	-	96
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	50%	-5*	-	97
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99	-
					Total	**99**	**99**
					Maximum	**99**	

Appendix B Proposed Construction Plant Inventory
Mitigated Scenario
Feature No. 11SW-A/FR218

6 Installation of dowel bars and concrete works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	80%	-10***	80	-
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	80%	0	99	-
Concrete lorry mixer	CNP044	1	109	60%	-5*	-	102
Saw, circular, wood	EIA Ref. 2	1	103	50%	-5*	95	-
					Total	**101**	**102**
					Maximum	**102**	

7 Back filling of top soil

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	100%	-10***	81
					Total	**81**

8 Construction of concrete staircase

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A) [2]	
						Group 1	Group 2
Generator	QPME EPD-02677	1	91	100%	-10***	-	81
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	-	99
Breaker, hand-held, mass > 10kg and < 20kg	EIA Ref. 2	1	100	100%	0	-	100
Concrete lorry mixer	CNP044	1	109	60%	-5*	102	-
Saw, circular, wood	EIA Ref. 2	1	103	80%	-5*	97	-
					Total	**103**	**103**
					Maximum	**103**	

9 Landscape works

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	100%	-10***	81
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99
					Total	**99**

10 Site clearance and dismantle of hoarding

Powered Mechanical Equipment	Ref. [1]	No. of Items	SWL/Item, dB(A)	On-Time %	Barrier Correction, dB(A)	Total SWL, dB(A)
Generator	QPME EPD-02677	1	91	100%	-10***	81
Crane lorry, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99
Dump truck with grab, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCNP	1	105	80%	-5*	99
Welding set	EIA Ref. 1	1	78	100%	0	78
					Total	**102**

Notes:
[1] CNP – Table 3, Technical Memorandum on Noise from Construction Work Other than Percussive Piling (GW-TM)
OCNP – Other PME documented by the Noise Control Authority
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)
EIA Ref. 1 – Approved Sheung Shui to Lok Ma Chau Spur Line Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-052/2002)
EIA Ref. 2 – Approved Development of Anderson Road Quarry site - Road Improvement Works Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-195/2016)
QPME - Quality PME by EPD (http://www.epd.gov.hk/cgi-bin/npg/qpme/search_gen.pl?lang=eng&st=sim&valid=Y)
[2] PME in different groups will not be in use concurrently. The group with higher SWL has been adopted in the assessment for the worst case scenario.
[3] Due to the gradient and limited area of Bay 1 to Bay 3, bulky PME such as generators and trucks will be placed and operate at the "area for bulky PME for works at Bay 1 to Bay 3" as shown in **Figure 3.2**.
* Movable noise barrier is proposed and it is assumed a 5 dB(A) reduction for all PME as a conservation approach.
For movable noise barrier, a typical design which has been used locally is a wooden framed barrier with a cantilevered upper portion of superficial density no less than 10kg/m^2 on a skid footing with 25mm thick internal sound absorptive lining.
** Noise insulating fabric is proposed and it is assumed a 10 dB(A) reduction for drill rig.
*** Full noise enclusure with surface density no less than 10kg/m² is proposed and it is assumed a 10 dB(A) reduction for generator and air compressor.

APPENDIX C

Construction Noise Impact

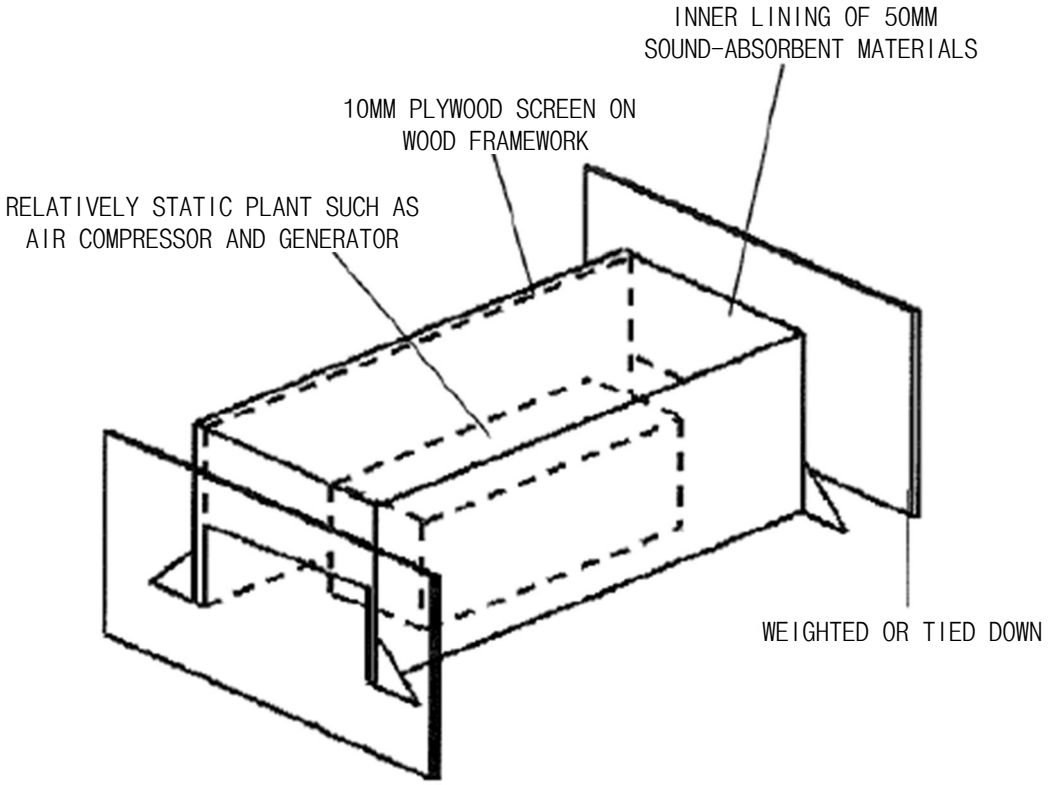
Appendix C Construction Noise Impact

Distance of NSRs to the Notional Source Positions

NSR	Description	Land use	Horizontal distance to notional source position, m					
			Feature No. 11SW-A/R94	Feature No. 11SW-A/FR218				
				Overall	Bay 1	Bay 2	Bay 3	Area for bulky PME for works at Bay 1 to Bay 3
N1	Silver Jubilee Mansion	Residential	58	19	22	22	24	17
N2	Cherry Crest	Residential	53	18	15	22	29	17
N3	No.1, U Lam Terrace	Residential	39	24	25	29	34	29
N4	The Bellevue place	Residential	34	54	57	59	63	60
N5	Briar-Caine Co-Op Building	Residential	23	66	72	70	69	75
N6	Island Christian Academy	Educational Institution	68	58	56	62	69	59

