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## **4. NOISE IMPACT ASSESSMENT**

### **4.1 Introduction**

4.1.1 This *Section* assesses the potential noise impacts associated with the construction of the Project in accordance with the requirements stated in *Clause 3.4.11* of the *EIA Study Brief (ESB-322/2019)*. It presents the potential construction noise impacts to the identified Noise Sensitive Receivers (NSRs) for the Project.

4.1.2 During the operation of the Project, the drainage channel does not involve any pumping system/mechanical/electrical equipment. Small-scale maintenance shall be conducted which is small-scale in nature. Therefore, the Project does not have a noise pollution source during operation and therefore noise impact arising from the Project during operation phase is not anticipated and not included in this *Section*.

### **4.2 Relevant Legislation and Guidelines**

4.2.1 The principal legislation relating to the control of construction noise is the *Environmental Impact Assessment Ordinance (EIAO) (Cap. 499)*. The *Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)*, issued under the *EIAO*, provides guidelines and noise criteria for evaluating the noise impact. The guideline referred is:

- *EIAO Guidance Note No. GN 9/2010 - Preparation of Construction Noise Impact Assessment*.

4.2.2 The *Noise Control Ordinance (NCO) (Cap. 400)* also provides means to assess the construction noise impact. Various *Technical Memoranda (TMs)*, which stipulate control approaches and criteria, have been issued under the NCO. The following *TMs* are applicable to the control of noise impact from construction activities:

- *Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM)*; and
- *Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM)*.

#### ***General Construction Works***

4.2.3 Under the *EIAO*, potential noise impact arising from general construction works during normal working hours (i.e. 07:00 to 19:00 hrs on any day not being a Sunday or public holiday) at 1 m from the external façade of the uses, which rely on opened windows for ventilation, is to be assessed in accordance with the noise criteria specified in the *EIAO-TM*. The *EIAO-TM* noise standards are presented in **Table 4.1**.

**Table 4.1**  
**EIAO-TM Day-time Construction Noise Standards (Leq, 30 min dB(A))**

| Use                                                   | Noise Standard (dB(A)) |
|-------------------------------------------------------|------------------------|
| Domestic Premises                                     | 75                     |
| Educational Institutions (normal periods)             | 70                     |
| Educational Institutions (during examination periods) | 65                     |

**Notes:**

(a) The above standards apply to uses which rely on opened windows for ventilation.

(b) The above standards shall be viewed as the maximum permissible noise levels assessed at 1m from the external façade.

4.2.4 When assessing a Construction Noise Permit (CNP) application for the use of Powered Mechanical Equipment (PME) during the restricted hours, the Noise Control Authority will compare the Acceptable Noise Levels (ANLs), as promulgated in *GW-TM*, and the Corrected Noise Levels (CNLs) (i.e. after accounting for factors such as barrier effects and reflections) associated with the proposed PME operations. The ANLs are obtained with corrections for the duration of the CNP and multiple permit situations, if applicable, to the Basic Noise Levels (BNLs). The BNLs are related to the noise sensitivity of the area in question and different Area Sensitivity Ratings (ASR) have been established to reflect the background characteristics of different areas. The appropriate ASR for the Noise Sensitive Receiver (NSR) is determined with reference to **Table 4.2**.

**Table 4.2**  
**Area Sensitivity Ratings**

| Types of Area Containing NSR                                                           | Degree to which NSR is affected by Influencing Factor (IF) |                     |                   |
|----------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------|-------------------|
|                                                                                        | Not Affected                                               | Indirectly Affected | Directly Affected |
| Rural area, including Country Parks or village type developments                       | A                                                          | B                   | B                 |
| Low density residential area consisting of low-rise or isolated high-rise developments | A                                                          | B                   | C                 |
| Urban area                                                                             | B                                                          | C                   | C                 |
| Area other than those above                                                            | B                                                          | B                   | C                 |

**Notes:**

The following definitions apply:

(a) "Country Park" means an area that is designated as a country park pursuant to section 14 of the *Country Parks Ordinance*;

(b) "directly affected" means that the NSR is at such a location that noise generated by the IF is readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR;

(c) "indirectly affected" means that the NSR is at such a location that noise generated by the IF, whilst noticeable at the NSR, is not a dominant feature of the noise climate of the NSR;

(d) "not affected" means that the NSR is at such a location that noise generated by the IF is not noticeable at the NSR; and

(e) "urban area" means an area of high density, diverse development including a mixture of such elements as industrial activities, major trade or commercial activities and residential premises.

