

## 5 NOISE IMPACT ASSESSMENT

### 5.1 Introduction

This Chapter presents an assessment of the likely noise impacts arising from Scheme 2 development. The impacts will arise during construction and operation of the scheme. As the infrastructure works and activities for Scheme 2 are similar to those for Scheme 1, it is anticipated that the impacts and the required mitigation measures would be similar to those described in Volume 1 of this Report. However, the operation phase noise impacts are expected to be substantially different because of the difference in the type and layout of buildings in Scheme 2 and the consequential changes in the traffic flows. Emphasis has therefore been placed in this chapter on the noise impact assessment during the operation phase.

### 5.2 Description of Surrounding Environment

Section 5.2 in Volume 1 of this Report has described the characteristics of the existing and future environments. To a large extent, the future environment is not expected to deviate much between Scheme 1 and Scheme 2.

### 5.3 Noise Sensitive Receivers

Noise sensitive receivers in Scheme 2 include the houses of 2-3 storeys high along Route 7, the low-rise and high-rise residential buildings between Route 7 and Road D1, the mid-rise residential buildings near the Northern Access Road (NAR), and high-rise residential buildings between Southern Access Road (SAR) and Road D1. Representative receivers that are likely to be worst-affected by road traffic on the surrounding road network and the fixed noise sources in the STW during the operation phase have been identified and these are given in Table 5.1. The locations are shown in Figure 5.1.

**Table 5.1 Representative Noise Sensitive Receivers during Operation Phase**

NSR ID	Description	No. of Floors	Land Use
1	High-rise T7 facing SAR and VR*	22	R
2	High-rise T8 facing SAR and VR	23	R
3	High-rise T9 facing SAR and VR	24	R
4	High-rise T10 facing SAR and VR	25	R
5	High-rise T11 facing SAR and VR	26	R
6	High-rise T7 facing Road D1 and R7	22	R
7	High-rise T8 facing Road D1 and R7	23	R
8	High-rise T9 facing Road D1 and R7	24	R
9	High-rise T10 facing Road D1 and R7	25	R
10	High-rise T11 facing Road D1 and R7	26	R
11	High-rise T12 facing Road D1 and R7	29	R
12	High-rise T12 facing Road D1 and R7	29	R

NSR ID	Description	No. of Floors	Land Use
13	High-rise T13 facing Road D1 and R7	31	R
14	High-rise T13 facing Road D1 and R7	31	R
15	High-rise T14 facing Road SAR and R7	38	R
16	High-rise T14 facing SAR and R7	38	R
17	High-rise T15 facing SAR and R7	40	R
18	High-rise T15 facing SAR and R7	40	R
19	High-rise T16 facing SAR and R7	42	R
20	High-rise T16 facing SAR and R7	42	R
21	High-rise T17 facing SAR and R7	40	R
22	High-rise T17 facing SAR	40	R
23	High-rise T18 facing SAR	38	R
24	High-rise T18 facing SAR	38	R
25	High-rise T19 facing SAR	36	R
26	High-rise T19 facing SAR	36	R
27	High-rise T6 facing Road D1	46	R
28	High-rise T6 facing R7	46	R
29	High-rise T6 facing R7	46	R
30	High-rise T5 facing Road D1, SAR and VR	44	R
31	High-rise T5 facing R7	44	R
32	High-rise T5 facing R7	44	R
33	High-rise T4 facing Road D1, SAR and VR	42	R
34	High-rise T4 facing R7	42	R
35	High-rise T4 facing R7	42	R
36	High-rise T3 facing Road D1, SAR and VR	40	R
37	High-rise T3 facing R7	40	R
38	High-rise T3 facing R7	40	R
39	High-rise T2 facing Road D1, SAR and VR	38	R
40	High-rise T2 facing R7	38	R
41	High-rise T2 facing R7	38	R
42	High-rise T1 facing Road D1 and VR	36	R
43	High-rise T1 facing R7	36	R
44	High-rise T1 facing R7	36	R
45	Low-rise L6 facing R7	7	R
46	Low-rise L5 facing R7	7	R
47	Low-rise L4 facing R7	7	R
48	Low-rise L3 facing R7	7	R
49	Low-rise L2 facing R7	7	R
50	Low-rise L1 facing R7	7	R
51	Low-rise L1 facing Road D1 and VR	7	R
52	Low-rise L2 facing Road D1 and VR	7	R
53-68	House facing R7	2	R
69-72	House facing Roads D2 and D1	2	R
73	Service Apartment facing NAR	10	R

