

7.1 INTRODUCTION

This *Section* provides an assessment of the potential noise impacts arising from the construction and operation of the San Tin Eastern MDC. The quantitative assessment methodology which has been adopted for the assessment is presented and control measures, necessary to ensure the effective protection of the identified noise sensitive receivers, are recommended.

7.2 ENVIRONMENTAL LEGISLATION AND NON-STATUTORY GUIDELINES

7.2.1 Construction Phase

For the control of construction noise during normal working hours (ie from 0700 to 1900 hrs during weekdays), a limit of $L_{eq, 30min}$ 75 dB(A) for residential dwellings and 70 dB(A) (65 dB(A) during examination period) for schools, has been proposed in the *Practice Note for Professional Persons - Noise from Construction Activities - Non-Statutory Controls*, Environmental Protection Department, June 1993 (ProPECC PN2/93) and *Technical Memorandum on Environmental Impact Assessment, Environmental Impact Assessment Ordinance (EIAO-TM)*.

Construction noise during restricted hours (1900-0700 hours for weekdays and all day on Sundays and Public Holidays) is controlled by the *Noise Control Ordinance* (NCO) and the subsidiary technical memoranda namely *Technical Memorandum on Noise From Construction Work Other Than Percussive Piling (GW-TM)*. The control of Percussive Piling (at all times) is governed by the *Technical memorandum on Noise From Percussive Piling (PP-TM)*. These technical memoranda prescribe the permitted noise levels for construction work depending upon working hours and the existing noise climate.

A subsidiary technical memoranda namely *Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM)*, applies to Construction Works during restricted hours, within designated areas, as defined by the *Noise Control (Construction Work Designated Areas) Notice, Legal Supplement No. 2 to Gazette No. 2/1996, 12 January 1996*. However, the Eastern MDC site is not within the noise control designated area, and therefore DA-TM will not be applicable.

Construction works requiring the use of Powered Mechanical Equipment (PME) during restricted hours under GW-TM and percussive piling under PP-TM require a Construction Noise Permit (CNP) and will need to achieve the applicable Acceptable Noise Level (ANL). The ANL is derived from the Basic Noise Levels (BNL) determined in GW-TM by applying corrections for the duration of the works and the effect of any other nearby sites operating under a CNP. For this assessment, these corrections are negligible and so have been set to zero. As a result, the ANLs are equal to the BNLs.

In the process of a CNP application, the Noise Control Authority assesses and determines the Area Sensitivity Rating based on contemporary situations which the application is received. Despite any description or assessment made in the EIA report, the Noise Control Authority will be guided by the relevant Technical Memoranda in assessing an application, once filed, for a CNP. Depending on

exact locations, orientations of the receivers/noise source, and shielding effect of other structures or topographical feature, the effect of influencing factors (IFs) and hence the Area Sensitivity Rating may vary from the EIA stage to construction stage. The Area Sensitivity Rating assumed are for the purpose of this EIA study and there is no guarantee that a CNP will be issued.

From the recommendations given by the *Deep Bay Guidelines for Dredging, Reclamation and Drainage Works*, construction noise within the areas of Special Measure Zone (SMZ) will be subject to additional noise control. Within the Special Measure Zone, the noise level measured at any point 100 m from the site limit will not exceed $L_{eq\ 5min}$ 60 dB(A) or the background $L_{90\ 1\ hour}$ plus 10 dB(A) whichever is lower between 0700 and 2300 hours. However, since the construction activities associated with the Eastern Drainage Channel will fall outside the SMZ (as shown in *Figure 7.3a*) these restrictions are not considered applicable in this case.

7.2.2 *Operational Phase*

Noise from fixed plant such as pumping stations is controlled by the NCO and noise restrictions are imposed at all times. The appropriate ANL for fixed plant noise at a particular Noise Sensitive Receiver (NSR) is obtained by referring to the *Technical Memorandum on Noise from Places Other Than Domestic Premises, Public Places or Construction Sites* (IND-TM). However, the EPD generally require that in planning for new developments, operational noise impacts on NSRs should not exceed the criteria set by the *Hong Kong Planning Standards and Guidelines* (HKPSG) which recommends the noise level from fixed plant should be 5 dB(A) below the ANL given by IND-TM.

7.3 *BASELINE CONDITIONS AND SENSITIVE RECEIVERS*

7.3.1 *Baseline Conditions*

Existing Conditions

A site visit and noise survey was conducted on 28 May 1997. Daytime noise levels were measured at Chau Tau and San Tin Villages for reference and recorded a level of approximately $L_{90\ 15\ min}$ 44 dB(A) (free field) in the areas. The noise environment is dominated by animal sounds and noise associated with village and agricultural settlements.

