

4 NOISE IMPACT

Introduction

4.1 This section presents an assessment of potential noise impact pertinent to the construction and operation phase of the Project. Appropriate mitigation measures have been recommended, where necessary, to alleviate the potential noise impacts to acceptable levels.

Environmental Legislation, Policies, Plans, Standards and Criteria

4.2 Noise impacts were assessed in accordance with the criteria and methodology given in the Technical Memoranda made under the Noise Control Ordinance (NCO), and EIAO-TM.

4.3 The NCO provides the statutory framework for noise control. This defines statutory limits applicable to equipment used during the construction and operation phases of the proposed works in the study area. The NCO invokes four Technical Memoranda, which define the technical means for noise assessment:

- Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM);
- Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM);
- Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM); and
- Technical Memorandum on Noise from Percussive Piling (PP-TM).

4.4 The NCO and the accompanying Technical Memoranda provide a mechanism for assessing noise levels and provide the statutory power to control noise.

4.5 With regard to the assessment of the operational noise impacts, the NCO designates acceptable noise levels for Noise Sensitive Receivers (NSRs) on the basis of an Area Sensitivity Rating (ASR), based on the characteristics of the area within which they are located such as rural, village, low-density residential, or urban. Within these areas, the presence of "influencing factors" (such as the presence of industrial activities or major roads) can further affect the ASR and hence the acceptable noise level (see **Table 4.1**).

Construction Activities

4.6 Under the GW-TM, noise from construction activity is not restricted during the period 0700 - 1900 hours on weekdays, except Public Holidays. However, the EIAO-TM identifies a daytime general construction noise limit of 75 dB(A)_{Leq (30 minutes)} for domestic premises. This standard was used as the assessment criteria in the construction noise assessment.

Table 4.1 Area Sensitivity Ratings (ASRs)

Type of Area Containing NSR	Degree to which NSR is affected by Influencing Factor		
	Not Affected	Indirectly Affected	Directly Affected
Rural Area	A	B	B
Urban Area	B	C	C
Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
Area other than those above	B	B	C

4.7 Between 1900 and 0700 hours and all day on Sundays and public holidays, activities involving the use of powered mechanical equipment (PME) for the purpose of carrying out construction work are prohibited unless a Construction Noise Permit (CNP) has been obtained. A CNP may be granted provided that the Acceptable Noise Level (ANL) for the noise sensitive receivers (NSRs) can be

complied with. ANLs are assigned depending upon the Area Sensitive Rating (ASRs). The corresponding basic noise levels (BNLs) for evening and night-time periods are given in **Table 4.2**.

Table 4.2 Construction Noise Criteria for Activity other than Percussive Piling

Time Period	Basic Noise Level (BNLs) (dB(A))		
	ASR A	ASR B	ASR C
All days during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the daytime and evening (0700 to 2300 hours)	60	65	70
All days during the night-time (2300 to 0700 hours)	45	50	55

4.8 The Study Area for noise impact is defined by a distance of 300m from the boundary of the Project site. Within the study area, there are a number of industrial establishments; or an establishment which is having industrial operations (e.g. shipyards, dockyard, refuse transfer station, bus depot, Container Terminal 8, etc.). Noise generated by these industrial operations (i.e. Influencing Factor) would be readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR. Besides, the study area is an area other than rural area, low density residential area and urban area. As a result, the Area Sensitivity Rating (ASR) of “C” is determined. According to the **Table 4.2**, the construction noise criteria for the sensitive receiver would be 70 dB(A) in the evening and 55 dB(A) at night.

4.9 The Area Sensitivity Ratings assumed in this EIA Report are for indicative assessment only. Despite any description or assessment made in this EIA Report on construction noise aspects, there is no guarantee that a Construction Noise Permit (CNP) will be issued for the project construction. The Noise Control Authority will consider a well-justified CNP application, once filed, for construction works within restricted hours as guided by the relevant Technical Memoranda issued under the Noise Control Ordinance. The Noise Control Authority will take into account contemporary conditions/situations of adjoining land uses and any previous complaints against construction activities at the site before making his decision in granting a CNP. Nothing in this EIA Report shall bind the Noise Control Authority in making his decision. If a CNP is to be issued, the Noise Control Authority shall include in it any Condition he thinks fit. Failure to comply with any such conditions will lead to cancellation of the CNP and prosecution action under the NCO.