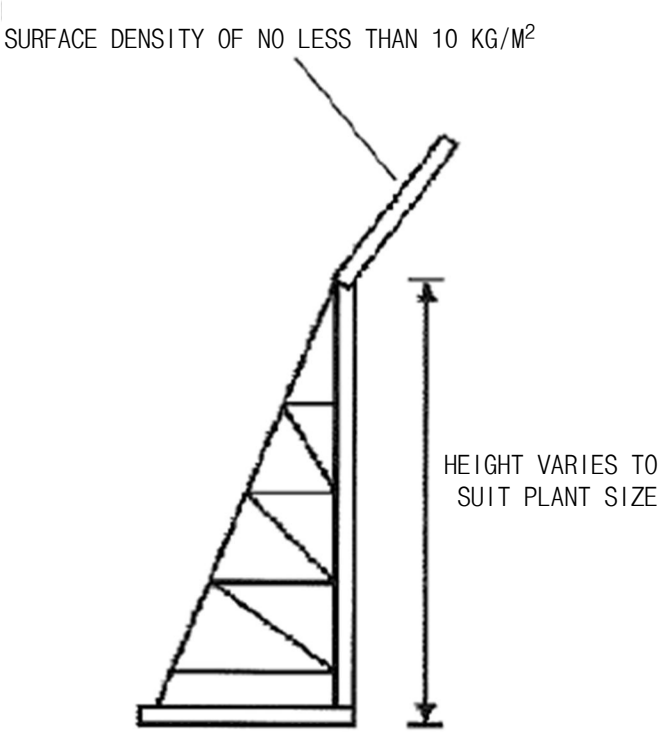
Appendix C Construction Noise Impact

Indicative design of typical noise enclosure and movable noise barrier



TYPICAL NOISE ENCLOSURE FOR STATIC PLANT
(E.G. AIR COMPRESSOR, GENERATOR, ETC.

HEIGHT: ~3 - 4 METRES
WIDTH/LENGTH: ~3 - 7 METRES
SURFACE DENSITY: NO LESS THAN 10 KG/M^2



TYPICAL MOVABLE NOISE BARRIER
~ 3 - 5 METRES TALL

Appendix C Construction Noise Impact

Unmitigated Scenario

NSR N1

Description Silver Jubilee Mansion

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	103	58	63	63								
2	Initial survey and erection of hoarding	108	58	68		68							
3	Ground investigation works	111	58	71		71							
4	Take off existing masonry stone facing	111	58	71			71						
5	Installation of soil nails and raking drains	114	58	73				73	73	73			
6	Construction of soil nail head	114	58	74							74		
7	Reinstatement of existing masonry stone facing	111	58	71								71	
8	Site clearance and dismantle of hoarding	111	58	70									70
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	103	19	72	72								
2	Initial survey and erection of hoarding	108	19	78	78								
3.1	Excavation works (Bay 1)	105	22	73		73							
3.1	Excavation works (Bay 3)	105	24	72		72							
3.2	Excavation works (Bulky PME area)	110	17	81		81							
4	Installation of dowel bars and concrete works	113	19	82			82						
5.1	Pit by pit excavation works (Bay 2)	106	22	74				74					
5.2	Pit by pit excavation works (Bulky PME area)	111	17	81				81					
6	Installation of dowel bars and concrete works	111	19	80					80				
7	Back filling of top soil	108	19	77						77			
8	Construction of concrete staircase	112	19	81							81		
9	Landscape works	109	19	79								79	
10	Site clearance and dismantle of hoarding	111	19	80									80
			Total SPL, dB(A):		79	83	82	82	81	79	82	79	80
			Exceedance:		4	8	7	7	6	4	7	4	5

Note:

Figures in red denote exceedance of the EIAO-TM construction noise criteria.

Appendix C Construction Noise Impact

Unmitigated Scenario

NSR N2

Description Cherry Crest

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	103	53	63	63								
2	Initial survey and erection of hoarding	108	53	69		69							
3	Ground investigation works	111	53	71		71							
4	Take off existing masonry stone facing	111	53	72			72						
5	Installation of soil nails and raking drains	114	53	74				74	74	74			
6	Construction of soil nail head	114	53	74							74		
7	Reinstatement of existing masonry stone facing	111	53	72								72	
8	Site clearance and dismantle of hoarding	111	53	71									71
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	103	18	73	73								
2	Initial survey and erection of hoarding	108	18	78	78								
3.1	Excavation works (Bay 1)	105	15	76		76							
3.1	Excavation works (Bay 3)	105	29	71		71							
3.2	Excavation works (Bulky PME area)	110	17	81		81							
4	Installation of dowel bars and concrete works	113	18	83			83						
5.1	Pit by pit excavation works (Bay 2)	106	22	74				74					
5.2	Pit by pit excavation works (Bulky PME area)	111	17	81				81					
6	Installation of dowel bars and concrete works	111	18	81					81				
7	Back filling of top soil	108	18	78						78			
8	Construction of concrete staircase	112	18	82							82		
9	Landscape works	109	18	79								79	
10	Site clearance and dismantle of hoarding	111	18	80									80
			Total SPL, dB(A):		79	83	83	83	82	79	82	80	81
			Exceedance:		4	8	8	8	7	4	7	5	6

Note:

Figures in red denote exceedance of the EIAO-TM construction noise criteria.

