



Demolition Noise Mitigation Measures Plan for the Existing Sha Tau Kok Sewage Treatment Plant

for

Contract No. DC/2018/03

EXPANSION OF SHA TAU KOK SEWAGE
TREATMENT WORKS PHASE 1 AND VILLAGE
SEWERAGE IN TONG TO

Rev. 5

Prepared by:


Jason Sin

Date: 05/05/2022

Approved by:

Site Agent: Ron Hung

Date:

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 2 of 16</i>

Environmental Permit No. EP-517/2017/A


Expansion of Sha Tau Kok Sewage Treatment Plant Works Phase I and Village Sewerage in Tong To

Reference EP Condition

Environmental Permit Condition: 2.9

Submission of Demolition Noise Mitigation Measures Plan (DNMMP)

The Permit holder shall submit a Demolition Noise Mitigation Measures Plan (DNMMP) no later than one month before the commencement of the demolition of the existing structures in the Sha Tau Kok Sewage Treatment Works (STKSW) and Sha Tau Kok Sewage Pumping Station (STKSPS). The DNMMP shall include the use of low-noise technology and equipment to minimize impact on the nearby noise sensitive receivers. Measures in the DNMMP shall be fully implemented.


Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 3 of 16</i>

Content

1. INTRODUCTION.....	4
1.1 Project Description.....	4
1.2 Purpose of this Demolition Noise Mitigation Measures Plan.....	4
2. CONSTRUCTION WORKS OF THE PROJECT	
2.1 Construction Activities.....	5
2.2 Construction Programme.....	5
2.3 Plant Inventory.....	5
3. AIREBORNE DEMOLITION NOISE ASSESSMENT	
3.1 Assessment Criteria.....	6
3.2 Assessment Methodology.....	6
3.3 Mitigation Measures.....	6
3.4 Noise Sensitive Receiver.....	9
3.5 Cumulative Impacts.....	14
3.6 Noise Assessment Results.....	14
4. CONCLUSION	16

APPENDIX

Appendix A	Layout of the Project and location of the NSRs
Appendix B	Tentative Construction Programme
Appendix C	Calculations for Predicted Construction Noise Levels
Appendix D	Location of the Temporary Noise Barrier
Appendix E	SWL of HDD equipment from CNP Report for Contract P560(R)

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 4 of 16</i>


1. Introduction

1.1 Project Description

- 1.1.1 The Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To Project aims to expand the treatment capacity of the existing Sha Tau Kok Sewage Treatment Works (STKSTW) and upgrade the submarine outfall to cope with the anticipated increase in sewage flow in Sha Tau Kok areas. The works comprise of demolition and reconstruction of STKSTW; construction of approximately 1.7 kilometres of submarine outfall with the methodology of Horizontal Directional Drilling, demolition of the existing Sha Tau Kok sewage pumping station and decommissioning of approximately 500 metres of twin rising mains and an existing submarine outfall; construction of approximately 520 metres gravity sewers in Sha Tau Kok town; construction of about 1 kilometre of gravity sewers for Tong To and ancillary works. As of this moment in the project, the demolition of the existing plant is required before being able to move forward to the expansion of STKSTW.
- 1.1.2 The Environmental Impact Assessment (EIA) Report for the Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To (Register No. AEIAR-207/2017) was approved on 14 February 2017 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) was issued on 15 February 2017 (EP-517/2017) for the construction and operation. Variations of EP (VEP) were applied after the issuance of EP. The latest VEP was applied 25 September 2019, and amendments incorporated on 18 October 2019 as EP No. EP-517/2017/A
- 1.1.3 This Works Contract No. DC/2018/03 was awarded to Build King Civil Engineering Limited-Kum Shing (S.F.) Construction Company Limited Joint Venture on 14 November 2018. EP No. EP-517/2017/A was also granted to the contractor.
- 1.1.4 As per Condition 2.9 of EP No. EP-517/2017/A, a Demolition Noise Mitigation Measures Plan (DNMMP) is required before the commencement of the demolition works of the existing plant.

1.2 Purpose of this Demolition Noise Mitigation Measures Plan

- 1.2.1 To minimize operation noise impact on the surrounding environment of the project, as per Condition 2.9 of EP No. EP-517/2017/A, a Demolition Noise Mitigation Measures Plan (DNMMP) is required to be submitted no later than one month before the commencement of the demolition of the existing structures in STKSTW, which is determined in the Tentative Construction Programme as shown in **Appendix B**. The DNMMP shall include the use of low-noise technology and equipment to minimize impact on the nearby noise sensitive receivers. Measures in the DNMMP shall be fully implemented. As demolition of STKSPS is scheduled in Aug to Oct 2023 as seen in **Appendix B**, the mitigation measures for demolition of STKSPS is not included in this DNMMP and will be submitted separately at least one month before the commencement of demolition of STKSPS in accordance with Condition 2.9 of EP-517/2017/A
- 1.2.2 The layout of the Project and location of the NSRs are shown in **Appendix A**.

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 5 of 16</i>

2. CONSTRUCTION WORKS OF THE PROJECT

2.1 Construction Activities

2.1.1 The major construction activities of the Project are summarised in **Table 2.1**


Table 2.1 Summary of Construction Tasks for the Project

Item	Major Construction Task
1	Construction of Temporary Sewage Treatment Plant (TSTP)
2	Diversion of sewage from existing STKSTW to TSTP
3	Demolition and reconstruction of existing STKSTW
4	Construction for new submarine outfall
5	Construction of gravity sewers for Tong To Village
6	Diversion of sewage from TSTP to new STW
7	Decommissioning of existing submarine outfall, STKSPS, rising main and TSTP

2.2 Construction Programme

2.2.1 All concurrent activities present on site is accounted for contributing to the noise level to surrounding environment. Notably both predrilling and HDD at submarine outfall are included as additional sources, as they are both concurrent activities to the demolition of existing STKSTW according to the updated construction programme prepared by Build King-Kum Shing Joint Venture as shown in **Appendix B**. The construction programme presents the construction and demolition activities to be undertaken and the tentative timeframe for each construction activity in corresponding worksites.

2.2.2 The demolition of STKSTW is proposed to be carried out from August to October 2020, while the tentative target of demolition of STKSPS is proposed to be in August to October 2023. All construction and demolition activities would be carried out during non-restricted hours, which include the daytime hours on working days which are not a Sunday or a public holiday between 0700-1900.

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 6 of 16</i>

3. AIRBORNE DEMOLITION NOISE ASSESSMENT

3.1 Assessment Criteria

- 3.1.1 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 are presented in **Table 3.1**.

Table 3.1 Daytime Construction Noise Criteria (0700-1900)

Use	Noise Level in L_{eq} (30-min), dB(A) (0700-1900)
Residential	75
Educational	70 / 65 (during exams)
*Place of Public Worship	75

Note:


* Place of Public Worship assumed similar to residential premises.

3.2 Assessment Methodology

- 3.2.1 The construction noise assessment has been conducted following the same methodology used in the Approved EIA Report.
- 3.2.2 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.
- 3.2.3 Sound power levels (SWLs) of the equipment have been made reference from Table 3 of GW-TM. Where no relevant SWL is found in the GW-TM, reference has been made to other approved EIA Reports.
- 3.2.4 With reference to the construction programme in **Appendix B**, all PME's for expansion of STKSTW, demolition of existing STKSTW and construction of submarine outfall using HDD were accounted for.
- 3.2.5 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.


3.3 Mitigation Measures

- 3.3.1 The noise mitigation measures proposed in the Approved EIA Report have been considered and reviewed in the DNMMMP, including the adoption of noise barriers.
- 3.3.2 For the purpose of this DNMMMP, quieter construction methods were first considered with reference to EPD's Good Practices on Mitigating Construction Noise (Quieter Construction

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 7 of 16</i>

Equipment/Quieter Construction Methods/Mitigation Measures;
https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/index.html). First, a concrete crusher (hydraulic) is proposed for the breaking down of large pieces of concrete left from the demolition works carried out. Compared to using a breaker for the task, the hydraulic crusher is considered a quieter construction method suited for the task as seen on the EPD website https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/home2/quieter-construction-methods/item/51-hydraulic-crusher.html. Other low-noise technologies mentioned in the EPD website were considered such as the diamond wire saw, however since the majority of the demolition works are underground structures, especially the Oxidation Ditch (OD) which is a long oval shaped pool with a large thick footing sitting underground, therefore the wire saw could not be threaded underneath the footing for cutting the underground structures. High pressure water jetting was also considered for the demolition works, but similarly to the diamond wire saw it is not suitable for the majority of the demolition works, as the depth of demolition is up to 1.4m below ground. It is not efficient and would take a much longer time compared to have a concrete crusher break up large concrete. Furthermore, since the COVID-19 pandemic is rampant and all structures to be demolished contain sludge or used to hold sewage, water jetting was considered totally inappropriate and could pose a health and safety hazard which could endanger the workers, especially when the project site has a small footprint. Moreover, blade saw was also considered for demolition works, however since penetration depth is limited due to size of blade, several layers have to be saw cut to penetrate 1.4m depth of the underground structure. It is a time-consuming procedure, as we are on tight program of demolition. Blade saw method is not efficient in demolition works. In-addition, bursting system and non-explosive chemical expansion agent mentioned in the EPD website were considered, however pre-drilled holes should be placed in advance for installation of hydraulic bursters. Due to massive structure to be demolished, it is not efficient and would take a much longer time compared to have a concrete crusher break up large concrete.