NSR ID	Description	No. of Floors	Land Use
74	Baguio Villa facing Road D1 and R7	30	R
75	Baguio Villa facing Road D1 and R7	10	R
76	Planned School at KSWV facing VR	5	G/IC
77	Planned School at KSWV facing VR	5	G/IC
78	Planned School at KSWV facing VR	5	G/IC
79	Planned School at KSWV facing VR	5	G/IC
80	Planned Mid-rise at KSWV facing VR	25	R
81	Planned Mid-rise at KSWV facing VR	25	R
82	Planned Mid-rise at KSWV facing VR	25	R
83	Planned Mid-rise at KSWV facing VR	25	R
84	Aegean Terrace facing NAR	3	R
85	Point Breeze facing NAR	3	R
86	Magnolia Villas B4 facing NAR	3	R
87	Magnolia Villas B2 facing NAR	3	R
88	Seascape facing NAR and SWD	3	R
89	Pine Court Bk 3 facing NAR and SWD	3	R
90	Tam Villas Bk 5 facing SWD	22	R
91	Provident Villa facing VR, SWD and NAR	22	R
92	Stone Manor facing VR, SWD and NAR	3	R
93	41 Sassoon Road facing SR, SWD and NAR	3	R
94	47 Sassoon Road facing SR and NAR	3	R
95	Villa Ellenbud facing NAR	3	R
96	<i>Crane Court facing SR and NAR</i>	3	R
97	SKH Lui Ming Choi Secondary School facing R7, SAR and VR	6	G/IC
98	Wah Ming House, Wah Fu Estate facing R7	35	R
99	Wah Chui House, Wah Fu Estate facing R7, SAR and VR	35	R
100	Pui Ying Secondary School facing R7, SAR and VR	6	G/IC
101	Precious Blood Primary School facing R7	5	G/IC
102	Tsui Chin Tong School for Handicap facing R7	5	G/IC
103	Pok Fu Lam Training Centre facing SAR and VR	5	G/IC

- \* VR – Victoria Road  
 R7 – Route 7  
 KSWV – Kong Sin Wan Village  
 SWD – Sha Wan Drive  
 SD – Sassoon Road  
 SAR – Southern Access Road, NAR – Northern Access Road

## 5.4 Construction Phase Noise Impacts

### 5.4.1 Advance Works

Section 5.4. in Volume 1 of this Report has assessed the potential noise impacts on existing NSRs, e.g. Baguio Villa and Wah Fu Estate from vertical drain installations and earthwork/surcharging and Section 5.4.4 of the same has identified mitigation measures to reduce the impacts. The same applies to Scheme 2 development. There would be no impacts on noise sensitive receivers in the proposed development as the advance works should have been completed before the intake of population in early 2002.

### 5.4.2 Main Construction Works

Section 5.4 in Volume 1 of this Report has assessed the potential noise impacts on existing NSRs from jetty/quay construction, building construction works, main civil works and G/IC site construction. The Main Construction Works in Scheme 2 are slightly different. For example, the building form, building layout and development phasing are different from those in Scheme 1.

According to the Outline Development Programme in Figure 2.7, all roadworks, apart from Route 7 construction and part of Northern Access Road construction, should have been completed before the intake of population in early 2002. The major impacts of these works would be on existing noise sensitive receivers outside the Study Area. As the construction programme of these works in Scheme 2 is similar to that in Scheme 1, the potential noise impacts on the existing NSRs should be similar and the identified mitigation measures in Volume 1 of this Report should apply.