Appendix C Construction Noise Impact

Unmitigated Scenario

NSR N3

Description No.1, U Lam Terrace

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	103	39	66	66								
2	Initial survey and erection of hoarding	108	39	72		72							
3	Ground investigation works	111	39	74		74							
4	Take off existing masonry stone facing	111	39	74			74						
5	Installation of soil nails and raking drains	114	39	77				77	77	77			
6	Construction of soil nail head	114	39	77							77		
7	Reinstatement of existing masonry stone facing	111	39	74								74	
8	Site clearance and dismantle of hoarding	111	39	74									74
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	103	24	70	70								
2	Initial survey and erection of hoarding	108	24	76	76								
3.1	Excavation works (Bay 1)	105	25	72		72							
3.1	Excavation works (Bay 3)	105	34	69		69							
3.2	Excavation works (Bulky PME area)	110	29	76		76							
4	Installation of dowel bars and concrete works	113	24	80			80						
5.1	Pit by pit excavation works (Bay 2)	106	29	71				71					
5.2	Pit by pit excavation works (Bulky PME area)	111	29	77				77					
6	Installation of dowel bars and concrete works	111	24	79					79				
7	Back filling of top soil	108	24	75						75			
8	Construction of concrete staircase	112	24	79							79		
9	Landscape works	109	24	77								77	
10	Site clearance and dismantle of hoarding	111	24	78									78
			Total SPL, dB(A):		77	80	81	80	81	79	81	79	79
			Exceedance:		2	5	6	5	6	4	6	4	4

Note:

Figures in red denote exceedance of the EIAO-TM construction noise criteria.

Appendix C Construction Noise Impact

Unmitigated Scenario

NSR N4

Description The Bellevue Place

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	103	34	67	67								
2	Initial survey and erection of hoarding	108	34	73		73							
3	Ground investigation works	111	34	75		75							
4	Take off existing masonry stone facing	111	34	75			75						
5	Installation of soil nails and raking drains	114	34	78				78	78	78			
6	Construction of soil nail head	114	34	78							78		
7	Reinstatement of existing masonry stone facing	111	34	75								75	
8	Site clearance and dismantle of hoarding	111	34	75									75
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	103	54	63	63								
2	Initial survey and erection of hoarding	108	54	69	69								
3.1	Excavation works (Bay 1)	105	57	65		65							
3.1	Excavation works (Bay 3)	105	63	64		64							
3.2	Excavation works (Bulky PME area)	110	60	70		70							
4	Installation of dowel bars and concrete works	113	54	73			73						
5.1	Pit by pit excavation works (Bay 2)	106	59	65				65					
5.2	Pit by pit excavation works (Bulky PME area)	111	60	70				70					
6	Installation of dowel bars and concrete works	111	54	72					72				
7	Back filling of top soil	108	54	68						68			
8	Construction of concrete staircase	112	54	72							72		
9	Landscape works	109	54	70								70	
10	Site clearance and dismantle of hoarding	111	54	71									71
			Total SPL, dB(A):		72	78	77	79	79	78	79	76	76
			Exceedance:		-	3	2	4	4	3	4	1	1

Note:

Figures in red denote exceedance of the EIAO-TM construction noise criteria.

Appendix C Construction Noise Impact

Unmitigated Scenario

NSR N5

Description Briar-Caine Co-Op Building

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	103	23	71	71								
2	Initial survey and erection of hoarding	108	23	76		76							
3	Ground investigation works	111	23	79		79							
4	Take off existing masonry stone facing	111	23	79			79						
5	Installation of soil nails and raking drains	114	23	81				81	81	81			
6	Construction of soil nail head	114	23	82							82		
7	Reinstatement of existing masonry stone facing	111	23	79								79	
8	Site clearance and dismantle of hoarding	111	23	78									78
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	103	66	61	61								
2	Initial survey and erection of hoarding	108	66	67	67								
3.1	Excavation works (Bay 1)	105	72	63		63							
3.1	Excavation works (Bay 3)	105	69	63		63							
3.2	Excavation works (Bulky PME area)	110	75	68		68							
4	Installation of dowel bars and concrete works	113	66	71			71						
5.1	Pit by pit excavation works (Bay 2)	106	70	64				64					
5.2	Pit by pit excavation works (Bulky PME area)	111	75	68				68					
6	Installation of dowel bars and concrete works	111	66	70					70				
7	Back filling of top soil	108	66	67						67			
8	Construction of concrete staircase	112	66	70							70		
9	Landscape works	109	66	68								68	
10	Site clearance and dismantle of hoarding	111	66	69									69
			Total SPL, dB(A):		73	81	80	82	82	82	82	79	79
			Exceedance:		-	6	5	7	7	7	7	4	4

Note:

Figures in red denote exceedance of the EIAO-TM construction noise criteria.

Appendix C Construction Noise Impact

Unmitigated Scenario

NSR N6

Description Island Christian Academy

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	103	68	61	61								
2	Initial survey and erection of hoarding	108	68	67		67							
3	Ground investigation works	111	68	69		69							
4	Take off existing masonry stone facing	111	68	69			69						
5	Installation of soil nails and raking drains	114	68	72				72	72	72			
6	Construction of soil nail head	114	68	72							72		
7	Reinstatement of existing masonry stone facing	111	68	69								69	
8	Site clearance and dismantle of hoarding	111	68	69									69
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	103	58	63	63								
2	Initial survey and erection of hoarding	108	58	68	68								
3.1	Excavation works (Bay 1)	105	56	65		65							
3.1	Excavation works (Bay 3)	105	69	63		63							
3.2	Excavation works (Bulky PME area)	110	59	70		70							
4	Installation of dowel bars and concrete works	113	58	73			73						
5.1	Pit by pit excavation works (Bay 2)	106	62	65				65					
5.2	Pit by pit excavation works (Bulky PME area)	111	59	70				70					
6	Installation of dowel bars and concrete works	111	58	71					71				
7	Back filling of top soil	108	58	68						68			
8	Construction of concrete staircase	112	58	72							72		
9	Landscape works	109	58	69								69	
10	Site clearance and dismantle of hoarding	111	58	70									70
			Total SPL, dB(A):		70	75	74	75	75	73	75	72	73
			Exceedance [1]:		5	10	4	5	5	3	5	2	3

Note:

Figures in red denote exceedance of the EIAO-TM construction noise criteria.