Operational Activities

4.10 Operational noise emitted from the proposed Project is controlled under the IND-TM. The Acceptable Noise Level (ANL) is a function of the type of area within which the NSR is located, and the degree of the effect on the NSR of influencing factors such as major roads and industrial areas. According to the TM, the ANLs for different Area Sensitivity Ratings (ASRs) are given in **Table 4.3**.

Table 4.3 Acceptable Noise Levels (ANLs) (dB(A))

Time Period	ASR A	ASR B	ASR C
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)			
Night (2300 to 0700 hours)	50	55	60

4.11 When assessed in accordance with the IND-TM, the level of the intruding noise at the facade of the nearest sensitive use should be at least 5 dB(A) below the appropriate ANL shown in Table 2 of the IND-TM or, in the case of the background being 5 dB(A) lower than the ANL, the predicted noise level should not exceed the background.

4.12 In any event, the Area Sensitivity Rating assumed in this EIA Report is for indicative assessment only. It should be noted that fixed noise sources are controlled under section 13 of the NCO. At the time of investigation, the Noise Control Authority shall determine noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices being in force, and taking account of

contemporary conditions/ situation of adjoining land uses. Nothing in this EIA Report shall bind the Noise Control Authority in the Context of law enforcement against all the fixed noise sources being assessed.

- 4.13 As stated in Section 4.8, the Area Sensitivity Rating (ASR) of “C” is determined for the study area, i.e. its planning criteria for NSRs would be 65 dB(A) for daytime operations and 55 dB(A) for night-time operations.
- 4.14 The noise assessment criteria as described in EIAO-TM have been adopted for the assessment of fixed noise source impact in relation to the proposed plant operation.

Description of the Environment

- 4.15 The Project will be constructed within the existing sewage treatment works on Stonecutters Island. A number of establishments, which are having industrial operations, are located in the close vicinity of the Project site (e.g. shipyards, government dockyard, bus depot, refuse transfer station, Container Terminal 8, etc.). Besides, Route 8 is under construction and located close to the proposed dechlorination plant. The nearest large residential areas, Mei Foo Sun Chuen and Manhattan Hill, are located more than 1,000m away from the SCISTW.
- 4.16 A noise survey was undertaken in March 2006 to determine the background noise levels. Prevailing background noise levels were obtained through on-site noise measurements at two representative locations (see [Figure 4.1](#)) within the Study Area. The selected monitoring locations are located near the SCISTW and the existing drop shaft which are representative to reflect the prevailing background noise level. All the noise measurements were conducted in accordance with IND-TM. The detailed methodology and results are presented in [Appendix 4.1](#). As shown in **Table 4.4**, the measured noise levels at the selected locations range from 57.3 to 70.6 $Leq(15\text{-min})$ dB(A).

Table 4.4 Measured Noise Levels

Noise Measurement Point	Measured Noise Levels, $Leq(15\text{min})$ on Weekday		
	Morning (0900 - 1000)	Evening (2000 - 2100)	Nighttime (2330 - 0030)
M1	70.6	65.6	67.1
M2	58.7	58.0	57.3

- 4.17 **Tables 4.5 and 4.6** present the prevailing noise levels at representative measurement locations. The recommended assessment criteria, as adopted in this EIA Study, are also presented.

Table 4.5 Noise Criteria for Operational Noise Impact for the Noise Sensitive Receivers near the proposed Dechlorination Plant

	ANL	Planning Criteria	Measured Background Noise Level	Recommended Noise Criteria
Day (0700 to 1900 hours)	70	65	70.6	65
Evening (1900 to 2300 hours)			65.6	
Night (2300 to 0700 hours)	60	55	67.1	55

Table 4.6 Noise Criteria for Operational Noise Impact for the Noise Sensitive Receivers near the proposed Chlorination Plant

	ANL	Planning Criteria	Measured Background Noise Level	Recommended Noise Criteria
Day (0700 to 1900 hours)	70	65	58.7	58
Evening (1900 to 2300 hours)			58.0	
Night (2300 to 0700 hours)	60	55	57.3	55

Noise Sensitive Receivers

4.18 Representative Noise Sensitive Receiver (NSRs) within 300m of the Project boundary were identified for noise assessment. According to Annex 13 of the EIAO-TM, NSRs include the following:

- Residential uses – all domestic premises including temporary housing
- Institutional uses – including educational institutions
- Other uses such as hostels and country parks

4.19 In order to evaluate the construction and operational noise impacts likely to arise from the Project, representative NSRs (both existing and planned NSRs) were selected within the study area according to the criteria set out in the EIAO-TM, through site visits and a review of relevant land use plans including the Outline Zoning Plan (Plan No. S/K16/14).