The key noise issue will be the potential construction noise impacts on the earlier phases of the development due to building construction in subsequent phases. In order to minimise the impacts, the works sequence would be scheduled such that relatively noisy activities, e.g. foundation work, at adjacent areas or phases would be completed before the intake of population in these areas or phases.

In view of this, a general construction noise impact assessment has been carried out for the new NSR in the development and the existing NSR close to the development. The works under consideration are below:

- Building Construction
- Northern Access Road Construction
- Sewage Treatment Plant Construction

All works will be carried out in the non-restricted hours as no night works are anticipated at this stage. Appendix 5.1 gives the powered mechanical equipment likely to be employed for the various works. Percussive piling works, if required, are excluded in the assessment since they are separately controlled under the Noise Control Ordinance.

On the basis of the development phasing as shown in Figure 2.6 and the works sequencing as discussed above, the worst-affected NSR during the above works have been identified and are shown in Figure 5.2. C3 and C10, which represent the mid-rise residential, will be centrally air conditioned with the result that no adverse noise impacts are expected.

The maximum anticipated noise levels, assuming concurrent building works at the office sites and residential building sites, have been predicted and the results are shown in Appendix 5.2. The highest noise levels are predicted to be about 84 dB (A) without noise mitigation and this is predicted to occur at C4 and C5 which are close to the office construction sites.

Construction of the sewage treatment plant and the Northern Access Road would cause noise levels no higher than 70 dB (A) because of large distance attenuation. The results are shown in Appendix 5.3. No noise mitigation measures are required.

In order to meet the noise criterion of 75 dB (A) at dwellings during building construction, noise mitigation measures will be required. Appendix 5.4 shows the mitigated total SWLs for each item of construction activities as a result of the use of standard quiet type equipment and the adjustment of on-time of construction equipment. Appendix 5.5 gives the maximum anticipated noise levels during building construction with noise mitigation.

#### 5.4.3 Construction of Route 7

Noise impacts from the construction of Route 7 are expected to be less severe than those for Scheme 1 because houses and low-rise buildings are proposed along Route 7 alignment in the development. Nevertheless, a construction noise impact assessment has been carried out based on the equipment list as shown in Appendix 5.1. The maximum anticipated noise levels at NSR exposed to the construction activities are presented in Appendix 5.6, showing that noise levels can be as high as 79 dB (A) without mitigation at NSRs C11 to C15.

Noise calculations as presented in Appendix 5.7 have shown that with the use of site hoarding along the alignment in front of the houses and quiet type equipment as shown in Appendix 5.3, noise levels can be reduced to below 75 dB (A). For these low-rise receivers adjacent to Route 7, site hoarding should be acoustically effective.

#### 5.4.4 Cumulative Impacts

Cumulative noise impacts arising from the above construction activities, including building works, and the remaining roadworks, have also been considered. Based on the Outline Development Programme in Figure 2.6, 11 construction scenarios where concurrent activities may occur have been identified in Table 5.2.

**Table 5.2 Construction Scenarios for Noise Assessment**

Scenarios	Period (months)	Description
A	8	Construction at Phase CI only
B	12	Construction at Phases CI, and CII and Phase RII, sewage treatment plant and Northern Access Road construction
C	12	Construction at Phases CII, CIII and RII, sewage plant and Northern Access Road construction
D	7	Construction at Phases CIII, RII, and RIII
E	5	Construction at Phases CIII, RII and RIII and Route 7 construction
F	6	Construction at Phases RII, RIII and RIV and Route 7 construction
G	6	Construction at Phases RIII & RIV and Route 7 construction
H	6	Construction at Phases RIII, RIV and RV and Route 7 construction
I	12	Construction at Phases RIV and RV and Route 7 construction
J	7	Construction at Phase RV and Route 7 construction
K	5	Construction at Phase RV

The maximum noise levels under each of these construction scenarios have been predicted and these are shown in Appendix 5.8. The highest noise level is 83 dB(A) at C4 and C5 due to building construction at Phases CIII, RI, RII, and RIII without noise mitigation.

