

Environmental Team Services for Contract No. SS H504 Design and Construction of Chai Wan Government Complex and Vehicle Depot

Construction Noise Management Plan

(Rev E)

Certified by:



Fredrick Leong
Environmental Team Leader (ETL)
Aurecon Hong Kong Limited

Date:

17 November 2021

Verified by:



W.K. Chiu
Independent Environmental Checker (IEC)
Meinhardt Infrastructure and Environment Limited

Date:

19 November 2021

Chai Wan Government Complex and Vehicle Depot

Construction Noise Management Plan

Yau Lee Construction Company Limited

November 10 2021

Quality information

Prepared by



Gloria Chow

Checked & Verified by



Jackel Law
(MHKIOA M200)

Approved by



Y T Tang
(MHKIOA M093)

Revision History

Revision	Revision date	Details	Authorized	Name	Position
A	27 Aug 2021				
B	28 Sep 2021				
C	05 Oct 2021				
D	18 Oct 2021				
E	10 Nov 2021				

Prepared for:

Yau Lee Construction Company Limited

Prepared by:

AECOM Asia Company Limited
8/F, Block 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin
Hong Kong
aecom.com

© 2021 AECOM Asia Company Limited. All Rights Reserved.

This document has been prepared by AECOM Asia Company Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Table of Contents

1.	Introduction	1
2.	Construction Works of the Project.....	2
3.	Construction Noise Assessment	2
4.	Proposed Noise Mitigation Measures	3
5.	Conclusion	5

Tables

Table 1.	Summary of Predicted Noise Levels.....	2
Table 2.	Examination Period for 2021/2022 Academic Year.....	2
Table 3.	QPME Recommended for Adoption during Construction Phase	4
Table 4.	Noise Mitigation Measures for Certain PME during Construction Phase.....	4
Table 5.	Summary of Noise Assessment Result.....	5

List of Figure

Figure 1. Locations of Source, NSR and Measurement

List of Appendix

- Appendix A. Updated Construction Programme
- Appendix B. Construction Plant Inventory
- Appendix C. Notional Distance of Works Area and NSRs
- Appendix D. Detailed Assessment Results

1. Introduction

1.1 Project Description

- 1.1.1 Chai Wan Government Complex and Vehicle Depot (hereafter referred to as “the Project”) is a proposed vehicle depot-cum-office building for the Hong Kong Police Force (HKPF), the Food and Environmental Hygiene Department (FEHD), the Electrical and Mechanical Services Department (EMSD), the Government Logistics Department (GLD) and the Government Laboratory (GL) in Chai Wan. The Project will involve the construction and operation of an eight-storey vehicle depot-cum-office building (with a mezzanine floor above Level 3), including EMSD depot with facilities for government vehicle repair and maintenance and parking of government vehicles when not in operation. The area of the Project site will be about 7,000m².
- 1.1.2 The Environmental Impact Assessment (EIA) Report for the project (Register No. AEIAR-191/2015) was approved on 5 October 2015 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, Environmental Permits (EP) was granted on 17 December 2015 (EP-505/2015) for the construction and operation. Variations of EP (VEP) was applied after the issuance of the EP. The latest VEP was applied on 23 October 2019, and the corresponding EP (EP-505/2015/A) was issued by the Director of Environmental Protection (DEP) on 08 November 2019.
- 1.1.3 This Works Contract was awarded to Yau Lee Construction Limited (the Contractor) and the contract no. is SS H504.
- 1.1.4 The Chai Wan Government Complex and Vehicle Depot involves the following facilities:
- i. HKPF’s facilities
 1. HKPF’s Police Vehicle Pound and Examination Centre under Traffic Hong Kong Island;
 2. the storage facility of HKPF’s Store Management Division;
 3. a case property store for HKPF’s Crime Wing Headquarters;
 - ii. FEHD’s Vehicle Depot;
 - iii. EMSD’s Hong Kong Vehicle Depot;
 - iv. GLD’s Transport Pool; and
 - v. GL’s Specialist Laboratory.
- 1.1.5 As per Condition 2.4 of EP-505/2015/A, a Construction Noise Management Plan (CNMP) is required before the commencement of the Project.