4.20 With reference to Annex 13 of the EIAO-TM, existing developments (i.e. government dockyard, shipyards and West Kowloon Refuse Transfer Station) within the study area are not considered as NSRs. The Ngong Shuen Chau Barracks (main barrack) is located at more than 300m from the Project site at the existing SCISTW, and hence it has not been included in the noise assessment. However, a few barrack buildings which are located to the northeast of the proposed dechlorination plant have been identified as noise sensitive receivers.

4.21 According to the relevant Outline Zoning Plan (Plan No. S/K16/14) issued in April 2005, no planned noise sensitive uses are identified within 300m of the proposed Project boundary. The area in the close vicinity of Project site has been zoned for Other Specified Uses (“OU”).

4.22 It is understood that the planned Fire Services Department (FSD) diving rescue and diving training centre will be located to the east of the existing SCISTW (see [Figure 2.6](#)). Based on the latest information provided by the consultants for Architectural Services Department, the construction contract of the diving training centre had been commenced in December 2006 and is scheduled to be completed in August 2008. The diving training centre will be provided with VRV air-conditioning system, and it might rely on opened windows for ventilation. As such, the dormitories and a classroom of the diving training centre have been identified as representative NSR for the noise impact assessment. [Figures 4.2](#) and [4.3](#) shows the layout of the dormitories and the classroom within the diving training centre, respectively.

4.23 [Figure 4.4](#) and [Figure 4.5](#) show the locations of representative noise sensitive receivers (NSRs N1 and P1) for the proposed dechlorination plant and chlorination plant/day tank, respectively. Locations of treatment units at the proposed dechlorination plant and chlorination plant/day tank are shown in [Figures 2.2](#) and [2.3](#), respectively. Details of the NSRs are shown in [Table 4.7](#).

Table 4.7 Details of Noise Sensitive Receivers

NSR	Description	Uses	Distance between NSR and nearest Project Boundary (m)
N1	Naval Base Barrack	Barrack	80
P1	Planned FSD Diving Rescue and Diving Centre	Institutional	85

Identification of Environmental Impacts

Potential Noise Impacts

4.24 Major potential noise impacts arising from the Project would be:

- Construction noise
- Operation noise

Construction Noise

4.25 The potential source of noise impact during the construction phase of the Project would be the use of PME for various construction activities. The construction noise impacts arising from the proposed Project are discussed in Section 4.41 to 4.43.

4.26 As shown in [Appendix 4.2](#) and [Appendix 4.3](#), the construction of the dechlorination plant would commence in September 2008 for completion in September 2009, while the construction of the chlorination plant and day tank would commence in March 2008 for completion in September 2009. The Project would involve the following major construction activities. Except foundation works, the other works would be carried out by general construction methods. Piling work would only be required for the construction of proposed day tank. Instead of percussive piling, non-percussive piling method which would generate lower noise and dust emission is adopted.

- Site formation & site establishment
- Piling
- Excavation and backfilling
- Erection of formwork, reinforcement and concreting
- Fabrication of steelwork
- Installation of E&M equipment
- Testing and commissioning

4.27 Generally, the construction activities of the Project would be carried out in non-restricted hours (0700-1900 hours) during normal working days. In case of any construction activities during restricted hours, it is the Contractor's responsibility to ensure compliance with the NCO and the relevant TMs. The Contractor will be required to submit CNP application to the Noise Control Authority and abide by any conditions stated in the CNP, should one be issued.

Operation Noise

Dechlorination Plant

4.28 The potential source of noise impact during the operation phase of the dechlorination plant would be the use of various pumpsets. The operation noise impacts arising from the proposed dechlorination plant are discussed in Section 4.46.

4.29 The existing drop shaft and chamber no. 15 are located adjacent to the proposed dechlorination plant. Based on information provided by the Designer, the dechlorination agent will be dosed at chamber no. 15. Equipment likely to be installed in chamber no. 15 would be percolated pipe, sensors and CCTV which are not considered as noisy equipment. Noise impact from the drop shaft and chamber no. 15 would be negligible and therefore cumulative noise impact from the shaft and chamber no. 15 was not further assessed.

4.30 During the operation of the proposed dechlorination plant, the dechlorination chemical will be delivered to the site by 5 trucks rides, once per week. The operation of the proposed dechlorination plant would induce additional traffic to the existing Container Port Road South. However, in view of the infrequent truck delivery schedule, no insurmountable noise impact due to project-induced traffic during operation phase would be expected.

