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Sheung Shui Slaughter House

Environmental Monitoring and Audit Manual
(Construction Phase)

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**Sheung Shui Slaughter House
Environmental Monitoring and Audit Manual
(Construction Phase)**

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1. INTRODUCTION

1.1 Purpose of the Manual

The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the set-up of an EM&A programme to ensure compliance with the Supplementary Environmental Impact Assessment (SEIA) recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme to be undertaken for the construction of Sheung Shui Slaughter House. It aims to provide systematic procedures for monitoring, auditing and minimising of the environmental impacts associated with the construction works.

Hong Kong environmental regulations for air and water quality, and noise, the Hong Kong Planning Standards and Guidelines, and recommendations in the Supplementary EIA final report on Sheung Shui Slaughter House have served as environmental standards and guidelines in the preparation of this Manual.

This Manual contains the following :

- (a) duties of the *Environmental Team (ET)* with respect to the environmental monitoring and audit requirements during construction;
- (b) information on project organisation and programming of construction activities for the project;
- (c) requirements with respect to the construction schedule and the necessary environmental monitoring and audit programme to track the varying environmental impact;
- (d) definition of Action and Limit levels;
- (e) establishment of event and action plans;
- (f) requirements of reviewing pollution sources and working procedures required in the event of non-compliance of the environmental criteria;
- (g) requirements of presentation of environmental monitoring and audit data and appropriate reporting procedures.

For the purpose of this manual, the "Engineer" shall refer to the Engineer as defined in the Contract and the Engineer's Representative (ER), in cases where the Engineer's powers have been delegated to the ER, in accordance with the Contract. The 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.

1.2 Background

In order to facilitate the closure of the abattoirs at Kennedy Town, Cheung Sha Wan and Yuen Long, the Architectural Services Department proposed to construct a slaughter House in Area 2B, Sheung Shui, New Territories. The project site is shown in Figure 1.1.

The slaughterhouse (SSSH) will have daily throughput capacity of 5,000 pigs and 400 heads of cattle and a maximum of 300 goats.

In view of the likely adverse environmental impacts arising from the proposed development, the Environmental Protection Department called for a Supplementary Environmental Impact Assessment (SEIA) to provide specific information on the net and cumulative environmental impact resulting from the development and subsequent operation of the SSSH. Subsequently, a Study Brief was drawn up which required that:

- the performance of the necessary environmental surveys and baseline monitoring tests.
- the quantification of cumulative environmental impacts which may arise during the slaughterhouse development.
- the proposition of pragmatic, efficient, effective and enforceable measures necessary to mitigate any significant negative environmental impacts both short-term and long term.
- the outlining of a programme through which environmental impacts of the slaughterhouse development may be adequately monitored, audited and altered, if so required.

The main conclusions and recommendations from the SEIA report, specifically for impacts on Air, Noise and Water are detailed and mitigation measures are summarised in the following table:

Environmental Consideration	Potential Environmental Impact	Recommended Mitigation Measures
Air	Fugitive dust	Paving/gravelling and regular watering, cleaning and maintenance of vehicles and equipment.
Noise	Piling, equipment and machinery noise	Silencers on equipment, no parallel activities, use of portable sound barrier, route planning, no temporary generators.
Water	Contamination of surrounding watercourse	No untreated run-off, re-use for dust suppression, sediment and grease traps, spillage clean-up action plan, impervious ground for chemical use.

1.3 Environmental Monitoring and Audit Requirements

The SEIA Final Report requires Protection that the following monitoring activities shall be undertaken during the construction stage of the Project:

- *Baseline Monitoring* : measurements of dust, noise and water prior to the construction of the SSSH. This information is useful for assessing the short and long term environmental impacts of the Project activities.
- *Impact Monitoring* : measurements of dust, noise and water during the construction in order to determine the impacts of the activities and the effectiveness of the mitigation measures proposed in the EIA Report, and any further remedial measures which are needed.
- *Compliance Monitoring* involves periodic sampling and/or continuous measurement of dust, noise and water and the determination of their compliance with regulatory requirements and standards.

It is a further requirement that the environmental monitoring programme is subject to environmental audit. The aim is to determine whether satisfactory compliance with the legislative requirements has been met, and to ensure that no annoyance is caused to sensitive receivers or else the remedial action plan will be initiated, if required. This will require information on the statutory requirements for parameters of concern and monitoring data.