[1] As advised by Island Christian Academy (N6), there would be an international school assessment held between mid-September and early October 2016. The international school assessment has been considered as examination in the noise assessment

Appendix C Construction Noise Impact

Mitigated Scenario

NSR N1

Description Silver Jubilee Mansion

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	98	58	58	58								
2	Initial survey and erection of hoarding	98	58	58		58							
3	Ground investigation works	99	58	59		59							
4	Take off existing masonry stone facing	95	58	55			55						
5	Installation of soil nails and raking drains	105	58	64				64	64	64			
6	Construction of soil nail head	104	58	64							64		
7	Reinstatement of existing masonry stone facing	95	58	55								55	
8	Site clearance and dismantle of hoarding	102	58	62									62
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	98	19	67	67								
2	Initial survey and erection of hoarding	98	19	68	68								
3.1	Excavation works (Bay 1)	97	22	65		65							
3.1	Excavation works (Bay 3)	97	24	65		65							
3.2	Excavation works (Bulky PME area)	99	17	70		70							
4	Installation of dowel bars and concrete works	103	19	72			72						
5.1	Pit by pit excavation works (Bay 2)	98	22	66				66					
5.2	Pit by pit excavation works (Bulky PME area)	99	17	70				70					
6	Installation of dowel bars and concrete works	102	19	71					71				
7	Back filling of top soil	81	19	50						50			
8	Construction of concrete staircase	103	19	72							72		
9	Landscape works	99	19	68								68	
10	Site clearance and dismantle of hoarding	102	19	71									71
			Total SPL, dB(A):		71	72	72	72	72	64	73	69	72
			Exceedance:		-	-	-	-	-	-	-	-	-

Appendix C Construction Noise Impact

Mitigated Scenario

NSR N2

Description Cherry Crest

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	98	53	58	58								
2	Initial survey and erection of hoarding	98	53	58		58							
3	Ground investigation works	99	53	60		60							
4	Take off existing masonry stone facing	95	53	56			56						
5	Installation of soil nails and raking drains	105	53	65				65	65	65			
6	Construction of soil nail head	104	53	65							65		
7	Reinstatement of existing masonry stone facing	95	53	56								56	
8	Site clearance and dismantle of hoarding	102	53	63									63
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	98	18	68	68								
2	Initial survey and erection of hoarding	98	18	68	68								
3.1	Excavation works (Bay 1)	97	15	68		68							
3.1	Excavation works (Bay 3)	97	29	63		63							
3.2	Excavation works (Bulky PME area)	99	17	70		70							
4	Installation of dowel bars and concrete works	103	18	73			73						
5.1	Pit by pit excavation works (Bay 2)	98	22	66				66					
5.2	Pit by pit excavation works (Bulky PME area)	99	17	70				70					
6	Installation of dowel bars and concrete works	102	18	72					72				
7	Back filling of top soil	81	18	51						51			
8	Construction of concrete staircase	103	18	73							73		
9	Landscape works	99	18	69								69	
10	Site clearance and dismantle of hoarding	102	18	72									72
			Total SPL, dB(A):		71	73	73	72	72	65	73	69	72
			Exceedance:		-	-	-	-	-	-	-	-	-

Appendix C Construction Noise Impact

Mitigated Scenario

NSR N3

Description No.1, U Lam Terrace

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	98	39	61	61								
2	Initial survey and erection of hoarding	98	39	61		61							
3	Ground investigation works	99	39	63		63							
4	Take off existing masonry stone facing	95	39	58			58						
5	Installation of soil nails and raking drains	105	39	68				68	68	68			
6	Construction of soil nail head	104	39	68							68		
7	Reinstatement of existing masonry stone facing	95	39	58								58	
8	Site clearance and dismantle of hoarding	102	39	65									65
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	98	24	65	65								
2	Initial survey and erection of hoarding	98	24	66	66								
3.1	Excavation works (Bay 1)	97	25	64		64							
3.1	Excavation works (Bay 3)	97	34	61		61							
3.2	Excavation works (Bulky PME area)	99	29	65		65							
4	Installation of dowel bars and concrete works	103	24	70			70						
5.1	Pit by pit excavation works (Bay 2)	98	29	63				63					
5.2	Pit by pit excavation works (Bulky PME area)	99	29	65				65					
6	Installation of dowel bars and concrete works	102	24	69					69				
7	Back filling of top soil	81	24	48						48			
8	Construction of concrete staircase	103	24	70							70		
9	Landscape works	99	24	66								66	
10	Site clearance and dismantle of hoarding	102	24	69									69
			Total SPL, dB(A):		69	70	71	71	72	68	72	67	71
			Exceedance:		-	-	-	-	-	-	-	-	-

Appendix C Construction Noise Impact

Mitigated Scenario

NSR N4

Description The Bellevue Place

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	98	34	62	62								
2	Initial survey and erection of hoarding	98	34	62		62							
3	Ground investigation works	99	34	64		64							
4	Take off existing masonry stone facing	95	34	60			60						
5	Installation of soil nails and raking drains	105	34	69				69	69	69			
6	Construction of soil nail head	104	34	69							69		
7	Reinstatement of existing masonry stone facing	95	34	60								60	
8	Site clearance and dismantle of hoarding	102	34	66									66
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	98	54	58	58								
2	Initial survey and erection of hoarding	98	54	59	59								
3.1	Excavation works (Bay 1)	97	57	57		57							
3.1	Excavation works (Bay 3)	97	63	56		56							
3.2	Excavation works (Bulky PME area)	99	60	59		59							
4	Installation of dowel bars and concrete works	103	54	63			63						
5.1	Pit by pit excavation works (Bay 2)	98	59	57				57					
5.2	Pit by pit excavation works (Bulky PME area)	99	60	59				59					
6	Installation of dowel bars and concrete works	102	54	62					62				
7	Back filling of top soil	81	54	41						41			
8	Construction of concrete staircase	103	54	63							63		
9	Landscape works	99	54	59								59	
10	Site clearance and dismantle of hoarding	102	54	62									62
			Total SPL, dB(A):		65	68	65	70	70	69	70	62	68
			Exceedance:		-	-	-	-	-	-	-	-	-