Chlorination Plant & Day Tank

- 4.31 The potential source of noise impact during the operation phase of the chlorination plant and day tank would be the use of various pumpsets. The operation noise impacts arising from the proposed chlorination plant are discussed in Section 4.47.
- 4.32 The proposed chlorination plant and day tank are located within the existing SCISTW, which may give rise to cumulative operation noise impacts on sensitive receivers. Cumulative operation noise impacts associated with the operation of the proposed chlorination plant, day tank and the existing SCISTW were considered in this assessment.
- 4.33 The chlorination chemical will be supplied to the proposed chlorination plant by either barge/vessel or trucks. The chemical will be pumped to the storage tanks directly from the vessel. The barge unloading point is shown on [Figure 4.5](#). According to the information provided by the Designer, the number of barge/vessels generated by the proposed plant would be about 2-3 barges/week. In addition, the barging point would not be visible when viewed from the assessment façade of the identified NSR P1. Noise impact from the barge/vessel would be expected to be minimal having regard to the fact that the separation distance between the barging point and the nearest NSR P1 would be large (over 200m) and the line of sight of the NSR to the barging point would be limited. Alternatively, the chlorination chemical will be delivered to the site by 10 trucks rides per day. Based on the preliminary design information, it is envisaged that not more than 2 vehicles per hour (on average) would be induced by the proposed chlorination plant. No insurmountable noise impact due the project-induced traffic during operation phase would be expected.

Assessment Methodology

Construction Phase

- 4.34 In accordance with the EIAO-TM, the methodology outlined in the GW-TM was used for the construction noise assessment. The general approach is summarized below:
- Locate the NSRs which would most likely be affected by noise from the construction work
 - Determine the items of Powered Mechanical Equipment (PME) for each discrete construction activity, based on available information or agreed plant inventories
 - Assign sound power levels (SWLs) to the proposed PME according to the GW-TM or other sources
 - Calculate distance attenuation and screening effects to NSRs from notional noise source
 - Predict construction noise levels at NSRs in the absence of any mitigation measures
 - Include a 3 dB(A) façade correction to the predicted noise levels in order to account for the façade effect at each NSR.
- 4.35 Sound power levels (SWLs) of the equipment were taken from Table 3 of GW-TM. Where no sound power level (SWL) was given in the GW-TM, reference was made to British Standard 5228: Part 1:1997 *Noise Control on Construction and Open Sites* and previous similar studies or from measurements taken at other sites in Hong Kong. Groups of PME were assigned for various construction activities of the proposed Project. The proposed plant inventories for the construction of the dechlorination plant and chlorination plant are presented in [Appendix 4.2](#) and [Appendix 4.3](#), respectively. The Project Proponent has confirmed the proposed plant inventories as being practical and adequate for completing the works within the scheduled timeframe.
- 4.36 Based on the latest information available (updated as at 31 January 2007) on the contract web site of Highways Department, Route 8 Ngong Shuen Chau Viaduct has been scheduled to be completed by July 2007, and therefore its construction works would not be carried out concurrently with the proposed Project. No cumulative construction noise impact arising from Route 8 Ngong Shuen Chau Viaduct is expected. Besides, as advised by CEDD, the proposed berthing facilities within government dockyard at Stonecutters Island has been scheduled to commence in June 2007 for completion in July 2008. Construction works would be completed before the occupation of FSD diving rescue and diving training centre (NSR P1), therefore cumulative construction noise impact arising

from the berthing facilities was not considered in the assessment.

Operational Phase

- 4.37 For the assessment of noise from equipment, the noise level at NSR was predicted using the standard acoustic principles:

Predicted Noise Level = Sound Power Level of Equipment - Distance Attenuation - Enclosure Reduction (if any) - Screening Reduction (if any) + Façade Correction

where Distance Attenuation = $20 \log D + 8$ [where D is the distance in meters]
Façade Correction = 3 dB(A)

- 4.38 Based on the estimated horsepower and operating speed of pumpset by supplier, the appropriate SWL of the pumps was made reference to *Good Practice on Pumping System Noise Control* (GPPSNC). However, if the flow rate of the pump is subject to dosing plan that is not available at this stage, the maximum SWL (i.e. 109 dB(A)) of the pumpset in GPPSNC was used in the assessment.