Lok Ma Chau Road, NTCR and Castle Peak Road - Chau Tau Section, Mai Po Section & San Tin Section are the dominant noise sources in the area. The NSRs, Chau Tau and San Tin Villages are located over 50 m from these road. Mai Po Lo Wai and Mai Po San Tsuen (S) will be affected by NTCR and Castle Peak Road - Mai Po Section.

Future Conditions

The future noise environment will include traffic growth on existing roads and new noise sources from proposed transportation projects, including the KCRC West Rail. As a result of these projects it is considered that background noise levels will increase in future and the noise environment will eventually be influenced by road and rail noise.

7.3.2 Noise Sensitive Receivers

Noise Sensitive Receivers, as defined by HKPSG and the NCO, have been identified by site survey and reference to survey sheets. The identified NSRs are low-rise residential (2 to 3 storeys high) and their approximate distances from the channel (locations shown in *Figure 7.3a*) associated with the Eastern MDC are given in *Table 7.3a* below.

All NSRs are considered to be village type developments and therefore an Area Sensitivity Rating of "A" has been assigned to those distant from NTCR, and an Area Sensitivity Rating of "B" has been assigned to those considered to be indirectly affected.

Table 7.3a Identified NSRs and their Area Sensitivity Rating

NSRs		Distance to Eastern MDC (73CD)	Distance to Pumping Station	Area Sensitivity Rating
1	Ha Wan Tsuen	280	340	A
2	Pun Uk Tsuen	570	N/A	A
3	Chau Tau Tsuen	540	N/A	A
4	Ki Lun Tsuen	500	N/A	A
5	Yan Shau Wai	320	N/A	A
6	Tung Chan Wai	270	N/A	A
7	On Lung Tsuen	530	N/A	A
8	Fan Tin Tsuen	580	N/A	A
9	Wing Ping Tsuen	370	N/A	B
10	San Lung Tsuen	680	N/A	A
11	Tsing Lung Tsuen	830	N/A	B

All distances to NSRs have been calculated in accordance with *Clause 2.7* of IND-TM.

7.4 CONSTRUCTION PHASE

7.4.1 Introduction

Construction of the Eastern MDC is scheduled to commence in June 2001 and is likely to continue for a period of thirty months. It is expected that the nature, extent and scale of the construction works for the Eastern MDC will be typical of those presented in previous studies.

7.4.2 *Potential Sources of Impact*

It is expected that the construction of the Eastern MDC will be carried out in stages, involving different plant teams. The following construction activities are likely to be used for the construction works during normal working hours.

- Dredging and Pond Draining Operations
- Excavation
- Embankment Formation and Access Road Construction
- River Bed Construction; and
- Pumping Station Construction.

The plant inventory as well as the individual sound power level (SWL) of each item of plant is presented in *Table 1 of Annex 7-A*.

7.4.3 *Evaluation of Impacts*

The normal working hours for the construction is assumed with reference to 35CD works, ie. 0800-1800 during weekdays. An assessment of unmitigated noise levels was undertaken at the identified NSRs. The results are presented in *Table 1 of Annex 7-A* and indicate that adverse construction noise impacts are unlikely at any of the NSRs considered.

Should any construction works during the restricted hours be required, the contractor must obtain a Construction Noise Permit (CNP) under the control of NCO.

7.4.4 *Mitigation Measures*

7.4.4.1 Mitigation measures will not be required for the construction work of the Eastern MDC to meet the daytime construction noise criteria with respect to ProPECC and EIAO-TM. Nonetheless it is recommended that, good site practices are implemented within all construction sites to minimise the construction noise emissions.

7.4.4.2 Good site practice and noise management will considerably reduce noise emissions from construction activities on the NSRs. These good site practice and nuisance avoidance measures include the following:

- only well-maintained plant should be operated on-site and plant will be serviced regularly during the re-profiling works;
- plant and mobile plant (ie trucks) that may be in intermittent use will be shut down between work periods or should be throttled down to a minimum;
- plant known to emit noise strongly in one direction, will, be orientated so that the noise is directed away from the NSRs;
- silencers or mufflers on construction equipment will be utilised and should be properly maintained during the re-profiling works;
- all plant will be sited as far away as practical from the NSRs; and

- material stockpiles and other structures will be utilised to screen noise from on-site construction activities.
- contractor shall select the models of PMEs that are quieter than standard types given in GW-TM.

7.4.5 *Residual Impacts*

No residual impacts are likely to arise during the construction phase of the Eastern MDC.

