路政署
HIGHWAYS DEPARTMENT
主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

ERM

Environmental Permit No. EP-457/2013/C

Central Kowloon Route

Independent Environmental Checker Verification

Works Contract:	**Ho Man Tin Access Shaft (HY/2014/09)**

Reference Document/Plan

~~Document~~/Plan to be ~~Certified~~/ Verified:	Construction Noise Mitigation Measure Plan
Date of Report:	3 April 2018 (HMTS/CNMMP/002 Rev. E)
Date received by IEC:	12 April 2018

Reference EP Condition

Environmental Permit Condition: 2.9

To further reduce the air-borne construction noise impacts on Yau Ma Tei Catholic Primary School (Hoi Wang Road), Tak Cheong Building, Prosperous Garden Block 1, The Coronation Tower 1, Ko Fai House of Kwun Fat Court, Grand Waterfront Tower 3 and Hang Chien Court Block J, the Permit Holder shall, no later than one month before the commencement of construction of the corresponding component(s) of the Project, submit to the Director for approval four hard copies and one electronic copy of an updated Construction Noise Mitigation Measure Plan (CNMMP). The plan shall include:-

(a) a schedule of construction works to be carried out at the works areas of the Project within 300m from the NSRs;

(b) an updated construction methodology of the construction works;

(c) an updated powered mechanical equipment (PME) list for the construction works;

(d) an updated proposal of air-borne construction noise mitigation measures for the Noise Sensitive Receivers as mentioned above, including the provision of noise barriers, enclosures;

(e) other initiatives proposed by the Permit Holder; and

(f) an updated prediction of noise levels in accordance with the above updated information and mitigation proposals in place.

Before submission to the Director, the CNMMP shall be certified by the ET and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report. The approved CNMMP shall be fully and properly implemented.

IEC Verification

I hereby verify that the above referenced ~~document~~/plan complies with the above referenced condition of EP-457/2013/C.

Ms Mandy To

Independent Environmental Checker

Date: 18 April 2018

Our ref: 0436942_IEC Verification Cert_HMTS_CNMMP_20180418.docx

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Nishimatsu Construction Co. Ltd.

Central Kowloon Route Contract HY/2014/09
Ho Man Tin Access Shaft

Construction Noise Mitigation Measure Plan
HMTS/CNMMP/002

Rev. E

Certified by: Kevin W. M. Li

Position: Environmental Team Leader

Date: 12th April 2018

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NISHIMATSU CONSTRUCTION CO.,LTD.

Central Kowloon Route Contract HY/2014/09

Ho Man Tin Access Shaft

CONSTRUCTION NOISE MITIGATION MEASURE PLAN

Document No.: HMTS/CNMMP/002 Rev. E

Prepared by:	Leo Wong / Environmental Officer	03 April 2018 date
Approved by:	Jim Ko / Site Agent	03 April 2018 date
Approved by:	O. Iwata / Project Manager	03 April 2018 date

REVISION HISTORY:

Revision	Effective Date	Section	Summary of Revision
-	December 2017	All	Issued for Approval
A	09 January 2018	General Text 1.15, 5.2 Table 8 & 9 Appendix D	Amendments made according to the IEC's and ET's comments given via an email dated on 05 and 08 January 2018.
B	12 January 2018	Revision History S1.13, S1.1.4, S1.1.6, S1.1.7, S2.2, S2.3, S3.2.1 to S3.2.6, S4.1, S4.3, S5.1.1, S5.2.2, S6.1 Figure 2 Table 2, Table 5, Table 6, Table 8, Table 9 Appendix C, D, E, F	Amendments made according to the IEC's comments given on 11 January 2018.
C	15 January 2018	S1.1.3, S1.1.6, S5.1.1, S5.2, S5.2.1, S5.2.2 Table 5, Table 6, Table 7, Table 9	Amendments made according to the IEC's comments given on 15 January 2018.
D	12 February 2018	S5.1.1, S5.1.5, S5.1.6, Table 2, Appendix C, G	Amendments made according to the EPD's comments given via a fax dated on 09 February 2018.
E	03 April 2018	S3.2.1, S3.2.4, S.5.1.1, S5.1.3, S5.1.4, S5.1.5, Table 2, Table 6, Table 7, Table 8. Appendix B, C, D	Amendments made according to the EPD's comments given via a fax dated on 15 March 2018.

CONTENT LIST

TABLES

APPENDICES

1 INTRODUCTION

1.1 Project Description

1.1.1 Central Kowloon Route (CKR) was proposed in the West Kowloon Reclamation Transport Study that a route in tunnel should be developed to link the West Kowloon Highway since 1990.

1.1.2 Highways Department (HyD) commissioned the Design and Construction Assignment for the Central Kowloon Route in June 1998. CKR is a dual 3-lane trunk road across central Kowloon linking the West Kowloon in the west and the proposed Kai Tak Development (KTD) in the east. The CKR will be about 4.7km long with an underground tunnel section of about 3.9km long, in particular, there will be an underwater tunnel of about 370m long in Kowloon Bay to the north of the To Kwa Wan Typhoon Shelter. It will connect the West Kowloon Highway at Yau Ma Tei Interchange with the road network at Kowloon Bay and the future Trunk Road T2 at KTD which will connect to the future Tseung Kwan O – Lam Tin Tunnel (TKO-LTT) and Cross Bay Link (CBL). CKR, Trunk Road T2 and TKO-LTT will form a strategic highway link, namely Route 6, connecting West Kowloon and Tseung Kwan O. Consultancy studies for Trunk Road T2, TKO-LTT and CBL have been commissioned by CEDD. In addition, 3 ventilation buildings, which will be located in Yau Ma Tei, Ho Man Tin and ex-Kai Tak airport area, are proposed to ensure acceptable air quality within the tunnel.

1.1.3 The Central Kowloon Route – Design and Construction Environmental Impact Assessment Report (Register No.: AEIAR-171/2013) was approved with conditions by the Environmental Protection Department (EPD) on 11 July 2013. An Environmental Permit (EP-457/2013) was issued on 9 August 2013. Variations of EP (VEP) was subsequently applied for and the latest EP (EP-457/2013/C) was issued by EPD on 16 January 2017.

1.1.4 The construction of the CKR had been divided into different sections. This Construction Noise Mitigation Plan (CNMMP) for Contract No. HY/2014/09 - Ho Man Tin Access Shaft (HMTS) covers part of the construction activities located at Ho Man Tin under the EP which includes:

- Central Portion
  - i. Decant of Housing Authority Mock Up Centre and Site Establishment
  - ii. Diaphragm Walls Construction
  - iii. Excavation of Vertical Access Shaft approximately 100m deep and 21m internal diameter

The site location of HMTS is shown in Figure 1.

1.1.5 Foundation works for Ventilation Building and Construction of Ventilation Buildings are excluded in the scope of works in this Contract. These works will be included in other Contracts of Central Kowloon Route.

1.1.6 Condition 2.9 of the Environmental Permit No. EP-457/2013/C for Central Kowloon Route stipulated that to further reduce the air-borne construction noise impacts on Ko Fai House of Kwun Fai Court (NSR), the Permit Holder shall, no later than one month before the commencement of the construction of the corresponding component(s) of the Project, submit to

the Director for approval four hard copies and one electronic copy of an updated Construction Noise Mitigation Measure Plan (CNMMP). The plan shall include:

(a) A schedule of construction works to be carried out at the works areas of the Project within 300m from the NSRs;
(b) An updated construction methodology of the construction works;
(c) An updated powered mechanical equipment (PME) list for the construction works;
(d) An updated proposal of air-borne construction noise mitigation measures for the Noise Sensitive Receivers as mentioned above, including the provision of noise barriers, enclosures;
(e) Other initiatives proposed by the Permit Holder; and
(f) And updated prediction of noise levels in accordance with the above updated information and mitigation proposals in place.

1.1.7 The Plan will be reviewed once the change of construction methods or materials. The updated list of Powered Mechanical Equipment (PME) in the Table 2 has represented the worst-case scenario which is reasonable and practicable for completing the Works Contract within the scheduled timeframe.

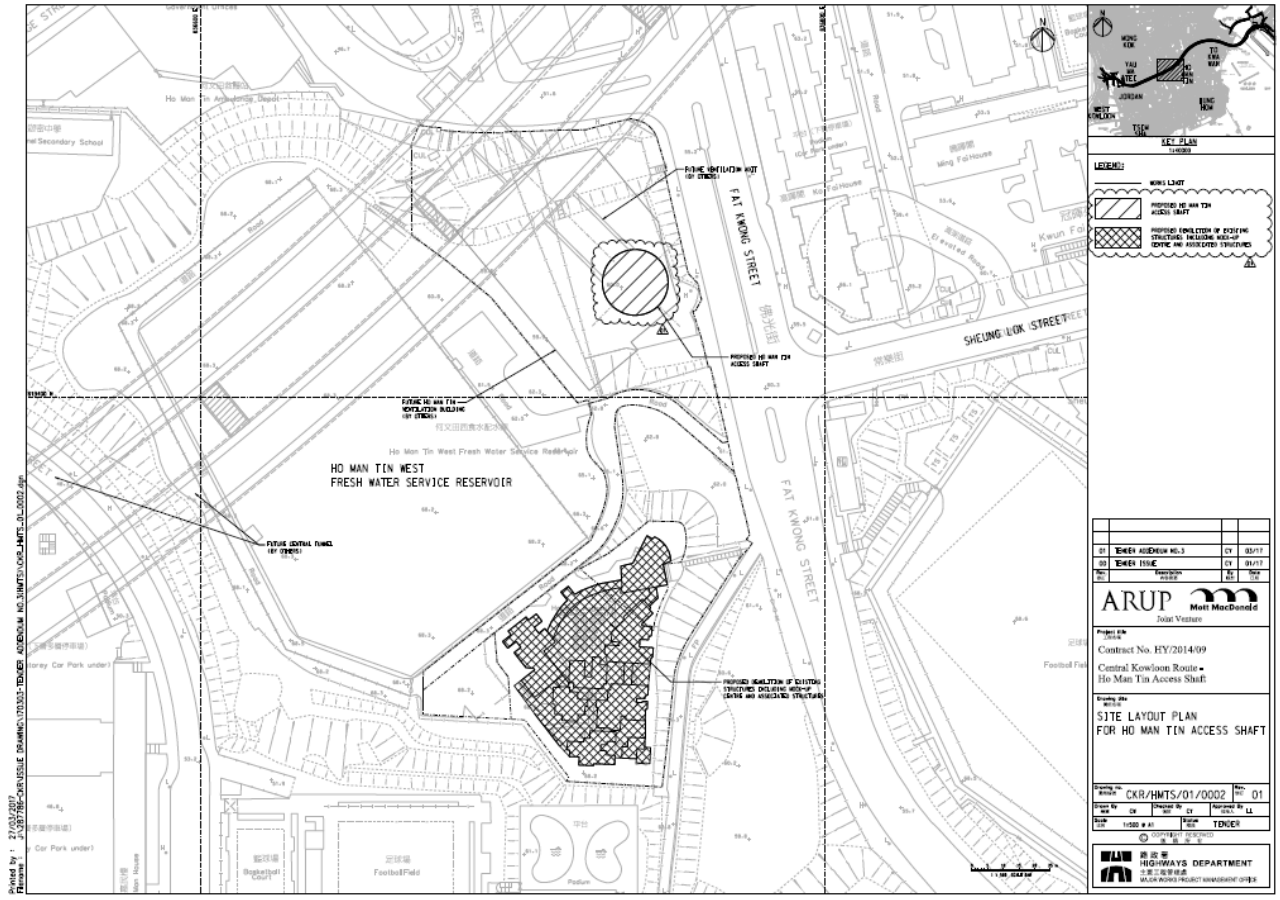

Figure 1: Site Layout Plan

2 CONSTRUCTION WORKS/ACTIVITIES OF THE PROJECT

2.1 The construction works would commence in the February 2018 and expected to complete in 2019. Table 1 summarises the major construction tasks to be carried out, the programme of each construction task in shown in Appendix B.

Table 1: Summary of Construction Tasks for the Works

Item	Major Construction Task
1	Decant of Housing Authority Mock Up Centre and Site Establishment
2	Diaphragm Walls Construction
3	Excavation of Vertical Access Shaft

* Foundation works for Ventilation Building and Construction of Ventilation Buildings are excluded in the scope of work in this Project.