- 4.39 As there is no specification and noise data for the existing noise sources within the SCISTW, the sound power level (SWL) of the existing SCISTW was determined with reference to the on-site noise measurement of existing plant operation. As advised by DSD, the period with most of the pumps in operation would be 21:00 – 00:00 hours. One of the on-site noise measurements was carried out during 23:30 – 00:30 hours, and the measured noise level at location M2 (i.e. boundary of planned FSD diving training centre) was 57.3 dB(A). For a conservative cumulative operational noise assessment, however, a relatively higher noise level of 58.7 dB(A) measured at location M2 during 09:00 – 10:00 hours was adopted instead to calculate the SWL of the existing SCISTW using the following standard acoustic equation. The horizontal distance between the approximate geographical centre of the SCISTW and location M2 is about 260m. The SWL of the existing SCISTW was calculated to be 112 dB(A). Considering the noise source is stationary in nature and the noise level at location M2 was already measured at the direction of the existing SCISTW, therefore correction factor for directivity was not applied.

$SPL = SWL - \text{Distance Attenuation} + \text{Façade Correction}$

$58.7 \text{ dB(A)} = SWL - 56.3 \text{ dB(A)} + 3 \text{ dB(A)}$
 $SWL = 58.7 \text{ dB(A)} + 56.3 \text{ dB(A)} - 3 \text{ dB(A)}$
 $SWL = 112 \text{ dB(A)}$

- 4.40 Noise impact was assessed on the basis of the following three conservative assumptions:
- All items of operational plant required for operation of the proposed facilities would be located at the actual source position.
 - A +3 dB(A) façade correction was added to the predicted noise levels to account for the façade effect at each NSR.
 - Noise impacts at the nearest façades of the NSRs to the source positions were assessed.

Prediction and Evaluation of Environmental Impacts

Construction Phase

Dechlorination Plant

- 4.41 As illustrated in the construction programme, some of the construction activities would be carried out concurrently during a particular period. Cumulative noise impacts arising from different construction activities have been predicted and are shown in [Appendix 4.2](#). As indicated in [Appendix 4.2](#), the major noisy construction tasks would be site formation and excavation & backfilling with a total SWL of 124 dB(A) each.
- 4.42 The predicted noise levels at NSR N1 were in the range of 70 to 77 dB(A). The noise level at the NSR

N1 would exceed the daytime noise criteria of 75 dB(A) during the construction activities of site formation, excavation & backfilling, erection of formwork and fabrication of steelwork. As a result, noise mitigation measures are required.

Chlorination Plant & Day Tank

- 4.43 As indicated in [Appendix 4.3](#), the predicted noise levels at NSR P1 were in the range of 62 to 70 dB(A). The cumulative noise level at the NSR P1 would comply with the daytime noise criteria of 75 dB(A) throughout the construction period. Owing to the considerable distance of the proposed facilities from other existing NSRs outside the study area, the potential noise impact arising from the construction of the proposed facilities would not be considered significant.

Operation Phase

- 4.44 The tentative plant inventory and the corresponding SWL are summarised in [Appendix 4.4](#). As confirmed by the Designer, the plant inventory used for prediction of operation noise impact is practical and realistic. To represent the worst case scenario, all items of equipment were assumed to operate concurrently 24 hours a day and the directivity was not included in the calculation.
- 4.45 With reference to “Good Practices on Pumping System Noise Control” published by Environmental Protection Department, facilities that would be housed/enclosed in a concrete structure were assumed to have a 20 dB(A) reduction of noise emitted from the source due to transmission loss of the wall. For the proposed chlorination plant and day tank, items of equipment would be screened from the line-of-sight of NSR by the structure of planned FSD diving training centre itself. This allowed a 10 dB(A) reduction in accordance with the relevant Technical Memorandum. Due to the facade effect, a positive 3 dB(A) has been added to predict noise levels at the NSRs. For determining the distance correction factors, the distances between the probable source positions and the NSRs were considered.

Dechlorination Plant

- 4.46 According to the plant inventory for the proposed dechlorination plant as shown in [Appendix 4.4](#), the predicted noise level at the NSR N1 would be 53 dB(A). It would comply with the daytime criterion of 65 dB(A) and the night-time criteria of 55 dB(A). Thus, no further specific mitigation measures would be required for the proposed dechlorination plant. Details of the calculation are presented in [Appendix 4.4](#).

Chlorination Plant & Day Tank

- 4.47 According to the plant inventory for the proposed chlorination plant as shown in [Appendix 4.4](#), the predicted cumulative operational noise level at the NSR P1 would be 48 dB(A). It would meet both the daytime and night-time noise criteria of 58 dB(A) and 55 dB(A), respectively. Thus, further specific noise mitigation measures would not be required. Details of the calculation are presented in [Appendix 4.4](#).