After consulting with the Project Engineer on the inherent site constraints which include small site working area, health and safety concerns due to ongoing COVID-19 pandemic with the upcoming demolition of existing sewage plant and the demolition works being a critical path to the progress of the Project, it was decided that the PME employed to be kept minimal to allow enough working area but able to meet Project deadlines. With reference to **Figure 1** taken from the EPD website, the usage of an excavated mounted breaker was the only available option that suits the site constraints and is accepted by the Project Engineer. None of the options of QPME listed on EPD is able to assist in replacing a breaker to penetrate the foundation and footing of the existing Oxidation Ditch (OD) Tank. However a hydraulic concrete breaker (as referenced on EPD website as a quieter construction method) as mentioned previously is able to lower the amount of noise created for the purpose of breaking large concrete produced by a breaker before transported offsite, and is proposed to be employed for the demolition works to be carried out. We will maximise the use of concrete

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 8 of 16</i>

crusher (hydraulic) during the demolition works, while the traditional breaker would only be used when there are inevitable site constraints.

Traditional equipment/methods

Excavator-mounted Breaker (95-105)

Handheld Breaker (85-104)

Quieter equipment/methods

High Pressure Water Jetting (79)

Hand-held Concrete Crusher (67-69)

Quieter type Wire Saw or Diamond Wire Saw (76-81)


Hydraulic Crusher for Concrete Breaking (67-69)

Quieter type Blade Saw (76-81)

Non-Explosive Chemical Expansion Agent (60-65)

Figure 1. Construction equipment and methods referenced on EPD Website
(https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/demolition.html)

In addition to using quieter equipment, the use of noise barriers was also planned to implement during the period of demolition works, as recommended by the EPD as a mitigation measure (https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/index.html). A continuous noise barrier is to be erected along the fencing of the site boundary to enclose the area to be demolished as shown in **Appendix D**. Since the closest NSR9 can be blocked from view with a height of 2m as well as demolition works are to be involved in below ground level, it is assumed that a noise barrier of 2m will be sufficient to reduce noise level. As proven in

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 9 of 16</i>

other EIA reports, by implementing the acoustic sheet barriers a 5 to 10dB(A) reduction can be achieved. For a conservative estimation for calculating the noise assessment results, a reduction of 5 dB(A) will be assumed. As the concrete breakers employed on site do not belong to the QPME category, additional noise barriers will be wrapped around the breaker to reduce the noise level emitted during demolition. A summary of implementation of noise mitigation measures is included in **Table 3.2**.

Table 3.2 Implementation of Mitigation Measures

Mitigation Measure	When	Where	What requirement
Concrete Crusher (Hydraulic)	During the excavation and concrete offsite	In STKSTW	Operated by a skilled worker with the respective license. Work area of the Concrete crusher (Hydraulic) must be fenced off
Noise Barrier	For the whole demolition works	Surrounding the site perimeter of STKSTW	Erect along site boundary continuously with no gaps in between and 2m in height
Covering Breaker with noise barrier	For the whole demolition works	Covering the Breaker mounted on the excavator	Using 1 sheet of noise barrier per breaker to wrap around with no gaps and secure the noise barrier with cable ties

3.4 Noise Sensitive Receiver

- 3.4.1 According to EP No. EP-517/2017/A of the Project, DNMMMP is required for nine NSRs: Village house at Ha Tam Shui Hang, Village house at Ha Tam Shui Hang, Sha Tau Kok Central Primary School, Block 1 Sha Tau Kok Chuen, Sun Ying Lau, No. 10 Sha Tau Kok Road, Block 45 Sha Tau Kok Chuen, Sha Tau Kok Chuen Ying Hoi House, Building along Shun Lung Street and Tin Hau Temple. Locations of these NSRs are shown in **Appendix A**. Noise Criteria of NSR according to the EIAO-TM are presented in **Table 3.3**. Construction of NSR7 (Sha Tau Kok Chuen Ying Hoi House) was completed in 2017, we have carried out desktop survey and concluded there is no change to all identified NSRs in terms of nature of use and distance to the works area according to the site survey in March 2020.


Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 10 of 16</i>

Table 3.3 Noise Criteria of NSR

NSR ID	NSR Description	Landuse	Noise Criteria, L_{eq} (30-min), dB(A)
NSR 1	Village house at Ha Tam Shui Hang	Residential	75
NSR 2	Village house at Ha Tam Shui Hang	Residential	75
NSR 3	Sha Tau Kok Central Primary School	Educational	70 / 65 (during exams)
NSR 4	Block 1, Sha Tau Kok Chuen	Residential	75
NSR 5	Sun Ying Lau, No.10 Sha Tau Kok Road	Residential	75
NSR 6	Block 45, Sha Tau Kok Chuen	Residential	75
NSR 7	Sha Tau Kok Chuen Ying Hoi House	Residential	75
NSR 8	Building along Shun Lung Street	Residential	75
NSR 9	Tin Hau Temple	Place of Public Worship	75

Note:

- According to EIAO-TM, noise criteria for residential premises: 75dB(A); educational institutions 70dB(A) (65dB(A) during examinations). Noise criteria for NSR 9 (Tin Hau Temple) assumed similar to residential premises.

To accurately predict the noise level for the aforementioned NSRs, a list of PME expected to be used on the site for all concurrent activities during the demolition of STKSTW with their respective noise levels is compiled in **Table 3.4**. An updated predicted construction noise level is tabulated in the following **Table 3.5**. All calculations are included in **Appendix C**. It is noted that the SWL for equipments referenced in **Appendix E** were identical models provided for contract P560(R) as well as this project DC/2018/03. The plant inventory and utilization rate for PME's were also confirmed with the Project Engineer to be feasible and practicable for the intended construction programme. Some of the PME listed in **Table 3.4** would not be operated concurrently (e.g. concrete crusher and breaker) and a conservative approach has been adopted for assessment which assumed all PME would be operating at the same time.



Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 11 of 16</i>

Table 3.4 PMEs to adopt and their respective SWL for all activities on site

Type of PME	TM Code	No. of Units	SWL-dB(A)	On-time %	Corrected SWL – dB(A)	Total SWL-dB(A)
A. Expansion of STKSTW**						
Drill rig	*	3	110	100%	114.8	114.8
B. Demolition works for existing STKSTW**						
Generator	CNP101	2	108	100%	111.1	120.6
Dump Truck, 5.5 tonne < gross vehicle weight < 38 tonne	*	1	105	50%	102.0	
Excavator	CNP081	1	112	75%	111.0	
Breaker, excavator mounted (hydraulic)	CNP028	1	122	50%	119.0	
Water pump, submersible, electric	CNP283	2	85	100%	88.0	
Concrete Crusher (hydraulic)	*	1	103	75%	102	
Lorry with crane/grab, gross vehicle weight > 38 tonne	CNP141	1	112	50%	109.0	
C. Construction of Submarine outfall using HDD						
HDD casing rig (Hydraulic Station with mitigation measures from Appendix E)	#	1	110	100%	110.0	119.0
Power Pack for HDD Casing Rig (Generator)	CNP 101	1	108	100%	108.0	
Slurry Pump	*	1	105	100%	105.0	
Mud pump	*	1	109	100%	109.0	
Slurry Mixing Tank	#	1	90	100%	90.0	
Mud buffer Tank (with 2 stirrer and centrifuge)	#	1	92	100%	92.0	
Mud Processor	#	1	107	100%	107.0	
Crane, electric	CNP048	2	112	100%	115.0	
Lorry with crane/grab, 5.5	*	1	105	100%	105.0	

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 12 of 16</i>

tonne < gross vehicle weight < 38 tonne						
Generator	CNP101	2	108	100%	111.1	

* Sound power levels of other commonly used PME (Guidance Notes for License Application in EPD Website)

** Demolition works of existing STKSTW only coincide with the GI works of expansion of STKSTW, for which entails the pre-drilling of the site. Only drill rig is used for GI works of expansion of STKSTW.


Equipments not found in EPD's Sound Power Level of Other Commonly used PME. SWL is referenced with CNP Report for Contract P560(R) shown in **Appendix E**. A conservative +3db(A) is added to the measured SWL of equipments as mentioned in the report.