#### 5.4.5 Mitigation Measures

The following noise mitigation measures are proposed to mitigate the construction noise impacts on the affected NSRs.

<u>Mitigation Measures</u>	<u>Anticipated Noise Reduction</u>
a. Adjustment of on-time of construction equipment	1-3 dB(A) <sup>1</sup>
b. Use of standard quiet type equipment	5 dB(A)
c. Use of 3m high temporary noise barrier	10 dB(A)

<sup>1</sup> Based on BS5228: Part 1: 1984 and Final EIA Report on “Tai Po Development – Formation and Servicing of Area 12 (Part) and 39 Pak Shek Kok”

The mitigated construction noise levels are shown in Appendix 5.9. With the first two mitigation measures in place, the predicted noise levels at all the representative NSRs except C4 and C5 could be mitigated to comply with the noise standard of 75 dB(A). In order to further mitigate the noise impacts at C4 and C5, a 3m high temporary noise barrier as shown in Figure 5.3 is proposed to be erected at the western site boundary of Phase CIII construction. Through a proper implementation of these mitigation measures, maximum anticipated noise levels are expected to meet the construction noise criterion for all represented NSRs. As such, no adverse construction noise impacts are expected from the cumulative effect of various concurrent construction activities in and around the Study Area.

## 5.4.6 Residual Impacts

No adverse residual impacts are identified with the adoption of the mitigation measures identified for Scheme 1.

## 5.5 Operation Phase Noise Impacts

### 5.5.1 Traffic Noise

#### 5.5.1.1 Impact Prediction and Assessment

Road traffic noise will be the main noise source during the operation phase of Scheme 2. As for Scheme 1, a road traffic noise impact assessment has been carried out using the HFA Noise model and the assessment criteria as described in 5.5.2 in Volume 1 of this Report. Traffic flows for morning peak hours in year 2022, i.e. 15 years after the commissioning of Route 7 are shown in Figure 5.4. Two options of Route 7, which will be paved with Low Noise Surfacing Material (LNSM) (i.e. Open Textured Friction Course) to reduce noise, have been considered in the assessment. In general, traffic flows on local roads within the development area are low and have limited potential for traffic noise impacts, and therefore are not included in the noise model.

A preliminary noise calculation based on the above input assumptions has shown that a semi-enclosure and a vertical barrier along Road D1 would be required to separately screen the high-rise receivers along Road D1 and Baguio Villa. In order to minimise visual impacts of these noise structures on the development, and to avoid problem with highway maintenance, LNSM is also assumed to be applied on the level section of Road D1, i.e. between junction with Road D2 and junction with the inclined section of Southern Access Road as a base condition. No LNSM is recommended for the inclined section of Southern Access Road due to severe maintenance problem during the operation phase, though this is desirable from the noise point of view.

#### *Depressed Route 7*

Predicted traffic noise levels at various floor levels of the representative NSRs in 2022 are shown in Appendix 5.10. These noise levels are what would be expected in the design year without any noise mitigation. As can be seen, noise levels at all exposed facades and, particularly, most of the upper floors of the high-rise buildings exceed the noise criterion. While the noise levels at the first floor of the houses facing Route 7 meet the noise criterion because of topographic screening, those at the second floor either are close to or exceed the criterion. The highest predicted noise levels are 74 -77 dB(A) and these occur at NSRs 16, 17, 18, and 19 which are close to Southern Access Road and NSRs 28, 29, 31, 32 and 45 which are facing Route 7 with limited setback from the road. High noise levels are also predicted at facades facing Road D1, i.e. NSRs 27, 30, 33, 36, 39, and 42. NSR and particularly NSR 97 (Lui Ming Choi Secondary School) at Wah Fu Estate have a direct line of sight of Southern Access Road and Route 7, resulting in noise levels exceeding the noise

criterion for schools at NSR 97. There would also be a marginal exceedance of the noise criterion for schools at NSR 100, 101 and 102. Exceedance at NSR 91 is due entirely to the existing Victoria Road. Mitigation measures are required to reduce the noise levels by as much as 7 dB(A). Sample computer output is shown in Appendix 5.11.