1.2 Purpose of this Construction Noise Management Plan

- 1.2.1 Condition 2.4 of EP-505/2015/A for the project stipulated that to further reduce the construction noise impacts during examination periods of the Schools, including Hong Kong Institute of Vocational Education (Chai Wan) and the THEi New Campus, no later than one month before the commencement of construction of the corresponding component(s) of the Project, submit to the Director for approval an updated Construction Noise Management Plan (CNMP). The plan shall include:
- i. a proposal of construction noise mitigation measures, including the provision of noise barriers and enclosures for different types of construction activities to be carried out for the Project where applicable, and any other initiatives proposed by the Permit Holder; and
 - ii. administrative measures, including setting up a manned hotline or a channel of communication with the Schools, including Hong Kong Institute of Vocational Education (Chai Wan) and the THEi New Campus, to avoid noisy construction activities during examination.
- 1.2.2 AECOM Asia Co. Ltd. was commissioned by Yau Lee Construction Limited, to prepare the CNMP for the Project.
- 1.2.3 The layout of the Project and location of the noise sensitive receivers (NSRs) are shown in **Figure 1**.

2. Construction Works of the Project

2.1 Construction Activities

2.1.1 The major construction activities of the Project are Site formation, excavation and filling, foundation and main building construction.

2.2 Construction Programme

2.2.1 The construction works are expected to be conducted from October 2021 to December 2024. An updated construction programme for the Project prepared by Yau Lee Construction Limited is shown in **Appendix A**. The construction programme presents the construction activities to be undertaken and the tentative timeframe for each construction activity in corresponding worksites.

2.3 Plant Inventory

2.3.1 As recommended in the Approved EIA Report, Quiet Powered Mechanical Equipment (QPME) should be adopted for the construction works to minimise the noise impact at the NSRs. The plant inventory for individual construction activities under the Project, which the types, numbers, grouping and percentage usages of the PME with mitigated scenario by using QPME, is presented in **Appendix B**.

3. Construction Noise Assessment

3.1 Noise Sensitive Receiver

3.1.1 According to EP No. EP-505/2015/A for the project, CNMP is required for two NSRs, Hong Kong Institute of Vocational Education (Chai Wan) (NAP 201) and the THEi New Campus (NAP 801) since the predicted mitigated construction noise levels exceedance is expected during examination period. The THEi Campus have been in service since 2019, the NAP 801 of THEi Campus was revised to NAP 801a. Locations of these two NAPs are shown in **Figure 1**. Details of the NSRs with the predicted noise results are presented in **Table 1**.

Table 1. Summary of Predicted Noise Levels

NSR ID	NAP ID	NSR Description	Landuse	Noise Criteria, Leq (30-min), dB(A)	Maximum Construction Noise Levels, dB(A)		No. of months of exceedance
					Unmitigated	Mitigated	
NSR 2	NAP 201	Hong Kong Institute of Vocational Education (Chai Wan)	Educational	65	70	69	3
NSR 8	NAP 801a	THEi Campus	Educational	65	67	66	3

Note:

[1] Bold values denote exceedance of the EIAO-TM criteria of 65 dB(A) for schools during examination periods.

3.1.2 Communication channel by manned hotline was setup with Hong Kong Institute of Vocational Education (Chai Wan) and the THEi Campus, and the exam period for 2021/2022 academic year shown at **Table 2**. For exam period afterward, will be held in similar period, but the exact date would confirm by the school at the beginning of each academic year.

Table 2. Examination Period for 2021/2022 Academic Year

Hong Kong Institute of Vocational Education (Chai Wan)	THEi Campus
3 Jan 2022 to 11 Jan 2022	11 Dec 2021 to 24 Dec 2021
25 Apr 2022 to 29 Apr 2022	14 May 2022 to 28 May 2022
5 May 2022 to 14 May 2022	25 Jul 2022 to 30 Jul 2022

Hong Kong Institute of Vocational Education (Chai Wan)	THEi Campus
14 Jun 2022 to 17 Jun 2022	----
21 Jul 2022 to 27 Jul 2022	----

3.2 Assessment Criteria

- 3.2.1 Noise impacts generated by the construction of this Project have been assessed in accordance with the criteria given in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The construction noise standards for schools are 70 dB(A) at normal school days and 65 dB(A) during examination periods.