Table 3.5 Predicted Construction Noise Level with assumed PME

Noise Sensitive Receivers	Construction Works Involved	Distance of NSR from Notional Point	Unmitigated Sound Power Level	Predicted Noise Level (unmitigated)	Total Predicted Noise Level (unmitigated)
		m	dB(A)	dB(A)	dB(A)
NSR1	A. Expansion of STKSTW	143	114.8	66.7	76
	B. Demolition works of existing STKSTW	143	120.6	72.5	
	C. Construction of submarine outfall using HDD	142	119.0	71.0	
NSR2	A. Expansion of STKSTW	150	114.8	66.2	75
	B. Construction of submarine outfall using HDD	150	120.6	72.1	
	C. Construction of submarine outfall using HDD	162	119.0	69.8	
NSR3	A. Expansion of STKSTW	405	114.8	57.6	67
	B. Demolition works of existing STKSTW	405	120.6	63.5	
	C. Construction of submarine outfall using HDD	456	119.0	60.9	
NSR4	A. Expansion of STKSTW	170	114.8	65.2	74
	B. Demolition works of existing STKSTW	170	120.6	71.0	
	C. Construction of submarine outfall using HDD	214	119.0	67.4	
NSR5	A. Expansion of STKSTW	199	114.8	63.8	72
	B. Demolition works of existing STKSTW	199	120.6	69.7	
	C. Construction of submarine outfall using HDD	252	119.0	66.0	
NSR6	A. Expansion of STKSTW	195	114.8	64.0	73
	B. Demolition works of existing STKSTW	195	120.6	69.8	
	C. Construction of submarine outfall using HDD	252	119.0	66.0	
NSR7	A. Expansion of STKSTW	320	114.8	59.7	68
	B. Demolition works of existing STKSTW	320	120.6	65.5	
	C. Construction of submarine outfall using HDD	375	119.0	62.6	
NSR8	A. Expansion of STKSTW	395	114.8	57.8	67
	B. Demolition works of existing STKSTW	395	120.6	63.7	
	C. Construction of submarine outfall using HDD	452	119.0	60.9	
NSR9	A. Expansion of STKSTW	90	114.8	70.7	79
	B. Demolition works of existing STKSTW	90	120.6	76.6	
	C. Construction of submarine outfall using HDD	135	119.0	71.4	

Notes:

- 1) As-built distance values are adopted in the assessment, refer to **Appendix C** for detailed calculations.
- 2) 3dB(A) façade correction has been included in the Predicted Noise Level.
- 3) EIAO-TM daytime construction noise standards: residential premises 75dB(A); educational institutions 70dB(A) (65dB(A) during examinations). Noise criteria for NSR 9 (Tin Hau Temple) assumed similar to residential premises.

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: <i>Page 14 of 16</i>

3.5 Cumulative Impacts

- 3.5.1 Based on the Approved EIA Report, Sediment Removal at Sha Tau Kok Fish Culture Zone, Boat Shelter and Approach Channel (CEDD), and CE 78/2014 (DS) Drainage Improvement Works at North District – Package B (DSD) were identified to be concurrent with the Project.
- 3.5.2 The CEDD sediment removal project will mainly be marine dredging works conducted in the Starling Inlet. Details of the construction works and programme are not yet available at the time of assessment. Nonetheless, it is envisaged that such dredging works would require limited construction equipment and cumulative noise impact is not expected. Close liaison with responsible department was proposed to carry out the formulation of a best programming to minimise project interfaces.
- 3.5.3 As for the drainage improvement works, the project is still under planning and design stage. The project engineer of the drainage improvements works has been contacted and it was advised that their works was anticipated to be commenced in late 2022. As the demolition works of existing STKSTW is scheduled to be completed by October 2020 for which the drainage improvement works have not yet started, adverse cumulative impact is not expected. Cumulative impact due to drainage improvement works will be further reviewed prior to demolition of STKSPS in Year 2024.

3.6 Noise Assessment Results


- 3.6.1 The airborne construction noise impacts for the construction works under the Project have been assessed and summarized in **Table 3.6**.
- 3.6.2 Having implemented all practicable noise mitigation measures as stated and recommended in the Approved EIA Report, the predicted noise levels for all NSRs fully comply with the EIAO-TM noise criteria of 75 dB(A) for residential dwelling. As summarized in the following table, the maximum predicted noise level is at 74 dB(A) for NSR 9 Tin Hau Temple and the predicted noise level for NSR 3 is 62 dB(A), well under the noise standard for education NSR of 70 dB(A)/65 dB(A) (during exams). Detailed calculations are included in **Appendix C**.

Table 3.6 Summary of Noise Assessment Result

Noise Sensitive Receivers	Construction Works Involved	Distance of NSR from Notional Point	Unmitigated Sound Power Level	Predicted Noise Level (unmitigated)	Total Predicted Noise Level (unmitigated)	Mitigated 1 Sound Power Level	Predicted Noise Level (Mitigated 1)	Total Predicted Noise Level (Mitigated 1)
		m	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
NSR1	A. Expansion of STKSTW	143	114.8	66.7	76	109.8	61.7	71
	B. Demolition works of existing STKSTW	143	120.6	72.5		115.6	67.5	
	C. Construction of submarine outfall using HDD	142	119.0	71.0		114.0	66.0	
NSR2	A. Expansion of STKSTW	150	114.8	66.2	75	109.8	61.2	70
	B. Construction of submarine outfall using HDD	150	120.6	72.1		115.6	67.1	
	C. Construction of submarine outfall using HDD	162	119.0	69.8		114.0	64.8	
NSR3	A. Expansion of STKSTW	405	114.8	57.6	67	109.8	52.6	62
	B. Demolition works of existing STKSTW	405	120.6	63.5		115.6	58.5	
	C. Construction of submarine outfall using HDD	456	119.0	60.9		114.0	55.9	
NSR4	A. Expansion of STKSTW	170	114.8	65.2	74	109.8	65.2	74
	B. Demolition works of existing STKSTW	170	120.6	71.0		115.6	71.0	
	C. Construction of submarine outfall using HDD	214	119.0	67.4		114.0	67.4	
NSR5	A. Expansion of STKSTW	199	114.8	63.8	72	109.8	63.8	72
	B. Demolition works of existing STKSTW	199	120.6	69.7		115.6	69.7	
	C. Construction of submarine outfall using HDD	252	119.0	66.0		114.0	66.0	
NSR6	A. Expansion of STKSTW	195	114.8	64.0	73	109.8	64.0	73
	B. Demolition works of existing STKSTW	195	120.6	69.8		115.6	69.8	
	C. Construction of submarine outfall using HDD	252	119.0	66.0		114.0	66.0	
NSR7	A. Expansion of STKSTW	320	114.8	59.7	68	109.8	54.7	63
	B. Demolition works of existing STKSTW	320	120.6	65.5		115.6	60.5	
	C. Construction of submarine outfall using HDD	375	119.0	62.6		114.0	57.6	
NSR8	A. Expansion of STKSTW	395	114.8	57.8	67	109.8	52.8	62
	B. Demolition works of existing STKSTW	395	120.6	63.7		115.6	58.7	
	C. Construction of submarine outfall using HDD	452	119.0	60.9		114.0	55.9	
NSR9	A. Expansion of STKSTW	90	114.8	70.7	79	109.8	65.7	74
	B. Demolition works of existing STKSTW	90	120.6	76.6		115.6	71.6	
	C. Construction of submarine outfall using HDD	135	119.0	71.4		114.0	66.4	

Notes:

- 1) As-built distance values are adopted in the assessment, refer to **Appendix C** for detailed calculations.
- 2) 3dB(A) façade correction has been included in the Predicted Noise Level.
- 3) EIAO-TM daytime construction noise standards: residential premises 75dB(A); educational institutions 70dB(A) (65dB(A) during examinations). Noise criteria for NSR 9 (Tin Hau Temple) assumed similar to residential premises.

Rev.: 5	Build King – Kum Shing Joint Venture	 BUILD KING - KUM SHING JV
Title: Demolition Noise Mitigation Measures Plan for the Existing Sewage Treatment Plant Contract No. DC/2018/03 Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To		Page #: Page 16 of 16












4 CONCLUSION

- 4.1.1 This DNMMP has predicted the construction noise impact from Contract No. DC/2018/03 to the nine NSRs determined in the Approved EIA Report. This plan has taken into account the recommendations of mitigation measures as suggested in the Approved EIA Report which would be adopted by the Contractor. With the implementation of mitigation measures in the form of movable barriers/acoustic sheet barriers, the maximum predicted noise level for all NSRs do not exceed the noise standards of 75 dB(A) for residential areas or 70 dB(A) (65 dB(A) during examinations) for educational institutions nor violate the Noise Control Ordinance
- 4.1.2 To ensure the proposed measures would be implemented by the *Contractor* as per this DNMMP, the *Project Manager's* Representative would conduct daily site checking and the ET and IEC would conduct regular site inspections weekly and monthly respectively to check the implementation of the proposed measures performed by the *Contractor*. If implementation of the proposed measures is observed to be improper by ET / IEC during the regular inspections, the *Contractor* should rectify the problem immediately and ET / IEC will record the finding in their site checklists for record. According to the EM&A Manual, weekly noise monitoring at the NSR 6 and NSR 8 would be conducted by the ET. In case noise exceedance is recorded by ET, the *Contractor / Project Manager's* Representative / IEC would be notified and appropriate actions should be followed as stated in the Event and Action Plan of EM&A Manual.
- 4.1.3 Where necessary, further review and update will be performed if further demolition works carried out in the Project, and liaison with affected parties is recommended to minimize construction noise impacts as far as practicable.