Each audit will consist of a review of the monitoring data and comparison with the relevant legislative requirements and environmental performance standards specified in the Contract Document.

The monitoring and audit requirements for the Project will be as follows:

- *Pre-Construction Phase* Including all baseline monitoring prior to any Project activity occurring on site.
- *Construction Phase* Including impact/compliance monitoring and audit during all construction activities.

Auditing requirements for the project as stipulated in this Manual provide a direct means to review and enforce the specified environmental protection and pollution control measures, and to ensure compliance with the appropriate legal requirements.

1.4 Project Organisation

The project organisation and lines of communication with respect to environmental protection works is shown in Figure 1.2.

The ET shall not be in any way an associated body of the Contractor. The ET leader shall have relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the ER and the Environmental Protection Department (EPD).

Appropriate staff shall be included in the ET, under the supervision of the ET Leader, to fulfil the EM&A duties of the ET Leader specified in this manual. Basically, the duties comprise the following:

- (a) To monitor the various environmental parameters as required in SEIA Final Report.
- (b) To investigate and audit the Contractors' equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues for proactive action before problems arise.
- (c) To audit and prepare audit reports on the environmental monitoring data and the site environmental conditions;
- (d) To report on the environmental monitoring and audit results to the Contractor, the ER, and the EPD or its delegate.

Appropriate resources shall also be allocated under the Contractor and the ER to fulfil their duties specified in this manual.

1.5 Construction Programme

The Works comprise the construction of the following facilities :

- KCRC Siding and Livestock Loading/Unloading Yard
- Lairage Block
- Slaughter Block
- Meat Despatch Bank
- Administration & Amenities Block
- Wastewater Treatment Plant
- External Facilities, e.g. main gate & securities, carpark, truck washing facilities, on-site and off-site noise barrier walls, etc.

Figure 1.3 is the works programme for the project. This programme is for information of the ET Leader to get an initial idea of the projection of the works. The ET Leader shall make reference to the actual works progress and programme during the construction stage to schedule the EM&A works, and the Contractor shall provide the respective information to the ET Leader for formulating the EM&A schedule.

2. AIR QUALITY

2.1 Air Quality Parameters

Monitoring and audit of the Total Suspended Particulates (TSP) levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

1-hour and 24-hour TSP levels should be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval of the ER, 1-hour TSP levels can be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts.

All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. shall be recorded down in details. A sample data sheet is shown in Figure 2.1.

2.2 Monitoring Equipment

High volume sampler (HVS) in compliance with the following specifications shall be used for carrying out the 1-hr and 24-hr TSP monitoring:

- (a) 0.6-1.7 m³/min (20-60 SCFM) adjustable flow range;
- (b) equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- (c) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- (d) capable of providing a minimum exposed area of 406 cm² (63 in²);
- (e) flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;
- (f) equipped with a shelter to protect the filter and sampler;
- (g) incorporated with an electronic mass flow rate controller or other equivalent devices;
- (h) equipped with a flow recorder for continuous monitoring;
- (i) provided with a peaked roof inlet;
- (j) incorporated with a manometer;
- (k) able to hold and seal the filter paper to the sampler housing at horizontal position;
- (l) easy to change the filter; and
- (m) capable of operating continuously for 24-hr period.

The ET Leader is responsible for provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with an appropriate calibration kit are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc. shall be clearly labelled.

Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference. All the data should be converted into standard temperature and pressure condition.

The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down in the data sheet as mentioned in Section 2.1.

If the ET Leader proposes to use a direct reading dust meter to measure 1-hr TSP levels, he shall submit sufficient information to the ER to prove that the instrument is capable of achieving a comparable result as that the HVS and may be used for the 1-hr sampling. The instrument should also be calibrated regularly, and the 1-hr sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.

Wind data monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET Leader and agreed with the ER. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- (a) the wind sensors should be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- (b) the wind data should be captured by a data logger and to be downloaded for processing at least once a month;
- (c) the wind data monitoring equipment should be re-calibrated at least once every six months; and
- (d) wind direction should be divided into 16 sectors of 22.5 degrees each.

In exceptional situations, the ET Leader may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from EPD.

2.3 Laboratory Measurement / Analysis

A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments, to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS accredited.