2.2 The proposed construction methodology is generally following that presented in the Chapter 3 of the approved CKR EIA Report. The construction tasks are divided in to 3 tasks as mentioned in the Table 1. Decant of HA Mock Up Centre will be dismantled the unused parts such as windows, A/C machines, doors, pipes, metal fences, and etc, before structure breaking. D-walls structure will be constructed by in-situ concreting. The vertical access shaft section between ground surface to approximate 100m deep will be construction by soil excavation method for the first 50m, and the other 50m will be constructed by drill and blast method.

2.3 According to the construction programme, the excavation of vertical access shaft would be divided into various sub-tasks at different levels and depths. This assessment is prepared and based on the updated plant inventory and construction programme (see Appendix C).

2.4 As suggested in the EIA studies, quiet plants and practicable utilisation rates will be used for the construction tasks in accordance with the Appendix 5.4 of the EIA Report to minimise the noise impact to the nearby NSRs. The PMEs used in the project are summarised in Table 2.

Table 2: Summary of PMEs

PME	Reference	SWL, dB(A)*
Air compressor, air flow > 10m3/min and <= 30m3/min (100%)	CNP002	102
Breaker, Excavator Mounted (Hydraulic) (70%) or (90%)	BS5228 Table D.8/13	108 or 110
Concrete Crusher, Excavator Mounted (90%)	CNP055	103
Bar Bender and Cutter (70%)	CNP021	88
Concrete Lorry Mixer (50%)	CNP044	106
Dump Truck with Grab (50%)	CNP069	102
Dump Truck, 5.5 tonne < gross vehicle weight ≤ 38 tonne	Other PME	105
Generator, QPME Noise Label 101dB(A) (100%)**	QPME ID Code EPD-02845**	101**
Generator, silenced, 75 dB(A) at 7 m (100%)	CNP102	100
Crane/Tracked Mobile (50%)	CNP048	109
Excavator/Loader, Wheeled/Tracked, QPME Noise Label 99dB(A) (70%)***	QPME ID Code EPD-01145***	97***
Excavator/Loader, Wheeled/Tracked (50%)	CNP081	109
Water Pump, Submersible (Electric) (100%)	CNP283	85
Piling, Diaphragm Wall Bentonite Filtering Plant (100%)	CNP162	105

Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90
Water pump (electric) (100%)	CNP281	88
Ventilation Fan with Silencer (100%)	CNP241	108
Shotcreting Machine (100%)	BS5228 Table D.6/13	108
Concrete mixer (electric) (100%)	CNP045	96
Rock drill, crawler mounted (hydraulic) (70%)	CNP182 or SIL EIA#	121

*Noise data refers to the Quiet Plant in the Appendix 5.4 and the Appendix 5.6a of EIA Report, the BS5228 - Code of practice for noise and vibration control on construction and open sites, and the Technical Memorandum on Noise from Construction Work Other Than Percussive Piling (GW-TM) under the Noise Control Ordinance

Reference to Approved South Island Land (East) EIA

** QPME Nissha – NES400EM QPME ID Code EPD-02845, or other brands / series of this kind of PME with same or lower SWL will be adopted.

*** QPME Caterpillar - 320D QPME ID Code EPD-01145, or other brands / series of this kind of PME with same or lower SWL will be adopted.

2.5 A more detailed of the each construction activity conducted in this Project is shown in the noise assessment in the Appendix C and D.

3 ASSESSMENT CRITERIA AND METHODOLOGY

3.1 Assessment Criteria

3.1.1 Noise impacts generated by the construction of this Project are assessed in accordance with the criteria given in the Technical Memoranda (TMs) under the Noise Control Ordinance, and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The construction noise standards are presented in Table 3.

Table 3: Daytime Construction Noise Criteria

Use	Noise Level in Leq (30-min), dB(A)
Residential	75
Educational Institute (Examination Period)	70 (65)

3.2 Assessment Methodology

3.2.1 The construction noise assessment has been carried out in accordance with the methodology used in the approved CKR EIA Report. The individual work sites and relative distance between the NSRs are the same as that adopted in the CKR EIA Report.

3.2.2 The percentage on-time for each PME has been estimated individually for each construction activity to ensure practicality and is consistent with the assumptions made in the CKR EIA Report.

3.2.3 NCC has confirmed that the programme and plant inventory are reasonable and practicable for completing the Works Contract HY/2014/09 – Ho Man Tin Access Shaft within the scheduled timeframe.

3.2.4 All mitigation measures and their effectiveness proposed in the CKR EIA Report including movable noise barrier and noise enclosure for relevant PMEs have been considered in this CNMMP as shown in the Table 2. An acoustic fabric will be proposed to adopt by NCC for relevant PMEs with better effectiveness and its sound reduction test report is shown in the Appendix F and G.

3.2.5 To predict the noise level, PME items are divided into groups required for each discrete construction task. The objective is to identify the worst case scenario representing those items of PME that would be in use concurrently at any given time. The sound pressure level of each construction task at representative NSRs is calculated based on the number of plant and the distance from the noise assessment points. If there are concurrent construction tasks, the noise levels at representative noise assessment points are predicted by adding up the sound pressure levels of all concurrent construction tasks.

3.2.6 All construction activities will be operated in sequence rather than simultaneously.

3.2.7 A positive 3 dB(A) façade correction is added to the predicted noise levels in order to account for the façade effect at each noise assessment point. Noise impacts at the nearest sensitive facades of the residential buildings/educational institutes to the source positions are assessed.

3.2.8 Cumulative impact assessment would account all other concurrent works within 300m study area of the NSRs described in the EIA Reports (Register No.: AEIAR-171/2013). However, there is no other concurrent work has been identified within the study area.

4 NOISE SENSITIVE RECEIVERS

4.1 Based on the EP condition, Ko Fai House of Kwun Fai Court is identified as Representative NSRs in this assessment, however, the other NSRs identified in the EIA Report (Register No.: AEIAR-171/2013) will also be assessed in this Plan. The description of these NSRs relevant to the Contract No. HY/2014/09 – Ho Man Tin Access Shaft are shown in the Table 4 and 5.

Table 4: Summary of Noise Sensitive Receivers

NSR ID	Description	Landuse*	No. of Storey
M-N1	Kar Man House, Oi Man Estate	R	6
M-N2	Carmel on the Hill	R	25
M-N3	SKH Tsoi Kung Po Secondary School	E	8
M-N4	Man Fuk House Block A	R	15
M-N5	Cascades Block A	R	18
M-N6	Ko Fai House, Kwun Fai Court	R	9
M-P2	Planned Residential Area B (Planned)	R	-
M-P3	Planned Residential Area B (Planned)	R	-

*Note – R – Residential; E – Educational

Table 5: Summary of Predicted Noise Levels in the Approved EIA Report (Mitigated)

NSR ID	NSR Description	Uses	Criterion [1] dB(A)	Max. Mitigated Noise Level [2] dB(A)	Exceedance [3] dB(A) month (1 – 5 dB(A))
Central Portion					
M-N1	Kar Man House, Oi Man Estate	R	75	66	-
M-N2	Carmel on the Hill	R	75	63	-
M-N3	SKH Tsoi Kung Po Secondary School	E	70 (65)	**70**	1 month Jan/Feb 18 (5dB(A)) 2 month Jun 18 & Jan 19 (1-4dB(A))
M-N4	Man Fuk House Block A	R	75	63	-
M-N5	Cascades Block A	R	75	63	-
M-N6	Ko Fai House, Kwun Fai Court	R	75	73	-
M-P2	Planned Residential Area B (Planned)	R	75	73	-
M-P3	Planned Residential Area B (Planned)	R	75	75	-

[1] Values in parentheses indicate the noise criterion during examination period of educational institution.
[2] Bolded values mean exceedance of the relevant noise criteria.
[3] The normal examination period of M-N3 are scheduled in January and June. In 2018, there are 2 days examinations will be held on 01 and 02 February 2018. * In reference to the Appendix 5.6F of the CKR EIA Report.

4.2 While Ultima (M-P2 / M-P3) is a newly developed residential building located within 300m from the south of the construction site, where is considered as a NSR location (M-P3) to be assessed.

4.3 The locations of NSRs relevant to this Contract identified in the Appendix 5.3 of the CKR EIA Report is shown in the Figure 2.

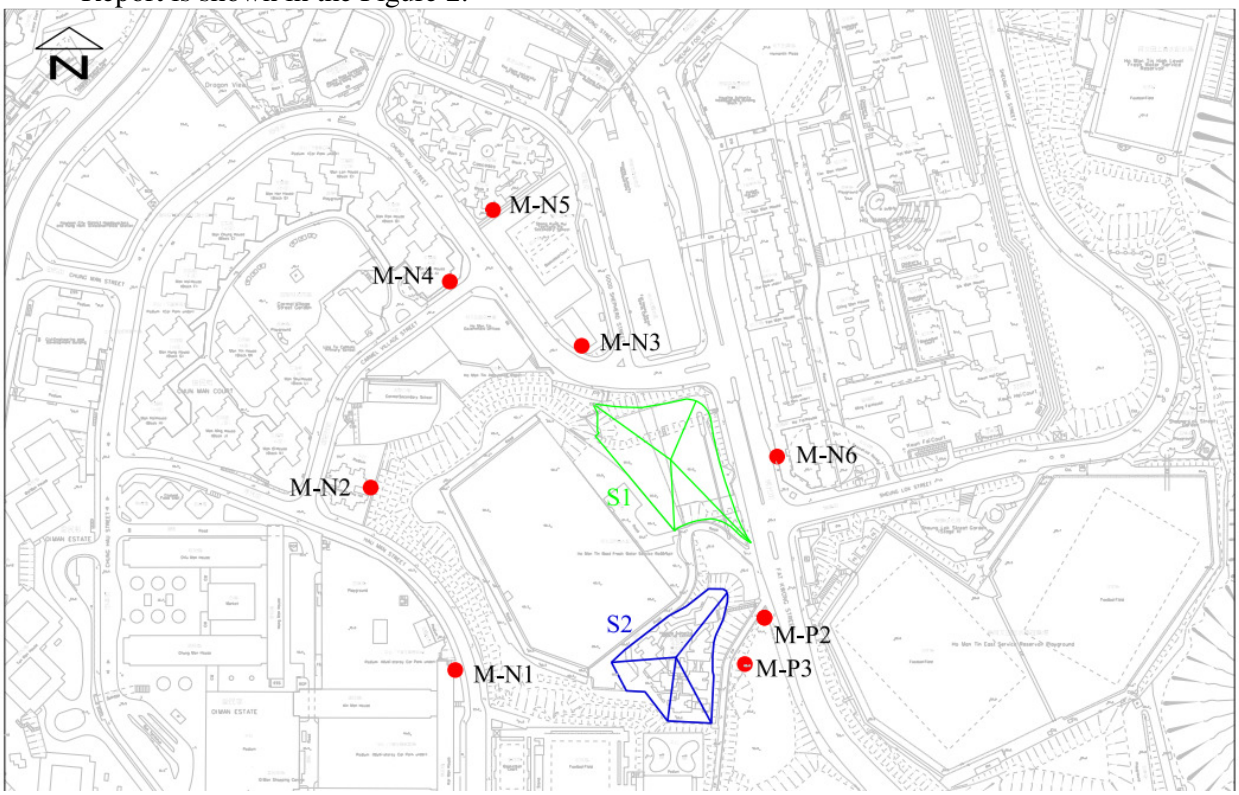

Figure 2: Locations of NSRs (Central Portion)

5 ASSESSMENT OF COSNTRUCTION NOISE IMPACT

5.1 Mitigation Measures

5.1.1 The mitigation measures proposed in the approved EIA Report of CKR have been adopted, which are movable barrier and noise cover. The adopted mitigation measures are summarized in the Table 6. As this worksite is limited, to achieve better result of noise reduction, NCC will propose movable barrier and noise cover with sound reduction of 5dB(A) and 15dB(A) as proposed mitigation measures in this Contract, respectively. The proposed noise cover has been adopted as a solid enclosure to mitigate noise generated from construction activities for the shaft and tunneling wall construction in MTRC South Island Line (East) Contract 902 - Nam Fung Tunnel and Ventilation Buildings.