4.2.5 The relevant BNLs are shown in **Table 4.3**.

**Table 4.3**  
**Basic Noise Levels for General Construction Works (BNL, Leq, 5 min dB(A))**

| Time period                                                                                                                                   | Area Sensitivity Rating (dB(A)) |    |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----|----|
|                                                                                                                                               | A                               | B  | C  |
| All days during the evening (i.e. 19:00-23:00 hrs) and general holidays (including Sundays) during the day and evening (i.e. 07:00-23:00 hrs) | 60                              | 65 | 70 |
| All days during the night-time (i.e. 23:00-07:00 hrs)                                                                                         | 45                              | 50 | 55 |

4.2.6 The Noise Control Authority will consider a well-justified CNP application, for construction works within restricted hours as guided by the relevant TMs issued under the *NCO*. The Noise Control Authority will take into account adjoining land uses and any previous complaints against construction activities at the site before making a decision. Nothing in this *EIA Report* shall bind the Noise Control Authority in making its decision. The Noise Control Authority may include any conditions in a CNP that it considers appropriate. Failure to comply with any such conditions may lead to cancellation of the CNP and prosecution action under the *NCO*.

### 4.3 Description of the Noise Environment

4.3.1 The Project is located in a remote rural area in Ping Che, New Territories, with some villages scattered within the Study Area (i.e. within 300m from the Project Site). Site inspection was conducted to confirm its existing condition. Background noise levels are typical of a general rural environment in the vicinity of village environment and agricultural use with some small-scale industrial establishments, such as storage yards and workshops scattered in and around the villages. The major existing noise sources were identified as traffic noise from Ping Che Road and local roads. Noise from the small scale industrial establishment also contribute to the ambient noise level.

4.3.2 In accordance with the Outline Zoning Plan (OZP) for Ping Che and Ta Kwu Ling (No.S/NE-TKL/14) and Ta Kwu Ling North (No.S/NE-TKLN/2), the land uses of the surrounding areas were zoned as “Agriculture” (AGR), “Green Belt” (GB), “Government/Institution/Community” (GIC), “Industrial (Group D)” (I(D)), “Recreation” (REC), “Open Space” (O), “Open Storage” (OS) and “Village Type Development” (V).

4.3.3 Four improvement options were formulated and investigated to determine the optimal scheme of improvement, taking due consideration of the design factors, such as physical and site constraints, capital costs, programme of works, land issues, environmental impacts, traffic impacts, geotechnical issues, interfacing issues with other projects and public concerns. The general description of the different alignment options and their key merits and constraints are provided in **Table 4.4** below.

**Table 4.4 Summary of Options for Watercourses TKL04 and TKL05**

| Option                       | Description                                                                                                                                                                                                                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 1 – Conforming Scheme | Two-stage river design concept was adopted basically for the drainage improvement works for the existing watercourses of TKL04 and TKL05. The existing watercourse are designed remaining undisturbed as far as practicable while the area adjacent to the stream was served as floodplain with embankment provided at the both sides. |

|                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 2 – Widening and Deepening Scheme               | The major concept of this option is to upgrade the hydraulic performance by widening and deepening the existing watercourses and hence, to increase the flow capacity for catering the required rainfall return period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Option 3 – Bypass Box Culvert Scheme                   | The design concept of this option is to carry the over-flow water from upstream of the watercourses of TKL04&05 to the upstream of Ping Yuen River through the underground box culverts adjacent to the existing watercourses. To minimize the impact to the public and by consideration of the constructability, open cut excavation method would be proposed for construction of box culvert and the associated by-pass pipe. The proposed box culvert is designed for catering 50 years Rainfall Events so that it could minimize the land disturbs or land requirement in the future development. As the existing watercourses is proposed to be retain, the impact to the ecology and natural view of the existing watercourses is considered minimal. For the open space above the proposed box culvert, it is recommended to be opened for public use (e.g. recreation, education, O&M, environmental and walkability enhancement purposes). |
| Option 4 – Drainage Tunnel with Pumping Station Scheme | The major concept of this option is to provide a drainage tunnel system along TKL04 and TKL05 for collection of excessive stormwaters from TKL04 and TKL05 and to discharge the collected stormwater to Ping Yuen River directly by a pumping station with estimated flow rate of 90m <sup>3</sup> /s. The existing watercourses of TKL04 and TKL05 will be maintained except the downstream section of TKL05 between Ping Yuen River and the junction of TKL04 and TKL05. Flood walls will be constructed along this downstream section of TKL05 to avoid backwater effect from Ping Yuen River.                                                                                                                                                                                                                                                                                                                                                   |
| Option 5 – Deepening Scheme with Pumping Station       | The major concept of this option is similar to Option 2 which is to upgrade the hydraulic performance by widening and deepening the existing watercourse and hence, to increase the flow capacity for catering the required rainfall return period. The major difference is the scale of widening in a section of watercourse near Lei Uk Tsuen and the reduction of widening scale is compensated with a pump station.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

4.3.4 A comparison of the options is summarized in **Table 4.5** below.

**Table 4.5**  
**Comparison of the Options**

| Options* | Major Noise Source before Construction                                                            | Environmental Benefit                                                                                                                                                    | Additional Noise Source after Construction |
|----------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Option 1 | Traffic Noise from Ping Che Road and local roads, Noise from small-scale industrial establishment | Provide a more pleasant acoustic environment through improvement of water channel and surrounding environment, provision of open space, and associated landscaping works | NO                                         |
| Option 2 |                                                                                                   |                                                                                                                                                                          | NO                                         |
| Option 3 |                                                                                                   |                                                                                                                                                                          | NO                                         |
| Option 4 |                                                                                                   |                                                                                                                                                                          | E&M Noise from Pump Station                |
| Option 5 |                                                                                                   |                                                                                                                                                                          | E&M Noise from Pump Station                |

Note: \*As briefly described in Section 2 of this EIA, Option 2 is the final design option.