7.4.6 *Cumulative Impacts*

Lok Ma Chau Boundary Crossing

Construction of the Eastern MDC may coincide with construction activities for the Expansion of the Kiosks and Facilities at Lok Ma Chau Boundary Crossing as described in *Section 2.5*. Potential noise impact from the construction of these kiosk expansion facilities has been assessed in the *Final Environmental Study*⁽⁹⁾, indicating that noise levels of up to 65 dB(A) are expected at the nearest NSRs. Since the contributions at the NSRs are at least 10 dB(A) less than the daytime noise criteria (75dB(A)), adverse cumulative noise impacts are not anticipated.

East Rail Spur Line

It is understood that the construction phase of the proposed East Rail Spur Line (see *Section 2.5*) may coincide with the construction of the Eastern MDC. Since no information is currently available regarding the construction process or the programme to be used for this project, it is not possible to address potential cumulative impacts in this EIA. It is therefore recommended that potential cumulative noise impacts from the East Rail Spur Line and the Eastern MDC are assessed in the EIA for the East Rail Spur Line, when more detailed information will be available.

7.5 **OPERATIONAL PHASE**

7.5.1 *Introduction*

This section identifies the scope for operational noise impacts and makes recommendations for control measures to be considered in the preliminary design.

⁹⁾ Consultancy Agreement No. CAAF51 PWP Item No. 6GB Expansion of Kiosks and Other Facilities at Lok Ma Chau Boundary Crossing. Final Environmental Study. March 1999. Binnie Black & Veatch.

7.5.2 *Potential Source of Impact*

Fixed Plant

The main source of operational noise associated with the Eastern MDC will be the pumping station. The location of the pumping stations is shown in *Figure 7.3a*. The distance to the pumping station and Area Sensitivity Ratings for the NSRs in the vicinity are shown in *Table 7.3a*.

The pumping station will be approximately 24 m x 42 m and will house four screw pumps. It is assumed that the pumps will be of typical of those used in similar facilities, each having a power rating of 75 kW and Sound Power Level (SWL) of 104 dB(A). The following assumptions have been made:

- the pumping station will be approximately 3 m in height;
- the internal reverberant noise level is typical of an average plant room design;
- louvres of approximately 4 m² in area will be required for the ventilation system in each plant room; and
- the transmission loss provided by the louvres is 5 dB(A). (Assuming a concrete envelope construction, the louvre will be the main source of noise breakout).

Maintenance Dredging

It is anticipated that the impacts from the maintenance dredging will be similar to capital dredging during the construction phase but on a smaller scale as less dredged material will be handled for maintenance dredging over relatively brief time periods consequently no noise impacts are likely during these works.

7.5.3 *Evaluation of Impacts*

The SWL of each of the pumping station has been calculated based on the assumptions described above.

Noise levels have been predicted at the closest NSR to the pumping stations. The nearest NSR to the pumping station for Eastern MDC would be Ha Wan Tsuen (NSR1), located approximately 340 m to the east. This NSR has an Area Sensitivity Rating of "A" therefore the criterion which will have to be met will be $L_{eq, 5min}$ 45 dB(A). The noise levels predicted at the NSR is 50 dB(A) indicating that operational noise criteria exceedances of up to 5 dB(A) are likely (calculations are provided in Annex 7-B).