If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER and the measurement procedures shall be witnessed by the ER. The ET Leader shall provide the ER with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

Filter paper of size 8"x10" shall be labelled before sampling. It shall be a clean filter paper with no pin holes, and shall be conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper is then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard. All the collected samples shall be kept in a good condition for 6 months before disposal.

2.4 Monitoring Locations

Air sensitive receivers are shown on Figure 2.2. The co-ordinates of the eight concerned sensitive receivers are given in table below:

ASR	x-Coordinate	y-Coordinate	Description
1	30420	41601	Small residential village houses at east bank of Ng Tung River about 250m from the study site
2	30255	41725	Small residential village houses at east bank of Ng Tung River about 150m from the study site
7-11	29850	41320	Village houses located on both sides of River Beas about 250m from the study site
12	29442	41652	Tsung Yuen village houses about 660m west of the study site
13	29630	41898	Lo Wu Camp about 600m north west from the study site
14	30155	40942	Small village houses about 400m south of the study site
15	30305	40495	Sheung Shui temporary housing area about 550m south of the study site
16	30625	41140	Residential village house about 450m east of the study site

Dust monitoring shall be carried out at two locations as shown in Figure 2.3. at D1 and D2 (1 hour dust), T1 and T2 (24-hour TSP) which are located approximately 150 meter to the east of the existing site.

Locations	x-Coordinate	y-Coordinate	Description
D1 / T1	30420	41601	Small residential village houses at east bank of Ng Tung River about 250m from the study site
D2 / T2	30255	41725	Small residential village houses at east bank of Ng Tung River about 150m from the study site

When alternative monitoring locations are proposed, the following criteria, as far as practicable, should be followed:

- (a) at the site boundary or such locations close to the major dust emission source;
- (b) close to the sensitive receptors; and
- (c) take into account the prevailing meteorological conditions.

The ET Leader shall agree with the ER on the position of the HVS for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

- (a) a horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- (b) no two samplers should be placed less than 2 meter apart;
- (c) the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- (d) a minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;
- (e) a minimum of 2 metre separation from any supporting structure, measured horizontally is required;
- (f) no furnace or incinerator flue is nearby;
- (g) airflow around the sampler is unrestricted;
- (h) the sampler is more than 20 metres from the dripline;
- (i) any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- (j) permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- (k) a secured supply of electricity is needed to operate the samplers.

2.5 Baseline Monitoring

The ET Leader shall carry out baseline monitoring at all of the designated monitoring locations for at least 14 consecutive days prior to the commissioning of the construction works to obtain daily 24-hr TSP samples. 1-hr sampling shall also be done at least 3 times per day while the highest dust impact is expected.

During the baseline monitoring, there should not be any construction or dust generation activities in the vicinity of the monitoring stations.

In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with EPD.

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

Ambient conditions may vary seasonally and shall be reviewed at three monthly intervals. If the ET Leader considers that the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be at times when the contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with EPD.

2.6 Impact Monitoring

The ET Leader shall carry out impact monitoring during the course of the Works. For regular impact monitoring, the sampling frequency of at least once in every six-days, shall be strictly observed at all the monitoring stations for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs.

The specific time to start and stop the 24-hr TSP monitoring shall be clearly defined for each location and be strictly followed by the operator.

In case of non-compliance with the air quality criteria, more frequent monitoring exercise, as specified in the Action Plan in Section 2.7, shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

2.7 Event and Action Plan for Air Quality

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET Leader shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. Table 2.1 shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occurs, the ET, the ER and the Contractor shall undertake the relevant action in accordance with the Action Plan in Table 2.2.

Table 2.1 Action and Limit Levels for Air Quality

Parameters	Action	Limit
24 Hour TSP Level in mg/m ³	For baseline level < 108 mg/m ³ , Action level = average of baseline level plus 30% and Limit level For baseline level > 108 mg/m ³ and baseline level < 154 mg/m ³ , Action level = 200 mg/m ³ For baseline level > 154 mg/m ³ , Action level = 130% of baseline level	260
1 Hour TSP Level in mg/m ³	For baseline level < 154 mg/m ³ , Action level = average of baseline level plus 30% and Limit level For baseline level > 154 mg/m ³ and baseline level < 269 mg/m ³ , Action level = 350 mg/m ³ For baseline level > 269 mg/m ³ , Action level = 130% of baseline level	500