#### 4.4 Noise Sensitive Receivers

4.4.1 In accordance with the requirements stated in *Clause 3.4.11.2* of the *EIA Study Brief*, the Study Area for the noise impact assessment covered an area of 300 m from the boundary of the Project. Only the first layer of representative NSRs located along the Project site boundary was included in the assessment as the NSRs behind were located

further away from the Project and/or were screened. The area considered in the assessment is shown in **Figure 4.1**.

- 4.4.2 The 300m assessment boundary is within the No.S/NE-TKL/14 (Ping Che and Ta Kwu Ling) and No. No.S/NE-TKLN/2 (Ta Kwu Ling North) of the Outline Zoning Plan (OZP). The relevant OZP, Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans, including plans and drawings published by the Lands Department and any land use and development applications approved by the Town Planning Board have been reviewed. The selected existing representative NSRs that may potentially be affected by the construction of the Project include Ping Yeung, Tong Fong, Lei Uk, Sing Ping Village, Tai Po Tin, Ping Che, Caritas Fung Wong Fung Ting Home in Ping Che Road, two temporary shelters, and the Wun Chuen Sin Kwoon at Ping Che. No planned NSRs were identified within the Study Area. No planned or committed NSRs have been identified within the Study Area.
- 4.4.3 The locations of the identified representative NSRs are presented in **Figure 4.1**. Photographs showing the representative NSRs are also presented in **Appendix 4.8**.
- 4.4.4 Descriptions of the representative NSRs are provided in **Table 4.6**.

**Table 4.6**  
**Representative Noise Sensitive Receivers (NSRs)**

| NSR                | Description                      | Minimum Horizontal Separation Distance away from the Project (m) | Type of Use          | Noise Criteria<br>L <sub>eq</sub> 30-min, dB(A) |
|--------------------|----------------------------------|------------------------------------------------------------------|----------------------|-------------------------------------------------|
| NSR1               | 307 Ping Yeung                   | 5                                                                | Residential          | 75                                              |
| NSR2               | 17 Ping Yeung                    | 4                                                                | Residential          | 75                                              |
| NSR3               | 362 Ping Yeung                   | 5                                                                | Residential          | 75                                              |
| NSR4               | 331 Ping Yeung                   | 4                                                                | Residential          | 75                                              |
| NSR5               | 156B Ping Yeung                  | 7                                                                | Residential          | 75                                              |
| NSR6               | Temporary Shelter near TKL04     | 3                                                                | Residential          | 75                                              |
| NSR7               | 20 Sing Ping Village             | 36                                                               | Residential          | 75                                              |
| NSR8               | Caritas Fung Wong Fung Ting Home | 6                                                                | Home for the Elderly | 75                                              |
| NSR9               | 5 Tong Fong                      | 67                                                               | Residential          | 75                                              |
| NSR10              | 55 Lei Uk                        | 33                                                               | Residential          | 75                                              |
| NSR11 <sup>#</sup> | Wun Chuen Sin Kwoon              | 35                                                               | Temple               | 75                                              |
| NSR12              | 200 Tai Po Tin                   | 42                                                               | Residential          | 75                                              |
| NSR13              | 323 Tai Po Tin                   | 32                                                               | Residential          | 75                                              |
| NSR14              | 118 Tai Po Tin                   | 36                                                               | Residential          | 75                                              |
| NSR15              | 103 Ping Che                     | 87                                                               | Residential          | 75                                              |
| NSR16              | Temporary Shelter near TKL05     | 2                                                                | Residential          | 75                                              |
| NSR17              | 60 Tong Fong                     | 29                                                               | Residential          | 75                                              |
| NSR18              | Village house in Tai Po Tin      | 3                                                                | Residential          | 75                                              |
| NSR19              | 124A Ping Yeung                  | 2                                                                | Residential          | 75                                              |
| NSR20              | 196 Ping Che                     | 36                                                               | Residential          | 75                                              |
| NSR21              | Village house at Lei Uk Tsuen    | 33                                                               | Residential          | 75                                              |
| NSR22              | Temporary Shelter                | 9                                                                | Residential          | 75                                              |
| NSR23              | Ta Kwu Ling Farm house           | 8                                                                | Residential          | 75                                              |
| NSR24              | House 223 Ping Che Road          | 8                                                                | Residential          | 75                                              |

**Notes:**

#Choice of temple as a noise sensitive receiver has been referenced Table 4.7 of an approved EIA report (AEIAR-207/2017). Noise criteria Woon Chuen Sin Kwoon is assumed similar to residential premises.

