MTR Corporation Limited

Mass Transit Railway – Lai Chi Kok Station Cheung Lai Street Pedestrian Subway and Entrances Works

Environmental Monitoring and Audit Manual

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MTR Lai Chi Kok Station
Cheung Lai Street Pedestrian Subway & Entrance Works

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According to Permit Condition 1.9 of the above Environmental Permit, the titled document(s) certified by the Environmental Team Leader has / ~~have~~ been checked and verified by the undersigned. The document(s) is / ~~are~~ considered to be in environmental acceptable manner.

Verified by:

Glenn Frommer

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14 AUG 2007

Date

APPROVAL SHEET

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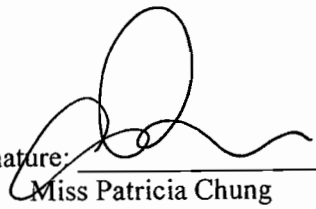


Signature: _____ Date: 14 AUG 2001

Miss Patricia Chung

CONTENTS

Page

1. INTRODUCTION 1
1.1 Background 1
1.2 Objectives of this EM&A Manual 1
1.3 Content of this Manual 2

2. PROJECT DESCRIPTION 3
2.1 The project Site 3
2.2 Proposed Subway and Entrances Works 3
2.3 Construction Programme 3
2.4 Proposed Construction Sequence 4

3. SENSITIVE RECEIVERS 5

4. PROJECT ORGANISATION 6

5. ENVIRONMENTAL SUBMISSION 8
5.1 Environmental Management Plan 8
5.2 Construction Method Statement 9
5.3 Waste Management Plan 9

6. CONSTRUCTION NOISE MONITORING 10
6.1 Monitoring Parameters 10
6.2 Monitoring Equipment 10
6.3 Monitoring Locations 10
6.4 Baseline Monitoring 11
6.5 Impact Monitoring 11
6.6 Event and Action Plan for Construction Noise 11
6.7 Noise Mitigation measures 13

7. SITE ENVIRONMENTAL AUDIT 14
7.1 Site Inspections 14
7.2 Compliance with Legal and Contractual Requirement 15
7.3 Environmental Complaints 15

8. REPORTING 17
8.1 General 17
8.2 Baseline Monitoring Report 17
8.3 Monthly EM&A Reports 18
8.4 Forms to be Adopted 21
8.5 Data Keeping 21
8.6 Interim Notifications of Environmental Quality Limit Exceedances 21

FIGURES

FIGURE 1 Alignment of the Subway

FIGURE 2 Construction Worksite

FIGURE 3 Temporary Diversion of Lai Chi Kok Sewer

FIGURE 4 Locations of Sensitive Receivers

FIGURE 5 Project Organisation

FIGURE 6 Noise Monitoring Locations

FIGURE 7 Preliminary Site Inspection, Deficiency and Action Reporting System

FIGURE 8 Complaint – Response Procedures

APPENDICES

APPENDIX A Implementation Schedule of Recommended Environmental Mitigation Measures

APPENDIX B Typical Record Forms

1. INTRODUCTION

1.1 Background

A pedestrian subway (hereafter called "the Subway") connecting the Liberté and The Pacifica and the existing Lai Chi Kok MTR Corporation Limited (MTRC) station in Kowloon is proposed (**Figure 1**).

The purpose of this Project is to improve the accessibility to the Lai Chi Kok Station (LCK) from the existing and future developments by providing MTRC passengers a more direct, convenient and comfortable access to the LCK. Extending to the south of the West Kowloon Corridor, the subway will reduce at-grade pedestrian movements and provide significant improvements to the environmental and comfort levels experienced by passengers accessing LCK and people crossing Lai Chi Kok Road.

The Subway extending from the boundary of the existing LCK to the lot boundaries of the Liberté and The Pacifica will be owned, operated, managed and maintained by MTRC. The remaining areas of the Subway located within the lot boundaries of the developments including the integrated Entrance D3 to Liberté and the Entrance D4 to The Pacifica.

The civil construction of the Subway will require approximately 30 months. Prior to construction of the Subway, it would need to take about 6 months for temporary diversion of an existing 1.8m diameter sewer located along Lai Chi Kok Road. The planned project completion date is in the first quarter of Year 2010.

1.2 Objectives of this EM&A Manual

This Manual outlines the monitoring and audit programme to be undertaken during the construction of this Project. It aims to provide systematic procedures for monitoring, auditing and minimising of the environmental impact associated with the construction activities. The main objectives of the EM&A programme include:

(i) to provide a database on baseline environmental quality for subsequent checking of any short or long term environmental impacts arising from the project;

(ii) to identify any need for additional mitigation measures or remedial action;

(iii) to monitor the performance of the project from an environmental viewpoint and the sufficiency and effectiveness of the implemented mitigation measures;

(iv) to verify the environmental impacts predicted in the Project Profile for this Project;

(v) to determine project compliance with relevant regulatory standards, requirements and guidelines;

(vi) to stipulate remedial action should unexpected problems or unacceptable impacts be identified;

For the purpose of this manual, the Engineer Representative (ER) shall refer to the Engineer as defined in the Contract, in cases where the Engineer's powers have been delegated to the ER, in accordance with the Contract. The Contractor shall be responsible for the construction of the Project including the required site environmental management. The Environmental Team (ET) Leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the environmental monitoring and audit requirements as stated in Environmental Permit (EP) of the Project issued by the Director of Environmental

Protection The Independent Environmental Checker (IEC) shall be responsible for conducting auditing and checking on the works and submissions from the Contractor and ET to ensure compliance with the EP. (See **Section 4** for project EM&A organisation)

According the Condition 2.4 of the EP (ref http://www.epd.gov.hk/eia/register/permit/latest/ep2532006.htm), this EM&A Manual shall list out the EM&A programme requirements including, at least, the following:

- construction noise monitoring requirement (incl. monitoring frequency, location and methodology for baseline and impact monitoring;
- the means to mitigate the construction noise impact;
- the environmental quality performance limits (Action and Limit Levels);
- Event/Action Plans and decision audit flow charts;
- procedures for reviewing the noise monitoring results;
- compliance audit procedures and follow-up; and
- complaint investigation procedures.

1.3 Content of this Manual

This Manual contains the following information:

(i) Responsibilities of the Contractor, Engineer's Representative (ER), Independent Environmental Checker (IEC) and Environmental Team (ET);

(ii) information on project organisation, construction schedule and activities;

(iii) information on the tentative construction programme and the necessary environmental monitoring and audit programme to track the varying environmental impacts;

(iv) definition of Action and Limit levels, and establishment of Event and Action Plans;

(v) requirements of reviewing pollution sources and work procedures in the event of non-compliance of the environmental criteria;

(vi) requirements on environmental monitoring and audit data and appropriate reporting procedures;

(vii) an Implementation Schedule **(Appendix A)** of the environmental mitigation measures;

(viii) Record forms **(Appendix B)** to be adopted during the construction phase of the project.

2. PROJECT DESCRIPTION

2.1 The project Site

The Project will involve modification of the existing station, Lai Chi Kok (LCK) (including entrances connecting to the concourse), and construction of the Subway, three dedicated entrances and one integrated entrance to Liberté. The proposed Subway will be fully air-conditioned and is approximately 300m in total length (i.e. walking distance) with access to Lai Chi Kok Road via The Pacifica. The internal clear width of the Subway between architectural finishes is about 4.5m, with a floor to ceiling height of about 2.8m. The alignment of the Subway is shown in **Figure 1**.

The horizontal alignment of the Subway passes underneath Cheung Lai Street, Lai Chi Kok Road and the Western Kowloon Corridor with a change in direction at the junction of Cheung Lai Street and Lai Chi Kok Road to avoid the foundation of the Western Kowloon Corridor.

The vertical alignment of the Subway ranges between the levels of +4.29mPD and –7.05mPD, where the lowest subway level is designed to avoid the existing 1.8m diameter sewer along Lai Chi Kok Road. The gradient of the Subway is between 1:12 and approximately 1:30.

2.2 Proposed Subway and Entrances Works

There are five proposed entrances. A street level dedicated entrance at The Pacifica, namely Entrance D4, is proposed to serve developments located to the south of Lai Chi Kok Road. A stair of 2.6m wide provides access between the Subway level at –1.26mPD and ground level, where direct access will be provided to Lai Chi Kok Road via The Pacifica (**Figure 1**).

Two other dedicated street level entrances, namely Entrances D1 and D2, are proposed within the widened footway of the Cheung Lai Street. The proposed widening works will be implemented by others prior to the completion of the Subway, and do not form part of this Subway proposal. A single stair and a single ascending escalator are proposed respectively at these 2 Entrances, providing a direct access between the subway level at –2.7mPD and street level (**Figure 1**).

An integrated entrance, namely Entrance D3, will be provided to form a direct connection to Liberté. At northern end of the Subway, it connects directly to the concourse level of LCK, namely Entrance D, at an approximately level of –4.85mPD (**Figure 1**).

The Subway will be constructed by cut and cover technique. The construction would require the temporary diversion of the existing 1.8m diameter sewer located along Lai Chi Kok Road to ensure proper functioning of the sewer and no adverse effect on the maintenance of the sewer.