Appendix A

Layout of the Project and location of the NSRs

LEGEND:

-  PROPOSED EXPANSION OF SEWAGE TREATMENT WORKS
-  PROPOSED DEMOLITION OF SEWAGE PUMPING STATION
-  PROPOSED GRAVITY SEWER
-  PROPOSED SENER BY TRENCHLESS METHOD
-  NOISE SENSITIVE RECEIVER
NSR 1
-  PROPOSED SUBMARINE OUTFALL
-  DECOMMISSION OF EXISTING RISING MAIN
-  ABANDONMENT OF EXISTING EFFLUENT OUTFALL
-  INDICATIVE LOCATION OF LAUNCHING PIT FOR HDD
-  INDICATIVE LOCATION OF RECEIVING PIT FOR HDD
-  300m STUDY AREA

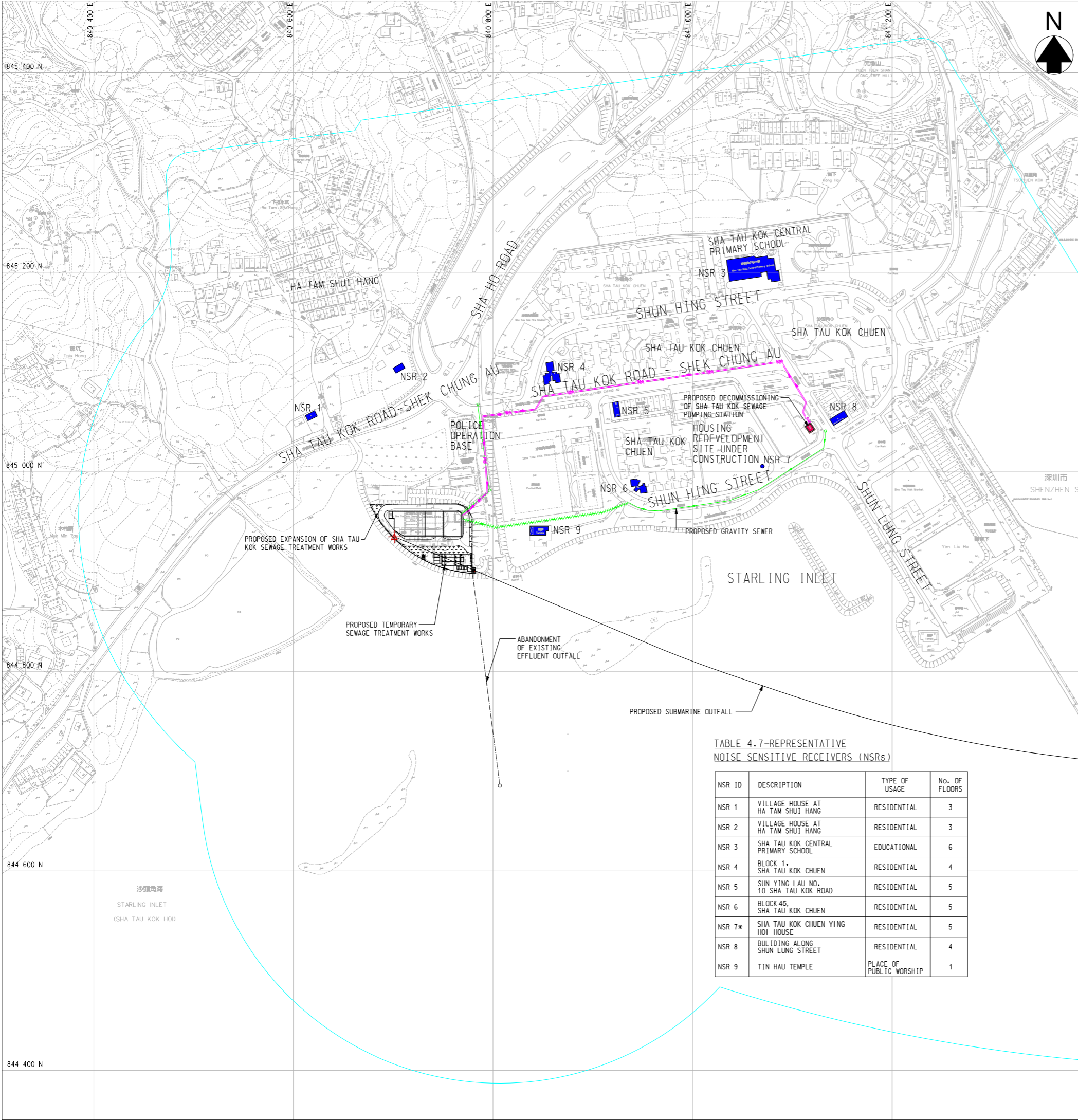
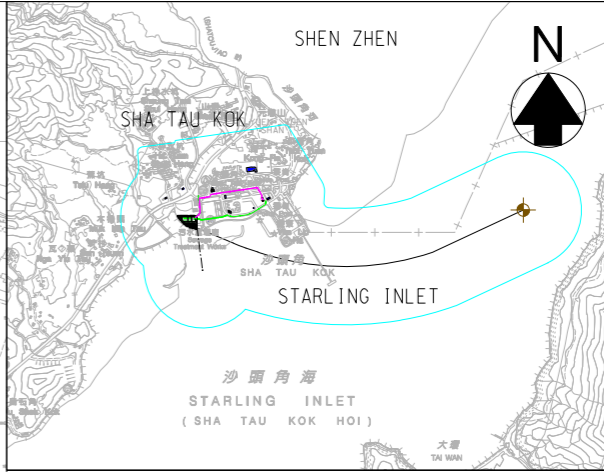


TABLE 4.7-REPRESENTATIVE NOISE SENSITIVE RECEIVERS (NSRs)

NSR ID	DESCRIPTION	TYPE OF USAGE	No. OF FLOORS
NSR 1	VILLAGE HOUSE AT HA TAM SHUI HANG	RESIDENTIAL	3
NSR 2	VILLAGE HOUSE AT HA TAM SHUI HANG	RESIDENTIAL	3
NSR 3	SHA TAU KOK CENTRAL PRIMARY SCHOOL	EDUCATIONAL	6
NSR 4	BLOCK 1, SHA TAU KOK CHUEN	RESIDENTIAL	4
NSR 5	SUN YING LAU NO. 10 SHA TAU KOK ROAD	RESIDENTIAL	5
NSR 6	BLOCK 45, SHA TAU KOK CHUEN	RESIDENTIAL	5
NSR 7*	SHA TAU KOK CHUEN YING HOI HOUSE	RESIDENTIAL	5
NSR 8	BUILDING ALONG SHUN LUNG STREET	RESIDENTIAL	4
NSR 9	TIN HAU TEMPLE	PLACE OF PUBLIC WORSHIP	1

Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	JW	HTL	SZ
Date	MAY2015	MAY2015	MAY2015
Approved			

PRELIMINARY

Agreement no.
Project title
EXPANSION OF SHA TAU KOK SEWAGE TREATMENT WORKS

Drawing title
LOCATION PLAN OF PROPOSED NOISE MONITORING STATION AND NOISE SENSITIVE RECEIVERS

Drawing no. **APPENDIX A** Revision **-**

Scale **A1 1 : 2000 A3 1 : 4000**

 香港特別行政區政府渠務署
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE SERVICES DEPARTMENT

 BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

**ANNEX 4B
PHOTOS OF NOISE SENSITIVE RECEIVERS**

	
<p>NSR 1</p>	<p>NSR 2</p>
	
<p>NSR 3</p>	<p>NSR 4</p>
	
<p>NSR 5</p>	<p>NSR 6</p>

Expansion of Sha Tau Kok Sewage Treatment Works



NSR 7



NSR 8



NSR 9

Appendix B

Tentative Constructive Programme



EXPANSION OF SHA TAU KOK SEWAGE TREATMENT WORKS PHASE 1 AND VILLAGE SEWERAGE IN TONG TO



Activity ID	Activity Name	Remaining Duration	Start	Finish	Total Float	Calendar	2020												2021
							May 19	Jun 20	Jul 21	Aug 22	Sep 23	Oct 24	Nov 25	Dec 26	Jan 27				
3 Month Rolling Programme (2020-07 to 2020-10)																			
2.0 Access Date																			
KDA1000	Portion W1 (within 90 days from Starting Date)	0	14-Jan-19 A																
KDA1010	Portion W2 (within 549 days from Starting Date)	0	23-Mar-20 A																
KDA1020	Portion W3 (within 90 days from Starting Date)	0	18-Feb-19 A																
KDA1030	Portion W4 (Starting Date)	0	21-Nov-18 A																
KDA1040	Portion W5 (within 549 days from Starting Date)	0	20-Jul-20*		-59														
KDA1050	Works Area for Site Accommodation (within 90 days from Starting Date)	0	27-Nov-18 A																
3.0 Sectional Completion Date																			
KSSC1000	Section 1 Commissioning of Temporary Sewage Treatment Plant	0		21-Jul-20 A															
KSSC1010	Section 2 Completion of Submarine Outfall	0		17-Jan-22*	0														
KSSC1020	Section 3 Commissioning of Sha Tau Kok Sewage Treatment Works	0		20-Jul-23*	0														
KSSC1030	Section 4 Completion of Tong To Village Sewerage Works	0		22-Feb-22*	0														
KSSC1040	Section 5 Whole of the Works excluding Section 1 to 4	0		19-Jul-24*	0														
4.0 Planned Sectional Completion of the Works																			
KDPC1000	Section 1 Commissioning of Temporary Sewage Treatment Plant	0		21-Jul-20 A															
5.0 Preliminaries, Submission, Contractor's Design Submission and Approval																			
6.0 Section 1 Temporary Sewage Treatment Plant																			
6.1 Civil Works																			
SITSTC1070	Rising Main for Sewage Diversion to IPS	0	21-Nov-19 A	23-Mar-20 A															
SITSTC1080	Diversion of Sewage to IPS via new Rising Main	0	24-Mar-20 A	25-Apr-20 A															
6.2 E&M Works																			
SITSTE1081	Energization (2nd Source)	0	15-May-20 A	18-Jun-20 A															
SITSTE1110	BS Works and Fire Service Installation Works	0	20-Jan-20 A	13-Jul-20 A															
SITSTE1115	WSD Inspection and Issuance of Water Supply Certificate	0	20-Mar-20 A	14-Jul-20 A															
SITSTE1120	FSD Inspection and Issuance of Acceptance Letter	0	01-Apr-20 A	26-Aug-20 A															
SITSTE1130	Rectification of Defect	73	22-Jul-20 A	14-Oct-20*	0														
6.3 T&C																			
SITSTC1030	Plant Commissioning Phase (notification + test + lab result)	0	22-May-20 A	21-Jul-20 A															
6.4 Handover of Existing STK STW and Operation Period																			
SITSTOP1030	Start of TSTP Operation Period	0	22-Jul-20 A																
7.0 Section 2 Submarine Outfall																			
7.1 Preparation Works																			
S2HDDP1000	Coordination with owner of STK Fish Culture Zone	100	30-Aug-19 A	27-Oct-20	326														
S2HDDP1035	Application and Approval of MDN for Temporary Support Frame	30	05-Sep-20 A	18-Aug-20	142														
S2HDDP1040	Application and Approval of MDN for HDD sea side operation	30	05-Sep-20 A	18-Aug-20	168														
S2HDDP1080	EPD Approval to PSQR and allocation of Marine Dumping Ground	0	05-May-20 A	03-Jul-20 A															
S2HDDP1090	Obtain Dumping Location from MFC / EPD	0	01-Jun-20 A	09-Jul-20 A															
S2HDDP1100	Application and Approval of Marine Dumping Permit	60	20-Jul-20	17-Sep-20*	317														
S2HDDP1110	Application and Approval of Operation License of HDD Barge by Marine Department	9	20-Jul-20	28-Jul-20	167														
7.2 Temporary Support Frame at Sea Side																			

- ◆ Milestone
- Critical Activity
- Non-Critical Activity
- Remaining Level of Effort
- Actual Work



DC/2018/03
3 Month Rolling Programme 2020-07
 Data Date: 20-Jul-20 Run Date: 20-Jul-20

Project ID :Mth Update_202009-2
 Layout : 3-Mth Rolling Programme
 Page 1 of 2

Monthly Revised Programme (2020-07)			
Date	Revision	Checked	Approved
20-Jul-20	Rev 0	KY Yeung	RON

Appendix C

Calculations for Predicted Construction Noise Levels

Location of NSR:

Village House at Ha Tam Shui Hang NSR 1 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	143	-51.1	-5	3	62	57
	*	110	100%	110.0	1	110.0	143	-51.1	-5	3	62	57
	*	110	100%	110.0	1	110.0	143	-51.1	-5	3	62	57
114.8											66.7	61.7

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	143	-51.1	-5	3	60	55
	CNP 101	108	100%	108	1	108	143	-51.1	-5	3	60	55
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	143	-51.1	-5	3	37	32
	CNP 283	85	100%	85	1	85.0	143	-51.1	-5	3	37	32
Dump Truck	*	105	50%	102	1	102	143	-51.1	-5	3	54	49
Excavator	CNP 081	112	75%	111	1	111	143	-51.1	-5	3	63	58
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	143	-51.1	-5	3	71	66
Concrete crusher, excavator mounted	*	103	75%	102	1	102	143	-51.1	-5	3	54	49
Lorry with crane/grab	CNP 141	112	50%	109	1	109	143	-51.1	-5	3	61	56
120.6											72.5	67.5

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	142	-51.0	-5	3	62	57
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	142	-51.0	-5	3	60	55
Slurry Pump	*	105	100%	105	1	105	142	-51.0	-5	3	57	52
Mud Pump	*	109	100%	109	1	109	142	-51.0	-5	3	61	56
Slurry Mixing Tank	*	90	100%	90	1	90	142	-51.0	-5	3	42	37
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	142	-51.0	-5	3	44	39
Mud Processor	*	107	100%	107	1	107	142	-51.0	-5	3	59	54
Crane, electric	CNP 048	112	100%	112	1	112	142	-51.0	-5	3	64	59
	CNP 048	112	100%	112	1	112	142	-51.0	-5	3	64	59
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	142	-51.0	-5	3	57	52
Generator, standard	CNP 101	108	100%	108	1	108	142	-51.0	-5	3	60	55
	CNP 101	108	100%	108	1	108	142	-51.0	-5	3	60	55
119.0											71.0	66.0

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Village House at Ha Tam Shui Hang NSR 2 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	150	-51.5	-5	3	61	56
	*	110	100%	110.0	1	110.0	150	-51.5	-5	3	61	56
	*	110	100%	110.0	1	110.0	150	-51.5	-5	3	61	56
114.8											66.2	61.2

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	150	-51.5	-5	3	59	54
	CNP 101	108	100%	108	1	108	150	-51.5	-5	3	59	54
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	150	-51.5	-5	3	36	31
	CNP 283	85	100%	85	1	85.0	150	-51.5	-5	3	36	31
Dump Truck	*	105	50%	102	1	102	150	-51.5	-5	3	53	48
Excavator	CNP 081	112	75%	111	1	111	150	-51.5	-5	3	62	57
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	150	-51.5	-5	3	70	65
Concrete crusher, excavator mounted	*	103	75%	102	1	102	150	-51.5	-5	3	53	48
Lorry with crane/grab	CNP 141	112	50%	109	1	109	150	-51.5	-5	3	60	55
120.6											72.1	67.1

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	162	-52.2	-5	3	61	56
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	162	-52.2	-5	3	59	54
Slurry Pump	*	105	100%	105	1	105	162	-52.2	-5	3	56	51
Mud Pump	*	109	100%	109	1	109	162	-52.2	-5	3	60	55
Slurry Mixing Tank	*	90	100%	90	1	90	162	-52.2	-5	3	41	36
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	162	-52.2	-5	3	43	38
Mud Processor	*	107	100%	107	1	107	162	-52.2	-5	3	58	53
Crane, electric	CNP 048	112	100%	112	1	112	162	-52.2	-5	3	63	58
	CNP 048	112	100%	112	1	112	162	-52.2	-5	3	63	58
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	162	-52.2	-5	3	56	51
Generator, standard	CNP 101	108	100%	108	1	108	162	-52.2	-5	3	59	54
	CNP 101	108	100%	108	1	108	162	-52.2	-5	3	59	54
119.0											69.8	64.8

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Sha Tau Kok Central Primary School NSR 3 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	405	-60.1	-5	3	53	48
	*	110	100%	110.0	1	110.0	405	-60.1	-5	3	53	48
	*	110	100%	110.0	1	110.0	405	-60.1	-5	3	53	48
114.8											57.6	52.6

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	405	-60.1	-5	3	51	46
	CNP 101	108	100%	108	1	108	405	-60.1	-5	3	51	46
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	405	-60.1	-5	3	28	23
	CNP 283	85	100%	85	1	85.0	405	-60.1	-5	3	28	23
Dump Truck	*	105	50%	102	1	102	405	-60.1	-5	3	45	40
Excavator	CNP 081	112	75%	111	1	111	405	-60.1	-5	3	54	49
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	405	-60.1	-5	3	62	57
Concrete crusher, excavator mounted	*	103	75%	102	1	102	405	-60.1	-5	3	45	40
Lorry with crane/grab	CNP 141	112	50%	109	1	109	405	-60.1	-5	3	52	47
120.6											63.5	58.5

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	456	-61.2	-5	3	52	47
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	456	-61.2	-5	3	50	45
Slurry Pump	*	105	100%	105	1	105	456	-61.2	-5	3	47	42
Mud Pump	*	109	100%	109	1	109	456	-61.2	-5	3	51	46
Slurry Mixing Tank	*	90	100%	90	1	90	456	-61.2	-5	3	32	27
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	456	-61.2	-5	3	34	29
Mud Processor	*	107	100%	107	1	107	456	-61.2	-5	3	49	44
Crane, electric	CNP 048	112	100%	112	1	112	456	-61.2	-5	3	54	49
	CNP 048	112	100%	112	1	112	456	-61.2	-5	3	54	49
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	456	-61.2	-5	3	47	42
Generator, standard	CNP 101	108	100%	108	1	108	456	-61.2	-5	3	50	45
	CNP 101	108	100%	108	1	108	456	-61.2	-5	3	50	45
119.0											60.9	55.9