On the other hand, NSRs at Baguio Villa which are the closest to the proposed new roads are unlikely to be adversely affected by traffic noise from the road network in the development and Route 7 because of the use of LNSM. NSR at Kong Sin Wan Village and in particular the proposed schools and the low-rise buildings along Sassoon Road are not expected to be adversely affected by road traffic noise because of large distance attenuation and topographic screening. Non-compliance rates for various types of NSRs in the development are shown in Table 5.2 below:

**Table 5.2 Non-compliance Rates for NSRs - Depressed Route 7**

	Total No. of Flats/floor	No of flats with noise level >70dB(A)	% of residential units complying with TM EIAO noise standard
House Development	49	5	90
Residential Development	2875	1574	45
Service Apartment	50	0	100
<b>Total</b>	<b>2974</b>	<b>1579</b>	<b>47</b>

*At-grade Route 7*

Predicted traffic noise levels at various floor levels of the representative NSRs in 2022 are shown in Appendix 5.12. These noise levels are what would be expected in the design year without any noise mitigation. As can be seen, noise levels are similar to those for the depressed option, except that those at facades of the houses facing Route 7 and near the roundabout are slightly higher because of reduced topographic screening. The highest predicted noise levels are about 74-77 dB(A) as for the depressed option. Mitigation measures are required to reduce the noise levels by as much as 7 dB (A).

Non-compliance rates for various types of sensitive receivers in the development are shown in Table 5.3 below:



**Table 5.3 Non-compliance Rate for NSRs – At-grade Route 7**

	Total No. of Flats/floor	No of flats with noise level >70dB(A)	% of residential units complying with TM EIAO noise standard
House Development	49	9	82
Residential Development	2875	1554	46
Service Apartment	50	0	100
<b>Total</b>	<b>2974</b>	<b>1563</b>	<b>47</b>

### 5.5.1.2 Mitigation Measures

Iterative calculations have been performed to determine the minimum direct mitigation measures to be included in the road construction to meet the noise criteria at all sensitive facades. All possible direct measures have been exhausted to reduce the noise levels to the required noise criteria.

#### *Depressed Route 7*

Figure 5.5 shows the mitigation measures, which are necessary to meet the noise criteria at all residential buildings and houses. These measures include:

- 4.5m high vertical barrier of 110m long along Road D2 (a - b) to screen the houses along Road D2. This barrier would be erected at the verge of the road.
- 1.5m high vertical barrier of 30m long at roundabout (b - c) to screen the houses facing the roundabout. In order to prevent sightline problem, the barrier would be erected at +10.0 mPD along the edge of the roundabout.
- 0.5m high vertical barrier of 290m long along Route 7 (c - d) to screen the houses. This barrier would be located at +10.0 mPD in the buffer zone on the verge of Route 7.
- Cantilevered barrier of 5.5m high and 795m long with a 3.5m cantilever inclined at 45° along Route 7 (d – e) to screen the high-rise buildings. This barrier would be erected at the verge of the road.
- 4.0m high vertical barrier of 160m long and another 85m along the central divider of Route 7 (f-g & j – k).
- Cantilevered barrier of 5.5m high and 570m long with a 3.5m cantilever inclined at 45° along the central divider of Route 7 (g – j).
- Cantilevered barrier of 5.5m high and 345m long with a 2.5m cantilever inclined at 30° along Road D1 (l – m and n - o) to screen the high-rise buildings along the road. The barrier would be erected at the verge of the road. A break in the barrier is necessary to allow for vehicular access.
- Cantilevered barriers of 5.5m high and 130m long with a 3.5m cantilever inclined at 45° along Southern Access Road (p – q and r - s) to screen the high-rise buildings along the

road. The barriers would be erected at the verge of the road. A break in the barrier is necessary to allow for vehicular access.

- Cantilevered barrier of 5.5m high and 400m long with a 3.5m cantilever inclined at 45° along Southern Access Road (t – u) to screen the high-rise buildings along the road. The barrier would be erected at the verge of the road.