3.3 Assessment Methodology

- 3.3.1 The construction noise assessment has been conducted following the same methodology used in the Approved EIA Report based on the updated construction programme and plant inventory provided by Yau Lee Construction Limited.
- 3.3.2 Noise impacts generated by the construction of this Project are assessed in accordance with the methodology given in the *Technical Memorandum on Noise from Construction Work Other Than Percussive Piling (GW-TM)* under the Noise Control Ordinance.
- 3.3.3 Sound power levels (SWLs) of the equipment have been made reference from Table 3 of GW-TM. SWLs of the QPME have been made reference from EPD's Quality Powered Mechanical Equipment (QPME) labels.
- 3.3.4 It is assumed that all PME items required for a particular construction activity would be located at the notional source position, as defined in GW-TM.
- 3.3.5 To predict the noise level, PME items has been divided into groups 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 (SPL) of construction task at the NSRs is calculated based on the number of plant and the notional distance from the noise assessment points. The notional distances of the works area to the NSR are presented in **Appendix C**. If there are concurrent construction tasks, the noise levels at representative noise assessment points are predicted by adding up the SPLs of all concurrent construction tasks.
- 3.3.6 A positive 3 dB(A) façade correction has been added to the predicted noise levels in order to account for the façade effect at each noise assessment point. Noise impact at the worst affected sensitive façade of the NSR to the noise source is assessed.

4. Proposed Noise Mitigation Measures

4.1 Use of QPME

- 4.1.1 The noise mitigation measures proposed in the Approved EIA Report have been considered and reviewed in this CNMP, including use of QPME as summarised in **Table 3**, use of movable barriers/acoustic sheet barriers as summarised in **Table 4**, sequencing operation/grouping of PME and implement good site practices.
- 4.1.2 Extra QPME for bulldozer is proposed and the QPME as listed in **Table 3** would be used on this project. However, if the exact model specified in the references of the listed QPME are not available during the construction period, the model with SWL not higher than the listed SWL shall be adopted.

Table 3. QPME Recommended for Adoption during Construction Phase

PME	Reference ^[1]	SWL, dB(A)
Bulldozer	Ref 1	102
Crane, mobile/barge mounted(diesel)	EPD-10792	101
Excavator / loader, wheeled/ tracked	EPD-11386	92
Generator, standard	EPD-08950	80
Roller, vibratory	EPD-10386	94

Note:

[1] The SWLs are referred to the following references:

EPD – List of Quality Powered Mechanical Equipment Label (valid), as of 28th Sep 2021

Ref 1 – Appendix 5.2 of the approved EIA Report for Housing Sites in Yuen Long South (Register No. AEIAR-215/2017)

4.2 Movable Noise Barrier

4.2.1 Movable noise barriers/acoustic sheet barriers are proposed for certain PME as summarised in **Table 4**. The mitigation measures generally follow the suggestions in the Approved EIA Report. Following the assumptions in the Approved EIA Report, it is anticipated that suitably designed movable barriers/acoustic sheet barriers could achieve at least 5 dB(A) reduction. For a conservative assessment, only a reduction of 5 dB(A) is assumed. Movable barrier/acoustic sheet barrier material with surface mass at least 10kg/m² is recommended to achieve the predicted screening effect as suggested in the Approved EIA Report. Movable barrier/acoustic sheet barrier should have no openings or gaps. Their locations should be adjusted where and when necessary taking into consideration the locations and type of PME involved and the NSRs intended to be protected.

Table 4. Noise Mitigation Measures for Certain PME during Construction Phase

PME	Noise Mitigation Measures	Noise Reduction, dB(A)
Breaker, hand-held, mass >=20 kg and <=35 kg	Movable barrier/acoustic sheet barrier	5
Concrete corer	Movable barrier/acoustic sheet barrier	5
Generator, silenced, 75dB(A) at 7m	Movable barrier/acoustic sheet barrier	5
Generator, standard	Movable barrier/acoustic sheet barrier	5
Piling, vibrating hammer	Movable barrier/acoustic sheet barrier	5
Saw, circular, wood	Movable barrier/acoustic sheet barrier	5

4.3 Good Site Practice

4.3.1 Besides, to implement good site practices and noise management also mentioned in the Approved EIA Report to reduce noise impact of the site activities. The practices listed as below would be implement while carrying out construction works at site:

- i. Use only well-maintained and regularly-serviced plant during the works;
- ii. Turn off or throttle down the plant in intermittent use to a minimum;
- iii. Orient the plant known to emit noise strongly in one direction to face away from the NSRs;
- iv. Use silencers, mufflers and enclosures for plant where possible and maintain properly throughout the works;
- v. Site fixed plant as far away from NSRs as possible; and
- vi. Use stockpiles of excavated materials and other structures such as site buildings effectively to screen noise from the works.