Appendix C Construction Noise Impact

Mitigated Scenario

NSR N5

Description Briar-Caine Co-Op Building

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	98	23	66	66								
2	Initial survey and erection of hoarding	98	23	66		66							
3	Ground investigation works	99	23	67		67							
4	Take off existing masonry stone facing	95	23	63			63						
5	Installation of soil nails and raking drains	105	23	72				72	72	72			
6	Construction of soil nail head	104	23	72							72		
7	Reinstatement of existing masonry stone facing	95	23	63								63	
8	Site clearance and dismantle of hoarding	102	23	70									70
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	98	66	56	56								
2	Initial survey and erection of hoarding	98	66	57	57								
3.1	Excavation works (Bay 1)	97	72	55		55							
3.1	Excavation works (Bay 3)	97	69	55		55							
3.2	Excavation works (Bulky PME area)	99	75	57		57							
4	Installation of dowel bars and concrete works	103	66	62			62						
5.1	Pit by pit excavation works (Bay 2)	98	70	56				56					
5.2	Pit by pit excavation works (Bulky PME area)	99	75	57				57					
6	Installation of dowel bars and concrete works	102	66	60					60				
7	Back filling of top soil	81	66	40						40			
8	Construction of concrete staircase	103	66	62							62		
9	Landscape works	99	66	58								58	
10	Site clearance and dismantle of hoarding	102	66	61									61
			Total SPL, dB(A):		67	70	65	73	73	72	73	64	70
			Exceedance:		-	-	-	-	-	-	-	-	-

Appendix C Construction Noise Impact

Mitigated Scenario

NSR N6

Description Island Christian Academy

Act No.	Main Construction Elements	SWL	Distance, m	SPL	Construction Period (Tentative)								
					2016				2017				
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					1	2	3	4	5	6	7	8	9
Feature No. 11SW-A/R94													
1	Site clearance, UU detection and preparation	98	68	56	56								
2	Initial survey and erection of hoarding	98	68	56		56							
3	Ground investigation works	99	68	58		58							
4	Take off existing masonry stone facing	95	68	53			53						
5	Installation of soil nails and raking drains	105	68	63				63	63	63			
6	Construction of soil nail head	104	68	63							63		
7	Reinstatement of existing masonry stone facing	95	68	53								53	
8	Site clearance and dismantle of hoarding	102	68	60									60
Feature No. 11SW-A/FR218													
1	Site clearance, UU detection and preparation	98	58	58	58								
2	Initial survey and erection of hoarding	98	58	58	58								
3.1	Excavation works (Bay 1)	97	56	57		57							
3.1	Excavation works (Bay 3)	97	69	55		55							
3.2	Excavation works (Bulky PME area)	99	59	59		59							
4	Installation of dowel bars and concrete works	103	58	63			63						
5.1	Pit by pit excavation works (Bay 2)	98	62	57				57					
5.2	Pit by pit excavation works (Bulky PME area)	99	59	59				59					
6	Installation of dowel bars and concrete works	102	58	62					62				
7	Back filling of top soil	81	58	41						41			
8	Construction of concrete staircase	103	58	63							63		
9	Landscape works	99	58	59								59	
10	Site clearance and dismantle of hoarding	102	58	62									62
			Total SPL, dB(A):		62	64	63	65	65	63	66	60	64
			Exceedance [1]:		-	-	-	-	-	-	-	-	-

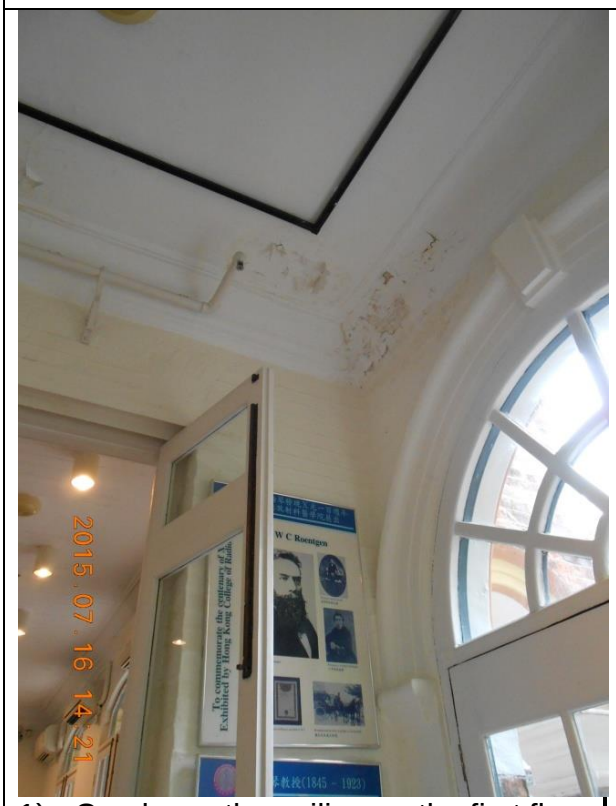
Note:

[1] As advised by Island Christian Academy (N6), there would be an international school assessment held between mid-September and early October 2016. The international school assessment has been considered as examination in the noise assessment