Table 6: Summary of PMEs

PME	Mitigation Measures Proposed	Noise Reduction, dB(A)*
Air compressor, air flow > 10m3/min and <= 30m3/min (100%)	Noise Cover	15
Breaker, Excavator Mounted (Hydraulic)	Movable Barrier / Noise Cover	5 / 15
Concrete Crusher, Excavator Mounted	Movable Barrier	5
Bar Bender and Cutter	Movable Barrier	5
Concrete Lorry Mixer	Movable Barrier	5
Dump Truck with Grab	Movable Barrier	5
Dump Truck (24 Ton)	Movable Barrier	5
Generator	Movable Barrier / Noise Cover	5 / 15
Mobile/Tracked Crane	Movable Barrier	5
Excavator/Loader, Wheeled/Tracked Ground Surface	Movable Barrier	5
Excavator/Loader, Wheeled/Tracked Access Shaft	Noise Cover	15
Piling, Diaphragm Wall Bentonite Filtering Plant	Movable Barrier	5
Piling, diaphragm wall, hydraulic extractor	Movable Barrier	5
Ventilation Fan with Silencer	Noise Cover	15
Shotcreting Machine	Noise Cover	15
Concrete mixer	Noise Cover	15
Rock drill, crawler mounted (hydraulic)	Noise Cover	15

*Noise level reduction of 5dB(A) was adopted for movable barrier for mobile plant and stationary plant operating on ground surface. Noise cover was also adopted with 15dB(A) for PMEs operating inside the noise cover or under the access shaft, and its design information refer to the Appendix E.

5.1.2 The predicted noise levels at several NSRs after the implementation of mitigation measures is relatively lower than the predicted noise levels in the approved CKR EIA Report, which are described in the Table 6. In such mitigated scenario, NCC will propose a tailor-made noise cover upon the access shaft when the shaft excavation reaches at 50m deep rock level as an alternative mitigation measure instead of the “Large Full Enclosure for Mucking Out Points”. This noise cover is designed to have better sound reduction than 15dB(A) of large full enclosure as specified in the Section 5.4.1 of the EIA Report, and it smaller size will bring less visual impact to the

neighbourhood. The detailed of the proposed noise cover as given in the Section 5.1.3 and the Appendix E.

5.1.3 The proposed noise cover is a solid enclosure and constructed with sandwich panels, which shall cover on the top of approximate 1.5 meter high concrete side wall. The sandwich panels shall be comprised of outer shell and infill sound-absorbent material to achieve the noise reduction criteria in this Contract. The proposed sound-absorbent material shall be 50mm in thickness with surface density of 60-80 kg/m2 or equivalent standard materials. The inter lining of the sandwich panel shell is made of 1mm perforated G.I. sheet. The sandwich panels together with the associated supporting steel frame will set on the top of concrete side wall.

5.1.4 There is an opening oriented to the WSD reservoir, which will be used for the air intake/outtake for ventilation purpose. Ventilation fan equipped with silencer shall be operating inside the noise cover and its exhaust shall be oriented away from any NSR identified in this plan. The direction of the WSD reservoir is ideal where is far from the construction site. In addition to the noise reduction during the operation, acoustic louvres are designed to be installed at the air exhaust of the ventilation fan, and regular maintenance shall also be implemented.

5.1.5 The predicted noise levels at several NSRs after the implementation of quiet plants and mitigation measures, including noise cover and movable barriers are shown in the Table 7.

Table 7: Summary of Predicted Noise Levels (Mitigated)

NSR ID	NSR Description	Uses	Criterion [1] dB(A)	Mitigated Noise Level [2] dB(A)	Exceedance dB(A)	Exceedance Duration / Months [3]
Central Portion						
M-N1	Kar Man House, Oi Man Estate	R	75	59-64	-	-
M-N2	Carmel on the Hill	R	75	59-62	-	-
M-N3	SKH Tsoi Kung Po Secondary School	E	70 (65)	68-**(69)**	- (4)	3 months Jun 2018 Jan & Jun 2019
M-N4	Man Fuk House Block	R	75	60-62	-	-
M-N5	Cascades Block A	R	75	59-61	-	-
M-N6	Ko Fai House, Kwun Fai	R	75	70-71	-	-
M-P3	Planned Residential Area B (Ultima)	R	75	63-74	-	-

[1] Values in parentheses indicate the noise criterion during examination period of educational institution.
[2] Bolded values mean exceedance of the relevant noise criteria.
[3] In general practice, examination period should only last for 2 weeks. By scheduling the construction works to avoid the examination period, the adverse residual impact should be minimised.

5.1.6 Examination periods of SKH Tsoi Kung Po Secondary School would be normally held in January and June and they are considered to exceed the noise criterion for school examination periods. To further reduce the noise impacts, it is proposed the NCC should closely liaise with the school to avoid noisy construction works during examination period such as minimise the number of PME operation and reschedule the construction time or period.

5.1.7 According to the construction programme, diaphragm wall construction, shaft excavation and less noisy works are expected to be carried out during the examination periods of SKH Tsoi Kung Po Secondary School. Noise monitoring will be carried out at the school under the EM&A programme. In case of non-compliance with the construction noise criteria, more frequent monitoring will be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or demonstrated to be unrelated to the construction activities

5.1.8 The following general noise abatement practices will be adopted by the NCC for this Contract during the examination periods of SKH Tsoi Kung Po Secondary School:

- Implement good site practice, re-schedule construction activities and improve construction programme to limit noise emissions at the sources;
- Movable noise barrier shall be provided for movable PMEs (i.e. excavator, loader, crane, breaker etc.) as far as possible;
- Plant known to emit noise strongly in one direction, shall, where possible, be orientated so that the noise is directed away from the school;
- Locate mobile plant as far away from the schools as possible;
- Close all hoods, cover panels and inspection hatches of powered mechanical plant such as generators, air compressors etc during operation;
- Throttle down or turn off idle equipment; and
- QPME (e.g. generator, road roller, and roller vibratory) will be deployed as far as practicable.

5.2 Noise Assessment Results

5.2.1 The air-borne construction noise impacts for the construction activities under the Works Contract HY/2014/09 have been assessed and summarised in the Table 8. The potential noise impact at the educational institution NSR M-N3 in the Table 9. As shown in the Table 8 and 9, with the implementation of quiet plant, temporary movable noise barrier, noise cover, and acoustic fabric for the PMEs, and scheduling of PMEs operation as far as possible. The proposed mitigation measures described above are included in the assessment and, as such, only the mitigated scenario has been presented.

Table 8: Updated Mitigated Construction Noise Impact at Identified NSRs

NSR	Noise Criterion dB(A)	EIA Prediction			CNMMP Prediction		
		Max Noise Level, dB(A)	Exceedance Duration (Month)		Max Noise Level, dB(A)	Exceedance Duration (Month)	
			1 – 4 dB(A)	5 dB(A)		1 – 4 dB(A)	5 dB(A)
M-N1	75	66	-	-	64	-	-
M-N2	75	63	-	-	62	-	-
M-N3	70	70	-	-	69	-	-
M-N4	75	63	-	-	62	-	-
M-N5	75	63	-	-	61	-	-
M-N6	75	73	-	-	71	-	-
M-P3	75	75	-	-	74	-	-

Table 9: Updated Mitigated Construction Noise Impact (Educational Institution during Examination Period)

NSR	Noise Criterion dB(A)	EIA Prediction			CNMMP Prediction		
		Max Noise Level, dB(A)	Exceedance Duration (Month)		Max Noise Level, dB(A)	Exceedance Duration (Month)	
			1 – 4 dB(A)	5 dB(A)		1 – 4 dB(A)	5 dB(A)
M-N3	65	70	2 Jun 18 Jan 19	1 Jan/Feb 18	69	3 Jun 18 Jan & Jun 19	0

Note:

- Typical examination period is in January and June. Examination of M-N3 was scheduled in 8 January 2018 to 2 February 2018, and June 2018. The exceedance duration is subject to the school activity schedule of M-N3 when available.
- In general practice, examination period should only last for 2 weeks. By scheduling the construction works to avoid the examination period, the residual impact should be minimised.

5.2.2 With the implementation of the above-mentioned mitigation measures, there is no residual impact predicted at all residential NSRs and school during normal school days. And the exceedance over the noise criterion during examination period of up to 4dB(A) is predicted for 3 months at M-N3. In preliminary assessment, there is 1 month noise exceedance up to 5dB(A) at M-N3 in EIA prediction, while no noise exceedance up to 5dB(A) is predicted after implementation of mitigation measures in CNMMP. In general practice, examination period should only last for 2 weeks. By scheduling the construction works to avoid the examination period, the adverse residual impact should be minimised.

6 CONCLUSION

6.1 The CNMMP has predicted the construction noise impact from CKR Contract No. HY/2014/09 to the identified NSRs. This plan has taken into account the updated information on PMEs and works programme which would be adopted by Nishimatsu Construction Co. Ltd.. With the implementation of mitigation measures in form of quiet plants, barriers and noise enclosure, the construction noise impact are predicted would either remain unchanged or to be reduced in respect of both exceedances and duration comparing with the results given in the approved EIA Report.

6.2 Further review and update will be performed during the construction phase and liaison with affected parties is recommended to minimise the construction noise impacts as far as practicable. Attention will be given to construction activities which are predicted to give noise exceedances ensuring proper implementation of the appropriate mitigation measures.

APPENDIX A

Photos of Existing NSRs

NSR No.	Location	Photo
CKR – Central Portion		
M-N1	Kar Man House, Oi Man Estate	
CKR – Central Portion		
M-N2	Carmel on the Hill	
CKR – Central Portion		
M-N3	SKH Tsoi Kung Po Secondary School	

NSR No.	Location	Photo
CKR – Central Portion		
M-N4	Man Fuk House Block A	
CKR – Central Portion		
M-N5	Cascades Block A	
CKR – Central Portion		
M-N6	Ko Fai House, Kwun Fai Court	

NSR		
M-P3	Ultima	

*Refer to Appendix 5.6B in EIA Report

APPENDIX B

Construction Programme

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Contract No. HY/2014/09

Central Kowloon Route - Ho Man Tin Access Shaft **Work Programme**

		Calendar Year/Month																	
		2017	2018											2019					
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Description of Work	**Duration**																			
Decant of Housing Authority Mock Up Centre and Site Establishment	1 mth																			
Diaphragm Wall Excavation	6 mth																			
Soil Excavation of Shaft	4 mth																			
Rock Excavation of Shaft	6 mth																			

APPENDIX C

Prediction of Noise Assessment to NSRs

Ko Fai House, Kwun Fai Court (M-N6)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)

Nearest NSR: Ko Fai House

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	120	120	-50.0	-5.0	3.0	61.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	120	120	-50.0	-5.0	3.0	53.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	120	120	-50.0	-5.0	3.0	45.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	120	120	-50.0	-5.0	3.0	51.0
											Total CNL	**62.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Ko Fai House

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	50	50	-42.0	-5.0	3.0	61.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	50	50	-42.0	-5.0	3.0	49.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	50	50	-42.0	-5.0	3.0	60.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	50	50	-42.0	-5.0	3.0	65.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	50	50	-42.0	-5.0	3.0	61.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	50	50	-42.0	-5.0	3.0	65.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	50	50	-42.0	-5.0	3.0	47.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	50	50	-42.0	0.0	3.0	52.0
	Water pump (electric)	CNP281	88	1	88	0	50	50	-42.0	0.0	3.0	49.0
											Total CNL	**70.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Ko Fai House

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	50	50	-42.0	-5.0	3.0	68.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	50	58	-43.0	-5.0	3.0	67.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	50	58	-43.0	0.0	3.0	51.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	50	50	-42.0	-5.0	3.0	61.0
											Total CNL	**71.1**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Ko Fai House

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	50	50	-42.0	-5.0	3.0	65.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	50	50	-42.0	-5.0	3.0	65.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	50	71	-45.0	-5.0	3.0	65.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	50	71	-45.0	0.0	3.0	52.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	50	50	-42.0	-5.0	3.0	64.0
											Total CNL	**70.9**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Ko Fai House

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	50	50	-42.0	-15.0	3.0	54.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	50	50	-42.0	-5.0	3.0	65.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	50	71	-45.0	-15.0	3.0	51.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	50	50	-42.0	-5.0	3.0	65.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	50	71	-45.0	-15.0	3.0	55.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	50	71	-45.0	0.0	3.0	52.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	50	50	-42.0	-5.0	3.0	64.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	50	71	-45.0	-15.0	3.0	51.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	50	71	-45.0	-15.0	3.0	64.0
	Concrete mixer (electric)	CNP045	96	1	96	50	50	71	-45.0	-15.0	3.0	39.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	50	50	-42.0	-15.0	3.0	48.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	50	50	-42.0	-15.0	3.0	46.0
											Total CNL	**70.9**