2.3 Construction Programme

The works is scheduled to commence in mid-August 2007 for completion in the first quarter of Year 2010. The civil construction of the Subway would take approximately 30 months. Prior to construction of the Subway, it would need to take about 6 months for temporary diversion of an existing 1.8m diameter sewer located along Lai Chi Kok Road. The tentative implementation programme is shown below.

Activities	Month					
	1-5	6-10	11-15	16-20	21-25	26-30
1800 ∅ Sewer Diversion of Lai Chi Kok Sewer						
Construction of Subway						
Construction of smoke extraction air shaft (above ground)						
Construction of fresh air intake shaft (above ground)						
Construction of subway entrance D1 (above ground)						
Construction of subway entrance D2 (above ground)						
Construction of subway entrance D3 inside Liberte						
Construction of subway entrance D4 inside The Pacifica						

The Subway will be constructed by cut and cover technique. The use of alternative tunnelling method such as horizontal mining is considered not appropriate, as it will require construction of access pits at about every 25 to 30m. The construction of these pits requires long duration of lane closure and will have adverse impact on both vehicular and pedestrian traffic. Other tunnelling method that involves the use of boring machine is also infeasible because the proposed subway is to be constructed at relative shallow depth. The soil cover above the bored tunnel is insufficient to prevent the occurrence of ground heaving due to overburden pressure provided by earth material.

The construction of Subway will be carried out in three sections simultaneously by cut and cover method, each with one set of the construction plant equipment for the work activities to be carried out phase by phase (**Figure 2**). Vertical open cut will be undertaken along each section. Temporary walls and internal bracings will be installed to provide support for excavation. In order to maintain traffic flow, road decking will be provided as soon as practical. This will also act as a screen to minimize the nuisance to the public and pedestrian. All excavation and construction of the subway and its ancillary underground structure will be carried out underneath the deck thereby minimising environmental impacts. At-grade access points will be provided for transportation of material/spoil and workers' access. Once the construction of the subway structure is completed, the work areas will be backfilled with earth material and the road surface will be reinstated.

2.4 Proposed Construction Sequence

The work sequence for this Project is described as follow:

- Diversion of the 1800mm sewer will be carried out simultaneously with the construction of the subway (**Figure 3**).
- Traffic lanes will be closed in alternate fashion. At any time, only one or two lane will be closed at each location to minimize the impact to the traffic. Road surface will be demolished and utilities will be diverted. Temporary walls and grout curtain will be installed. King posts and first layer of bracing will be installed and the area will be covered by road deck immediately.

- Excavation will then be conducted under the road deck. Layers of bracing will be installed at suitable depth as the excavation progresses.
- Construction of the subway structures, including the plant room and ancillary ventilation adits, will be carried out under the road deck.
- Backfilling of the excavated ground will be undertaken underneath the deck until to the level near the first layer of bracing.
- Remaining backfilling and road reinstatement will be carried out in alternate fashion. Decking will be removed and the road surface will be reinstated to the original condition.
- Construction of the above ground structures, such as ventilation shafts and at-grade entrances, will be carried out.
- Electrical and Mechanical (E&M) equipment and subway interior works will be carried out.

3. SENSITIVE RECEIVERS

Sensitive receivers located in the vicinity of the project site that might be potentially affected by the construction works with respect to air quality and/or noises were identified in the Project Profile.

To north of Lai Chi Kok Road, the area comprises of factories and commercial buildings. The Banyan Garden, Liberté and The Pacifica at the southern end of the Subway are identified as the major existing sensitive receivers. They are all high-rise buildings with the residential dwellings located on top of a podium at approximately 30m above the ground.

There are a number of existing and future planned/committed developments located within 500m of the Project site to the south of Lai Chi Kok Road. These include Sham Shui Po Government Primary School, Lai Chi Kok Catholic Primary School, Aqua Marine, a Senior Secondary School and a Public Housing Development (**Figure 4**). All of these planned developments are totally screened by the existing high-rise buildings including Banyan Garden, Liberté and The Pacifica, and hence potential environmental impacts are not anticipated during the construction of the Project.

4. PROJECT ORGANISATION

An organisation consisting of ER, Contractor, IEC, ET shall be formed to take the responsibilities of the environmental protection matters. The project organisation and lines of communication with respect to environmental protection works are shown in **Figure 5**. MTRC shall appoint the IEC and establish the ET for compliance of the EP requirements. The responsibilities of respective parties are detailed in the following:

The Engineer or the Engineer's Representative

The Engineer, or the ER shall:

- monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- instruct the Contractor to follow the agreed protocols or those in the Contract Specifications in the event of exceedances or complaints;
- comply with the agreed Event and Action Plan in the event of any exceedance; and
- ensure the Contractor and the ET to comply with the requirements and conditions stated in the Project Profile and the Environmental Permit.

Independent Environmental Checker

The IEC shall audit and verify the overall environmental performance of this Project and to assess the effectiveness of the ET in their duties. The main duties of IEC are to:

- all specified duties stated in Item 2.2 of the Environmental Permit.;
- review and comment on all environmental submissions certified by the ET leader as per the Environmental Permit;
- arrange and conduct monthly site inspections at the different works area along alignment of subway;
- review the programme of work to anticipate any potential environmental impacts that may arise;
- ensure the impact monitoring is conducted at the correct locations at the correct frequency as identified in this Manual;
- check the mitigation measures that have been recommended in the Project Profile and this Manual, and ensure they are properly implemented in a timely manner, when necessary;
- report the findings of site inspections and other environmental performance reviews to EPD; and
- verify the log books prepared by the ET Leader and report the Director of EPD of notification from the ET Leader of occurrence, change of circumstances or non-compliance with the Project Profile or the Environmental Permit.

The Environmental Team

The ET shall be responsible for the EM&A works required in the EM&A Manual for this project. The ET shall not be an associated company of the Contractor. The ET leader shall plan, organise and manage the implementation of the EM&A programme, and to ensure that the EM&A works are undertaken to the required standards. The ET leader shall have relevant professional qualification and sufficient experience in carrying out EM&A works.

Appropriately qualified staff shall be included in the ET. The ET shall be under the supervision of the ET Leader in fulfilling the EM&A duties specified in this Manual. The duties of the ET are to:

(i) undertake all ET duties stated in Item 2.1 of the Environmental Permit;

(ii) monitor various environmental parameters for both baseline and impact monitoring as required by this Manual;

(iii) investigate and audit the equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues as far as practicable for proactive action before problems arise;

(iv) undertake regular on-site audits/inspections and report to the Contractor, IEC and the ER of any potential non-compliance;

(v) liaise with the ER and inform the Contractor and the IEC immediately if there is an exceedance of the relevant action/ limit levels;

(vi) certify the environmental acceptability of permanent and temporary works, relevant design plans and submissions as stated in the EP;

(vii) implement the log-book record system and reporting procedures as stated in the EP;

(viii) assist ER and Contractor in formulating any needed corrective actions and/ or additional mitigation measures, if necessary, and will liaise with relevant Government Departments as appropriate on environmental related-matters in relation to the project;

(ix) audit and prepare audit reports on the environmental monitoring data and the site environmental conditions; and

(x) report on the environmental monitoring and audit results to the Contractor the ER, and the IEC.

The Contractor

The Contractor shall:

- work within the scopes of the construction Contract and other tender conditions with respect to the contractual environmental requirements, the Project Profile, the Environmental Permit and the Environmental Management Plan (EMP);
- provide requested information to the ET in the event of any exceedance in the environmental criteria specified in this Manual or other current environmental standards, and to rectify unacceptable practices;
- discuss with the ET and ER on any additional mitigation measures identified to be required by the ET and implement the agreed measures to alleviate any identified environmental impact to acceptable levels; and
- Inform the ET on the actions taken targeting at environmental protection for inclusion in the monthly report to be prepared by the ET.

5. ENVIRONMENTAL SUBMISSION

The Contractor shall prepare the Environmental Management Plan (EMP), Construction Method Statement, Waste Management Plan (WMP) which shall be certified by the ET Leader and verified by IEC and approved from ER to encompass the recommended environmental protection/mitigation measures with respect to the latest construction methodology and programme.

5.1 Environmental Management Plan

A systematic EMP shall be set up by the Contractor to ensure effective implementation of the mitigation measures, monitoring and remedial requirements presented in the Project Profile, EM&A and Implementation Schedule of the environmental mitigation measures. It shall address all the environmental aspects including noise, air quality, waste, water quality etc as stated in the Project Profile. The Contractor shall clearly present their approach to management the site work with respect to these environmental aspects. **Appendix A** presents all the environmental mitigation measures recommended in the Project Profile. A summary of the key mitigation measures is given below:

Table 5-1 Summary of Key Environmental Mitigation Measures

Environmental Aspect	o Key Mitigation Measures (see Appendix A for details)
Construction Noise	• Use well maintained construction plant; • Shut down plants between work periods; • Install silencers on construction equipment; • Locate mobile plant far away from NSRs; • Use quiet plants should be used; and • Use movable barrier or acoustic mat.
Fugitive Dust Emission	• Implement regular watering and vehicle washing facilities; • Cover excavated or stockpile of dusty material by impervious sheeting or sprayed with water; • Use tarpaulin to cover dusty materials on vehicles.
Water Quality	• Comply with the mitigation measures and practices in the ProPECC PN 1/94 “Construction Site Drainage” and “Recommended Pollution Control Clauses for Construction Contracts” issued by EPD. • Provide silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before being pumped to the public stormwater drainage system. • Provide site toilet facilities
Waste Management	• Reuse excavated material as far as possible • Recycle scrap metals or abandoned equipment. • Adopt a trip ticket system for the disposal of C&D materials • Handle chemical waste in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes. • All general refuse should be segregated and stored in enclosed bins or compaction units. • Provide waste separation facilities for paper, aluminium cans, plastic bottles etc.