LNSM on Route 7 and its associated slip roads, and the level section of Road D1 have been assumed as a base case.

Typical sections of these barriers are provided in Figures 5.6 - 5.10, showing the locations for installation of these barriers and the conceptual design of these barriers. Absorptive panels would be provided to all noise barriers. Detailed design will be carried out at a later stage to determine the exact locations and the engineering details.

Normal sightline for the speed limits under consideration on these roads is unlikely to be obstructed by these barriers.

As shown in the typical sections, access for fight-fighting is permitted since a buffer strip of at least 8m wide is provided between the barriers and the nearest building facade. Emergency vehicular access will be provided at each individual site at the proposed Cyber Port development scheme, if required. Details of this will be considered at the detailed design stage.

For proper maintenance of these barriers, a 3m non-building area opens to Government officials for free and 24-hr unrestricted access should be provided on either side of these barriers.

As Kong Sin Wan Village is well screened and remote from the roads, no specific noise mitigation measures are considered necessary for the proposed schools and residential development there.

Appendix 5.13 gives the predicted noise levels with the above mitigation measures. As can be seen, all noise levels comply with the TM on EIA Process except S.K.H. Lui Ming Choi Secondary School (NSR 97), Precious Blood Primary School (NSR 101) and Tsui Chin Tong School for Handicap (NSR 102). It is not practical to erect a barrier on the Southbound of Southern Access Road to screen these schools due to sightline and traffic safety problems. In addition, it would reflect noise to the proposed residential buildings (NSR 22 – 26) on the other side of the road. Boundary walls of say 3-4m high around the schools would not be sufficient to screen these schools. Since NSR 97 are already provided with air conditioning, no adverse traffic noise impact would be anticipated. It is understood that the air conditioners were provided for NSR 97 by the school, it is likely that re-provision of window improvement and air conditioning may be required. Besides, provision of window improvement and air conditioning may be required for NSRs 101 and 102 subject to the detailed Noise Insulation Work (NIW) Study.

### *At-grade Route 7*

Figure 5.11 shows the mitigation measures, which are necessary to meet the noise criteria at all residential buildings and houses. These measures include:

- 5.0m high vertical barrier of 110m long along Road D2 (a' – b') to screen the houses along Road D2. This barrier would be erected at the verge of the road.
- 2.0m high vertical barrier of 65m long at roundabout (b' – c') to screen the houses facing the roundabout. In order to prevent sightline problem, the barrier would be erected at +10.0 mPD along the edge of the roundabout.
- 0.5m high vertical barrier of 255m long along Route 7 (c - d) to screen the houses. This barrier would be located at +10.0 mPD in the buffer zone on the verge of Route 7.
- Cantilevered barrier of 5.5m high and 795m long with a 3.5m cantilever inclined at 45° along Route 7 (d – e) to screen the high-rise buildings. This barrier would be erected at the verge of the road.
- 4.0m high vertical barrier of 160m long and another 85m along the central divider of Route 7 (f -g & j – k).
- Cantilevered barrier of 5.5m high and 570m long with a 3.5m cantilever inclined at 45° along the central divider of Route 7 (g – j).
- Cantilevered barrier of 5.5m high and 345m long with a 2.5m cantilever inclined at 30° along Road D1 (l – m and n - o) to screen the high-rise buildings along the road. The barrier would be erected at the verge of the road. A break in the barrier is necessary to allow for vehicular access.
- Cantilevered barriers of 5.5m high and 130m long with a 3.5m cantilever inclined at 45° along Southern Access Road (p – q and r - s) to screen the high-rise buildings along the road. The barriers would be erected at the verge of the road. A break in the barrier is necessary to allow for vehicular access.
- Cantilevered barrier of 5.5m high and 400m long with a 3.5m cantilever inclined at 45° along Southern Access Road (t – u) to screen the high-rise buildings along the road. The barrier would be erected at the verge of the road.

As compared with the proposed measures for the depressed option, the difference is only in the height of the barrier along the roundabout and Road D2.