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Block 1, Sha Tau Kok Chuen NSR 4 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	170	-52.6	0	3	60	60
	*	110	100%	110.0	1	110.0	170	-52.6	0	3	60	60
	*	110	100%	110.0	1	110.0	170	-52.6	0	3	60	60
114.8											65.2	65.2

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	170	-52.6	0	3	58	58
	CNP 101	108	100%	108	1	108	170	-52.6	0	3	58	58
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	170	-52.6	0	3	35	35
	CNP 283	85	100%	85	1	85.0	170	-52.6	0	3	35	35
Dump Truck	*	105	50%	102	1	102	170	-52.6	0	3	52	52
Excavator	CNP 081	112	75%	111	1	111	170	-52.6	0	3	61	61
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	170	-52.6	0	3	69	69
Concrete crusher, excavator mounted	*	103	75%	102	1	102	170	-52.6	0	3	52	52
Lorry with crane/grab	CNP 141	112	50%	109	1	109	170	-52.6	0	3	59	59
120.6											71.0	71.0

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	214	-54.6	0	3	58	58
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	214	-54.6	0	3	56	56
Slurry Pump	*	105	100%	105	1	105	214	-54.6	0	3	53	53
Mud Pump	*	109	100%	109	1	109	214	-54.6	0	3	57	57
Slurry Mixing Tank	*	90	100%	90	1	90	214	-54.6	0	3	38	38
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	214	-54.6	0	3	40	40
Mud Processor	*	107	100%	107	1	107	214	-54.6	0	3	55	55
Crane, electric	CNP 048	112	100%	112	1	112	214	-54.6	0	3	60	60
	CNP 048	112	100%	112	1	112	214	-54.6	0	3	60	60
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	214	-54.6	0	3	53	53
Generator, standard	CNP 101	108	100%	108	1	108	214	-54.6	0	3	56	56
	CNP 101	108	100%	108	1	108	214	-54.6	0	3	56	56
119.0											67.4	67.4

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Sun Ying Lau, No.10 Sha Tau Kok Road NSR 5 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME						Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Location (Fixed/Notional)	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	F	110.0	199	-54.0	0	3	59	59
	*	110	100%	110.0	1	F	110.0	199	-54.0	0	3	59	59
	*	110	100%	110.0	1	F	110.0	199	-54.0	0	3	59	59
							114.8					63.8	63.8

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME						Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Location (Fixed/Notional)	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	F	108	199	-54.0	0	3	57	57
	CNP 101	108	100%	108	1	F	108	199	-54.0	0	3	57	57
Water pump, submersible, electric	CNP 283	85	100%	85	1	F	85.0	199	-54.0	0	3	34	34
	CNP 283	85	100%	85	1	F	85.0	199	-54.0	0	3	34	34
Dump Truck	*	105	50%	102	1	N	102	199	-54.0	0	3	51	51
Excavator	CNP 081	112	75%	111	1	N	111	199	-54.0	0	3	60	60
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	N	119	199	-54.0	0	3	68	68
Concrete crusher, excavator mounted	*	103	75%	102	1	N	102	199	-54.0	0	3	51	51
Lorry with crane/grab	CNP 141	112	50%	109	1	N	109	199	-54.0	0	3	58	58
							120.6					69.7	69.7

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME						Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Location (Fixed/Notional)	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	F	110	252	-56.0	0	3	57	57
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	F	108	252	-56.0	0	3	55	55
Slurry Pump	*	105	100%	105	1	F	105	252	-56.0	0	3	52	52
Mud Pump	*	109	100%	109	1	F	109	252	-56.0	0	3	56	56
Slurry Mixing Tank	*	90	100%	90	1	F	90	252	-56.0	0	3	37	37
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	F	92	252	-56.0	0	3	39	39
Mud Processor	*	107	100%	107	1	F	107	252	-56.0	0	3	54	54
Crane, electric	CNP 048	112	100%	112	1	F	112	252	-56.0	0	3	59	59
	CNP 048	112	100%	112	1	F	112	252	-56.0	0	3	59	59
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	N	105	252	-56.0	0	3	52	52
Generator, standard	CNP 101	108	100%	108	1	F	108	252	-56.0	0	3	55	55
	CNP 101	108	100%	108	1	F	108	252	-56.0	0	3	55	55
							119.0					66.0	66.0

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Block 45, Sha Tau Kok Chuen NSR 6 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	195	-53.8	0	3	59	59
	*	110	100%	110.0	1	110.0	195	-53.8	0	3	59	59
	*	110	100%	110.0	1	110.0	195	-53.8	0	3	59	59
114.8											64.0	64.0

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	195	-53.8	0	3	57	57
	CNP 101	108	100%	108	1	108	195	-53.8	0	3	57	57
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	195	-53.8	0	3	34	34
	CNP 283	85	100%	85	1	85.0	195	-53.8	0	3	34	34
Dump Truck	*	105	50%	102	1	102	195	-53.8	0	3	51	51
Excavator	CNP 081	112	75%	111	1	111	195	-53.8	0	3	60	60
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	195	-53.8	0	3	68	68
Concrete crusher, excavator mounted	*	103	75%	102	1	102	195	-53.8	0	3	51	51
Lorry with crane/grab	CNP 141	112	50%	109	1	109	195	-53.8	0	3	58	58
120.6											69.8	69.8

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	252	-56.0	0	3	57	57
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	252	-56.0	0	3	55	55
Slurry Pump	*	105	100%	105	1	105	252	-56.0	0	3	52	52
Mud Pump	*	109	100%	109	1	109	252	-56.0	0	3	56	56
Slurry Mixing Tank	*	90	100%	90	1	90	252	-56.0	0	3	37	37
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	252	-56.0	0	3	39	39
Mud Processor	*	107	100%	107	1	107	252	-56.0	0	3	54	54
Crane, electric	CNP 048	112	100%	112	1	112	252	-56.0	0	3	59	59
	CNP 048	112	100%	112	1	112	252	-56.0	0	3	59	59
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	252	-56.0	0	3	52	52
Generator, standard	CNP 101	108	100%	108	1	108	252	-56.0	0	3	55	55
	CNP 101	108	100%	108	1	108	252	-56.0	0	3	55	55
119.0											66.0	66.0

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Sha Tau Kok Chuen Ying Hoi House NSR 7 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	320	-58.1	-5	3	55	50
	*	110	100%	110.0	1	110.0	320	-58.1	-5	3	55	50
	*	110	100%	110.0	1	110.0	320	-58.1	-5	3	55	50
114.8											59.7	54.7

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	320	-58.1	-5	3	53	48
	CNP 101	108	100%	108	1	108	320	-58.1	-5	3	53	48
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	320	-58.1	-5	3	30	25
	CNP 283	85	100%	85	1	85.0	320	-58.1	-5	3	30	25
Dump Truck	*	105	50%	102	1	102	320	-58.1	-5	3	47	42
Excavator	CNP 081	112	75%	111	1	111	320	-58.1	-5	3	56	51
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	320	-58.1	-5	3	64	59
Concrete crusher, excavator mounted	*	103	75%	102	1	102	320	-58.1	-5	3	47	42
Lorry with crane/grab	CNP 141	112	50%	109	1	109	320	-58.1	-5	3	54	49
120.6											65.5	60.5

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	375	-59.5	-5	3	54	49
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	375	-59.5	-5	3	52	47
Slurry Pump	*	105	100%	105	1	105	375	-59.5	-5	3	49	44
Mud Pump	*	109	100%	109	1	109	375	-59.5	-5	3	53	48
Slurry Mixing Tank	*	90	100%	90	1	90	375	-59.5	-5	3	34	29
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	375	-59.5	-5	3	36	31
Mud Processor	*	107	100%	107	1	107	375	-59.5	-5	3	51	46
Crane, electric	CNP 048	112	100%	112	1	112	375	-59.5	-5	3	56	51
	CNP 048	112	100%	112	1	112	375	-59.5	-5	3	56	51
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	375	-59.5	-5	3	49	44
Generator, standard	CNP 101	108	100%	108	1	108	375	-59.5	-5	3	52	47
	CNP 101	108	100%	108	1	108	375	-59.5	-5	3	52	47
119.0											62.6	57.6

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Building along Shun Lung Street NSR 8 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	110.0	395	-59.9	-5	3	53	48
	*	110	100%	110.0	1	110.0	395	-59.9	-5	3	53	48
	*	110	100%	110.0	1	110.0	395	-59.9	-5	3	53	48
114.8											57.8	52.8

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	108	395	-59.9	-5	3	51	46
	CNP 101	108	100%	108	1	108	395	-59.9	-5	3	51	46
Water pump, submersible, electric	CNP 283	85	100%	85	1	85.0	395	-59.9	-5	3	28	23
	CNP 283	85	100%	85	1	85.0	395	-59.9	-5	3	28	23
Dump Truck	*	105	50%	102	1	102	395	-59.9	-5	3	45	40
Excavator	CNP 081	112	75%	111	1	111	395	-59.9	-5	3	54	49
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	119	395	-59.9	-5	3	62	57
Concrete crusher, excavator mounted	*	103	75%	102	1	102	395	-59.9	-5	3	45	40
Lorry with crane/grab	CNP 141	112	50%	109	1	109	395	-59.9	-5	3	52	47
120.6											63.7	58.7