The ER, ET and IEC will audit the implementation status against the EMP and advise the Contractor to take necessary remedial actions required. These remedial actions shall be enforced by the ER through contractual means.

The EMP will require the Contractor (together with its sub-contractors) to define in details how to implement the recommended mitigation measures in order to achieve the environmental performance defined in the Hong Kong environmental legislation and the Project Profile.

The regular review of on-site environmental performance shall be undertaken by the ER and the ET through a systematic checklist and audit once the construction commences. The environmental performance review programme comprises a regular assessment on the effectiveness of the EMP. The IEC will be informed if major deviations from the requirements of the EMP observed upon the review.

5.2 Construction Method Statement

In case the Contractor would like to adopt a different construction method or implementation schedule, it is required to submit details of methodology and equipment to the ER for approval before the commencement of the work. Any changes in construction method shall be reflected in a revised EMP or the Contractor will be required to demonstrate the manner in which the existing EMP should accommodate the proposed changes.

5.3 Waste Management Plan

The Contractor shall prepare a WMP for the construction of the project and submit to the ER for approval. Where waste generation is unavoidable, the opportunities for recycling or reusing should be maximised. If wastes cannot be recycled, recommendations for appropriate disposal routes should be provided in the WMP. A method statement for stockpiling and transportation of the excavated materials and other construction wastes should also be included in the WMP and approved before the commencement of construction. All mitigation measures arising from the approved WMP shall be fully implemented.

For the purpose of enhancing the management of Construction and Demolition (C&D) materials including rock, and minimising its generation at source, construction would be undertaken in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 - Management of Construction and Demolition Material Including Rock, or its latest versions. The management measures stipulated in the Technical Circular should be incorporated into the WMP.

6. CONSTRUCTION NOISE MONITORING

6.1 Monitoring Parameters

The construction noise level shall be measured in terms of A-weighted equivalent continuous sound pressure level (L_{Aeq}). $L_{Aeq(30\ mins.)}$ shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods (including restricted hours), $L_{Aeq(5mins)}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria. As supplementary information for data auditing, statistical results such as L_{A10} and L_{A90} shall also be obtained for reference.

6.2 Monitoring Equipment

In accordance with the Technical Memorandum issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) Specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement, the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agreed to within 1.0dB.

The ER shall liaise with the ET to undertake the provision, installation and maintenance of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled. The location of equipment installation should be proposed by the ET Leader and agreed with the Contractor and the ER and even with EPD if necessary.

Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

6.3 Monitoring Locations

The noise monitoring locations are shown in **Figure 6** and summarised in **Table 6-1**.

Table 6-1: Construction Noise Monitoring Locations

Sensitive Receiver No.	Location
R1	Podium, Block 7, Liberté
R2	Podium Tower 1, The Pacifica

The status and locations of Noise Sensitive Receivers (NSRs) may change after issuing this Manual. In such cases, the ET Leader should propose updated monitoring locations and seek approval from the Contractor, the ER, the IEC and EPD.

When alternative monitoring locations are proposed, the monitoring locations should be chosen based on the following criteria:

- at locations close to the major site activities which are likely to have noise impacts;
- close to the noise sensitive receivers; and

- for monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring.

The monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to free field measurement data. The ET shall inform the ER on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions as far as practicable.

6.4 Baseline Monitoring

The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. There shall not be any construction activities in the vicinity of the subway alignment during the baseline monitoring.

The baseline monitoring shall be carried out continuously over the daytime period (0700-1900) for every normal weekday and Saturday for at least two consecutive weeks using the $L_{Aeq,(30mins)}$ parameters. Monitoring during the restricted periods (i.e. 1900-2300, 2300-0700 of next day and Sundays/General Holiday) shall comprise 3 consecutive $L_{Aeq(5mins)}$ readings at least once in each of restricted period. A schedule on the baseline monitoring shall be submitted to the ER and IEC for approval before commencement of the monitoring.

In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET leader shall liaise with IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to the ER for approval.

6.5 Impact Monitoring

During normal construction working hours (0700-1900 Monday to Saturday), monitoring of $L_{Aeq, 30min}$ noise levels (as six consecutive $L_{Aeq, 5min}$ readings) shall be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM.

Other noise sources such as road traffic may make a significant contribution to the overall noise environment. Therefore, the results of noise monitoring activities shall take into account such influencing factors, which may not be presented during the baseline monitoring period.

In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Event and Action Plan in Section 6.6 shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

6.6 Event and Action Plan for Construction Noise

The Action and Limit levels for construction noise are defined in **Table 6-2**. Should non-compliance of the criteria occurs, action in accordance with the Event/Action Plan in **Table 6-3**, shall be carried out.

Table 6-2: Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700 – 1900 hrs on normal weekdays	When one documented complaint is received	75[1] dB(A)
0700 – 2300hrs on holidays; and 1900 – 2300 hrs on all other days		Subject to the control of Noise Control Ordinance
2300 – 0700 hrs of next day		Subject to the control of Noise Control Ordinance

Table 6-3: Event/Action plan for airborne construction noise

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	1. Notify IEC,ER and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to IEC,ER and the Contractor. 4. Discuss with the ER and the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation measures.	1. Review with analysed results submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise ER accordingly. 3. Supervise the implement of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to ER / ET. 2. Implement noise mitigation proposals.
Limit Level	1. Identify the source. 2. Notify IEC, ER, EPD and the Contractor. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform IEC, ER, and EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring	1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to ER and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.

To account for cases where ambient noise levels as identified by baseline monitoring approach or exceed the stipulated Limit Levels prior to commencement of construction, a Maximum Acceptable Impact Level may be defined and agreed with EPD, which incorporates the baseline noise levels and the identified construction noise Limit Level. The amended level will therefore be greater than 75dB(A) and will represent the maximum acceptable noise level at a specific monitoring station. Correction factors for the effects of acoustic screening and/or architectural features of NSRs may also be applied for as specified in the TM.

For the purposes of compliance checking, after taking into account any adjustments agreed with EPD, comparison with either the Limit or the Maximum Acceptable Impact Level shall represent the governing criteria for noise impact assessment.

6.7 Noise Mitigation measures

Construction noise can be mitigated to acceptable level by implementing good site practices such as orientating the noisy plants away from the nearby NSRs, proper fitting of silencers on the construction equipment, use of quiet plant, and use of movable barriers and acoustic mat to screen noise from noisy plants.

The following summarises good site practices and measures that should be followed during the construction period in order to ensure compliance of the noise criterion.

- Well maintained plant should be operated on-site and plant should be checked regularly;
- Plants (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;
- Silencers on construction equipment should be properly fitted and maintained during the construction works;
- Mobile plant should be sited as far away from NSRs as possible and practicable;
- Quiet plants as listed in Project Profile should be used;
- Movable barrier or acoustic mat should be adopted for the PMEs as listed in Project Profile. A typical design of movable barrier which has been used locally is a wooden framed barrier with no openings or gaps and of the superficial density not less than 10 kg/m^2.

7. SITE ENVIRONMENTAL AUDIT

7.1 Site Inspections

Site Inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They shall be undertaken routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented by the Contractor. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

The ET leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspections under the EM&A works. A preliminary site inspection, deficiency and action reporting system in the form of a flow chart is prepared and is shown in **Figure 7**.

Regular site inspections shall be carried out at least at bi-weekly basis, especially during the construction period before the completion construction of the planned road deck. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site, it should also review the environmental situation outside the site area, which may be affected, directly or indirectly, by the site activities. The ET leader shall make reference to the following information in conducting the inspection:

a) the recommendations in Project Profile on environmental protection and pollution control mitigation measures;

b) works progress and programme;

c) individual works methodology proposals (which shall include proposal on associated pollution control measures);

d) the contract specifications on environmental protection;

e) the relevant environmental protection and pollution control laws; and

f) previous site inspection results.

The Contractor shall update with the ET leader all relevant information of the construction contract for him to carry out the site inspection. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be made known to the ER, IEC and the Contractor within 3 working day for reference, and for taking immediate action as appropriate. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.

Ad hoc site inspections shall also be carried out on situations when significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

7.2 Compliance with Legal and Contractual Requirement

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong, which the construction activities shall comply with. In order to comply with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval shall be sent to the ET Leader for vetting, to see whether sufficient environmental protection and pollution control measures have been included.

The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented. The Contractor shall regularly copy relevant documents to the ET Leader so that the checking work can be carried out. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permits under the environmental protection laws, and all the valid licence/permit. The site diary shall also be available for the ET Leader's inspection upon his request.

After reviewing the document, the ET Leader shall advise the ER, IEC and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme, or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractor, ER, and IEC accordingly.

Upon receipt of the advice, the Contractor shall undertake immediate actions to rectify the situation. The ER and ET Leader shall follow up to ensure that appropriate action has been taken by the Contractor such that the environmental protection and pollution control requirements are fulfilled.