Kar Man House, Oil Man Estate (M-N1)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)
Nearest NSR: Kar Man House, Oi Man Estate
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	120	120	-50.0	-5.0	3.0	61.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	120	120	-50.0	-5.0	3.0	53.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	120	120	-50.0	-5.0	3.0	45.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	120	120	-50.0	-5.0	3.0	51.0
											Total CNL	**62.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Kar Man House, Oi Man Estate
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	175	175	-53.0	-5.0	3.0	50.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	175	175	-53.0	-5.0	3.0	38.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	175	175	-53.0	-5.0	3.0	49.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	175	175	-53.0	-5.0	3.0	54.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	175	175	-53.0	-5.0	3.0	50.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	175	175	-53.0	-5.0	3.0	36.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	175	175	-53.0	0.0	3.0	41.0
	Water pump (electric)	CNP281	88	1	88	0	175	175	-53.0	0.0	3.0	38.0
											Total CNL	**59.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Kar Man House, Oi Man Estate
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	175	175	-53.0	-5.0	3.0	57.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	175	178	-53.0	-5.0	3.0	57.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	175	178	-53.0	0.0	3.0	41.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	175	175	-53.0	-5.0	3.0	50.0
											Total CNL	**60.5**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Kar Man House, Oi Man Estate

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	175	182	-53.0	-5.0	3.0	57.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	175	182	-53.0	0.0	3.0	44.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	175	175	-53.0	-5.0	3.0	53.0
											Total CNL	**60.9**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Kar Man House, Oi Man Estate

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	175	175	-53.0	-15.0	3.0	43.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	175	182	-53.0	-15.0	3.0	43.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	175	182	-53.0	-15.0	3.0	47.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	175	182	-53.0	0.0	3.0	44.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	175	175	-53.0	-5.0	3.0	53.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	175	182	-53.0	-15.0	3.0	43.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	175	182	-53.0	-15.0	3.0	56.0
	Concrete mixer (electric)	CNP045	96	1	96	50	175	182	-53.0	-15.0	3.0	31.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	175	175	-53.0	-15.0	3.0	37.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	175	175	-53.0	-15.0	3.0	35.0
											Total CNL	**61.0**

Carmel on the Hill (M-N2)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)

Nearest NSR: Carmel on the Hill

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	205	205	-54.0	-5.0	3.0	57.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	205	205	-54.0	-5.0	3.0	49.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	205	205	-54.0	-5.0	3.0	41.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	205	205	-54.0	-5.0	3.0	47.0
											Total CNL	**58.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Carmel on the Hill

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	175	175	-53.0	-5.0	3.0	50.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	175	175	-53.0	-5.0	3.0	38.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	175	175	-53.0	-5.0	3.0	49.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	175	175	-53.0	-5.0	3.0	54.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	175	175	-53.0	-5.0	3.0	50.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	175	175	-53.0	-5.0	3.0	36.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	175	175	-53.0	0.0	3.0	41.0
	Water pump (electric)	CNP281	88	1	88	0	175	175	-53.0	0.0	3.0	38.0
											Total CNL	**59.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Carmel on the Hill

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m Deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	175	175	-53.0	-5.0	3.0	57.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	175	178	-53.0	-5.0	3.0	57.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	175	178	-53.0	0.0	3.0	41.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	175	175	-53.0	-5.0	3.0	50.0
											Total CNL	**60.5**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Carmel on the Hill
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	175	182	-53.0	-5.0	3.0	57.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	175	182	-53.0	0.0	3.0	44.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	175	175	-53.0	-5.0	3.0	53.0
											Total CNL	**60.9**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Carmel on the Hill
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	175	175	-53.0	-15.0	3.0	43.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	175	182	-53.0	-15.0	3.0	43.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	175	175	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	175	182	-53.0	-15.0	3.0	47.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	175	182	-53.0	0.0	3.0	44.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	175	175	-53.0	-5.0	3.0	53.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	175	182	-53.0	-15.0	3.0	43.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	175	182	-53.0	-15.0	3.0	56.0
	Concrete mixer (electric)	CNP045	96	1	96	50	175	182	-53.0	-15.0	3.0	31.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	175	175	-53.0	-15.0	3.0	37.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	175	175	-53.0	-15.0	3.0	35.0
											Total CNL	**61.0**

SKH Tsoi Kung Po Secondary School (M-N3)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)

Nearest NSR: SKH Tsoi Kung Po Secondary School

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	190	190	-54.0	-5.0	3.0	57.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	190	190	-54.0	-5.0	3.0	49.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	190	190	-54.0	-5.0	3.0	41.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	190	190	-54.0	-5.0	3.0	47.0
											Total CNL	**58.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: SKH Tsoi Kung Po Secondary School

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	65	65	-44.0	-5.0	3.0	59.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	65	65	-44.0	-5.0	3.0	47.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	65	65	-44.0	-5.0	3.0	58.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	65	65	-44.0	-5.0	3.0	63.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	65	65	-44.0	-5.0	3.0	59.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	65	65	-44.0	-5.0	3.0	63.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	65	65	-44.0	-5.0	3.0	45.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	65	65	-44.0	0.0	3.0	50.0
	Water pump (electric)	CNP281	88	1	88	0	65	65	-44.0	0.0	3.0	47.0
											Total CNL	**68.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: SKH Tsoi Kung Po Secondary School

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m Deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	65	65	-44.0	-5.0	3.0	66.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	65	72	-45.0	-5.0	3.0	65.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	65	72	-45.0	0.0	3.0	49.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	65	65	-44.0	-5.0	3.0	59.0
											Total CNL	**69.1**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: SKH Tsoi Kung Po Secondary School

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	65	65	-44.0	-5.0	3.0	63.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	65	65	-44.0	-5.0	3.0	63.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	65	82	-46.0	-5.0	3.0	64.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	65	82	-46.0	0.0	3.0	51.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	65	65	-44.0	-5.0	3.0	62.0
											Total CNL	**69.2**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: SKH Tsoi Kung Po Secondary School

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	65	65	-44.0	-15.0	3.0	52.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	65	65	-44.0	-5.0	3.0	63.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	65	82	-46.0	-15.0	3.0	50.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	65	65	-44.0	-5.0	3.0	63.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	65	82	-46.0	-15.0	3.0	54.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	65	82	-46.0	0.0	3.0	51.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	65	65	-44.0	-5.0	3.0	62.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	65	82	-46.0	-15.0	3.0	50.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	65	82	-46.0	-15.0	3.0	63.0
	Concrete mixer (electric)	CNP045	96	1	96	50	65	82	-46.0	-15.0	3.0	38.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	65	65	-44.0	-15.0	3.0	46.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	65	65	-44.0	-15.0	3.0	44.0
											Total CNL	**69.2**

Man Fuk House Block A (M-N4)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)

Nearest NSR: Man Fuk House Block A

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	260	260	-56.0	-5.0	3.0	55.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	260	260	-56.0	-5.0	3.0	47.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	260	260	-56.0	-5.0	3.0	39.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	260	260	-56.0	-5.0	3.0	45.0
											Total CNL	**56.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Man Fuk House Block A

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	155	155	-52.0	-5.0	3.0	51.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	155	155	-52.0	-5.0	3.0	39.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	155	155	-52.0	-5.0	3.0	50.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	155	155	-52.0	-5.0	3.0	55.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	155	155	-52.0	-5.0	3.0	51.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	155	155	-52.0	-5.0	3.0	55.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	155	155	-52.0	-5.0	3.0	37.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	155	155	-52.0	0.0	3.0	42.0
	Water pump (electric)	CNP281	88	1	88	0	155	155	-52.0	0.0	3.0	39.0
											Total CNL	**60.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Man Fuk House Block A

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	155	155	-52.0	-5.0	3.0	58.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	155	158	-52.0	-5.0	3.0	58.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	155	158	-52.0	0.0	3.0	42.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	155	155	-52.0	-5.0	3.0	51.0
											Total CNL	**61.5**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Man Fuk House Block A
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	155	155	-52.0	-5.0	3.0	55.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	155	155	-52.0	-5.0	3.0	55.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	155	163	-52.0	-5.0	3.0	58.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	155	163	-52.0	0.0	3.0	45.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	155	155	-52.0	-5.0	3.0	54.0
											Total CNL	**61.9**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Man Fuk House Block A
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	155	155	-52.0	-15.0	3.0	44.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	155	155	-52.0	-5.0	3.0	55.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	155	163	-52.0	-15.0	3.0	44.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	155	155	-52.0	-5.0	3.0	55.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	155	163	-52.0	-15.0	3.0	48.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	155	163	-52.0	0.0	3.0	45.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	155	155	-52.0	-5.0	3.0	54.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	155	163	-52.0	-15.0	3.0	44.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	155	163	-52.0	-15.0	3.0	57.0
	Concrete mixer (electric)	CNP045	96	1	96	50	155	163	-52.0	-15.0	3.0	32.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	155	155	-52.0	-15.0	3.0	38.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	155	155	-52.0	-15.0	3.0	36.0
											Total CNL	**62.0**

Cascades Block A (M-N5)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)

Nearest NSR: Cascades Block A

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	290	290	-57.0	-5.0	3.0	54.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	290	290	-57.0	-5.0	3.0	46.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	290	290	-57.0	-5.0	3.0	38.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	290	290	-57.0	-5.0	3.0	44.0
											Total CNL	**55.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Cascades Block A

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	170	170	-53.0	-5.0	3.0	50.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	170	170	-53.0	-5.0	3.0	38.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	170	170	-53.0	-5.0	3.0	49.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	170	170	-53.0	-5.0	3.0	54.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	170	170	-53.0	-5.0	3.0	50.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	170	170	-53.0	-5.0	3.0	54.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	170	170	-53.0	-5.0	3.0	36.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	170	170	-53.0	0.0	3.0	41.0
	Water pump (electric)	CNP281	88	1	88	0	170	170	-53.0	0.0	3.0	38.0
											Total CNL	**59.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Cascades Block A

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m Deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	170	170	-53.0	-5.0	3.0	57.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	170	173	-53.0	-5.0	3.0	57.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	170	173	-53.0	0.0	3.0	41.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	170	170	-53.0	-5.0	3.0	50.0
											Total CNL	**60.5**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Cascades Block A
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	170	170	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	170	170	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	170	177	-53.0	-5.0	3.0	57.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	170	177	-53.0	0.0	3.0	44.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	170	170	-53.0	-5.0	3.0	53.0
											Total CNL	**60.9**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Cascades Block A
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	170	170	-53.0	-15.0	3.0	43.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	170	170	-53.0	-5.0	3.0	54.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	170	177	-53.0	-15.0	3.0	43.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	170	170	-53.0	-5.0	3.0	54.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	170	177	-53.0	-15.0	3.0	47.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	170	177	-53.0	0.0	3.0	44.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	170	170	-53.0	-5.0	3.0	53.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	170	177	-53.0	-15.0	3.0	43.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	170	177	-53.0	-15.0	3.0	56.0
	Concrete mixer (electric)	CNP045	96	1	96	50	170	177	-53.0	-15.0	3.0	31.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	170	170	-53.0	-15.0	3.0	37.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	170	170	-53.0	-15.0	3.0	35.0
											Total CNL	**61.0**

Ultima (M-P3)

Decant of Housing Authority Mock Up Centre and Site Establishment

Location of Construction Site: Ho Man Tin Access Shaft Portion 1D (Work Site S2)

Nearest NSR: Ultima

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Decant	Breaker, excavator mounted (hydraulic) (90%)	BS5228 Table D.8/13	110	2	113	0	32	32	-38.0	-5.0	3.0	73.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	32	32	-38.0	-5.0	3.0	65.0
	Excavator/Loader, Wheeled/Tracked (70%)	QPME ID Code EPD-01145	97	1	97	0	32	32	-38.0	-5.0	3.0	57.0
	Concrete Crusher, Excavator Mounted (90%)	CNP055	103	1	103	0	32	32	-38.0	-5.0	3.0	63.0
											Total CNL	**74.1**