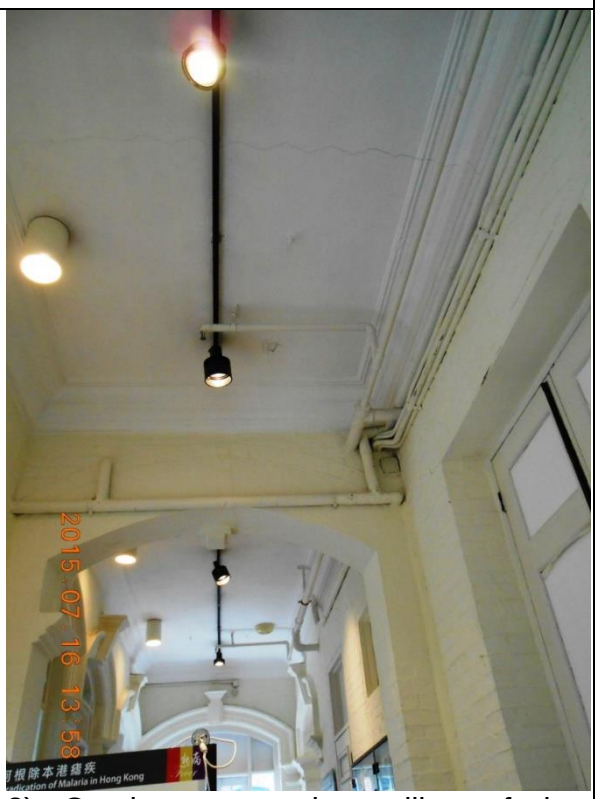
APPENDIX D

Photos of Cultural Heritage Site Inspection

Main Building of the Hong Kong Museum of Medical Sciences



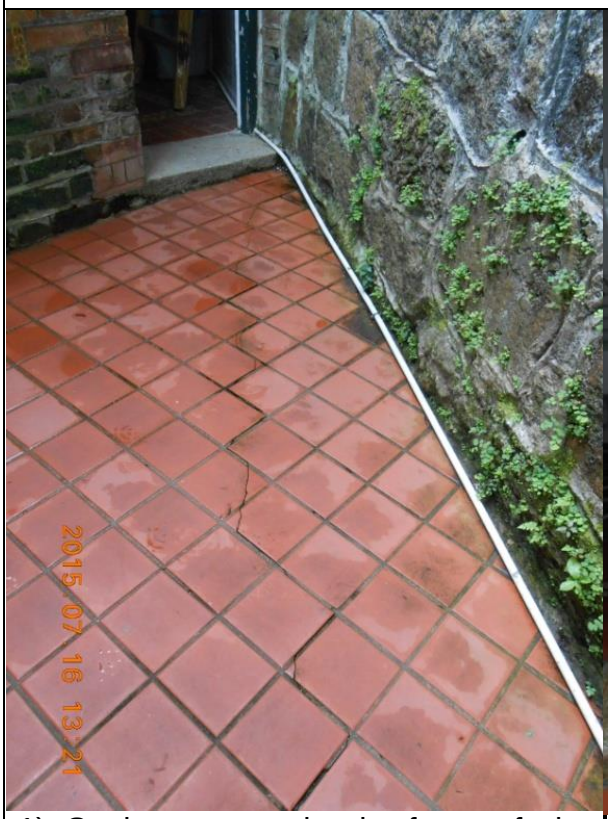
1) Cracks on the ceiling on the first floor



2) Cracks across the ceiling of the hallway on the ground floor

3) Cracks on wall above the door on the ground floor

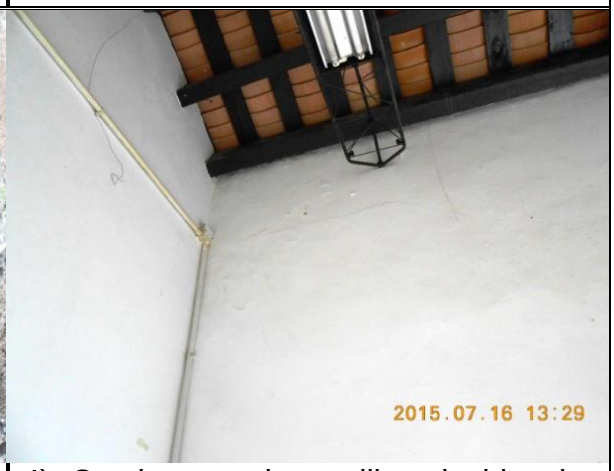
Annex Block of the Hong Kong Museum of Medical Sciences



1) Settlement cracks in front of the eastern corner of the area enclosed by the Annex Block and Feature No. 11SW-A/R94