7.3 Environmental Complaints

Complaints received on environmental issues shall be referred to the ET Leader for carrying out complaint investigation procedure. The ET leader shall undertake the following procedures upon receipt of the complaints. A flow chart of the complaint response procedures is shown in **Figure 8** and an example of complaint proforma is provided in **Appendix B**.

- log complaint and date of receipt onto the complaint database;
- investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- if a complaint is valid and due to works, identify mitigation measures;
- if mitigation measures are required, advise the Contractor / ER / IEC accordingly;
- review the Contractor's response on the identified mitigation measures, and the updated situation;
- if the complaint is transferred from EPD, submit interim report to EPD, ER and IEC on status of the complaint investigation and follow-up action within the timeframe assigned by EPD;
- undertake additional monitoring and audit to verify the situation if necessary, and review that any valid reason for complaint does not recur;

- report the investigation results and the subsequent actions to the source of complaint for responding to complainant (If the source of complaint is EPD, the results should be reported within the timeframe assigned by EPD); and
- record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

The Contractor and the ER shall also be notified of the nature of complaints. An investigation shall be initiated to determine the validity of the complaint and to identify the source of the problem. As necessary, the ER shall undertake the following steps:

- Investigation and identify the source of the problem (IEC/ER may request additional noise monitoring);
- Liaise with the IEC to identify remedial measures;
- Require the Contractor to take action to mitigate the situation;
- Repeat monitoring to check compliance with Action and Limit level; and
- Repeat review procedures to identify further possible areas of improvement if monitoring results show exceedances.

The outcome of the investigation and the action taken shall be documented on the complaints proforma. Where possible, a formal response to each complaint received shall be prepared, within a maximum of 7 days, so as to notify the concerned person(s) that action has been taken.

All enquires which trigger this process shall be reported in the monthly EM&A reports which shall include results of inspections undertaken by site staff, and details of the measures taken, and additional monitoring results. It should be noted that the receipt of complaints or enquiries will not, in itself be sufficient reason to introduce additional mitigation measures. They will however initiate the Event/ Action Plan and these procedures may lead to the introduction of mitigation measures if they are considered necessary. In all cases the complainant shall be notified of the findings of the Event/ Action Plan and audit procedures put in place to ensure that the problem does not recur.

During the complaint investigation work, the Contractor shall co-operate with the ET leader and ER in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation. The ER shall check that the measures have been carried out by the Contractor.

8. REPORTING

8.1 General

MTRCL is planned to use its computer-based monitoring and audit software known as Environmental Quality Protection Management System (EQPMS) for data recording. The reporting will be available in form of a website. The system and programme are well-established and have been successfully used before in some other recent MTRCL's projects, including Tseung Kwan O Extension and Quarry Bay Congestion Relief Works.

The Environmental Team shall liaise with ER, the Contractor and IEC for setting up an appropriate website for the electronic reporting of the EM&A information as stated Section 5 of the EP and ensure all the required information and monitoring data to be placed in a proper time manner.

8.2 Baseline Monitoring Report

The ET leader shall prepare and submit a Baseline Environmental Monitoring Report, endorsed by IEC, at least one week before commencement of construction. The Baseline Environmental Monitoring Report shall be made available to each of the four parties: the Contractor, the ER, the IEC and EPD. The ET leader shall liaise with the relevant parties on the exact number of copies. The format of the report and the format of the baseline monitoring data in magnetic media to be submitted to EPD shall be agreed with EPD.

The baseline monitoring report is suggested to contain at least the following:

a) up to half a page executive summary;

b) brief project background information;

c) drawings showing locations of the baseline monitoring stations;

d) monitoring results (in both hard and diskette copies) together with the following information:

- monitoring methodology;
- equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency and duration;

e) details on influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period;
- other factors which might affect the results;

f) determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data;

g) revisions for inclusion in the EM&A Manual; and

h) comments and conclusions.

8.3 Monthly EM&A Reports

The EM&A report shall be prepared by the ET and verified by IEC and then submitted to EPD within 10 working days of the end of each reporting month, with the first report due in the month after construction commences.

The ET shall review the number and location of monitoring stations and parameters to monitor every 6 months or on as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

First Monthly EM&A Report

The first monthly EM&A report is suggested to contain at least the following:

a) 1-2 pages executive summary

b) Basic project information including a synopsis of the project organisation, programme and management structure, and the work undertaken during the month;

c) A brief summary of EM&A requirements including:

- all monitoring parameters;
- environmental quality performance limits (Action and Limit levels);
- Event/Action Plans;
- environmental mitigation measures, as recommended in the Project Profile;
- environmental requirements in contract documents;

d) Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the Project Profile;

e) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

f) Monitoring results (in both hard and diskette copies) together with the following information;

- monitoring methodology
- equipment used and calibration details
- parameters monitored
- monitoring locations
- monitoring date, time, frequency, and duration;

g) Graphical plots of trends of monitored parameters for the representative monitoring stations annotated against the following:

- major activities being carried out on site during the period;
- weather conditions during the period; and

- any other factors which might affect the monitoring results;

h) advice on the solid and liquid waste management status;

i) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

j) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;

k) A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance;

l) A summary record of all complaints received (written or verbal) for each medium, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints; and

m) An account of the future key issues as reviewed from the works programme and work method statements.

Subsequent EM&A Reports

The subsequent monthly EM&A reports are suggested to contain at least the following:

a) Title Page

b) Executive Summary (1-2 pates)

- Breaches of Action and Limit levels
- Complaint Log
- Reporting Changes
- Future key issues

c) Contents Page

d) Environmental Status

- Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations
- Summary of non-compliance with the environmental quality performance limits
- Summary of complaints

e) Environmental Issues and Actions

- Review issues carried forward and any follow-up procedures related to earlier non-compliance (complaints and deficiencies)
- Description of the actions taken in the event of non-compliance and deficiency reporting
- Recommendations (should be specific and target the appropriate party for action)
- Implementation status of the mitigation measures and the corresponding effectiveness of the measures

f) Future Key Issues

g) Appendix

- Action and Limit levels

- Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
  - Major activities being carried out on site during the period;
  - Weather conditions during the period; and
  - Any other factors which might affect the monitoring results
- Monitoring schedule for the present and next reporting period
- Cumulative complaints statistics
- Details of complaints, outstanding issues and deficiencies

Final EM&A Review Report

The Final EM&A Report shall contain at least the following information:

- Executive Summary (1-2 pages);
- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations:
- basic project information including a synopsis of the project organization contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
- a brief summary of EM&A requirements including:
- environmental mitigation measures, as recommended in the Project Profile;
- environmental impact hypotheses tested;
- Action and Limit Levels;
- all monitoring parameters; and
- Event-Action Plans
- a summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project Profile summarized in the updated implementation schedule;
- graphical plots and the statistical analysis of the trends of monitored parameters over the course of the project, including the post project monitoring (for the past twelve months for annual report) for all monitoring stations against:
- the major activities being carried out on site during the period;
- weather conditions during the period; and
- any other factors which might affect the monitoring results
- a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels);
- a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- a description of the actions taken in the event of non-compliance;
- a summary record of all complaints received (written or verbal) for each media liaison and consultation undertaken, action and follow-up procedures taken;

- a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations including locations and nature of the breaches, investigation, follow-up actions taken and results;
- a review of the validity of predictions in the Project Profile and identification of shortcomings in Project Profile recommendations;
- a review of the effectiveness and efficiency of the mitigation measures;
- a review of success of the EM&A programme to cost effectively identify deterioration and to initiate prompt effective mitigation action when necessary.

8.4 Forms to be Adopted

To facilitate the management of the EM&A programme for the construction works, the record forms presented in **Appendix B** or equivalence should be used. These forms are listed as follows:

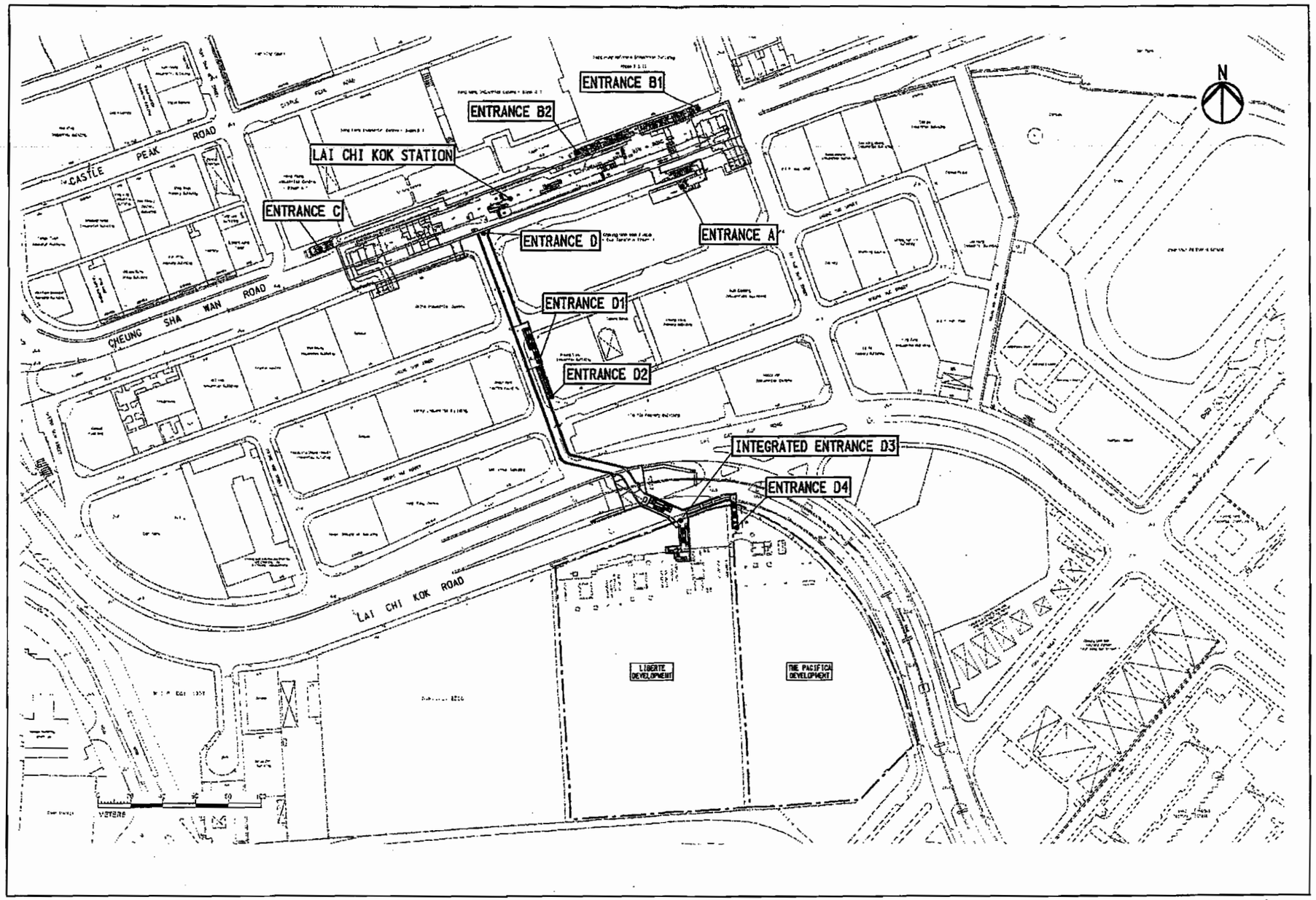
- Implementation Status Proforma;
- Data Recovery Schedule;
- Site Inspection Proforma;
- Proactive Environmental Protection Proforma;
- Regulatory Compliance Proforma;
- Complaint Proforma;
- Complaint Log;
- Sample Template for Interim Notifications of Environmental Quality Limits Exceedances;
- High Volume Air Sampler Field Data Log Sheet; and
- Noise Measurement Record.

8.5 Data Keeping

The site document such as the monitoring field records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document shall be well kept by the ET and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. All the documents and data shall be kept for at least one year after completion of the construction contract.

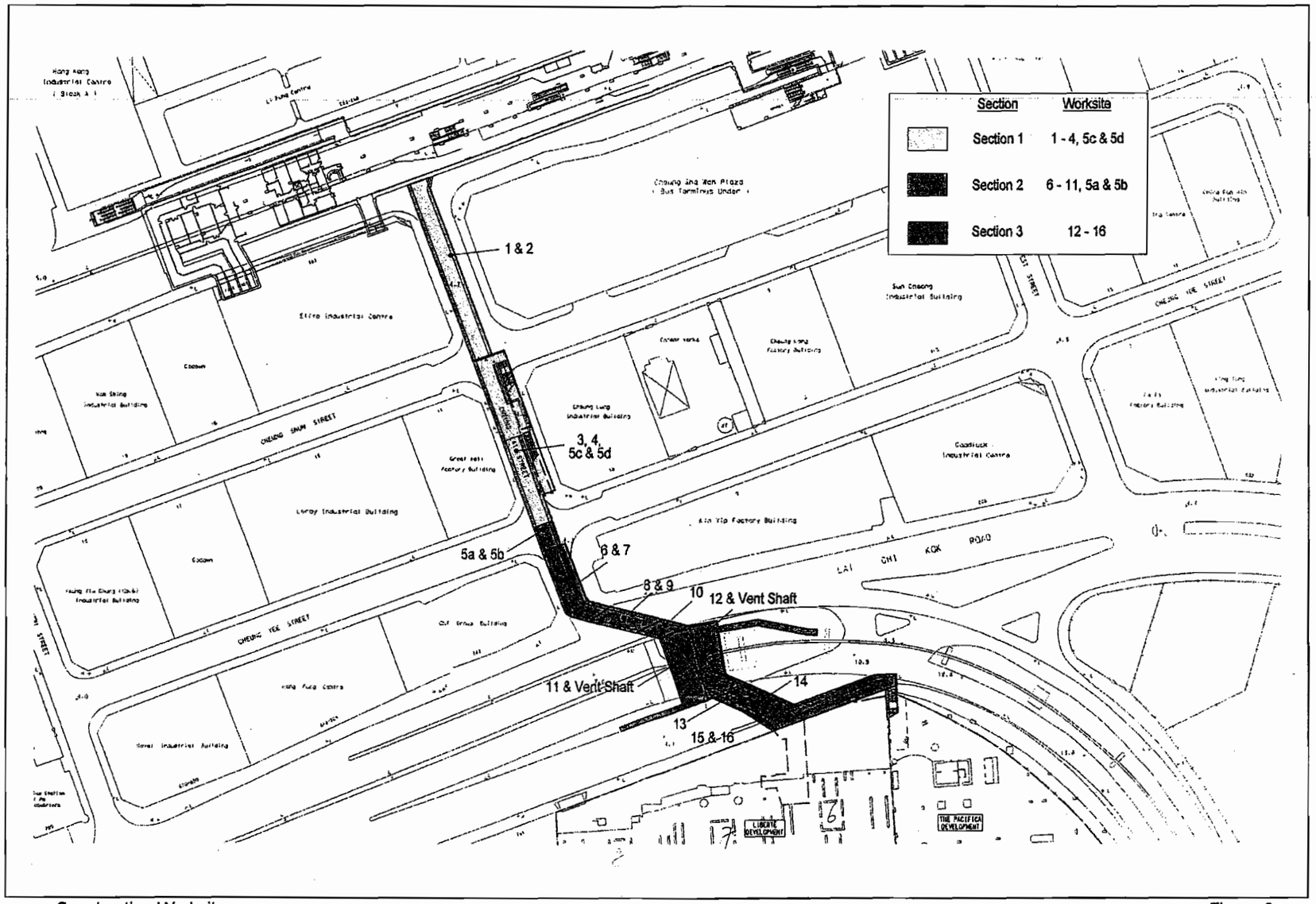
8.6 Interim Notifications of Environmental Quality Limit Exceedances

With reference to the Event Contingency Plans presented in previous sections, when the environmental quality limits are exceeded, the ET shall immediately notify the ER, IEC & EPD, as appropriate. The notification shall be followed up with advice to EPD and IEC on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals.