([https://www.epd.gov.hk/eia/register/report/eiareport/eia\\_2452016/SKTSTW%20EIA\\_HTML/EIA%20HTML/Chapter%2004%20Noise.htm](https://www.epd.gov.hk/eia/register/report/eiareport/eia_2452016/SKTSTW%20EIA_HTML/EIA%20HTML/Chapter%2004%20Noise.htm))<sup>2</sup>. Selected NSRs are the proposed construction noise assessment points.

## **4.5 Identification for Potential Impacts**

4.5.1 Potential impacts to the NSRs during the construction phase of the Project will mainly arise from the use of PME. The major construction activities will include:

### ***Improvement Works to Tributary Sections TKL04/TKL05***

- Site clearance;
- Excavation to formation level;
- Construction of Channel Base/Lining and Crossings; and
- Backfilling.

### ***Road Drainage System at Ping Che Road***

- Earth Works;
- Trench support and ground compaction;
- Pipe-laying works; and
- Backfilling & Surfacing.

### ***Drainage Improvement Works at Ping Yeung Village***

- Earth Works;
- Trench support and ground compaction;
- Pipe-laying works; and
- Backfilling & Surfacing.

4.5.2 All the works types will be conducted in stages and implemented concurrently. Estimated durations of the construction work are provided in **Table 4.7**. The proposed works will be conducted during non-restricted hours only, i.e. between 07:00 and 19:00 hours on any day except Sunday and general holiday.



**Table 4.7**  
**Tentative Construction Activities Schedule**

| Work Stage                                                   | Construction Activities               | Estimated Duration per Section |
|--------------------------------------------------------------|---------------------------------------|--------------------------------|
| Works Type 1 - Improvement Works to Tributary Sections TKL04 |                                       |                                |
| Stage 1                                                      | Site Clearance                        | 42 months                      |
| Stage 2                                                      | Form work of Temporary Channel        |                                |
| Stage 3                                                      | Excavation to Formation Level         |                                |
| Stage 4                                                      | Construction of Channel and Crossings |                                |
| Stage 5                                                      | Backfilling & Landscaping             |                                |
| Works Type 2 - Improvement Works to Tributary Sections TKL05 |                                       |                                |
| Stage 1                                                      | Site Clearance                        | 54 months                      |
| Stage 2                                                      | Form work of Temporary Channel        |                                |
| Stage 3                                                      | Excavation to Formation Level         |                                |
| Stage 4                                                      | Construction of Channel and Crossings |                                |
| Stage 5                                                      | Backfilling & Landscaping             |                                |
| Construction of Road Drainage System at Ping Che Road        |                                       |                                |
| Stage 1                                                      | Earth Works                           | 24 months                      |
| Stage 2                                                      | Trench support and ground compaction  |                                |
| Stage 3                                                      | Pipe-laying works                     |                                |
| Stage 4                                                      | Backfilling & Surfacing               |                                |
| Drainage Improvement Works at Ping Yeung Village             |                                       |                                |
| Stage 1                                                      | Earth Works                           | 24 months                      |
| Stage 2                                                      | Trench support and ground compaction  |                                |
| Stage 3                                                      | Pipe-laying works                     |                                |
| Stage 4                                                      | Backfilling & Surfacing               |                                |

4.5.3 According to the preliminary construction programme, the normal working hours of the construction works will be between 07:00 and 19:00 hrs from Monday to Saturday (except general holidays). Should evening and night works between 19:00 and 07:00 hrs or on public holidays (including Sundays) be required, the Contractor will submit a CNP application which will be assessed by the Noise Control Authority.

4.5.4 During the operation phase, there will be no pumping system/station and mechanical/electrical equipment. Only minor maintenance works such as regular clearance, and repair of damages to the channel bed and sides are expected. Therefore, it is anticipated that the potential noise impacts arising from these maintenance works would be minimal.

#### 4.6 Assessment Methodology

4.6.1 The construction noise impact assessment was undertaken in accordance with the procedures outlined in the *GW-TM*, which is issued under the *NCO*, the *EIAO-TM* and the *EIAO GN No. 9/2010*. The assessment methodology is summarised as follows:

- Identify the representative NSRs that may be affected by the construction of the Project;
- Determine the plant teams for corresponding construction activities, based on the agreed plant inventory;
- Assign sound power levels (SWLs) to the PME proposed based on the *GW-TM*

and list of SWLs of other commonly used PME <sup>(a)</sup>

- Calculate the correction factors based on the distance between the NSRs and the notional noise source positions of different works areas;
- Apply corrections in the calculations, such as potential screening effects and acoustic reflection, if any;
- Predict the construction noise levels at NSRs in the absence of any mitigation measures; and
- Add a positive 3 dB(A) façade correction to the predicted noise levels in order to account for the facade effect at each NSR.

4.6.2 In reality, not all PME items within a works area will be operating at all times. The construction noise assessment was undertaken based on the proposed construction works programme and plant inventory, and appropriate utilization rates of the PME items (see **Appendix 4.1** and **Appendix 4.2**). The Engineer and Project Proponent have reviewed the programme and plant inventory with appropriate utilization rates, and have confirmed that they are reasonable and practicable for completing the Project within the scheduled timeframe (see **Appendix 4.10**). The proposed methods for the construction of the Project are common in Hong Kong and the PMEs proposed are available in the Hong Kong market.