Table 2.2 Event/Action Plan for Air Quality

EVENT	ACTION		
	ET	ER	CONTRACTOR
ACTION LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source 2. Inform ER 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 	<ol style="list-style-type: none"> 1. Notify Contractor 2. Check monitoring data and Contractor's working methods 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source 2. Inform ER 3. Repeat measurements to confirm findings 4. Increase monitoring frequency to daily 5. Discuss with ER for remedial actions required 6. If exceedance continues, arrange meeting with ER 7. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Check monitoring data and Contractor's working methods 4. Discuss with Environmental Supervisor and Contractor on potential remedial actions 5. Ensure remedial actions properly implemented 	<ol style="list-style-type: none"> 1. Submit proposals for remedial actions to ER within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate
LIMIT LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source 2. Inform ER and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess effectiveness of Contractor's remedial actions and keep EPD and ER informed of the results 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Check monitoring data and Contractor's working methods 4. Discuss with Environmental Team Leader and Contractor potential remedial actions 5. Ensure remedial actions properly implemented 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to ER within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source 2. Inform ER and EPD the causes & actions taken for the exceedances 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Investigate the causes of exceedance 6. Arrange meeting with EPD and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 4. Discuss amongst Environmental Team Leader and the Contractor potential remedial actions 5. Review Contractor's remedial actions whenever necessary to assure their effectiveness 6. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to ER within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

2.8 Dust Mitigation Measures

The EIA report has recommended dust control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

- Paving/gravelling and regular watering and cleaning of the works areas.
- Regular maintenance of vehicles and equipment.

If the above measures are not sufficient to restore the air quality to acceptable levels upon the advice of ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to ER for approval, and implement the mitigation measures.

3. NOISE

3.1 Noise Parameters

The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (Leq). Leq(30 min) shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods, Leq(5 min) shall be employed for comparison with the NCO criteria.

As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet is shown in Figure 3.1 for reference.

3.2 Monitoring Equipment

As referred to in the Technical Memorandum (TM) 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 agree to within 1.0dB.

Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5ms^{-1} or wind with gusts exceeding 10ms^{-1} . The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

The ET Leader is responsible for the provision 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.

3.3 Monitoring Locations

Noise Sensitive Receivers are shown on Figure 2.2. The noise sensitive receivers at the junction of Po Shek Wu Road and Po Wan Road are village houses of 2 to 3 storeys high. The noise monitoring locations are shown in Figure 3.2.

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

- (a) at locations close to the major site activities which are likely to have noise impacts;
- (b) close to the noise sensitive receivers (N.B. For the purposes of this section, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing art centre should be considered as noise sensitive receiver); and
- (c) 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 the 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 the free field measurements. The ET Leader shall agree with 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.

3.4 Baseline Monitoring

The ET Leader shall carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least two weeks. A schedule on the baseline monitoring shall be submitted to the ER for approval before the monitoring starts.

There shall not be any construction activities in the vicinity of the stations during the baseline monitoring.

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

3.5 Impact Monitoring

Noise monitoring shall be carried out at all the designated monitoring station. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a per week basis when noise generating activities are underway:

- (a) one set of measurements between 0700-1900 hours on normal weekdays; and
- (b) one set of measurements between 0700-1900 hours on holidays.

For the measurements (b) above, one set of measurements shall at least include 3 consecutive Leq(5 min) results.

If a school exists near the construction activity, noise monitoring shall be carried out at the monitoring stations for the schools during the school examination periods. The ET Leader shall liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Action Plan in Section 3.6 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.

3.6 Event and Action Plan for Noise

The Action and Limit levels for construction noise are defined in Table 3.1. Should non-compliance of the criteria occurs, action in accordance with the Action Plan in Table 3.2, shall be carried out.

Table 3.1 Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)
0700-2300 hrs on holidays; and 1900-2300 hrs on all other days		60/65/70** dB(A)
2300-0700 hrs of next day		45/50/55** dB(A)

* reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

** to be selected based on Area Sensitivity Rating.

Table 3.2 Event/Action Plan for Construction Noise

EVENT	ACTION	
	ET Leader or ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify Contractor 2. Analyse investigation 3. Require Contractor to propose measures for the analysed noise problem 4. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to Environmental Team Leader/Engineer's Representative 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 1. Notify Contractor 2. Notify EPD 3. Require contractor to implement mitigation measures Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Implement mitigation measures 2. Prove to Environmental Team Leader ER effectiveness of measures applied

3.7 Noise Mitigation Measures

The EIA report has recommended construction noise control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

- Use of silencers on equipment.
- No parallel activities.
- Use of portable sound barriers.
- Use of route planning.