2) Cracks on the external brick wall of the Annex Block

3) Wall cracks on the Annex Block adjacent to Feature No. 11SW-A/R94



4) Cracks on the ceiling inside the Annex Block

Outdoor Area of the Hong Kong Museum of Medical Sciences

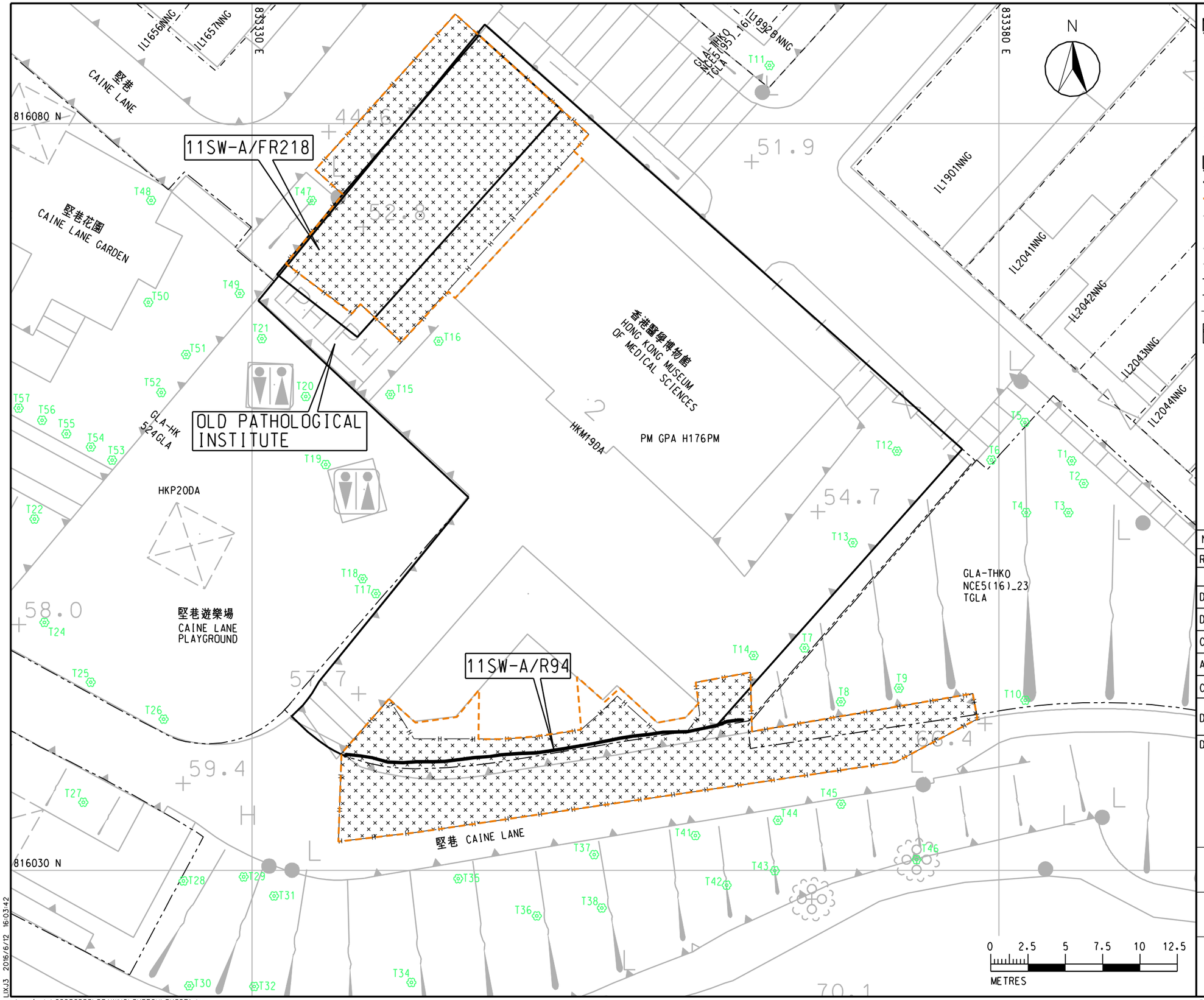
1) Crack on the fence wall next to Feature No. 11SW-A/R218, south to the lawn of the Main Building of the Hong Kong Museum of Medical Sciences

2) Dislocated upper compartment of the western gate post by Caine Lane

3) Eroded/damaged upper compartment of the eastern gate post by Caine Lane

APPENDIX E

Location and Photos of Existing Trees



NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, STANDARD DRAWINGS, THE SPECIFICATIONS AND INSTRUCTIONS ISSUED BY THE ENGINEER.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
3. ALL LEVELS ARE IN METRES ABOVE P.D.

LEGEND:

- FEATURE BOUNDARY
- PROJECT BOUNDARY
- 70 — EXISTING CONTOUR LINE
- +70.1 EXISTING GROUND LEVEL
- EXISTING SLOPE
- LICENCED LOT BOUNDARY
- PRIVATE LOT BOUNDARY
- PROPOSED HOARDING
- WORKS AREA
- EXISTING TREE

No.	Date	Description	Initial
REVISION			

	Name	Date
Designed	HYYL	01/16
Drawn	LT	01/16
Checked	ACCK	01/16
Approved	TCCT	01/16
Contract No.	GE/2013/35	-
Drawing No.	SK3071	01/16

Drawing Title

Feature No. 11SW-A/R94 AND 11SW-A/FR218
Hong Kong Museum of Medical Science, No. 2 Caine Lane, Mid-levels, Hong Kong
LOCATIONS OF TREES

GEOTECHNICAL ENGINEERING OFFICE

CEDD Civil Engineering and Development Department

AECOM

PART PRINT OF SURVEY SHEET NO. : 11SW8C

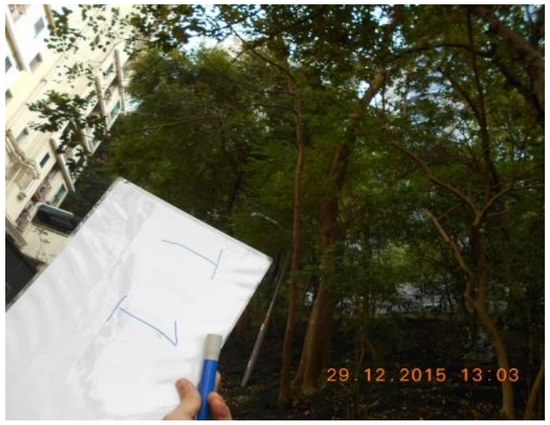
LXJ3 2016/6/12 16:03:42

p:\projects\60283888\DRAWING\SKETCH\SK3071.dgn

Agreement No. CE 24/2012 (GE): Landslip Prevention and Mitigation Programme, 2012, Package A,
Landslip Prevention and Mitigation Works - Investigation, Design and Construction