4.6.3 The works area of the Project are shown in **Figure 4.1**. The total SWL associated with each construction activity for corresponding sections was established. The potential noise impacts at NSRs were evaluated by comparing the predicted noise levels with the *EIAO-TM* day-time construction noise limits ( $L_{eq, 30min}$  dB(A)), as outlined in *Section 4.2*.

#### ***Scheduling of PME/Construction Activities***

4.6.4 The construction activities will be divided into sections, and further divide into sub-sections of about 50m length per each. To ensure no adverse noise impact will be imposed to the surrounding NSRs, at most 3 works front will be conducted at the same time for each sub-sections. Separation of works areas are shown in **Appendix 4.1**. The construction works at Ping Che Road and Ping Yeung Village shall carry out at only one work front in each divided section. Such arrangement is confirmed by Project Engineer to be practicable for completing the works in scheduled timeframe.

#### ***Cumulative Noise Impact***

4.6.5 The cumulative noise impact from North East New Territories Sewerage System is included in the assessment. Other concurrent projects are discussed in **Section 4.9**.

<sup>(a)</sup> “Sound power levels of other commonly used PME” prepared by the Noise Control Authority ([https://www.epd.gov.hk/epd/sites/default/files/epd/english/application\\_for\\_licences/guidance/files/OtherSWLe.pdf](https://www.epd.gov.hk/epd/sites/default/files/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf))

## 4.7 Evaluation of Impacts

4.7.1 The predicted construction noise levels during day-time period for the construction of the Project are presented in **Table 4.8**. Summaries of the predicted noise levels and details of the noise calculations are presented in **Appendix 4.3** and **Appendix 4.4**, respectively.

**Table 4.8**  
**Predicted Construction Noise Levels dB(A) (Without Mitigation)**

| NSR   | Description                      | Maximum Predicted Noise Level <sup>(a)</sup> , dB(A) | Noise Criteria, $L_{eq, 30min}$ , dB(A) | Compliance (Y/N) |
|-------|----------------------------------|------------------------------------------------------|-----------------------------------------|------------------|
| NSR1  | 307 Ping Yeung                   | 89                                                   | 75                                      | N                |
| NSR2  | 17 Ping Yeung                    | 90                                                   | 75                                      | N                |
| NSR3  | 362 Ping Yeung                   | 92                                                   | 75                                      | N                |
| NSR4  | 331 Ping Yeung                   | 89                                                   | 75                                      | N                |
| NSR5  | 156B Ping Yeung                  | 90                                                   | 75                                      | N                |
| NSR6  | Temporary Shelter near TKL04     | 92                                                   | 75                                      | N                |
| NSR7  | Sing Ping Village                | 83                                                   | 75                                      | N                |
| NSR8  | Caritas Fung Wong Fung Ting Home | 91                                                   | 75                                      | N                |
| NSR9  | 5 Tong Fong                      | 77                                                   | 75                                      | Y                |
| NSR10 | 55 Lei Uk                        | 82                                                   | 75                                      | N                |
| NSR11 | Wun Chuen Sin Kwoon              | 77                                                   | 75                                      | N                |
| NSR12 | 200 Tai Po Tin                   | 77                                                   | 75                                      | N                |
| NSR13 | 323 Tai Po Tin                   | 85                                                   | 75                                      | N                |
| NSR14 | 118 Tai Po Tin                   | 82                                                   | 75                                      | N                |
| NSR15 | 103 Ping Che                     | 74                                                   | 75                                      | Y                |
| NSR16 | Temporary Shelter near TKL05     | 93                                                   | 75                                      | N                |
| NSR17 | 60 Tong Fong                     | 82                                                   | 75                                      | N                |
| NSR18 | Village house in Tai Po Tin      | 92                                                   | 75                                      | N                |
| NSR19 | 124A Ping Yeung                  | 90                                                   | 75                                      | N                |
| NSR20 | 196 Ping Che                     | 78                                                   | 75                                      | N                |
| NSR21 | Village house at Lei Uk Tsuen    | 82                                                   | 75                                      | N                |
| NSR22 | Temporary Shelter                | 93                                                   | 75                                      | N                |
| NSR23 | Ta Kwu Ling Farm house           | 82                                                   | 75                                      | N                |
| NSR24 | House 223 Ping Che Road          | 85                                                   | 75                                      | N                |

**Notes:**

(a) All predicted noise levels dB(A) were corrected with 3dB(A) for façade reflection.

4.7.2 The results indicate the construction noise levels at all of the representative NSRs exceeded the *EIAO-TM* noise criteria in daytime during the course of the construction period, except NSR15(103 Ping Che) . Mitigation measures will therefore be required to mitigate the construction noise impact.

## 4.8 Mitigation Measures

4.8.1 In view of the predicted noise exceedances during the construction of the Project, the following mitigation measures have been considered. The “*Recommended Pollution Control Clauses for Construction Contracts*” promulgated by EPD will also be added to the Contract for future contractors to follow.