Diaphragm Wall Construction

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Ultima

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Diaphragm Wall Construction	Piling, Diaphragm Wall, Bentonite Filtering Plant (100%)	CNP162	105	1	105	0	115	115	-49.0	-5.0	3.0	54.0
	Piling, diaphragm wall, hydraulic extractor (100%)	CNP163	90	2	93	0	115	115	-49.0	-5.0	3.0	42.0
	Generator, QPME Noise Label 101dB(A)	QPME ID Code EPD-02845	101	2	104	0	115	115	-49.0	-5.0	3.0	53.0
	Concrete lorry mixer (50%)	CNP044	106	2	109	0	115	115	-49.0	-5.0	3.0	58.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	1	105	0	115	115	-49.0	-5.0	3.0	54.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	115	115	-49.0	-5.0	3.0	58.0
	Bar Bender and Cutter (70%)	CNP021	88	2	91	0	115	115	-49.0	-5.0	3.0	40.0
	Water pump, submersible (electric)	CNP283	85	4	91	0	115	115	-49.0	0.0	3.0	45.0
	Water pump (electric)	CNP281	88	1	88	0	115	115	-49.0	0.0	3.0	42.0
											Total CNL	**63.1**

Spoil Excavation to 30m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)

Nearest NSR: Ultima

General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation to 30m deep	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	2	112	0	115	115	-49.0	-5.0	3.0	61.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	30	115	119	-49.0	-5.0	3.0	61.0
	Water pump, submersible (electric) (100%)	CNP283	85	4	91	30	115	119	-49.0	0.0	3.0	45.0
	Dump Truck with Grab (50%)	CNP069	102	2	105	0	115	115	-49.0	-5.0	3.0	54.0
											Total CNL	**64.5**

Spoil Excavation from 30m to 50m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Ultima
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Spoil Excavation at 50m Deep	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	115	115	-49.0	-5.0	3.0	58.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	115	115	-49.0	-5.0	3.0	58.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	115	125	-50.0	-5.0	3.0	60.0
	Water pump, submersible (electric) (100%)	CNP283	85	8	94	50	115	125	-50.0	0.0	3.0	47.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	115	115	-49.0	-5.0	3.0	57.0
											Total CNL	**64.5**

Rock Excavation from 50m to 100m deep

Location of Construction Site: Ho Man Tin Access Shaft Portion 1A (Work Site S1)
Nearest NSR: Ultima
General Group

	PME	Identification Code	Sound Power Level (SWL)			Distance to NSR (m)			Correction, dB(A)			Corrected Noise Level, dB(A)
			SWL, dB(A)	Quantity	Total SWL, dB(A)	Vert	Hori	Slant	Dist.	Barrier Effect	Façade	
Rock Excavation at 50m deep (Drill and Blast)	Ventilation Fan with Silencer	CNP241	108	1	108	0	115	115	-49.0	-15.0	3.0	47.0
	Crane/Tracked Mobile (50%)	CNP048	109	1	109	0	115	115	-49.0	-5.0	3.0	58.0
	Breaker, excavator mounted (hydraulic) (70%) - Assess Shaft	BS5228 Table D.8/13	108	1	108	50	115	125	-50.0	-15.0	3.0	46.0
	Excavator/Loader, Wheeled/Tracked (50%) - Ground Surface	CNP081	109	1	109	0	115	115	-49.0	-5.0	3.0	58.0
	Excavator/Loader, Wheeled/Tracked (50%) - Assess Shaft	CNP081	109	2	112	50	115	125	-50.0	-15.0	3.0	50.0
	Water pump, submersible (electric)	CNP283	85	8	94	50	115	125	-50.0	0.0	3.0	47.0
	Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne	other PME	105	2	108	0	115	115	-49.0	-5.0	3.0	57.0
	Shotcreting machine	BS5228 Table D.6/13	108	1	108	50	115	125	-50.0	-15.0	3.0	46.0
	Rock drill, crawler mounted (hydraulic) (70%)	CNP182	121	1	121	50	115	125	-50.0	-15.0	3.0	59.0
	Concrete mixer (electric)	CNP045	96	1	96	50	115	125	-50.0	-15.0	3.0	34.0
	Air compressor, air flow > 10m3/min and <= 30m3/min, inside acoustic noise cover	CNP002	102	1	102	0	115	115	-49.0	-15.0	3.0	41.0
	Generator, silenced, 75 dB(A) at 7 m, inside acoustic noise cover	CNP102	100	1	100	0	115	115	-49.0	-15.0	3.0	39.0
											Total CNL	**64.6**

APPENDIX D

Detailed Noise Calculation

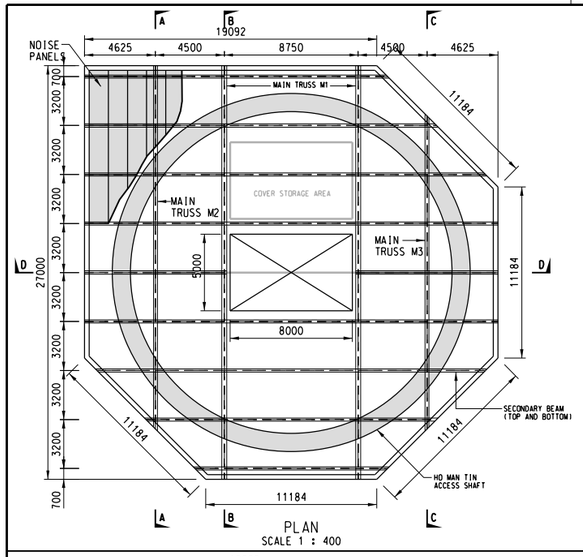
Successfully Building a Better Future.
西松建設
NISHIMATSU CONSTRUCTION CO.,LTD.

Contract No. HY/2014/09
Central Kowloon Route - Ho Man Tin Access Shaft
Work Programme

Scenario: Mitigated		Calendar Year/Month																											
		2017	2018																			2019							
		Dec	Jan	Feb		Mar		Apr	May	Jun	Jul	Aug		Sept	Oct		Nov	Dec		Jan	Feb	Mar	Apr	May	Jun				
Description of Work	NSRs	1	2	3a	3b	4a	4b	5	6	7	8	9a	9b	10	11a	11b	12	13a	13b	14	15	16	17	18	19				
Decant of Housing Authority Mock Up Centre and Site Establishment	Kar Man House, Oi Man Estate	-	-	-	62	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Carmel on the Hill	-	-	-	58	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SKH Tsoi Kung Po Secondary School	-	-	-	58	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Man Fuk House Block A	-	-	-	56	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Cascades Block A	-	-	-	55	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Ko Fai House, Kwun Fai Court	-	-	-	62	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Planned Residential Area B (Ultima)	-	-	-	74	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Diaphragm Wall Construction	Kar Man House, Oi Man Estate	-	-	-	59	59	59	59	59	59	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Carmel on the Hill	-	-	-	59	59	59	59	59	59	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SKH Tsoi Kung Po Secondary School	-	-	-	68	68	68	68	68	68	68	68	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Man Fuk House Block A	-	-	-	60	60	60	60	60	60	60	60	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Cascades Block A	-	-	-	59	59	59	59	59	59	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Ko Fai House, Kwun Fai Court	-	-	-	70	70	70	70	70	70	70	70	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Planned Residential Area B (Ultima)	-	-	-	63	63	63	63	63	63	63	63	-	-	-	-	-	-	-	-	-	-	-	-	-				
Overall Noise Levels, dB(A) Decant of Housing Authority Mock Up Centre and Site Establishment + Diaphragm Wall Construction	Kar Man House, Oi Man Estate	-	-	-	64	64	59	59	59	59	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Carmel on the Hill	-	-	-	62	62	59	59	59	59	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SKH Tsoi Kung Po Secondary School	-	-	-	68	68	68	68	68	68	68	68	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Man Fuk House Block A	-	-	-	61	61	60	60	60	60	60	60	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Cascades Block A	-	-	-	60	60	59	59	59	59	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Ko Fai House, Kwun Fai Court	-	-	-	71	71	70	70	70	70	70	70	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Planned Residential Area B (Ultima)	-	-	-	74	74	63	63	63	63	63	63	-	-	-	-	-	-	-	-	-	-	-	-	-				
Spoil Excavation to 30m deep	Kar Man House, Oi Man Estate	-	-	-	-	-	-	-	-	-	-	-	61	61	61	-	-	-	-	-	-	-	-	-	-				
	Carmel on the Hill	-	-	-	-	-	-	-	-	-	-	-	61	61	61	-	-	-	-	-	-	-	-	-	-				
	SKH Tsoi Kung Po Secondary School	-	-	-	-	-	-	-	-	-	-	-	69	69	69	-	-	-	-	-	-	-	-	-	-				
	Man Fuk House Block A	-	-	-	-	-	-	-	-	-	-	-	62	62	62	-	-	-	-	-	-	-	-	-	-				
	Cascades Block A	-	-	-	-	-	-	-	-	-	-	-	61	61	61	-	-	-	-	-	-	-	-	-	-				
	Ko Fai House, Kwun Fai Court	-	-	-	-	-	-	-	-	-	-	-	71	71	71	-	-	-	-	-	-	-	-	-	-				
	Planned Residential Area B (Ultima)	-	-	-	-	-	-	-	-	-	-	-	65	65	65	-	-	-	-	-	-	-	-	-	-				
Spoil Excavation from 30m to 50m deep	Kar Man House, Oi Man Estate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	-	-	-	-	-	-	-				
	Carmel on the Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	-	-	-	-	-	-	-				
	SKH Tsoi Kung Po Secondary School	-	-	-	-	-	-	-	-	-	-	-	-	-	-	69	69	69	-	-	-	-	-	-	-				
	Man Fuk House Block A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62	62	62	-	-	-	-	-	-	-				
	Cascades Block A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	-	-	-	-	-	-	-				
	Ko Fai House, Kwun Fai Court	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	71	71	-	-	-	-	-	-	-				
	Planned Residential Area B (Ultima)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	65	65	-	-	-	-	-	-	-				
Rock Excavation from 50m to 100m deep	Kar Man House, Oi Man Estate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	61	61	61	61				
	Carmel on the Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	61	61	61	61				
	SKH Tsoi Kung Po Secondary School	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	69	69	69	69	69	69	69				
	Man Fuk House Block A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62	62	62	62	62	62	62				
	Cascades Block A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	61	61	61	61	61				
	Ko Fai House, Kwun Fai Court	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	71	71	71	71	71	71				
	Planned Residential Area B (Ultima)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	65	65	65	65	65	65				

APPENDIX E

Noise Cover Design



PLAN
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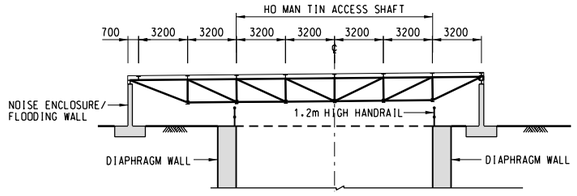
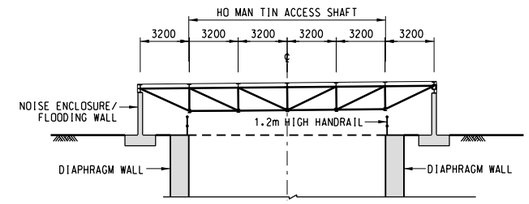
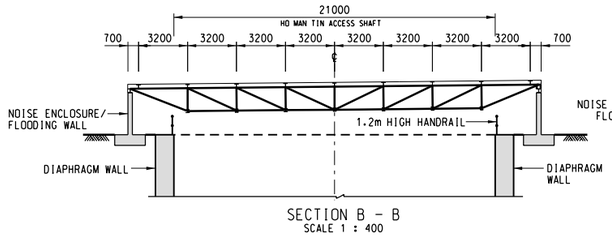