Feature No. 11SW-A/R94 & FR218

Tree Photo Date: December 2015

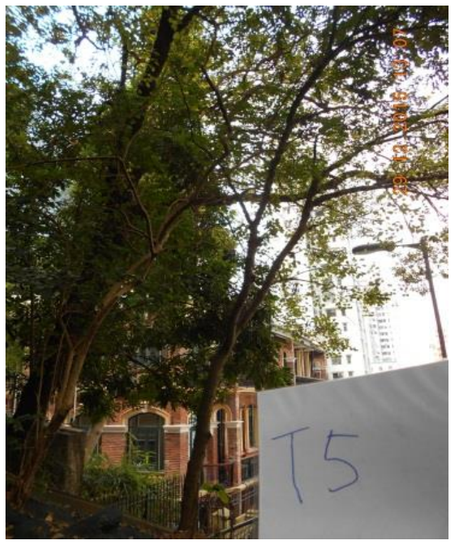


T1

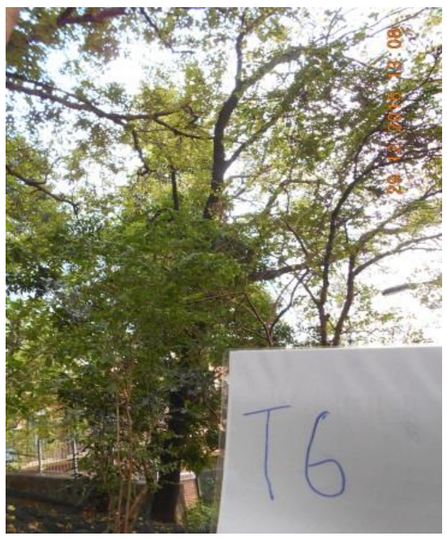
T2

T3

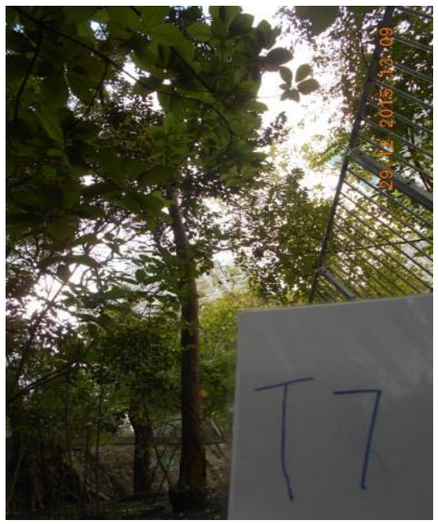
T4



T5



T6



T7

T8

Agreement No. CE 24/2012 (GE): Landslip Prevention and Mitigation Programme, 2012, Package A,
Landslip Prevention and Mitigation Works - Investigation, Design and Construction

Feature No. 11SW-A/R94 & FR218

Tree Photo Date: December 2015

T9

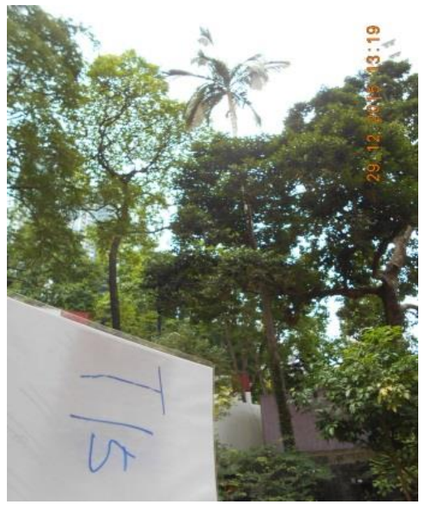
T10

T11

T12

T13

T14



T15

T16

Agreement No. CE 24/2012 (GE): Landslip Prevention and Mitigation Programme, 2012, Package A,
Landslip Prevention and Mitigation Works - Investigation, Design and Construction

Feature No. 11SW-A/R94 & FR218

Tree Photo Date: December 2015

T17

T18

T19

T20

T21

T22

T24

T25

Tree Photo Date: December 2015

TS08

T26

T27

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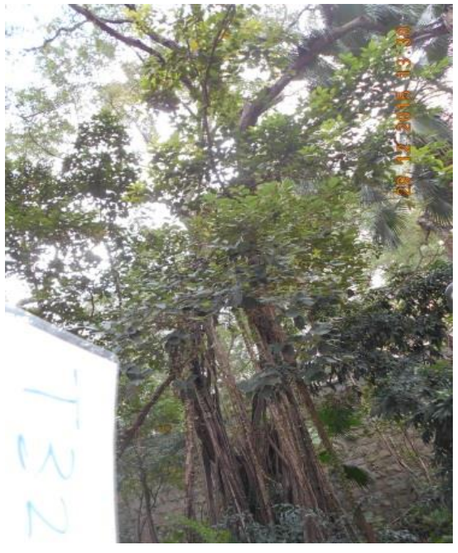

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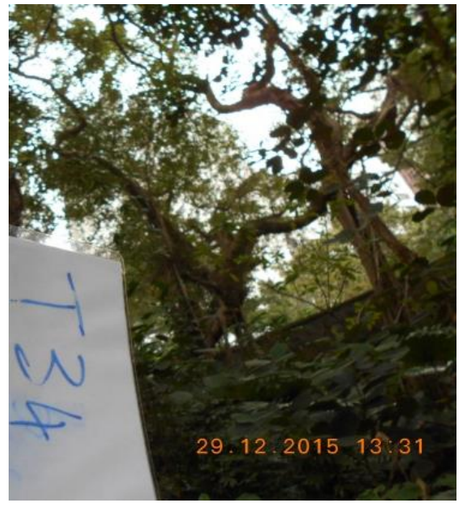

T34

Tree Photo Date: December 2015

T35

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Feature No. 11SW-A/R94 & FR218

Tree Photo Date: December 2015

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Tree Photo Date: December 2015

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APPENDIX F

Photographs of Representative Air / Noise Sensitive Receivers

Appendix F
Photographs of Representative Air / Noise Sensitive Receivers

A1 / N1 Silver Jubilee Mansion

A2 / N2 Cherry Crest

A3 / N3 No.1, U Lam Terrace

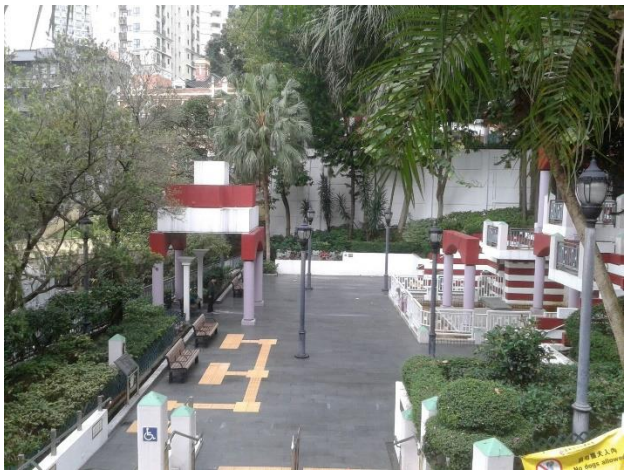
A4 / N4 The Bellevue Place

A5 / N5 Briar-Caine Co-Op Building

A6 Hong Kong Museum of Medical Sciences

N6 Island Christian Academy

A7 Caine Lane Playground

	
A8 Caine Lane Garden	A9 Caine Road Garden