- Good site practice;

- Use of quiet PME;
- Adoption of temporary noise barrier or noise enclosure; and
- Scheduling of PME/construction activities.

***Good Site Practices***

4.8.2 Good site practices and noise management can considerably reduce the potential noise impact of construction activities on nearby NSRs. The noise benefits of these practices can vary according to specific site conditions and operations. Since the effect of the good construction site practices could not be quantified, the mitigated noise levels calculated in the subsequent sections have not taken account of this effect. The following site practices should be followed during the construction of the Project:

- Only well-maintained plant will be operated on-site and plant will be serviced regularly during the construction phase;
- Silencers or mufflers on construction equipment will be utilized where required and will be properly maintained during the construction phase;
- Mobile plant, if any, will be sited as far away from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Plant known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

***Use of Quiet PME***

4.8.3 The use of quiet PME is considered to be a practicable means to mitigate the construction noise impact. Quiet PME is defined as a PME having actual SWL lower than the value specified in the GW-TM. The total SWL of all plant items to be used on-site at each works area will be specified so that flexibility is allowed for the Contractor to select plant items to suit the construction needs. The Contractor shall select plant items with total SWL equal to or lower than the total SWL specified in the plant inventory in **Appendix 4.5** in order to meet the relevant noise criteria. Quiet PME that have been adopted in the assessment are summarised in **Table 4.9**.

**Table 4.9**  
**Sound Power Level of Quiet PME**

| PME                                      | EPD QPME Reference <sup>(a)(b)</sup> | Sound Power Level, dB(A) |
|------------------------------------------|--------------------------------------|--------------------------|
| Excavator, mini-robot mounted (electric) | (a)                                  | 94                       |

|                                                                   |           |     |
|-------------------------------------------------------------------|-----------|-----|
| Hand-held Percussive Breaker                                      | EPD-04212 | 99  |
| Dump truck, with grab, 5.5 tonne <gross vehicle weight <=38 tonne | (a)       | 105 |
| Roller, vibratory                                                 | EPD-09720 | 94  |
| Poker, vibratory, hand-held (electric)                            | (a)       | 102 |
| Giken Piler                                                       | (c)       | 94  |
| Air blower (electric)                                             | (a)       | 95  |
| Mobile Crane                                                      | EPD-07164 | 92  |
| Super Silenced Generator                                          | CNP 103   | 95  |

**Note:**

- (a) Extracted from EPD document namely, "Sound power levels of other commonly used PME" ([https://www.epd.gov.hk/epd/sites/default/files/epd/english/application\\_for\\_licences/guidance/files/OtherSWLe.pdf](https://www.epd.gov.hk/epd/sites/default/files/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf))
- (b) Extracted from EPD database namely, "Quality powered mechanical equipment" ([https://www.epd.gov.hk/cgi-bin/npg/qpme/search\\_gen.pl?lang=eng&st=sim&valid=Y](https://www.epd.gov.hk/cgi-bin/npg/qpme/search_gen.pl?lang=eng&st=sim&valid=Y))
- (c) Extracted from approved EIA report "Tsim Sha Tsui Station Northern Subway" (Register No.: AEIAR-127/2008), and approved by Engineer. ([https://www.epd.gov.hk/eia/register/report/eiareport/eia\\_1542008/EIA%20Report/html/Appendices/App\\_4-4\\_Final.pdf](https://www.epd.gov.hk/eia/register/report/eiareport/eia_1542008/EIA%20Report/html/Appendices/App_4-4_Final.pdf))

**Adoption of Temporary Noise Barriers or Noise Enclosure**

- 4.8.4 The use of noise barriers will be an effective means to mitigate the noise impact arising from the construction works in the works area, particularly for low-rise NSRs. Temporary Noise Barriers of appropriate height with skid footing should be used and located within a few metres of stationary plant and mobile plant such that the line of sight to the NSR is blocked by the barriers. The length of the barrier should be at least five times greater than its height. It is anticipated that the major noise source of all PMEs, including movable and large PMEs, will be located at a level lower than the top of the proposed movable barriers. All movable barriers are expected to provide at least a 5 dB(A) noise reduction for mobile plant such as excavator, poker and roller; fixed barriers are capable to produce higher noise reduction of 10 dB(A) for stationary plant, such as air blower and winch. With reference to *A Practical Guide for the Reduction of Noise from Construction Works*, the noise barrier material should have a superficial surface density of at least at least 14 kg/m<sup>2</sup>, without openings or gap.
- 4.8.5 The use of noise enclosure is to cover stationary PMEs, such as generator which will be completely screened. The construction material of the noise enclosure should have a minimum surface density of 14 kg/m<sup>2</sup> and without openings or gaps. This can achieve at least a 15 dB(A) noise reduction according to the *EIAO Guidance Note No.9/2010*.
- 4.8.6 The Project Engineer has confirmed that the use of quieter PME in Table 4.8 and adoption of noise barrier/enclosure at the work sites are practicable.
- 4.8.7 The summary of screening structures proposed for each PME is presented in **Table 4.10** below. Schematic configuration of the noise barrier is presented in **Appendix 4.9**.