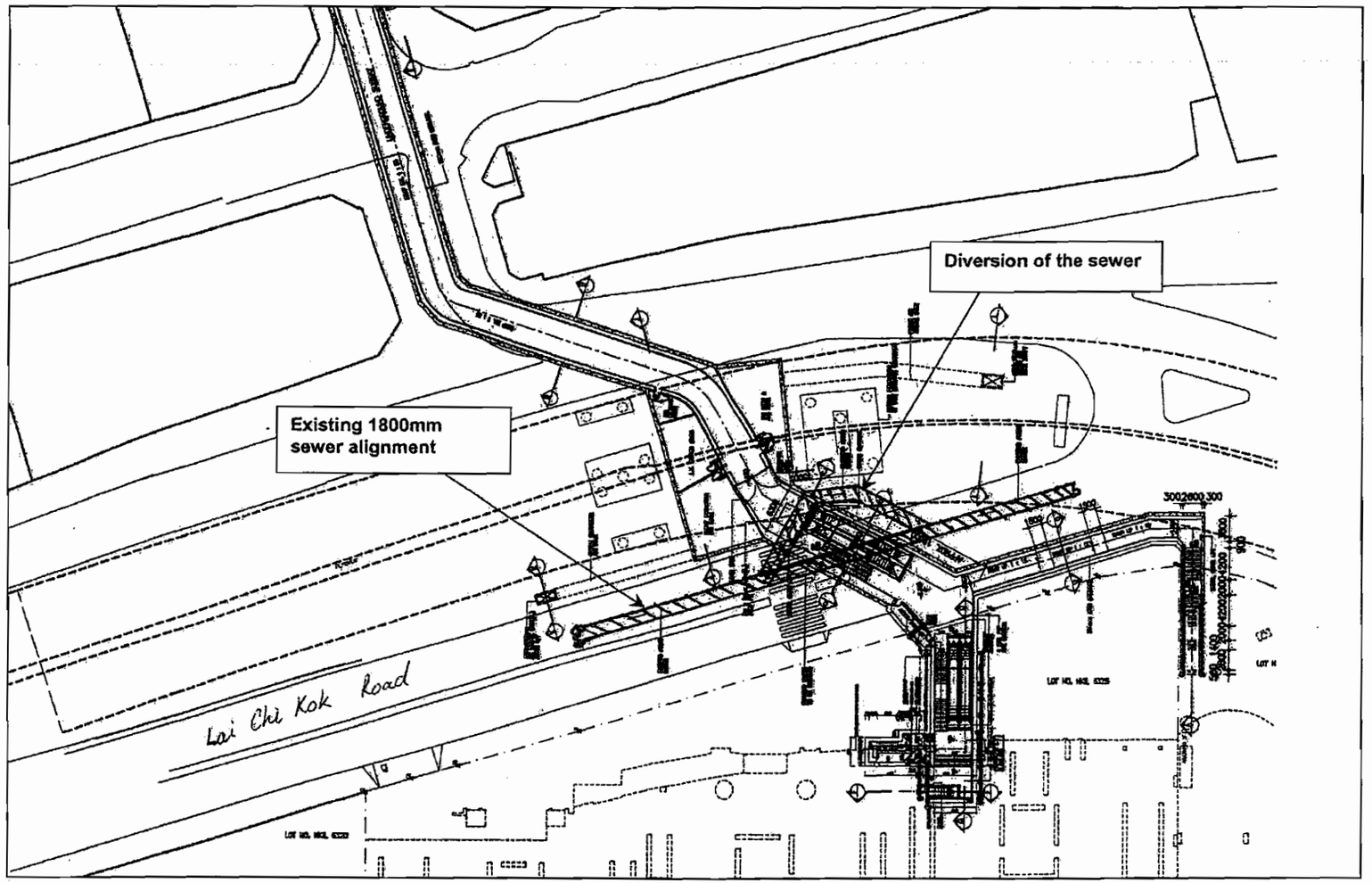
Alignment of the Subway

Figure 1



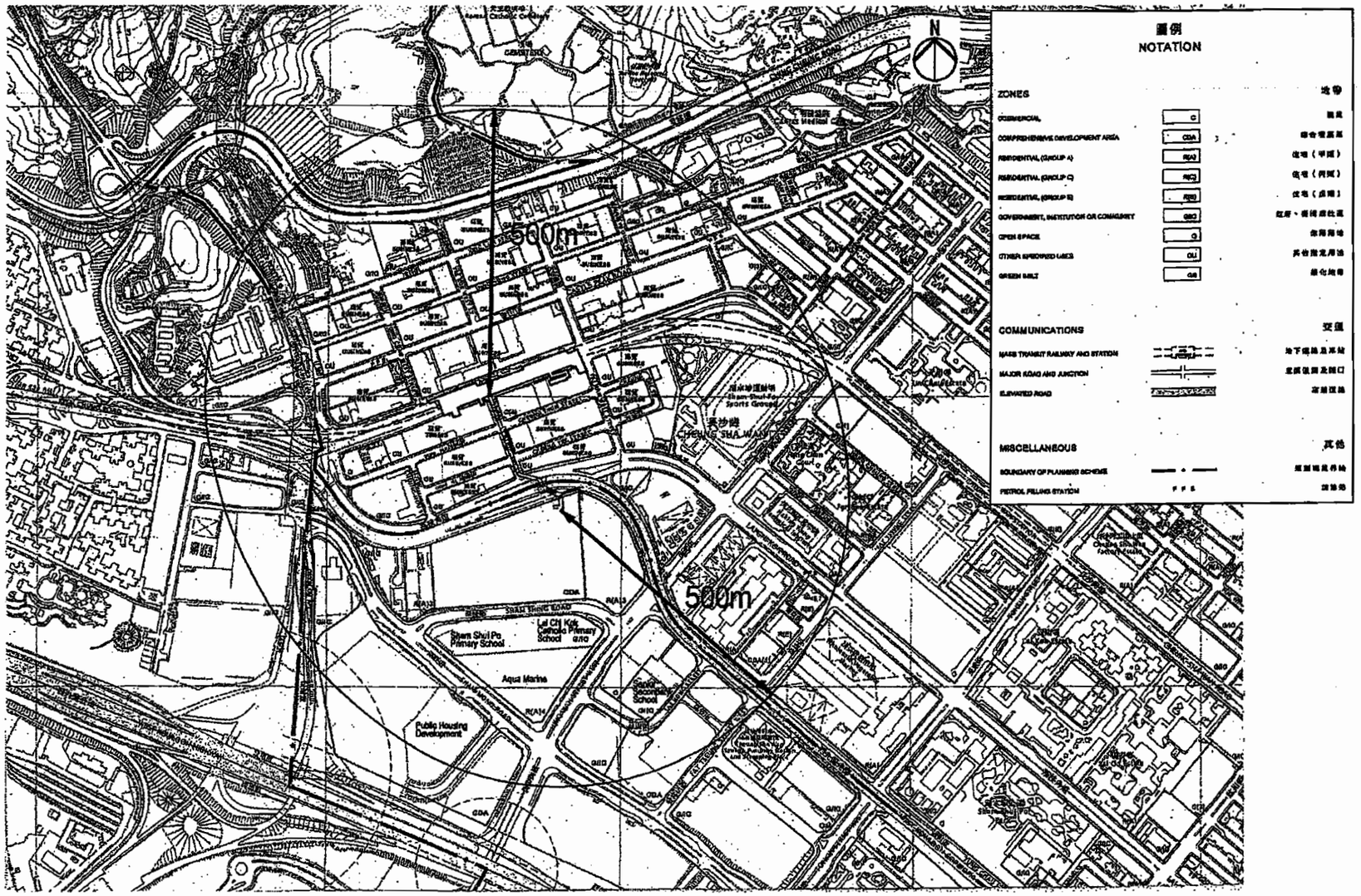
Construction Worksites

Figure 2



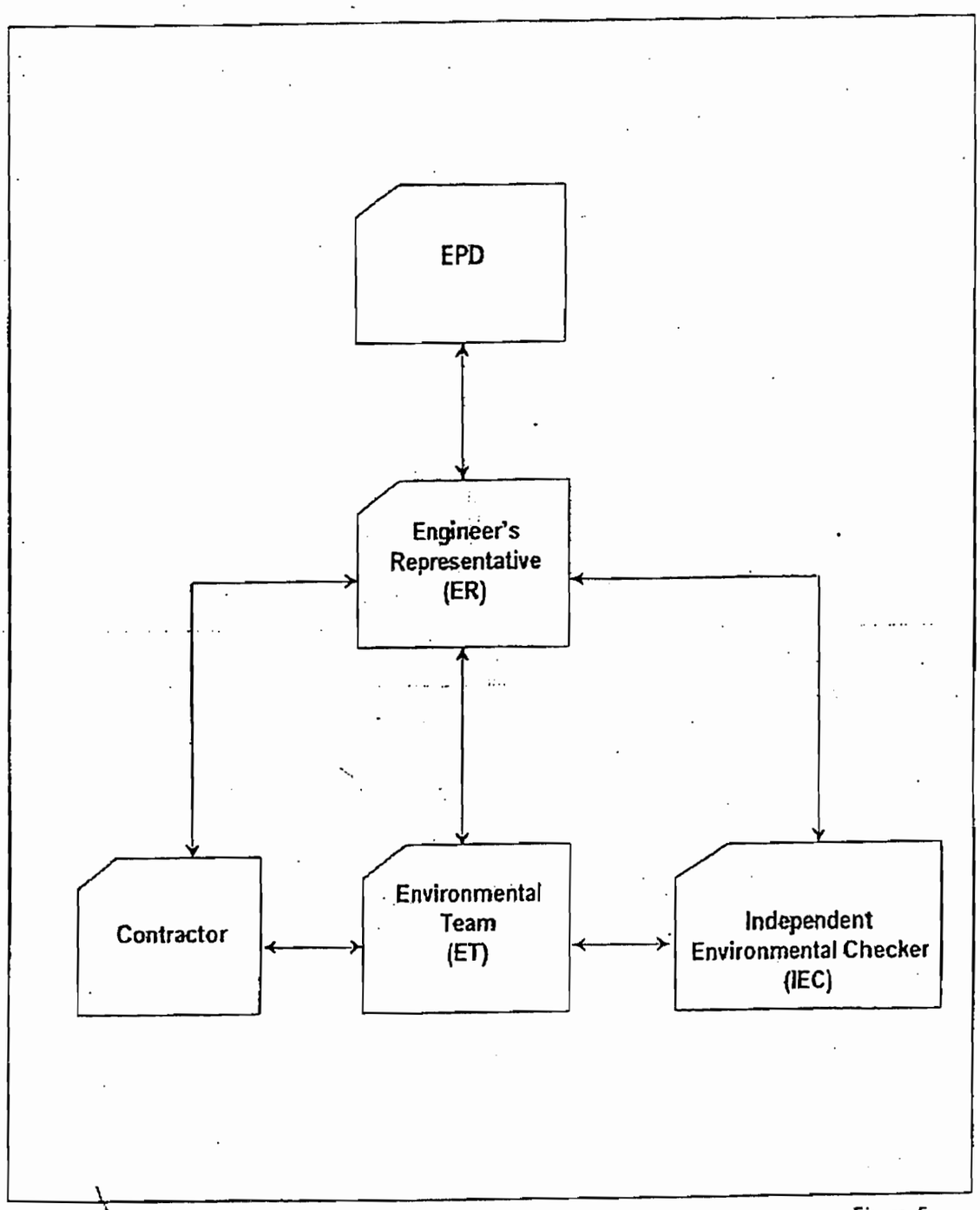
Temporary Diversion of Lai Chi Kok Sewer