4.4 Noise Assessment Results for Mitigated Scenario

4.4.1 The construction noise impacts for the construction works under the Project have been assessed based on the updated construction programme, plant inventory and proposed mitigation measures and are summarised in **Table 5**. Detailed assessment results are provided in **Appendix D**. The proposed mitigation measures described in Section 4.1 have been included in the assessment and hence only the mitigated scenario is presented.

4.4.2 Having implemented all practicable noise mitigation measures as stated in Section 4.1, the predicted noise levels at both NSRs fully comply with the EIAO-TM noise criteria of 65 dB(A) for schools during examination periods. The predicted noise levels at Hong Kong Institute of Vocational Education (Chai Wan) (NAP 201) is 59 dB(A). Comparing to the Approved EIA Report, the maximum predicted noise level reduces from 69 to 59 dB(A). For THEi Campus (NAP 801a), the predicted noise levels is 57 dB(A). Comparing to the Approved EIA Report, the maximum predicted noise level reduces from 66 to 57 dB(A). The duration of noise exceedance at Hong Kong Institute of Vocational Education (Chai Wan) and THEi Campus reduces from 3 months to no exceedance.

Table 5. Summary of Noise Assessment Result

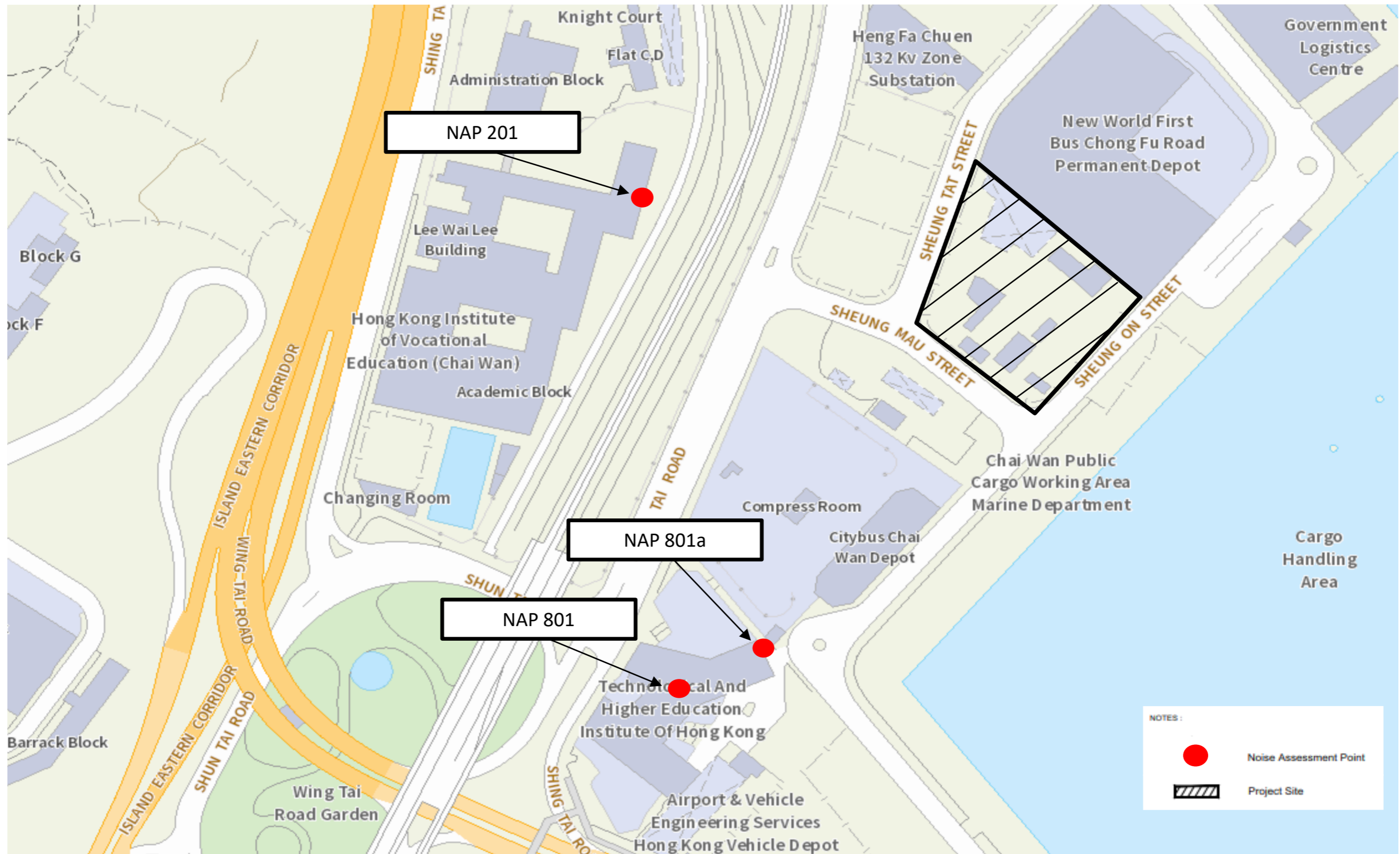
NAP ID	NSR	Noise Criteria, L _{eq} (30-min), dB(A)	Predicted Noise Level, L _{eq} (30-min), dB(A)	Exceedance, L _{eq} (30-min), dB(A)	No. of months of exceedance
NAP 201	Hong Kong Institute of Vocational Education (Chai Wan)	65	59-65	0	0
NAP 801a	THEi Campus	65	57-63	0	0