**Table 4.10**  
**Summary of Screening Structures for Each PME**

| PME                                                               | Type of Screening Structures | Noise reduction, dB(A) |
|-------------------------------------------------------------------|------------------------------|------------------------|
| Excavator, mini-robot mounted (electric)                          | Temporary Noise Barrier      | -5                     |
| Dump truck, with grab, 5.5 tonne <gross vehicle weight <=38 tonne | Temporary Noise Barrier      | -5                     |

|                                          |                         |     |
|------------------------------------------|-------------------------|-----|
| Hand-held Percussive Breaker             | Temporary Noise Barrier | -5  |
| Generator, super silenced, 70dB(A) at 7m | Enclosure               | -15 |
| Crane, mobile                            | Temporary Noise Barrier | -5  |
| Bar Bender and Cutter (Electric)         | Temporary Noise Barrier | -10 |
| Water pump, submersible (electric)       | Temporary Noise Barrier | -10 |
| Concrete mixer (electric)                | Temporary Noise Barrier | -5  |
| Poker, vibratory, hand-held (electric)   | Temporary Noise Barrier | -5  |
| Roller, vibratory                        | Temporary Noise Barrier | -5  |
| Giken Piler and Power Pack               | Temporary Noise Barrier | -5  |
| Winch (electric)                         | Temporary Noise Barrier | -10 |
| Air blower (electric)                    | Temporary Noise Barrier | -10 |

***Good Construction Site Practices, Use of Quiet PME, Noise Barriers and Enclosures***

4.8.8 With the implementation of the good construction site practices, use of quiet PME, noise barriers and enclosures (as shown in **Appendix 4.5**), the mitigated noise levels at the representative NSRs were calculated and the results are summarized in **Table 4.11**. Summaries of predicted mitigated noise levels and detailed calculations are presented in **Appendix 4.6** and **Appendix 4.7**, respectively.

**Table 4.11**  
**Predicted Construction Noise Levels (With Mitigation)**

| NSR   | Description                      | Maximum Predicted Noise Level <sup>(a)</sup> , dB(A) | Noise Criteria, $L_{eq, 30min}$ , dB(A) | Compliance (Y/N) |
|-------|----------------------------------|------------------------------------------------------|-----------------------------------------|------------------|
| NSR1  | 307 Ping Yeung                   | 71                                                   | 75                                      | Y                |
| NSR2  | 17 Ping Yeung                    | 73                                                   | 75                                      | Y                |
| NSR3  | 362 Ping Yeung                   | 75                                                   | 75                                      | Y                |
| NSR4  | 331 Ping Yeung                   | 72                                                   | 75                                      | Y                |
| NSR5  | 156B Ping Yeung                  | 73                                                   | 75                                      | Y                |
| NSR6  | Temporary Shelter near TKL04     | 73                                                   | 75                                      | Y                |
| NSR7  | Sing Ping Village                | 65                                                   | 75                                      | Y                |
| NSR8  | Caritas Fung Wong Fung Ting Home | 72                                                   | 75                                      | Y                |
| NSR9  | 5 Tong Fong                      | 63                                                   | 75                                      | Y                |
| NSR10 | 55 Lei Uk                        | 63                                                   | 75                                      | Y                |
| NSR11 | Wun Chuen Sin Kwoon              | 65                                                   | 75                                      | Y                |
| NSR12 | 200 Tai Po Tin                   | 64                                                   | 75                                      | Y                |
| NSR13 | 323 Tai Po Tin                   | 66                                                   | 75                                      | Y                |
| NSR14 | 118 Tai Po Tin                   | 63                                                   | 75                                      | Y                |
| NSR15 | 103 Ping Che                     | 59                                                   | 75                                      | Y                |
| NSR16 | Temporary Shelter near TKL05     | 74                                                   | 75                                      | Y                |
| NSR17 | 60 Tong Fong                     | 71                                                   | 75                                      | Y                |
| NSR18 | Village house in Tai Po Tin      | 73                                                   | 75                                      | Y                |
| NSR19 | 124A Ping Yeung                  | 73                                                   | 75                                      | Y                |

| NSR   | Description                   | Maximum Predicted Noise Level <sup>(a)</sup> , dB(A) | Noise Criteria, $L_{eq, 30min}$ , dB(A) | Compliance (Y/N) |
|-------|-------------------------------|------------------------------------------------------|-----------------------------------------|------------------|
| NSR20 | 196 Ping Che                  | 65                                                   | 75                                      | Y                |
| NSR21 | Village house at Lei Uk Tsuen | 63                                                   | 75                                      | Y                |
| NSR22 | Temporary Shelter             | 74                                                   | 75                                      | Y                |
| NSR23 | Ta Kwu Ling Farm house        | 70                                                   | 75                                      | Y                |
| NSR24 | House 223 Ping Che Road       | 72                                                   | 75                                      | Y                |

**Notes:**

- (a) All predicted noise levels were corrected with 3dB(A) for façade reflection.