Figure 3



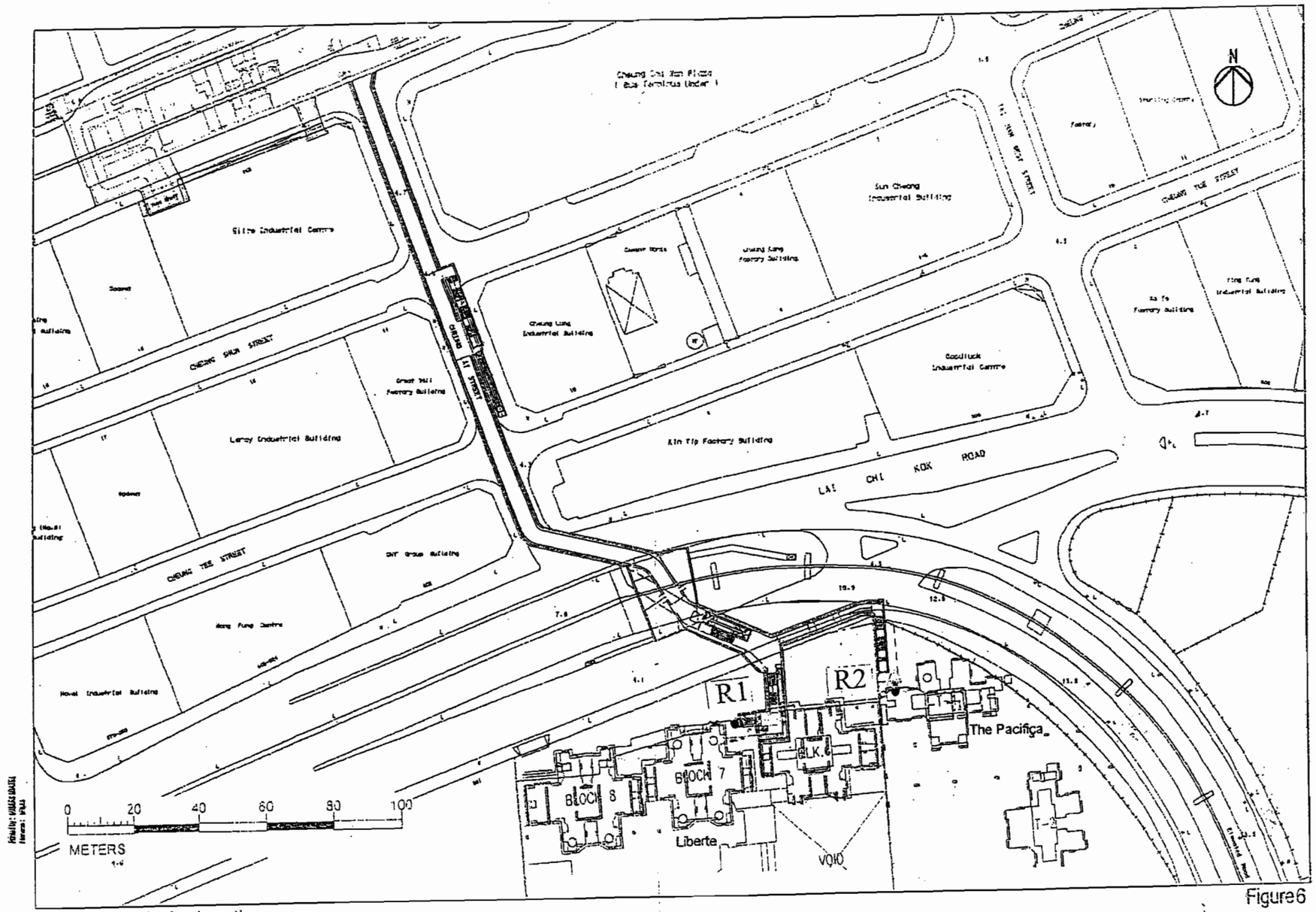
Locations of sensitive receivers

Figure 4



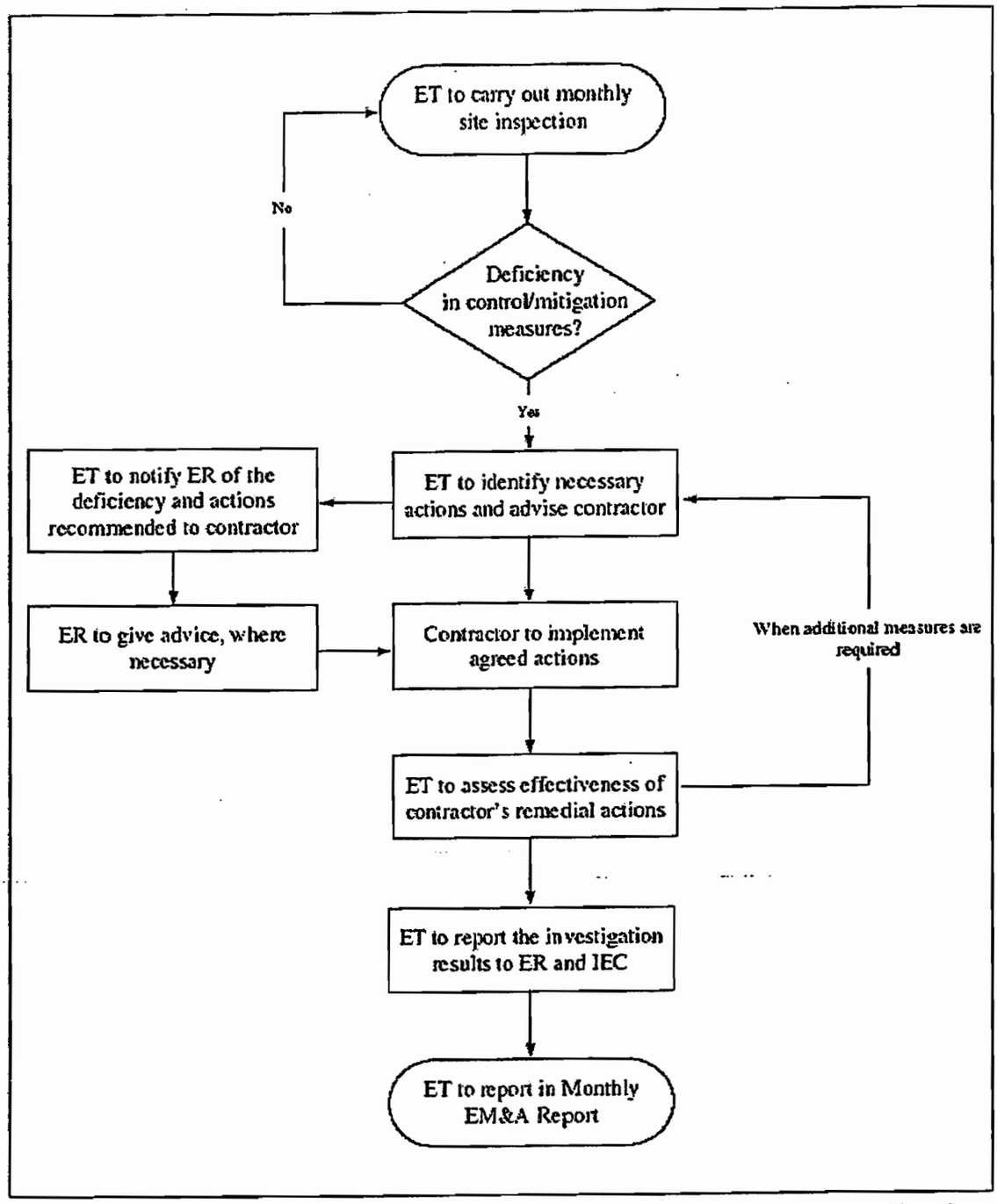
Project Organisation

Figure 5



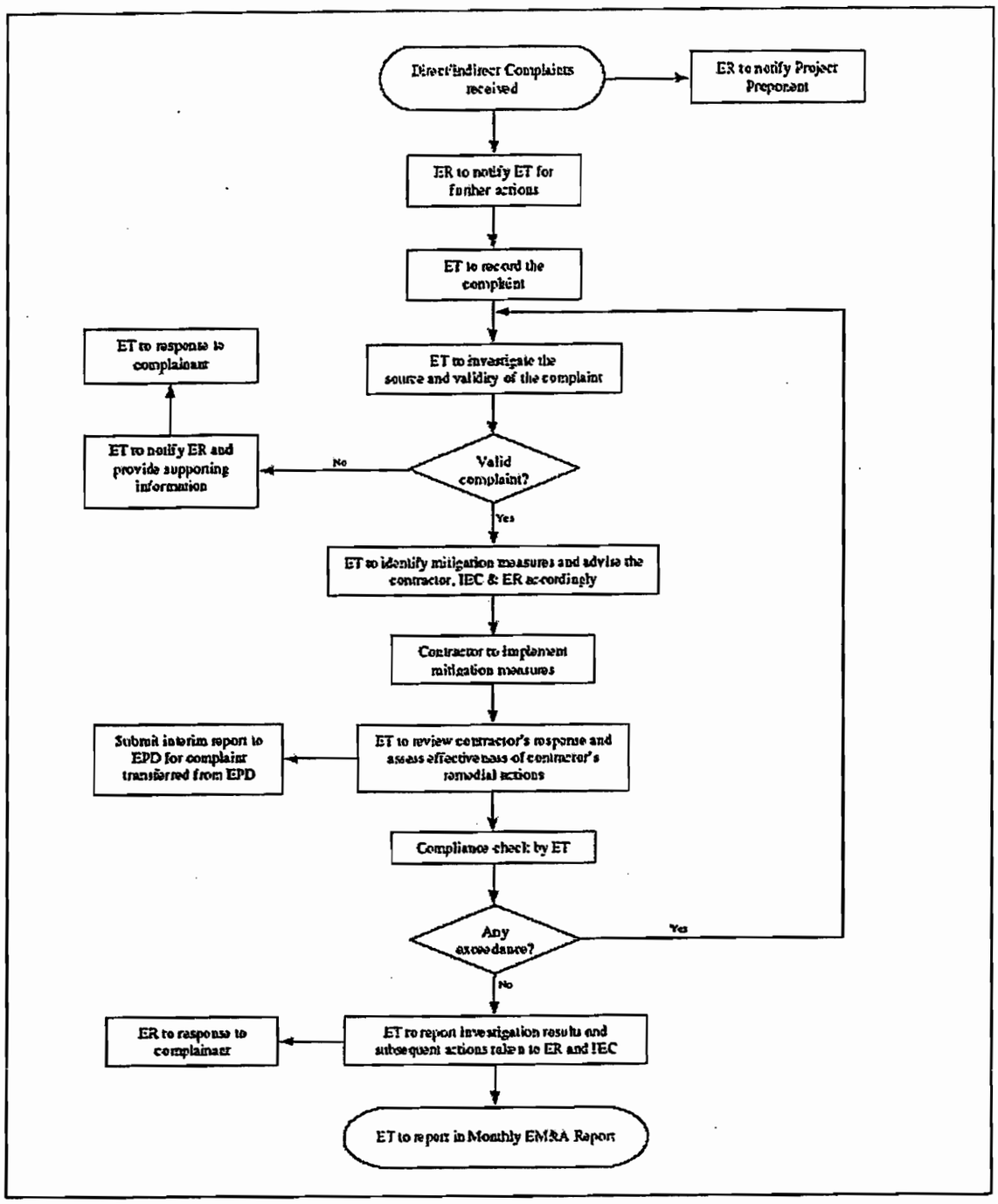
Noise Monitoring Locations

Figure6



Preliminary Site Inspection, Deficiency and Action Reporting System

Figure 7



Complaint – Response Procedures

Figure 8

APPENDIX A

Implementation Schedule of Recommended Environmental Mitigation Measures

Construction Phase Environmental Aspects	MITIGATION MEASURES	Implementation Agent	Location	Implementation Stage	Project Profile Reference
Construction Noise	Noise Mitigation Measures as recommended in the Project Profile: • Well maintained plant should be operated on-site and plant should be checked regularly; • Plants (such as trucks, cranes) that may be in intermittent use should be shut down to a minimum; • Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs: • Silencers on construction equipment should be properly fitted and maintained during the construction works: • Mobile plant should e sited as far away from NSRs as possible and practicable: • Quiet plants should be used; and • Movable barrier or acoustic mat should be adopted for the PMEs. A typical design of movable barrier which has been used locally is a wooden framed barrier with no openings or gaps and of the superficial density not less than 10 kg/m^2.implemented on site.	Contractor	All construction work sites	All construction work sites	Section 3.1.2
Fugitive Dust Emission	Dust Mitigation Measures as required under the Air Pollution Control (construction Dust) Regulation as far as practicable, such as: • Regular watering to reduce dust emission from all exposed site surface, particularly during dry weather; • Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; • Cover all excavated or stockpile or dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; • Provision of vehicle washing facilities at the exit points of the site; • Tarpaulin covering of any dusty material on a vehicle leaving the site.	Contractor	All construction work sites	All construction work sites	Section 3.2.1

Construction Phase Environmental Aspects	MITIGATION MEASURES	Implementation Agent	Location	Implementation Stage	Project Profile Reference
Water Quality	Mitigation measures to control surface runoff from construction site: • The Contractor should design and implement all the mitigation measure and practices specified in the proPECC PN 1/9+4 "Construction Site Drainage" and "Recommended Pollution Control Clauses for Construction Contracts" issued by EPD. • All runoffs arising from the construction site should be properly collected and treated to ensure the discharge standards as stipulated in WPCO are met. Silt trap and oil interceptor should be provided to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before being pumped to the public stormwater drainage system. The silt traps and oil interceptors should be cleaned and maintained regularly. • Any foul effluent should not be discharged into any public sewer and stromwater drain, unless an effluent discharge permit is obtained under the WPCO by the Contractor. • Site toilet facilities, if needed, should be chemical toilets or should have the foul water effluent directed to a foul sewer.	Contractor	All construction work sites	All construction work sites	Section 3.3.1

Construction Phase Environmental Aspects	MITIGATION MEASURES	Implementation Agent	Location	Implementation Stage	Project Profile Reference
Waste Management	Overall Waste Management: • Excavated material should be reused on site as far as possible to minimise off-site disposal. Scrap metals or abandoned equipment should be recycles if possible. • Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner. • The contractor should adopt a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill. Independent audits of the Contractor and resident site staff will be undertaken to ensure that the correct procedures are being followed. • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging. Handling and Storage of Chemical Wastes. • All general refuse should be segregated and stored in enclosed bins or compaction units and waste separation facilities for paper, aluminium cans, plastic bottle etc. should be provided to facilitate reuse or recycling of materials and their proper disposal.	Contractor	All construction work sites	All construction work sites	Section 3.4.1