Appendix 5.14 gives the predicted noise levels with the above mitigation measures. As can be seen, all noise levels comply with the TM on EIA Process.

#### 5.5.1.3 Residual Impacts

No residual impacts are anticipated if all the above mitigation measures are incorporated as part of the road or scheme development since 100% of the noise levels would comply with the noise criterion, except S.K.H. Lui Ming Choi Secondary School (NSR 97), Precious Blood Primary School (NSR 101) and Tsui Chin Tong School for Handicap (NSR 102). In

order to redress the residual impact at these three schools, sound insulation would need to be provided or reprovided and a further Noise Insulation Work study would be carried out later to identify details of the work required.

### 5.5.2 Fixed Noise Sources

Powered mechanical equipment, e.g. pumps would be used to operate the sewage treatment plant. Since all the equipment would be enclosed in structure and the nearest sensitive receiver, who is the mid-rise residential building with central air conditioning, has no direct line of sight to the sewage treatment plant, no significant noise impact is envisaged. Similarly, the proposed salt water pumping station near NSR 27 is not expected to create a noise problem because all pumps and the associated mechanical equipment will be enclosed in an acoustically treated structure underneath the podium deck.

The proposed 275 KV electricity substation will generate noise that may affect the high rise residential buildings located across Road D1. According to a preliminary noise assessment, the impact is unlikely to be adverse because of the following design features and evidence from similar substations in the urban area :

- Low noise gas insulated transformers will be installed at the substation.
- The nearest NSR are over 50m from the substation.
- The transformer rooms will be acoustically treated and acoustic louvers will be used to further reduce noise.
- The substation will be designed such that rooms housing the transformers and other equipment that may generate noise will not have openings in the façade facing the high rise residential buildings.

A Noise Impact Assessment will be carried out once the design details of the substation become available.

As the piers and marina are still at a conceptual stage, no specific details are available to assess the potential noise impacts from berthing activities at these facilities. As a broad brush assessment, it would appear that the piers and marina would create no adverse noise problem for the NSR in the development if they are designed and used in a manner similar to those at Hebe Haven in Sai Kung or Gold Coast in Tuen Mun, where boat noise has not been causing any noise problem for the nearby NSR. A separate EIA will be conducted for the marina and the associated shoreline facilities once detailed information is available. If the future EIA ascertains that there is insurmountable noise impact, the relevant part of marine activities should not be allowed to proceed.

## 5.6 Conclusions and Recommendations

Traffic noise will be a key environmental issue during the operation phase of the proposed development. Noise mitigation measures including vertical barriers and cantilevered barriers of various lengths, will be required with either a depressed option or an at-grade

option of Route 7. Also, low noise surfacing material will be required on Route 7 and part of Road D1. It has been predicted that with these barriers and the low noise surfacing material, all noise levels except at existing S.K.H. Lui Ming Choi Secondary School (NSR 97), Precious Blood Primary School (NSR 101) and Tsui Chin Tong School for Handicap (NSR 102), would comply with the noise criterion stipulated in the TM on EIA Process and no residual impacts are identified. In order to redress the residual impact at these three schools, sound insulation would be provided or reprovided and a further Noise Insulation Work study would be carried out later to identify details of the work required.

Fixed noise sources from the proposed sewage treatment plant, the salt water pumping station and the 275 KV electricity substation are unlikely to have any significant noise impacts on the adjacent noise sensitive receivers. A detailed Noise Impact Assessment for the substation will be carried out once the design details of the substation becomes available.

The marina and piers are at a conceptual stage and therefore no information is available for a proper noise assessment. However, a broad brush assessment has shown that no adverse noise problems would be expected if they are designed and used similar to the facilities at Hebe Haven in Sai Kung or Gold Coast in Tuen Mun. A separate EIA will be conducted for the marina and the associated shoreline facilities once detailed information is available.

Construction noise impacts would also be a key environmental issue. However, with the adoption of the noise mitigation measures as identified in the Volume 1 of this Report, and the works sequencing as recommended here, no adverse noise impacts during the construction phase are envisaged.