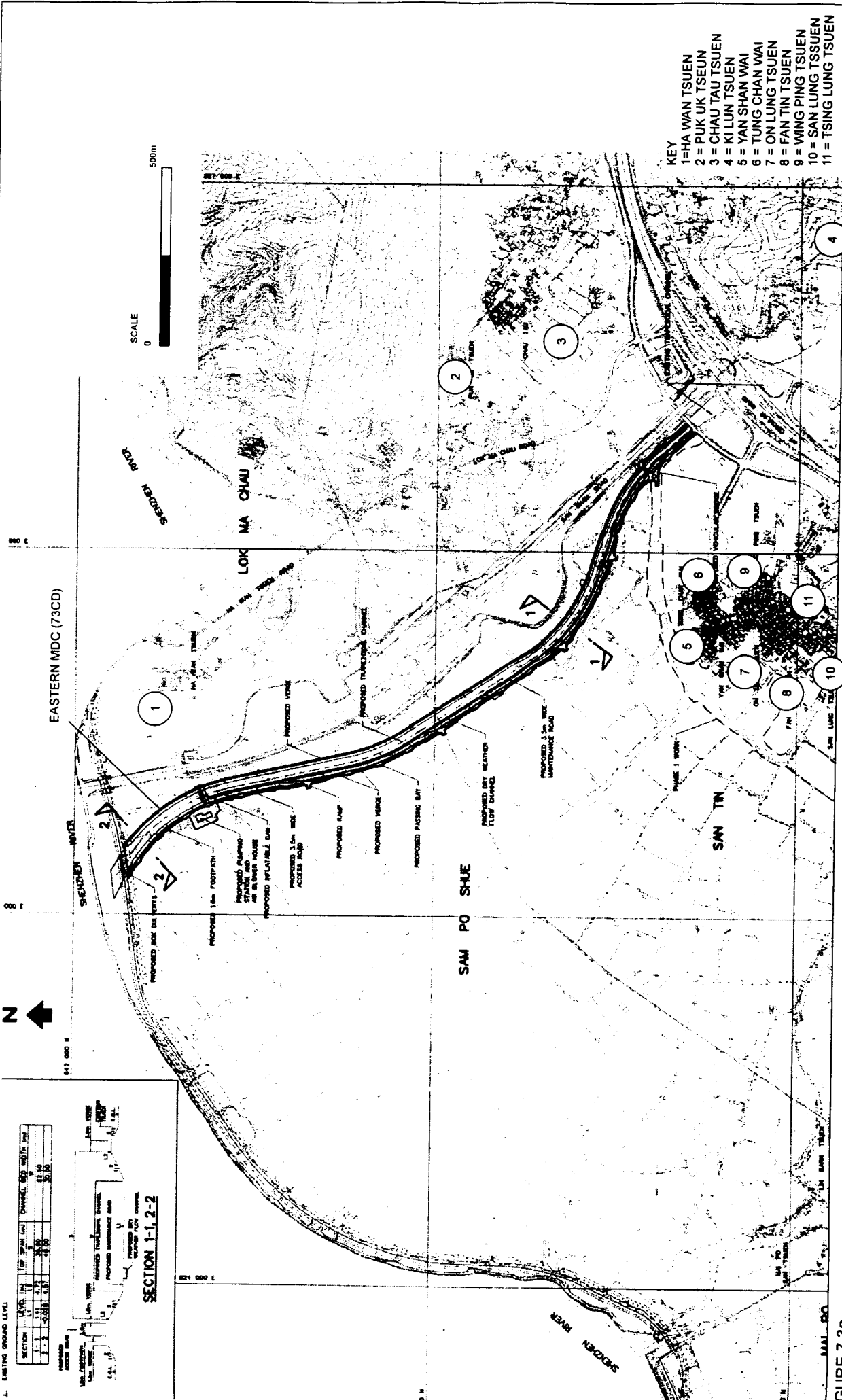
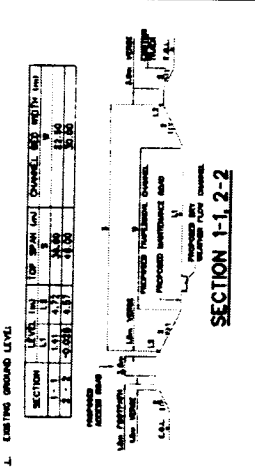
7.5.4 *Mitigation Measures*

- 7.5.4.1 Limiting the noise emissions from the pumping station to $L_{eq, 5min}$ 90 dB(A) at 1 m from the louvre will prevent unacceptable noise impacts to all NSRs (calculations are provided in Annex 7-B). However, considering sensitivity of the Deep Bay buffer zone area, it is recommended that a maximum noise level of $L_{eq, 5min}$ 75 dB(A) be achieved at 1 m from the louvre. This could be achieved by good engineering design such as selecting a quiet plant, suitable fabric and silencers, to be developed at the detailed engineering design stage.

CONCLUSION

This assessment has indicated that the construction of the Eastern MDC can be undertaken without exceeding the daytime noise criterion with respect to ProPECC Practice Note and EIAO-TM.

Operational noise emissions from the Eastern MDC pumping station can comply with the HKPSG standards through appropriate design of the pumping stations.



- KEY
- 1=HA WAN TSUEN
 - 2 = PUK UK TSEUN
 - 3 = CHAU TAU TSUEN
 - 4 = KI LUN TSUEN
 - 5 = YAN SHAN WAI
 - 6 = TUNG CHAN WAI
 - 7 = ON LUNG TSUEN
 - 8 = FAN TIN TSUEN
 - 9 = WING PING TSUEN
 - 10 = SAN LUNG TSUEN
 - 11 = TSING LUNG TSUEN

LOCATION OF REPRESENTATIVE NSRS