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME					Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	110	452	-61.1	-5	3	52	47
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	108	452	-61.1	-5	3	50	45
Slurry Pump	*	105	100%	105	1	105	452	-61.1	-5	3	47	42
Mud Pump	*	109	100%	109	1	109	452	-61.1	-5	3	51	46
Slurry Mixing Tank	*	90	100%	90	1	90	452	-61.1	-5	3	32	27
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	92	452	-61.1	-5	3	34	29
Mud Processor	*	107	100%	107	1	107	452	-61.1	-5	3	49	44
Crane, electric	CNP 048	112	100%	112	1	112	452	-61.1	-5	3	54	49
	CNP 048	112	100%	112	1	112	452	-61.1	-5	3	54	49
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	105	452	-61.1	-5	3	47	42
Generator, standard	CNP 101	108	100%	108	1	108	452	-61.1	-5	3	50	45
	CNP 101	108	100%	108	1	108	452	-61.1	-5	3	50	45
119.0											60.9	55.9

Note: As-built distance values are adopted in the assessment

Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Location of NSR:

Tin Hau Temple NSR 9 (See Location Plan)

Expansion of STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME						Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Location (Fixed/Notional)	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Drill rig	*	110	100%	110.0	1	F	110.0	90	-47.1	-5	3	66	61
	*	110	100%	110.0	1	F	110.0	90	-47.1	-5	3	66	61
	*	110	100%	110.0	1	F	110.0	90	-47.1	-5	3	66	61
											70.7	65.7	
											114.8		

Demolition works of existing STKSTW

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME						Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Location (Fixed/Notional)	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
Generator	CNP 101	108	100%	108	1	F	108	90	-47.1	-5	3	64	59
	CNP 101	108	100%	108	1	F	108	90	-47.1	-5	3	64	59
Water pump, submersible, electric	CNP 283	85	100%	85	1	F	85.0	90	-47.1	-5	3	41	36
	CNP 283	85	100%	85	1	F	85.0	90	-47.1	-5	3	41	36
Dump Truck	*	105	50%	102	1	N	102	90	-47.1	-5	3	58	53
Excavator	CNP 081	112	75%	111	1	N	111	90	-47.1	-5	3	67	62
Breaker, excavator mounted (hydraulic)	CNP 028	122	50%	119	1	N	119	90	-47.1	-5	3	75	70
Concrete crusher, excavator mounted	*	103	75%	102	1	N	102	90	-47.1	-5	3	58	53
Lorry with crane/grab	CNP 141	112	50%	109	1	N	109	90	-47.1	-5	3	65	60
											76.6	71.6	
											120.6		

Construction of Submarine Outfall using HDD

Powered Mechanical Equipment (PME)	Identification Code	Sound Power Level (SWL) of PME						Distance to NSR (m)	Correction			Unmitigated Level (dB(A))	Mitigated Level (dB(A))
		SWL (dB(A))	On -time% (dB(A))	Correct ed SWL (dB(A))	Quantity	Location (Fixed/Notional)	Total SWL (dB(A))		Distance Attenuation (dB(A))	Totally Screened Attenuation (dB(A))	Façade (dB(A))		
HDD Casing Rig 水平定向套管安裝鑽機	*	110	100%	110	1	F	110	135	-50.6	-5	3	62	57
Power Pack for HDD Casing Rig 水平定向套管安裝鑽機的動力供應器	*	108	100%	108	1	F	108	135	-50.6	-5	3	60	55
Slurry Pump	*	105	100%	105	1	F	105	135	-50.6	-5	3	57	52
Mud Pump	*	109	100%	109	1	F	109	135	-50.6	-5	3	61	56
Slurry Mixing Tank	*	90	100%	90	1	F	90	135	-50.6	-5	3	42	37
Mud Buffer Tank (with 2 stirrer)	*	92	100%	92	1	F	92	135	-50.6	-5	3	44	39
Mud Processor	*	107	100%	107	1	F	107	135	-50.6	-5	3	59	54
Crane, electric	CNP 048	112	100%	112	1	F	112	135	-50.6	-5	3	64	59
	CNP 048	112	100%	112	1	F	112	135	-50.6	-5	3	64	59
Lorry, with crane, 5.5 tonne < gross vehicle weight < 38 tonne	*	105	100%	105	1	N	105	135	-50.6	-5	3	57	52
Generator, standard	CNP 101	108	100%	108	1	F	108	135	-50.6	-5	3	60	55
	CNP 101	108	100%	108	1	F	108	135	-50.6	-5	3	60	55
											71.4	66.4	
											119.0		

Note: As-built distance values are adopted in the assessment

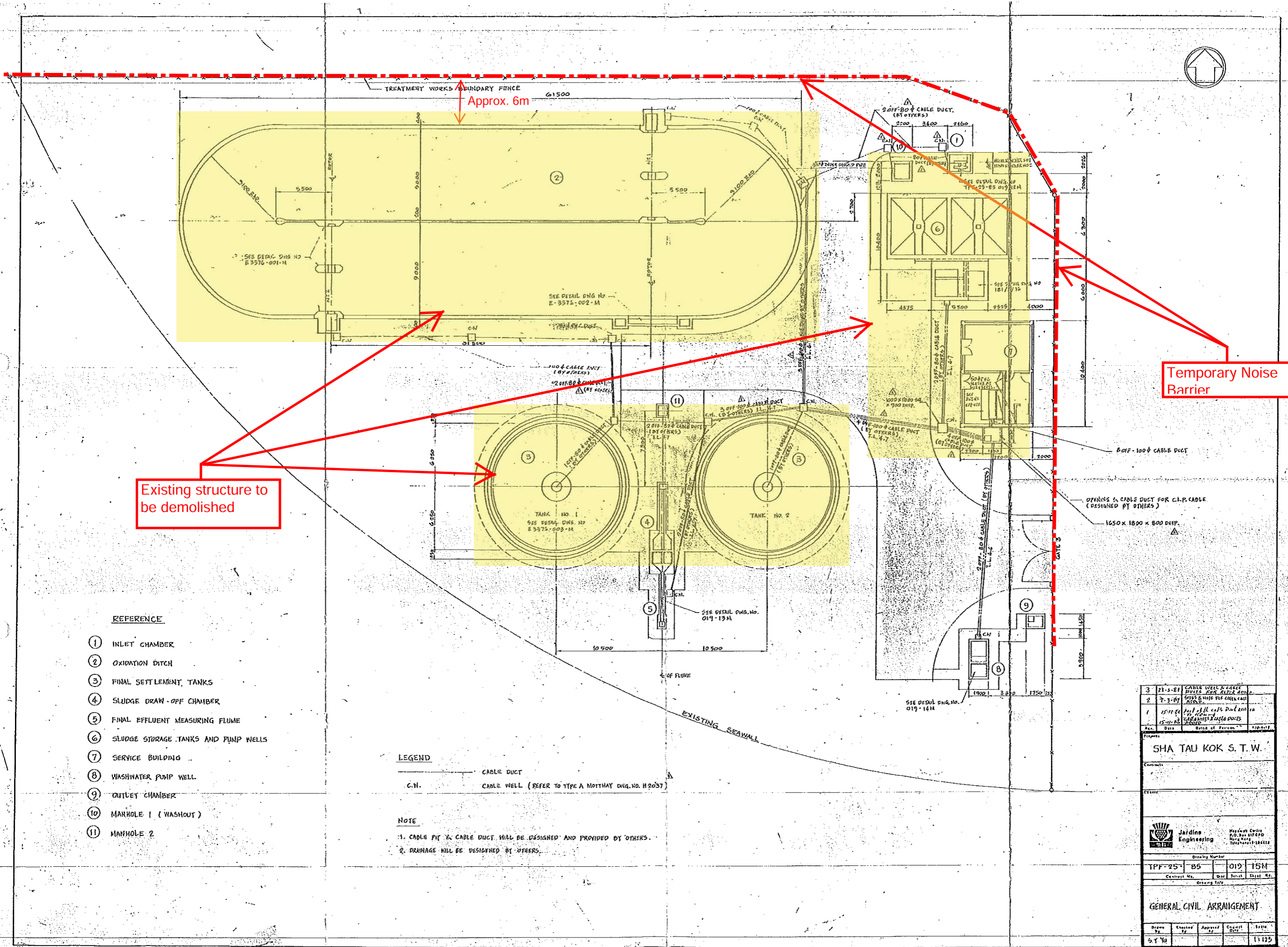
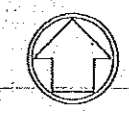
Unmitigated Sound Power Level = Total Sound Power Level + Distance Attenuation + Façade

where Distance Attenuation = 20 x log(Total Sound Power Level) + 8

Mitigated Sound Power Level = Unmitigated Sound Power Level + Screened Attenuation, where 5dB(A) is assumed

Appendix D

Location of the Temporary Noise Barrier



Existing structure to be demolished

Temporary Noise Barrier

REFERENCE

- ① INLET CHAMBER
- ② OXIDATION DITCH
- ③ FINAL SETTLEMENT TANKS
- ④ SLUDGE DRAW-OFF CHAMBER
- ⑤ FINAL EFFLUENT MEASURING FLUME
- ⑥ SLUDGE STORAGE TANKS AND PUMP WELLS
- ⑦ SERVICE BUILDING
- ⑧ WASHWATER PUMP WELL
- ⑨ OUTLET CHAMBER
- ⑩ MANHOLE 1 (WASHOUT)
- ⑪ MANHOLE 2

LEGEND

- CABLE DUCT
- C.H. CABLE WELL (REFER TO TYPE A MOTHAY DNG. NO. H2037)

NOTE

- 1. CABLE PIT & CABLE DUCT WILL BE DESIGNED AND PROVIDED BY OTHERS.
- 2. DRAINAGE WILL BE DESIGNED BY OTHERS.