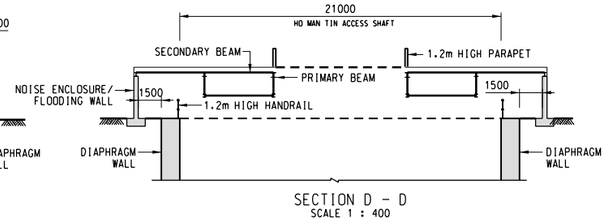
SECTION A - A
SCALE 1 : 400



SECTION C - C
SCALE 1 : 400



SECTION B - B
SCALE 1 : 400



SECTION D - D
SCALE 1 : 400

MEMBER SCHEDULE

ITEM	MEMBER SIZE	GRADE
MAIN TRUSS M1:		
TOP BEAM	305x305x118UC	S355
BOTTOM BEAM	203x203x86UC	S355
COLUMN	152x152x23UC	S355
BRACE	DOUBLE120x120x15EA	S275
MAIN TRUSS M2/M3:		
TOP BEAM	254x254x73UC	S355
BOTTOM BEAM	203x203x46UC	S355
COLUMN	152x152x23UC	S355
BRACE	DOUBLE120x120x15EA	S275
SECONDARY BEAM		
TOP(4.5m SPAN)	203x203x46UC	S355
TOP(8.75m SPAN)	203x203x71UC	S355
BOTTEM(4.5M SPAN)	152x152x23UC	S355
BOTTEM(8.75m SPAN)	152x152x23UC	S355
DIAGONAL BRACING	120x120x12EA	S275

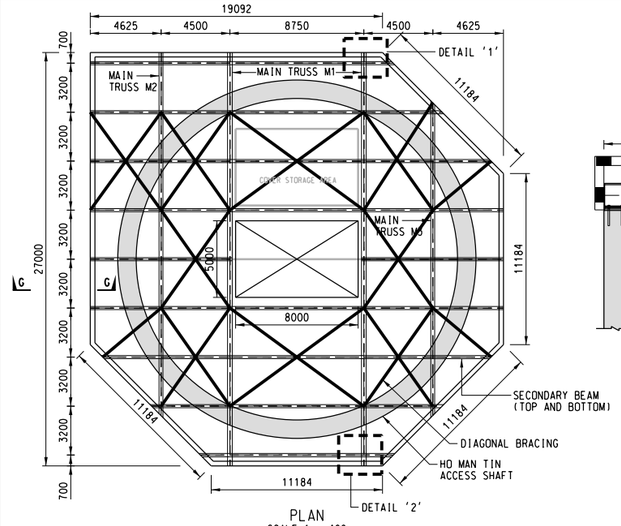
NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. SK3002 TO SK3006.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. ALL SRTUCTURAL STEEL SECTIONS AND PLATES SHALL BE GRADE 355 UNLESS OTHEERWISE STATED.
5. ALL THE STIFFENERS SHALL BE 12mm THICK UNLESS OTHERWISE STATED.
6. THE TOP AND BOTTEM MAIN BEAM SHALL BE SPLICED USING FULL PENETRARION BUT WELD.
7. ALL FILLED WELDS SHALL BE 6mm FILLED WELD ALL ROUND UNLESS OTHERWISE STATED.

WELDING CONNECTION BETWEEN STEEL MEMBERS:

1. MAIN BEAM, MEMBERS OF TRUSS FRAME-BUTT WELD.
2. OTHER CONNECTION WITHIN TRUSS FRAME-8MM ALL ROUND FILLET WELD.
3. STIFFENER-6mm FILLET WELD.
4. LATERAL BRACTING MEMBERS BETWEEN TURSS FRAMES-6mm ALL ROUND FILLET WELD.
5. SECONDARY BEAM SUPPORTING NOISE PANELS BETWEEN TRUSS FRAMES-6mm FILLET WELD.

NOISE ENCLOSURE - GENERAL LAYOUT



PLAN
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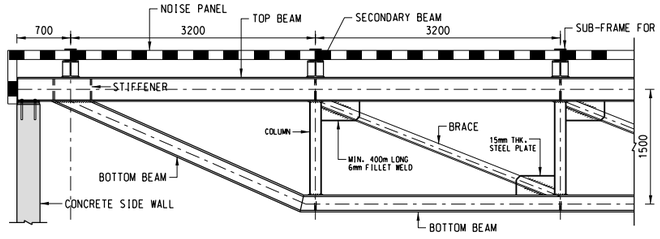
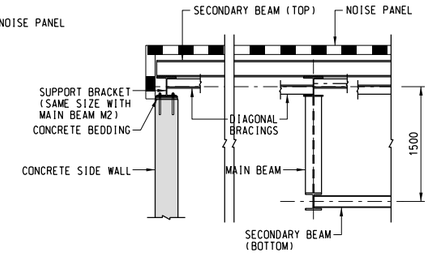
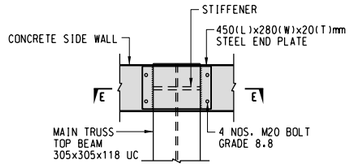


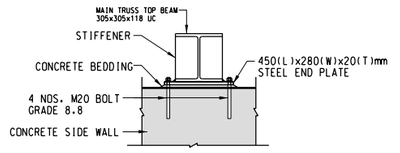
TYPICAL DETAILS OF MAIN TRUSS M1
SCALE 1 : 80



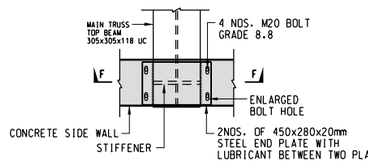
SECTION G - G
SCALE 1 : 80



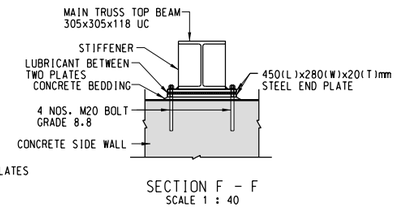
DETAIL '1'
SCALE 1 : 40



SECTION E - E
SCALE 1 : 40

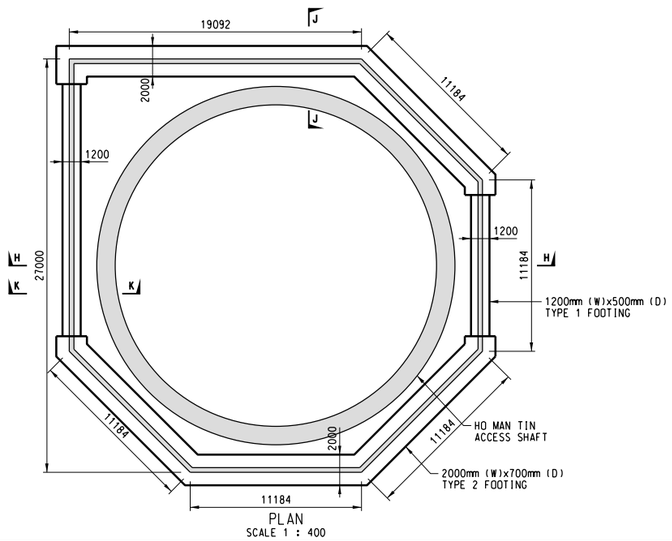


DETAIL '2'
SCALE 1 : 40

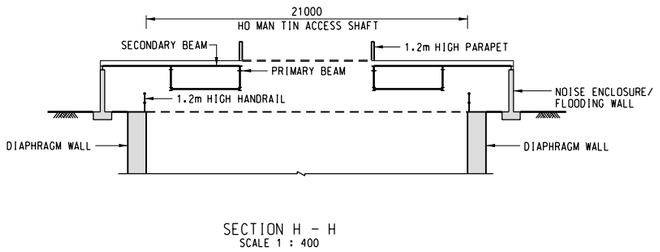


SECTION F - F
SCALE 1 : 40

NOISE ENCLOSURE - CONNECTION DETAILS



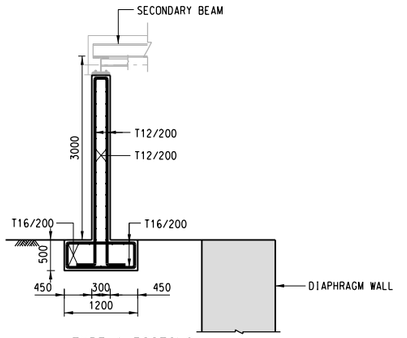
PLAN
SCALE 1 : 400



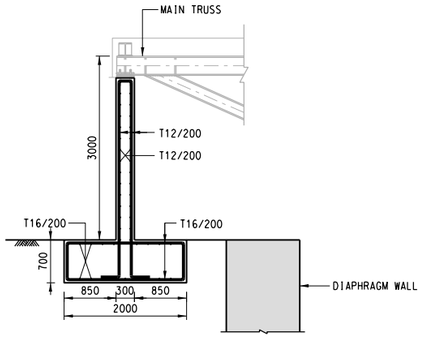
SECTION H - H
SCALE 1 : 400

NOTES:

1. ALL CONCRETE TO BE GRADE 40D UNLESS SHOWM OTHERWISE.
2. HIGH TENSILE STEEL BARS SHALL BE HOT ROLLED TYPE 2 AND HAVE A MINIMUM YIELD STRESS OF 500MPa.



TYPE 1 FOOTING
SECTION K - K
SCALE 1 : 100



TYPE 2 FOOTING
SECTION J - J
SCALE 1 : 100

NOISE ENCLOSURE - FOOTING LAYOUT

CLIENT
路政署
HIGHWAYS DEPARTMENT
主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

ARUP
Mott MacDonald
Joint Venture

ORIGINATOR
西松建設
Nishimatsu Construction Co. Ltd.

AECOM

DRAWN	-
CHECKED	-
APPROVED	-

PROJECT
CONTRACT NO. HY/2014/09
CENTRAL KOWLOON ROUTE-
HO MAN TIN ACCESS SHAFT

TITLE
DESIGN NOISE ENCLOSURE FOR HMT ACCESS SHAFT
GENERAL LAYOUT, CONNECTION DETAILS AND FOOTING LAYOUT

DRAWING NO.
HY/2014/09-SK104

SCALE	DATE	REV.
AS SHOWN (A3)	27MAR17	A

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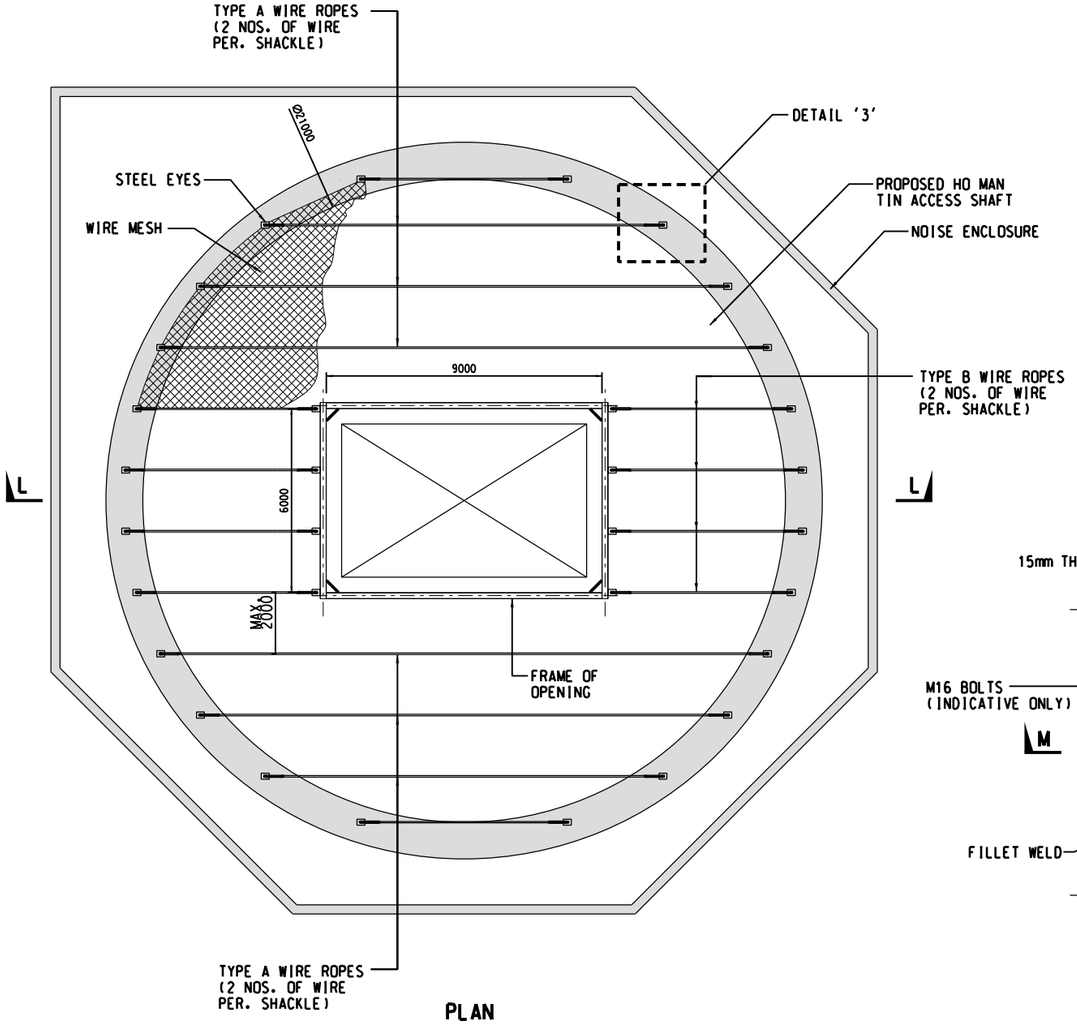
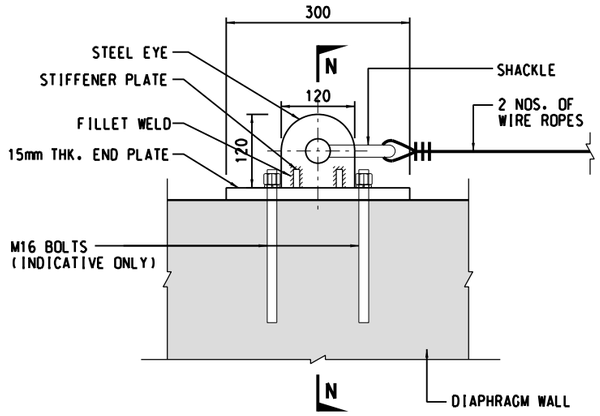