4.8.9 **Table 4.11** shows that the predicted noise levels at all NSRs comply with the noise criteria after the mentioned effective mitigation. Therefore, no adverse noise impact is expected to arise from the construction activities.

4.8.10 The future contractor will be required through contract specifications to provide and implement sufficient mitigation measures with reference to the recommendations in this report or the future detailed design to achieve acceptable noise levels on the nearby NSRs. The future contractor will also be required to prepare a construction noise management plan with reference to Section 8 and Annex 21 of the EIAO-TM, and EM&A Manual as well as this EIA Report. The construction management plan shall identify the inventory of noise sources and assess the effectiveness and practicality of all mitigation measures considered during the design and tendering stage to minimize the construction noise impact. The construction management plan should confirm and summarise the mitigation measures to be implemented for the Project, and shall be submitted two months prior to the commencement of construction.

## 4.9 Cumulative Impacts

4.9.1 The potential for cumulative construction noise impact during the construction phase has been checked against the following known committed/existing projects at the time the EIA is prepared. The Project construction programme may overlap with the following concurrent projects:

- Implementation of Water Intelligent Network (WIN), Remaining District Metering Areas and Pressure Management Areas in Yuen Long and Sheung Shui & Fanling Major Supply Zones;
- Widening of the Western Section and Eastern Section of Lin Ma Hang Road (Ping Yuen River to Ping Che Road / Tsung Yuen Ha to Lin Ma Hang).

4.9.2 Implementation of WIN will fall within the Study Area while the works will be confined into localised works area. The WIN project consists of the minor works to install flow meters, pressure reducing valves (PRV), PRV controllers and data logger, which will not create adverse noise impacts to the surrounding environment. However, the Contractor shall also keep close liaison with the nearby construction site to avoid cumulative noise impact. On the other hand, the widening of the Western Section and Eastern Section of Lin Ma Hang Road (Ping Yuen River to Ping Che Road / Tsung

Yuen Ha to Lin Ma Hang is over 300m from the nearest NSR. Therefore, the potential of causing adverse cumulative noise impacts from these projects is not anticipated.

4.9.3 In addition to the above projects, there are also three planning studies with study areas within and in the vicinity of the Project Site, which included the following:

- Preliminary Feasibility Study on Developing the New Territories North (NTN);
- Drainage Improvement Works in Hang Tau, Kong Ha and Sha Tau Kok Town, and Lower Ping Yuen River; and
- North East New Territories Sewerage System Upgrade.

4.9.4 No sufficient information on the Preliminary Feasibility Study on Developing the New Territories North (NTN) is available for assessing the construction noise impacts and hence it is not included in the assessment.

4.9.5 For Drainage Improvement Works in Hang Tau, Kong Ha, Sha Tau Kok Town and Lower Ping Yuen River, the predicted noise level from the Project at the nearest NSRs, i.e. NSR9, NSR10 and NSR17, to the works area of this concurrent project is 58 dB(A), 63 dB(A) and 62 dB(A) respectively, which are far below the noise criterion of 75 dB(A). Besides, other NSRs are located more than 300m away from the works area of this concurrent project. Therefore, adverse cumulative construction noise impact is not anticipated.

4.9.6 For North East New Territories Sewerage System Upgrade, the cumulative noise assessment is included in the assessment above. The above information is collected from Drainage Service Department.

4.9.7 Overall, it is expected that the cumulative impacts from the construction of the proposed works and other concurrent projects will not lead to exceedance of construction noise criteria. As such, no adverse cumulative environmental impacts are envisaged during both construction and operation phase of the Project.

#### **4.10 Residual Impacts**

4.10.1 With the implementation of the recommended noise mitigation measures, the cumulative construction noise levels from the Project and the concurrent projects would comply with the *EIAO-TM* day-time noise criteria. No residual impact is anticipated.

#### **4.11 Monitoring and Audit Requirements**

4.11.1 Noise monitoring is recommended during the construction phase to ensure compliance with the noise criterion at the NSRs. Weekly noise monitoring will be undertaken at the representative NSRs (NSR3 362 Ping Yeung, NSR6 Temporary Shelter near TKL04, NSR8 Caritas Fung Wong Fung Ting Home, NSR11 Wun Chuen Sin Kwoon and NSR16 Temporary Shelter near TKL05). Monthly site inspections and audits will



be conducted to ensure that the recommended mitigation measures are properly implemented during the construction stage.

#### **4.12 Conclusion**

4.12.1 Owing to the close proximity of some of the NSRs to the works area of the Project, mitigation measures are required to be implemented to all representative NSRs to mitigate the construction noise impacts. Practicable mitigation measures, including good construction site practices, use of quiet PME, temporary noise barriers and noise enclosures are recommended. With the implementation of the recommended mitigation measures, the mitigated construction noise levels at the representative NSRs will comply with the daytime construction noise criterion of 75 dB(A) throughout the construction period. Noise monitoring during the construction stage is recommended to ensure compliance with the relevant noise criterion.

4.12.2 No adverse noise impact is anticipated during operation phase as the Project does not have fixed noise source during operation.

**END OF TEXT**