3	23-5-87	CABLE LAYERS & CABLE	
2	7-3-87	SLUDGE PUMP PIPING & ACCESS	
1	15-11-86	Final effluent Duct	
	15-11-86	CABLE LAYERS & CABLE DUCTS	
Rev.	Date	Reason for Revision	By
Project			
SHA TAU KOK S. T. W.			
Contract			
Client			
Jardine Engineering 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000			
Drawing Number			
TPF-25	B5	019	15M
Contract No.	Disc	Sheet	Sheet No.
Drawing Title			
GENERAL CIVIL ARRANGEMENT			
Drawn	Checked	Approved	Scale
S.T.W.			1:100

Appendix E

Summary of SWL of HDD equipment from CNP Report for Contract P560(R)

Calculation of SWL for Hydraulic Station

I. MEASUREMENT DATA FOR OPERATING MODE

Measurement Position**		Leq (30sec) in operation*, dB(A)	Background, dB(A)
L1	LHS	77.1	60.8
L2	LHS	81.4	60.8
L3	LHS	83.1	60.8
L4	LHS	82.5	60.8
L5	LHS	77.5	60.8
L6	LHS	81.3	60.8
B1	Back	83.6	60.8
R1	RHS	80.2	60.8
R2	RHS	82.9	60.8
R3	RHS	89.0	60.8
R4	RHS	90.8	60.8
R5	RHS	81.3	60.8
R6	RHS	82.5	60.8
F1	Front	74.6	60.8
F2	Front	73.6	60.8
T1	Overhead	70.8	60.8
T2	Overhead	74.0	60.8
T3	Overhead	83.0	60.8
T4	Overhead	82.3	60.8
Average		83.3	60.8

II. CALCULATIONS

Dimensions of Plant	l1:	9
	l2:	3.3
	l3:	4.7
Measurement Distance	d1:	1
	d2:	1
	d3:	1
Dimensions of Measurement Surface	a:	5.5
	b:	2.65
	c:	5.7
Area of Measurement	S:	244.1

Difference in L ^p A - L ^p A	22.5
Background noise correction factor	0.00
Area of measurement surface	244.1
SWL (Sound Power Level)	<u>107</u>

A. Calculation of SWL for Mud Buffer Tank No. 1 (with 3 Stirrer)

I. MEASUREMENT DATA FOR OPERATING MODE

Measurement Position**		Leq (30sec) in operation*, dB(A)	Background, dB(A)
L1	LHS	63.0	59.8
L2	LHS	62.4	59.8
L3	LHS	60.5	59.8
L4	LHS	59.6	59.8
L5	LHS	58.6	59.8
L6	LHS	55.4	59.8
F1	Front	64.0	59.8
F2	Front	65.7	59.8
F3	Front	64.5	59.8
F4	Front	65.0	59.8
R1	RHS	63.9	59.8
R2	RHS	60.9	59.8
R3	RHS	60.0	59.8
R4	RHS	58.5	59.8
R5	RHS	58.4	59.8
R6	RHS	54.9	59.8
B1	Back	50.4	59.8
B2	Back	52.4	59.8
B3	Back	51.5	59.8
B4	Back	51.6	59.8
T1	Overhead	72.0	59.8
T2	Overhead	71.3	59.8
T3	Overhead	71.5	59.8
T4	Overhead	70.2	59.8
T5	Overhead	67.6	59.8
T6	Overhead	66.0	59.8
T7	Overhead	66.6	59.8
T8	Overhead	65.4	59.8
T9	Overhead	61.0	59.8
T10	Overhead	60.4	59.8
T11	Overhead	59.8	59.8
T12	Overhead	60.0	59.8
T13	Overhead	57.4	59.8
T14	Overhead	56.8	59.8
T15	Overhead	56.9	59.8
T16	Overhead	57.2	59.8
T17	Overhead	55.3	59.8
T18	Overhead	56.0	59.8
T19	Overhead	55.2	59.8
T20	Overhead	55.3	59.8
T21	Overhead	56.4	59.8
T22	Overhead	55.3	59.8
T23	Overhead	55.8	59.8
T24	Overhead	56.0	59.8
Average		63.9	59.8

II. CALCULATIONS

Dimensions of Plant	l1:	14.4
	l2:	12.2
	l3:	2.4
Measurement Distance	d1:	1
	d2:	1
	d3:	1
Dimensions of Measurement Surface	a:	8.2
	b:	7.1
	c:	3.4
Area of Measurement	S:	441.0

Difference in L_{pA} - L_{pA} 4.1
Background noise correction factor 2.17
Area of measurement surface 441.0

SWL (Sound Power Level) 88

B. Calculation of SWL for Mud Buffer Tank No. 2 (with 2 Stirrer and 1 Centrifuge pump)

I. MEASUREMENT DATA FOR OPERATING MODE

Measurement Position**		Leq (30sec) in operation*, dB(A)	Background, dB(A)
L1	LHS	65.1	59.8
L2	LHS	68.4	59.8
L3	LHS	64.8	59.8
L4	LHS	61.8	59.8
L5	LHS	55.2	59.8
L6	LHS	55.5	59.8
F1	Front	55.3	59.8
F2	Front	54.5	59.8
F3	Front	53.4	59.8
F4	Front	53.3	59.8
R1	RHS	62.7	59.8
R2	RHS	64.3	59.8
R3	RHS	58.7	59.8
R4	RHS	55.8	59.8
R5	RHS	54.7	59.8
R6	RHS	55.0	59.8
B1	Back	50.8	59.8
B2	Back	50.2	59.8
B3	Back	49.8	59.8
B4	Back	49.6	59.8
T1	Overhead	65.9	59.8
T2	Overhead	63.9	59.8
T3	Overhead	64.5	59.8
T4	Overhead	65.3	59.8
T5	Overhead	72.6	59.8
T6	Overhead	71.5	59.8
T7	Overhead	71.8	59.8
T8	Overhead	70.8	59.8
T9	Overhead	67.6	59.8
T10	Overhead	66.8	59.8
T11	Overhead	66.4	59.8
T12	Overhead	67.1	59.8
T13	Overhead	62.5	59.8
T14	Overhead	62.1	59.8
T15	Overhead	61.8	59.8
T16	Overhead	61.3	59.8
T17	Overhead	55.8	59.8
T18	Overhead	54.9	59.8
T19	Overhead	55.5	59.8
T20	Overhead	54.2	59.8
T21	Overhead	53.7	59.8
T22	Overhead	55.3	59.8
T23	Overhead	54.0	59.8
T24	Overhead	56.6	59.8
Average		64.5	59.8

II. CALCULATIONS

Dimensions of Plant	l1:	14.4
	l2:	12.2
	l3:	2.4
Measurement Distance	d1:	1
	d2:	1
	d3:	1
Dimensions of Measurement Surface	a:	8.2
	b:	7.1
	c:	3.4
Area of Measurement	S:	441.0

Difference in L_{pA} - L_{pA} 4.7
Background noise correction factor 1.80
Area of measurement surface 441.0

SWL (Sound Power Level) 89

Calculation of SWL for Slurry Mixing Tank

I. MEASUREMENT DATA FOR OPERATING MODE

Measurement Position**		Leq (30sec) in operation*, dB(A)	Background, dB(A)
L1	LHS	62.7	60.4
L2	LHS	62.3	60.4
L3	LHS	64.0	60.4
L4	LHS	62.9	60.4
B1	Back	61.1	60.4
R1	RHS	62.6	60.4
R2	RHS	62.0	60.4
R3	RHS	65.3	60.4
R4	RHS	62.8	60.4
F1	Front	61.8	60.4
T1	Overhead	63.0	60.4
T2	Overhead	69.2	60.4
T3	Overhead	71.0	60.4
T4	Overhead	69.1	60.4
Average		65.6	60.4

II. CALCULATIONS

Dimensions of Plant	l1:	12.2
	l2:	2.4
	l3:	2.4
Measurement Distance	d1:	1
	d2:	1
	d3:	1
Dimensions of Measurement Surface	a:	7.1
	b:	2.2
	c:	3.4
Area of Measurement	S:	189.0

Difference in L _p A - L _p A	5.2
Background noise correction factor	1.57
Area of measurement surface	189.0
SWL (Sound Power Level)	<u>87</u>