PLAN



SECTION M - M
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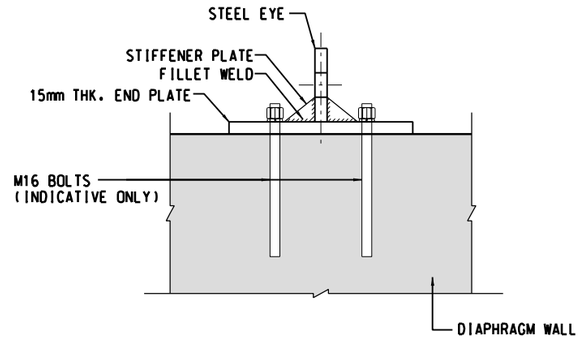

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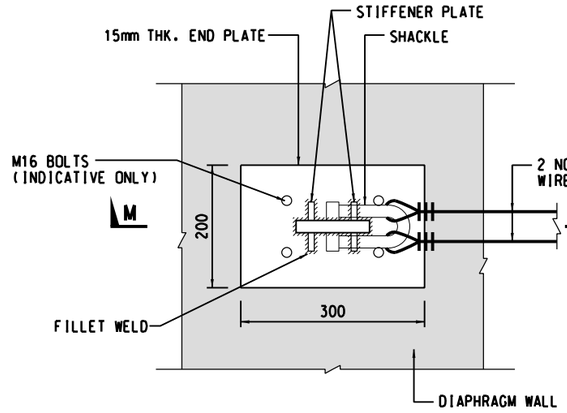

DETAIL '3'
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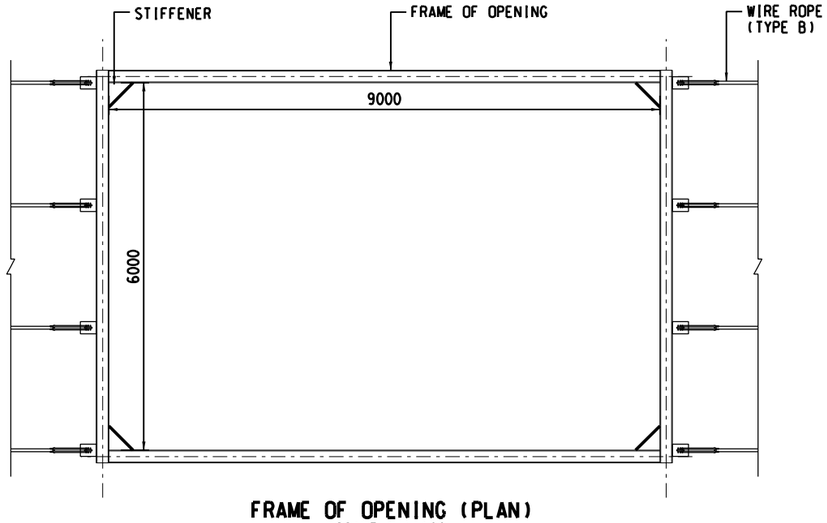
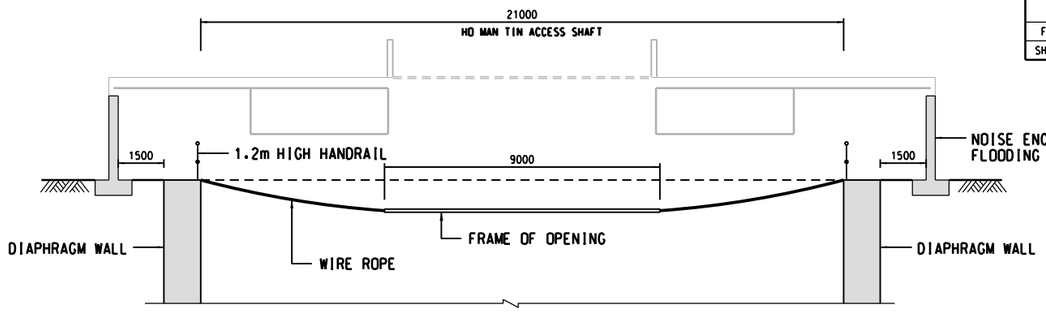


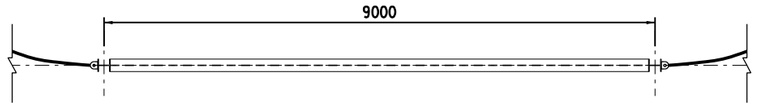
FRAME OF OPENING (PLAN)
SCALE 1 : 100

MEMBER SCHEDULE

MEMBER	SIZE		REQUIRED WORKING LOAD
WIRE ROPE (TYPE A)	2 NOS. 16mm DIA. WITH 2.0m SPACING (NOMINAL TENSILE STRENGTH = 1670mPa)		13KN PER ROPE
WIRE ROPE (TYPE B)	2 NOS. 16mm DIA. WITH 2.0m SPACING (NOMINAL TENSILE STRENGTH = 1670mPa)		18KN PER ROPE
WIRE MESH	OPENING	25mmx25mm	-
	WIRE DIAMETER	3.2mm	
	WIDTH OF THE ROLL	2.0m	
FRAME	STEEL MEMBER	203x203x52 UC (S275)	-
SHACKLE	3/4 INCHES		36KN



SECTION L - L



FRAME OF OPENING (ELEVATION)
SCALE 1 : 100

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FILENAME: Z:\90 Exchange\Terry Chan\From Tung\03 CKM.MMS\HY-2014-09-SK054.dgn

CLIENT: 路政署 HIGHWAYS DEPARTMENT 主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE

ARUP Mott MacDonald Joint Venture

ORIGINATOR: 西松建設 Nishimatsu Construction Co. Ltd.

AECOM

DRAWN –
CHECKED –
APPROVED –

PROJECT: CONTRACT NO. HY/2014/09
CENTRAL KOWLOON ROUTE-
HO MAN TIN ACCESS SHAFT

TITLE: ROOF OVER FOR HMT ACCESS SHAFT
GENERAL LAYOUT AND
CONNECTION DETAILS

DRAWING NO. HY/2014/09-SK105

SCALE AS SHOWN (A3) | DATE 27MAR17 | REV. A

APPENDIX F

Noise Assessment of Acoustic Fabric

REPORT TO: **Mayfair Trading (H.K.) Co. Ltd.**

ADDRESS: Room 13, 5/F.,
Ka Wah Industrial Building,
Hi Yip Street,
Yuen Long, N.T.,
Hong Kong.

ATTN.: Mr. K. C. Tse

REPORT NO.: APJ12-252-RP001(Rw)

ISSUE DATE: 21 December 2012

HOKLAS Accredited Laboratory
Sound Reduction Index Measurement
Test Report for
PVC Tarpaulin S4009(FR)-Sound Insulation Fabric

(PROJECT NO.: APJ12-252)

Prepared by:

Ng Yan Wa
Laboratory Manager
WY / WN / JJ / BW / AC / MT / NS

Endorsed by:

Dr. Poon Wai Yin
Technical Director
(Approved Signatory)

This laboratory is accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific tests and / or measurements and the results shown in this test report (or certificate, where appropriate) have been determined in accordance with the laboratory's terms of accreditation.

Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street, Fo Tan, Shatin, N.T., Hong Kong
Tel: (852) 2668 3423 Fax: (852) 2668 6946
Homepage: http://www.aa-lab.com E-mail: inquiry@aa-lab.com

1. Method of Measurement

1.1 The measurement was carried out in accordance with ISO 140-3:1995 (E) "Acoustics – Measurement of sound insulation in buildings and of building elements -- Part 3 Laboratory measurements of airborne sound insulation of building elements" (equivalent to BS 2750 Part 3: 1995) in the reverberation chamber of Acoustics and Air Testing Laboratory Co. Ltd. And the single-figure quantity for airborne sound insulation rating was evaluated in accordance with ISO 717-1:1997.

2. Details of Measurement

2.1 Principle of Measurement

The expression "sound transmission loss" (TL) is also equivalent to "sound reduction index" (R).

The sound reduction index of a partition is usually measured in a laboratory by placing the element in an opening between two adjacent reverberant rooms designed for such tests. Noise is introduced into one of the rooms, referred to as the source room, and part of the sound energy is transmitted through the test element into the second room, referred to as the receiving room. The resulting mean space-average sound pressure levels in the source room and receiving room is L_1 and L_2, respectively.

The sound reduction index is given by

$$TL = L_1 - L_2 + 10\log(S/A)$$

Where

S is the area of the test specimen, in square metres.
A is the equivalent absorption area in the receiving room, in square metres, which may preferably be evaluated from the reverberation time measured according to ISO 354: 1985 and evaluated using Sabine's formula

$$A = 0.16V/T$$

Where

V is the receiving room volume, in cubic metres;
T is the reverberation time, in seconds, which was obtained by reading and averaging the measured value in receiving room.

The Weighted Sound Reduction Index (Rw) in decibels (dB) is calculated by comparing the sixteen values of Sound Transmission Loss from 100 Hz to 3150 Hz with a defined reference curve which is incremented until the requirements of ISO 717-1: 1996 are met. Spectrum adaptation terms C and C_{tr} are also calculated.

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2.2 Laboratory Location

Acoustics and Air Testing Laboratory Company Limited
Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street,
Fo Tan, Shatin, N.T., Hong Kong.

2.3 Test Condition

Conditions	Source room	Receiving room
Volume	84m^3	206m^3
Air Temperature	22°C	22°C
Relative Humidity	48%	48%

2.4 Test Date

Date of receipt of test item: 19 December 2012

Dates test commenced and completed
Commenced date: 19 December 2012
Completed date: 19 December 2012

2.5 Instrumentation

2.5.1 For sound production

Type	Serial No.
One Real Time Frequency Analyzer – B&K PULSE 3560c	2411776
One Equalizer – Vestax GE62A	G76020697
One Amplifier – Vestax PT4000ua	527920
One OmniPower Sound Source – Bruel & Kjaer 4296	2128136

2.5.2 For sound measurement

One Real Time Frequency Analyzer – B&K PULSE 3560c	2411776
Two Free-field ½" Microphone – Bruel & Kjaer 4190	2731577 & 2731578
Two ½" Microphone Preamplifier – Bruel & Kjaer 2669	2081972 & 2081971
One Sound Level Calibrator – Bruel & Kjaer 4231	1914426

2.5.3 For reverberation time measurement

One Real Time Frequency Analyzer – B&K PULSE 3560c	3442A00385
One Free-field ½" Microphone – Bruel & Kjaer 4190	2731577
One ½" Microphone Preamplifier – Bruel & Kjaer 2669	2081972
One Loudspeaker – JBL EON 515	VTP0890-14112

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3. Results Application

3.1 The results obtained can be used to design building elements with appropriate acoustic properties, to compare the sound insulation properties of building elements and to classify such elements according to their sound insulation capabilities.