5. Conclusion

5.1.1 This CNMP has predicted the construction noise impact from Contract No. SS H504 to the two representative NSRs at Hong Kong Institute of Vocational Education (Chai Wan) (NAP 201) and THEi Campus (NAP 801a). This plan has considered the updated information on PME and works programme which would be adopted by the Contractor. With the implementation of mitigation measures in form of quiet plants and movable barriers/acoustic sheet barriers, comparing to the Approved EIA Report, the maximum predicted noise level at Hong Kong Institute of Vocational Education (Chai Wan) (NAP 201) reduces from 69 to 65 dB(A). For THEi Campus (NAP 801a), the maximum predicted noise level reduces from 66 to 63 dB(A). Noise levels at both representative NSRs are predicted to comply with the EIAO-TM noise criteria of 65 dB(A) during examination period.

5.1.2 Where necessary, 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.

Figure



Source: GeoInfo Map (www.geoinfo.gov.hk)

Yau Lee Construction Company Limited
 Chai Wan Government Complex and Vehicle Depot Construction Noise Management Plan

Locations of Source, NSR and Measurement

SCALE	N.T.S.	DATE	10-Nov-21
CHECK	JCHL	DRAWN	GCTY
		Figure No.	Rev
		1	-

Appendix A

Updated Construction Programme

Appendix B

Construction Plant Inventory

Appendix B Construction Plant Inventory

Construction Plant Inventory for the Proposed Project (Mitigated Scenario)

Construction Activities	PME	TM or Other Reference	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)
Activity 1 - Site Formation, Excavation and Filling								
Excavation and Filling	Air compressor, air flow >10m ³ /min and <=30 m ³ /min	CNP 002	1	102	100%	0	102	108
	Excavator/ loader, wheeled / tracked	EPD-11386 ^[2]	1	92	75%	0	91	
	Generator, Standard	EPD-08950 ^[2]	1	80	100%	-5	75	
	Dump truck, 5.5 tonne <gross vehicle weight=< 38 tonne	Other ^[1]	2	105	50%	0	105	
	Forklift	Other ^[4]	1	95	75%	0	94	
	Generator, silenced, 75dB(A) at 7m	CNP 103	1	95	100%	-5	90	
	Water Pump, submersible (electric)	CNP 283	10	85	100%	0	95	
	"Aquased" wastewater treatment plant	Other ^[4]	2	90	100%	0	93	
	Total							
Breaking excavated hard/ oversize materials	Breaker, hand-held, mass >= 20kg and <= 35kg	CNP 025	1	111	50%	-5	103	
	Excavator/ loader, wheeled / tracked	EPD-11386 ^[2]	2	92	75%	0	94	
	Total							
Ground Compression	Bulldozer	Other ^[3]	2	102	100%	0	105	
	Roller, vibratory	EPD-10386	2	94	100%	0	97	
	Total							
Activity 2 - Foundation								
General Foundation Construction	Air compressor, air flow > 30 m ³ /min	CNP 003	1	104	75%	0	103	
	Bar bender and cutter (electric)	CNP 021	3	90	75%	0	94	
	Generator	EPD-08950 ^[2]	2	80	100%	-5	78	
	Drill / grinder, hand-held (electric)	CNP 065	2	98	50%	0	98	
	Saw, circular, wood	CNP 201	2	108	75%	-5	105	
	Water pump, submersible (electric)	CNP 283	3	85	75%	0	89	
	Excavator / loader, wheeled / tracked	EPD-11386 ^[2]	1	92	75%	0	91	
	Dump truck, 5.5 tonne < gross vehicle weight =< 38 tonne	Other [1]	1	105	50%	0	102	
	Lorry	CNP 141	1	112	50%	0	109	
	Crane, mobile / barge mounted (diesel)	EPD-10792 ^[2]	1	101	75%	0	100	
	Water Pump, submersible (electric)	CNP 283	10	85	100%	0	95	
	"Aquased" wastewater treatment plant	Other ^[4]	2	90	100%	0	93	
Total							112	
Piling Works	Generator	EPD-08950 ^[2]	1	80	100%	-5	75	
	Piling, vibrating hammer	Other [1]	1	115	100%	-5	110	
	Total							
Concreting Works	Concrete lorry mixer	CNP 044	1	109	75%	0	108	
	Concrete pump, stationary / lorry mounted	CNP 047	1	109	75%	0	108	
	Generator	EPD-08950 ^[2]	1	80	100%	-5	75	
	Poker, vibratory, hand-held (electric)	Other ^[1]	1	102	100%	0	102	
	Dump truck, 5.5 tonne < gross vehicle weight =< 38 tonne	Other ^[1]	1	105	50%	0	102	
	Lorry, gross vehicle weight > 38 tonne	Other ^[1]	1	112	50%	0	109	
	Total							