APPENDIX B

Typical Record Forms

IMPLEMENTATION STATUS PROFORMA Ref: _____

Ref**	Environmental Protection Measures*	Implementation Status

* All recommended and requirements resulted during the Course of EIA/EA Process including ACE and/or accepted public comment to the propose project

** EIA Ref/Em & A Log Ref/Design Document Ref

Signed by Environmental Team Leader: _____ Date: _____

Audited by Independent Environmental Checker: _____ Date: _____

DATA RECOVERY SCHEDULE **REF: _____**

_____/_____
(Month) (Year)

Date	Noise Monitoring				
	Monitoring Location*				
	N1	N2	N3	N4	N5
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
% Of R					

* Remark type of parameters
% Of R The percentage Data Recovery is the actual monitoring over the scheduled monitoring

Signed by Environmental Team Leader: _____ Date: _____

Copy to Independent Environmental Checker

SITE INSPECTION PROFORMA Ref: _____

Date	Location	Req't Ref.	Observation/Deficiency	Mitigation Action** (Responsible Agency)	Date***of confirmation

* EIA Ref/EM&A Log Ref/Design Document Ref/Environmental Protection Contract Clause
** Specific Environmental Mitigation Measures should be stated, such as, equipment, processes, systems, practices or technologies
*** The required completion date to confirm the specified Environmental Protection Action

This Proforma is an Environmental Protection Instruction for: _____ on _____

Signed by Environmental Team Leader: _____ Date: _____

Copy to Independent Environmental Checker

PROACTIVE ENVIRONMENTAL PROTECTION PROFORMA Ref: _____

Ref*	Proposed Construction Method**	Location / Working Period	Anticipated Impacts	Recommended Mitigation Measures

* EIA Ref/EM&A Log Ref/Design Document Ref

** Details of equipment, vehicles, plants, processes, technologies for the option of construction method

Reviewed by Environmental Team Leader: _____ Date: _____

Approved by Independent Environmental Checker: _____ Date: _____

REGLUATORY COMPLIANCE PROFORMA Ref: _____

Ref*	Environmental License/Permit**	Control Area/Facility/Location	Effective Date

* Name of Applicant. Business Corporation, relevant regulation and remark of license/permit conditions
** File reference of the license/permittee

Recorded by Environmental Team Leader: _____ Date: _____

Signed by Independent Environmental Checker: _____ Date: _____

MTR Projects
Sheet: 1 of 1 **CR Dept Ref: _____**
Report Form For Complaints **Unit Ref: _____**

RECIPIENT

Name: (Project Hotline) Location: 23/F HQ Tel: 2993 3333
Received Date: _____ Received Time: _____

COMPLAINANT

Name: _____ Tel: _____
Address:

COMPLAINT ○TKE ○TMK ○LAR2
□Noise □Air quality/Dust □Water □Odour
□Environment □Traffic/Pedestrian □Safety □Others
Date: Time:
Location:

Copy sent to SIOW (Time/Date)	Original sent to SCONE (Date)

REVIEW RESULTS Signed: Date:

RECOMMENDATIONS Signed: Date:

ATTACHMENTS

Copy to (Time / Date)

PjCM …… ; Construction Manager ……..……. ;

Sustainability Development Manager ……

COMPLAINT LOG

Ref: _____

Log Ref	Date/Location	Complainant/ Date of Contact	Details of Complaint	Investigation/Mitigation Action	File Closed

Filed by Environmental Team Leader: _____ Date: _____

SAMPLE TEMPLATE FOR INTERIM NOTIFICATION OF

ENVIRONMENTAL QUALITY LIMITS EXCEEDANCE

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Exceedance	
Actions taken / to be taken	
Remarks	

Name Signature Date

Prepared By:

_____ _____ _____

NOISE MEASUREMENT RECORD

SUMMARY

Frequency weightings: _____dBA Weather: _____ Recorded by: _____

Date	Location	Time/H Duration Min.	Comment/Source	L_{max}	L_{min}	L_{10}	L_{90}	L_{Aeq}