3.2 The measurements are performed in laboratory test facilities in which transmission of sound on flanking paths is suppressed. Results of measurements shall not be applied directly in the field without accounting for other factors affecting sound insulation, especially flanking transmission and loss factor.

3.3 The test results obtained relate only to the specimen tested.

4. Description of the Test Construction

4.1 The test specimen was a piece of PVC Tarpaulin S4009(FR)-Sound Insulation Fabric (colour in grey) with approx. thickness of 0.9mm and surface density 1.25 kg/m^2.

4.2 One piece of the specimen with approx. dimension: 1100mm wide X 2600mm high was mounted in the test opening between two test chambers. The measurement setup at source & receiving rooms are given in Appendix 1

4.3 The tested sound insulation fabric was supplied and installed by Mayfair Trading (H.K.) Co. Ltd.

4.4 Photographic records showing the test specimen and measurement setup are given in Appendix 2.

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5. Measurement Results

5.1 The results of measurement for the tested specimen are given in the following table:

Frequency f, Hz	Sound reduction index R, dB	Sound reduction index R, dB	Uncertainty
100	0.8	3.2	±2.01
125	4.0		±1.75
160	6.9		±1.75
200	8.3	8.6	±1.24
250	8.5		±1.12
315	8.9		±0.86
400	10.0	11.0	±0.88
500	11.1		±0.60
630	12.1		±0.62
800	13.7	14.8	±0.58
1000	14.7		±0.49
1250	16.6		±0.55
1600	18.4	20.0	±0.50
2000	20.2		±0.43
2500	22.0		±0.42
3150	23.7	25.2	±0.44
4000	25.4		±0.44
5000	27.0		±0.51

NOTE: The 95% measurement uncertainty is calculated according to an engineering method in compliance with the "Guide to the Expression of Uncertainty in Measurement", 1995.

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5.2 The measured sound reduction index of the tested specimen against 1/3-octave band center frequencies is plotted on Figure 1.

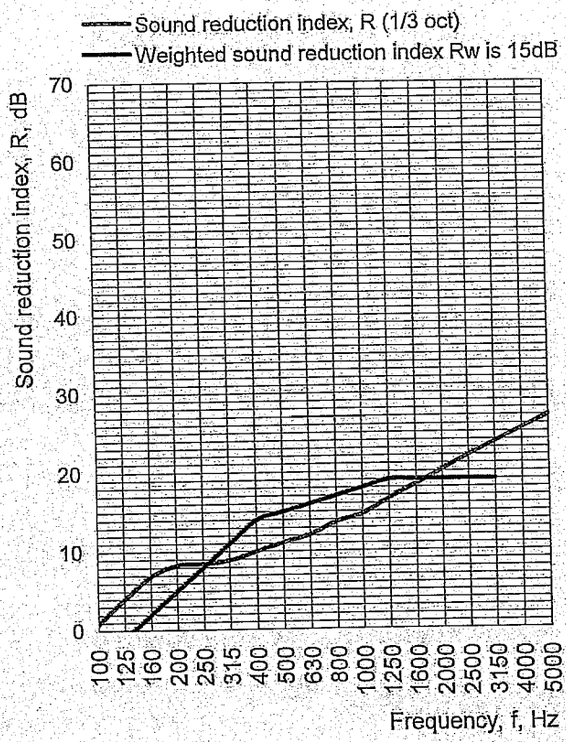

Figure 1. Sound Reduction Index against Frequency

5.3 Weighted Sound Reduction Index Rw:

Description	Weighted Sound Reduction Index Rw, dB
PVC Tarpaulin S4009(FR)-Sound Insulation Fabric	15

5.4 The rating standard, BS EN ISO 717-1:1996, identifies a number of single figure ratings for this type of test. Evaluation based on laboratory measurement results is obtained by a laboratory method. The calculated values of these rating are:

Rw ($C;C_{tr}$) = 15 (0;-3) dB	$C_{100\text{-}5000}$ = 1 dB
	$C_{tr,100\text{-}5000}$ = -3 dB

- END -

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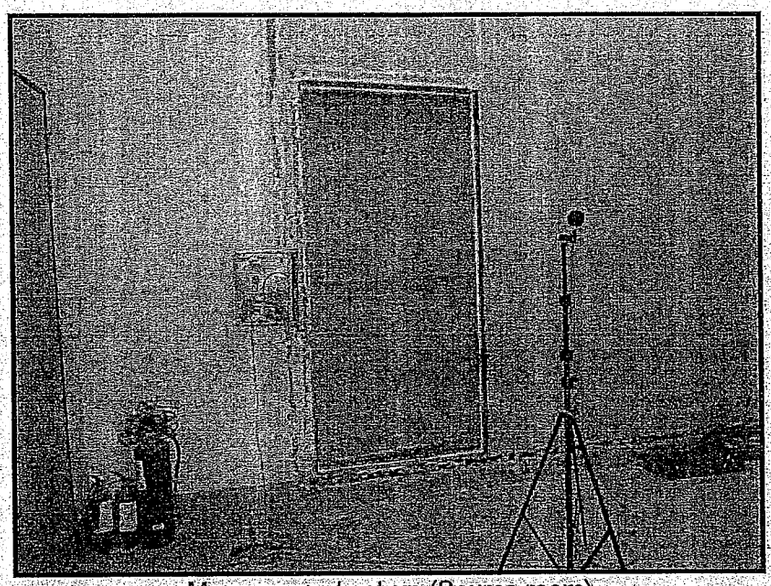
Appendix List

Appendix 1 Photographic Records

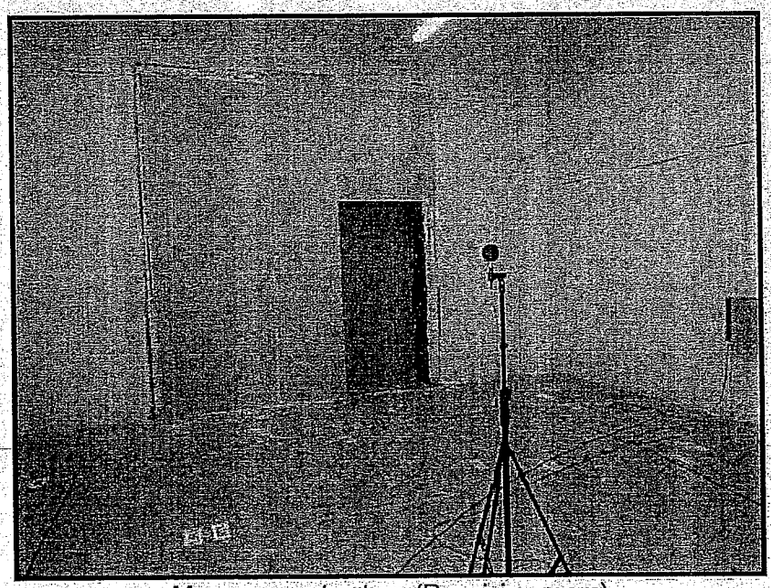
Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street, Fo Tan, Shatin, N.T., Hong Kong
Tel: (852) 2668 3423 Fax: (852) 2668 6946
Homepage: http://www.aa-lab.com E-mail: inquiry@aa-lab.com

Appendix 1

Photographic Records



Measurement set-up (Source room)



Measurement set-up (Receiving room)

Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street, Fo Tan, Shatin, N.T., Hong Kong
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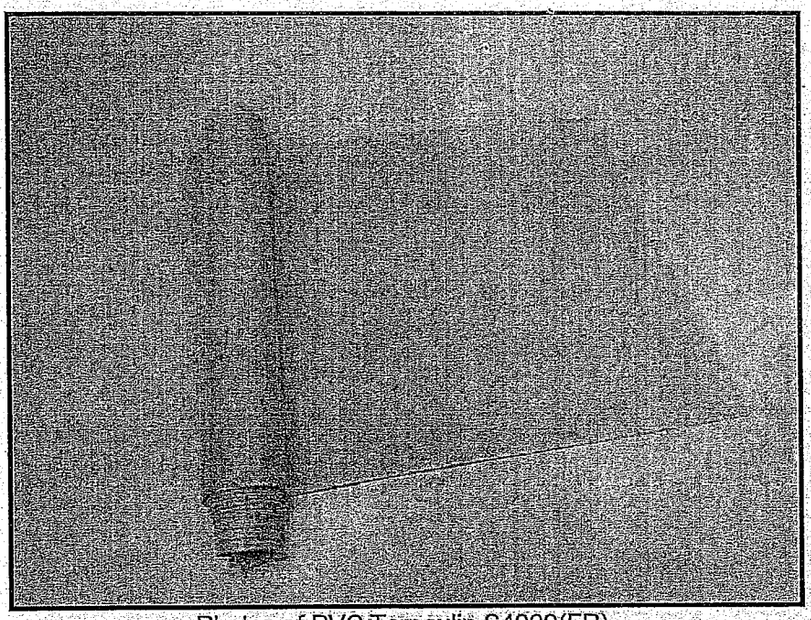

Photos of PVC Tarpaulin S4009(FR)-
Sound Insulation Fabric Material

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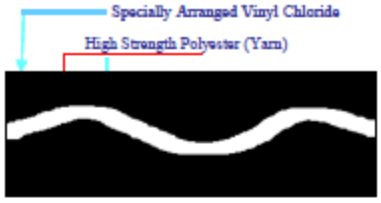
APPENDIX G

Information of Acoustic Fabric

EFFECTIVE NOISE ISOLATION

The Soundproof Sheet is specially produced for Building, Bridge and Civil Engineering works.

A mixture of High Density Fiber & natural fiber abstract from trees, long lasting, anti-fungus, most effective sound protection barrier and safe for construction site.

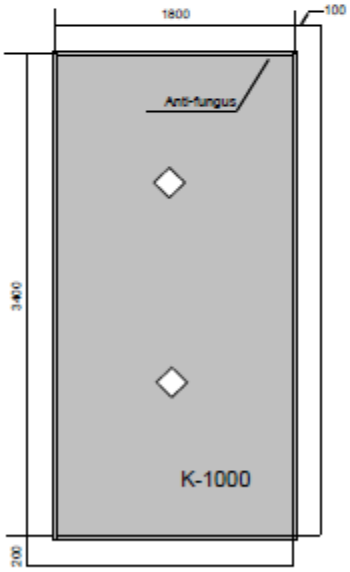


A. CHARACTERISTIC

Type	Weight (kg/m²)	Thickness (mm)	Elasticity N/3cm (kgf/3cm)		Elongation %		Breaking Load N (kgf)		Anti-fungus Test
			Tensile	Compression	Tensile	Compression	Tensile	Compression	
#1000	1.2	1.0	1588 (180)	1470 (150)	22	30	382 (40)	441 (45)	C0 880015

JIS A 8952

B. DIMENSION

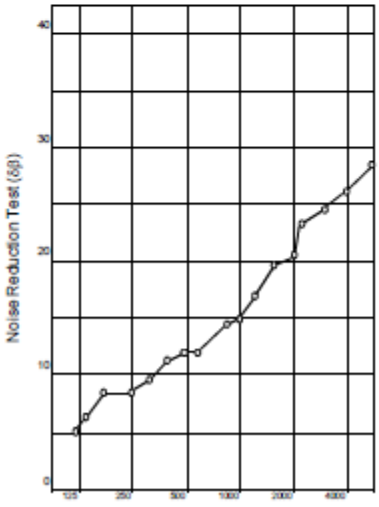


Note

Effective area 3400 x 1800mm

C. SOUND TRANSMISSION LOSS DATA

Testing Chart	#1000	Density	Density Area	1.2kg/m²
Size	910 x 1820mm		Ave. Density	5.0kg/m²
Thick	1.0mm	Room Temperature		21.0°C
Area	1.62m²	Humidity		77.0 %



High Frequency Test (Hz)	Noise Reduction Test (dB)
100	---
125	5
160	7
200	8
250	8
315	9
400	11
500	12
630	12
800	14
1000	15
1250	17
1600	19
2000	21
2600	23
3150	24
4000	26
5000	28

JIS A 1416

*Note – NCC will provide above noise fabric or other brands / series of this kind of acoustic fabric with same or equivalent will be adopted, which is subject to the availability.