Table 4.8 Predicted Noise Levels at Representative NSRs During Operation Phase

NSR	Predicted Unmitigated Noise Levels, dB(A)	Noise Criteria, dB(A)
N1	53	Daytime – 65 Night-time – 55
P1	48	Daytime – 58 Night-time – 55

Mitigation of Adverse Environmental Impacts

Construction Phase

Use of Quiet PME

- 4.48 To reduce construction noise impacts on NSR N1, silenced types of PME, which are in accordance with *BS 5228: Part 1, 1997*, are recommended. The total Sound Power Level (SWL) of PME for each construction activity was calculated and is summarized in [Appendix 4.2](#).
- 4.49 With the use of quiet PME, a noise reduction of 4 to 8 dB(A) at NSR N1 could be achieved. A detailed calculation of construction noise impact for the mitigated scenario is presented in [Appendix 4.2](#). The results indicate that the cumulative construction noise levels predicted at NSR N1 ranging from 62 to 73 dB(A) would comply with the daytime noise standard of 75 dB(A).
- 4.50 As mentioned in Section 4.43, the predicted construction noise levels at the NSR P1 near the chlorination plant would comply with the noise criteria of 75 dB(A) throughout the construction period. Nevertheless, in order to provide a better working environment within the SCISTW, use of silenced types of PME would also be recommended for the construction of chlorination plant and day tank (see [Appendix 4.3](#)).

Good Site Practice

- 4.51 In addition to quiet PME, good site practices listed below should be adopted to further abate any residual impacts during the construction phase of the Project and should be included in the contract document:
- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
 - Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program;
 - Mobile plant, if any, should be sited as far from NSRs as possible;
 - Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
 - Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
 - Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Operation Phase

Dechlorination Plant

- 4.52 As mentioned in Section 4.46, the predicted noise level at NSR N1 would meet both the daytime and night-time noise criteria of 65 dB(A) and 55 dB(A), respectively. No specific mitigation measures would be required for the proposed dechlorination plan.

Chlorination Plant & Day Tank

- 4.53 As mentioned in Section 4.47, the predicted noise level at NSR P1 would comply with both the daytime and night-time noise criteria of 58 dB(A) and 55 dB(A), respectively. No specific mitigation measures would be required for the proposed chlorination plan and day tank.

Evaluation of Residual Impacts

- 4.54 No adverse residual construction noise impact from the Project is expected with the use of silenced PME and implementation of good site practices.
- 4.55 No adverse residual operation noise impact from the proposed chlorination plant, day tank and dechlorination plant is expected with the proper designs.

Environmental Monitoring and Audit

- 4.56 It is recommended to establish an Environmental Monitoring and Audit (EM&A) programme for control of construction noise. The recommended mitigation measures should be incorporated into the EM&A

programme for implementation during the construction period. The EIA findings confirmed that proper designs of chlorination plant, day tank and dechlorination plant would control the potential noise impact at noise sensitive receivers within acceptable levels, operational noise monitoring is not considered necessary. Details of the programme are provided in a stand-alone EM&A Manual.

Conclusions

Construction Phase

- 4.57 The potential noise impact arising from construction of the proposed dechlorination plant and chlorination plant/day tank on the barrack buildings (NSR N1) and planned FSD Diving Training Centre (NSR P1) was assessed. The predicted noise levels at NSR N1 were in the range of 70 to 77 dB(A), while the predicted noise levels at NSR P1 were in the range of 62 to 70 dB(A). The noise level at the NSR N1 would exceed the daytime noise criteria of 75 dB(A) during the construction activities of site formation, excavation & backfilling, erection of formwork and fabrication of steelwork.
- 4.58 With the adoption of quiet PME and good site practices, the predicted construction noise levels at NSR N1 would not exceed the relevant noise criteria. The mitigated noise levels at NSR N1 would range from 62 to 73 dB(A). Although the predicted construction noise levels at the NSR P1 would comply with the noise criteria of 75 dB(A) throughout the construction period, use of silenced types of PME would still be recommended for the construction of chlorination plant and day tank in order to provide a better working environment within the SCISTW.

Operation Phase

- 4.59 The noise impacts associated with the operation of the Project were also assessed. The operation noise levels at NSRs N1 and P1 were predicted to be 53 dB(A) and 48 dB(A), respectively. No exceedances of relevant daytime and night-time noise criteria would be expected with the proper designs of chlorination plant, day tank and dechlorination plant.