Appendix B Construction Plant Inventory

Activity 3 - Main Building Construction							
General construction works	Air compressor, air flow > 10 m ³ /min and ≤ 30 m ³ /min	CNP 002	1	102	75%	0	101
	Bar bender and cutter (electric)	CNP 021	3	90	100%	0	95
	Crane, mobile / barge mounted (diesel)	EPD-10792 ^[2]	1	101	75%	0	100
	Crane, tower (electric)	CNP 049	1	95	100%	0	95
	Drill / grinder, hand-held (electric)	CNP 065	1	98	75%	0	97
	Generator	EPD-08950 ^[2]	1	80	100%	-5	75
	Breaker, hand-held, mass ≥ 20 kg and ≤ 35 kg	CNP 025	2	111	50%	-5	106
	Dump truck, 5.5 tonne < gross vehicle weight ≤ 38 tonne	Other ^[1]	1	105	50%	0	102
	Saw, circular, wood	CNP 201	3	108	70%	0	111
	Water Pump, submersible (electric)	CNP 283	10	85	100%	0	95
	"Aquased" wastewater treatment plant	Other ^[4]	2	90	100%	0	93
						Total	114
Concreting works	Concrete lorry mixer	CNP 044	1	109	75%	0	108
	Concrete pump, stationary / lorry mounted	CNP 047	1	109	75%	0	108
	Generator	EPD-08950 ^[2]	1	80	100%	-5	75
	Poker, vibratory, hand-held (electric)	Other ^[1]	1	102	100%	0	102
	Dump truck, 5.5 tonne < gross vehicle weight ≤ 38 tonne	Other ^[1]	1	105	50%	0	102
	Lorry, gross vehicle weight > 38 tonne	Other ^[1]	1	112	50%	0	109
						Total	114
Finishing	Drill, percussive, hand-held (electric)	CNP 064	3	103	50%	0	105
	Jig-saw, hand-held wood (electric)	Other ^[1]	1	99	50%	0	96
	Concrete corer	CNP 042	2	117	50%	-5	112
	Lorry, with crane / grab, 5.5 tonne < gross vehicle weight < 38 tonne	Other ^[1]	2	105	50%	0	105
						Total	114
							114

Notes:

- [1] Reference to Sound Power Levels of Other Commonly Used PME of Guidance Notes for Licence Application (valid), as of 28th Sep 2021
- [2] Reference to List of Quality Powered Mechanical Equipment Label (valid), as of 28th Sep 2021
- [3] Reference to Appendix 5.2 of the Approved EIA Report for Housing Sites in Yuen Long South (Register No. AEIAR-215/2017)
- [4] Reference to construction noise permit No. GW-RS0759-21 (valid), as of 10th Nov 2021

Appendix C

Notional Distance of Works Area and NSRs

Appendix C Notional Distance of Works Area and NSRs

NAP ID	Name of Building	Dist. (NSR to Site Boundary (A), m)	Dist. (Site Boundary to Notional Point (B), m)	Horz. Dist. (=A+B), m
NAP 201	Hong Kong Institute of Vocational Education (Chai Wan) - Academic Block	145	19	164
NAP 801a	THEi New Campus	180	17	197

Appendix D

Detailed Assessment Results