If the above measures are not sufficient to restore the construction noise quality to an acceptable levels upon the advice of ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to ER for approval, and carry out the mitigation measures.

4. WATER QUALITY

4.1 Water Quality Parameters

Monitoring of suspended solids (SS) in mg/l shall be carried out by the ET to ensure that the neighbouring water courses are not adversely affected by the construction activities. As the river system is highly polluted, and the zero level of wastewater discharges from site, effluent indicative parameters (e.g. BOD, COD, oil and grease, MLSS and TKN) need not be monitored. The monitoring of SS will ensure that there is not excessive impact from site run-off. A sample monitoring record sheet is shown in Figure 4.1 for reference.

4.2 Monitoring Equipment

- (a) A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres, and can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).
- (b) Water samples for suspended solids measurement should be collected in high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory as soon as possible after collection.

4.3 Laboratory Measurement / Analysis

Analysis of suspended solids shall be carried out in a HOKLAS or other international accredited laboratory. Water samples of about 500 mL shall be collected at the monitoring stations for carrying out the laboratory SS determination. The SS determination work shall start within 24 hours after collection of the water samples. The SS determination shall follow APHA 17ed 2540D or equivalent methods subject to approval of DEP.

If a site laboratory is set up or a non-HOKLAS and non-international accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control shall be approved by the DEP. All the analysis shall be witnessed by the ER. The ET Leader shall provide the ER with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" updated edition and any other relevant document for his reference.

For the testing methods of other parameters as recommended by EIA or required by DEP, detailed method procedures should be submitted to DEP for approval prior to the commencement of monitoring programme. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to DEP. In any circumstance, the sample testing should have comprehensive quality assurance and quality control programmes. The laboratory should prepare to demonstrate the programmes to DEP or his representatives when requested.

4.4 Monitoring Locations

During the construction phase, sensitive receivers identified within the area of influence include the River Indus and its tributaries, and therefore, Deep Bay. Other sensitive receivers include the numerous fish and duck ponds located in the north, west and east of the Site. The water quality monitoring locations W1 and W2 are shown in Figure 4.2.

When alternative monitoring locations W1 and W2 are proposed, they should be chosen based on the following criteria:

- (a) at locations close to and preferably at the boundary of the mixing zone of the major site activities as indicated in the EIA final report, which are likely to have water quality impacts;
- (b) close to the sensitive receptors which are directly or likely to be affected;
- (c) for monitoring locations located in the vicinity of the sensitive receptors, care should be taken to cause minimal disturbance during monitoring;
- (d) at two or more control stations which shall be at locations representative of the project site in its undisturbed condition. Control stations should be located, as far as is practicable, both upstream and down stream of the works area.

Control stations are necessary to compare the water quality from potentially impacted sites with the ambient water quality. Control stations shall be located within the same body of water as the impact monitoring stations but should be outside the area of influence of the works and, as far as practicable, not affected by any other works.

Measurements shall be taken at mid-water depth.

4.5 Baseline Monitoring

Baseline conditions for water quality shall be established and agreed with DEP prior to the commencement of works. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the works and to demonstrate the suitability of the proposed impact, control and reference monitoring stations. The baseline conditions shall normally be established by measuring the water quality parameter specified in Section 4.1. The measurements shall be taken at approximately 100 metres up-stream from the construction sites, and approximately 100 metres down-

stream from the construction sites named W1 and W2 respectively. The monitoring frequency should be taken 3 times per week for four weeks prior to the commencement of construction works.

In exceptional case when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from DEP on an appropriate set of data to be used as baseline reference.

4.6 Impact Monitoring

During the course of the construction works, monitoring shall be undertaken 3 times per week when the highest run-off impact is expected. Water samples shall be taken at mid-water depth.

4.7 Event and Action Plan for Water Quality

The water quality criteria, namely Action and Limit levels are shown in Table 4.1. Should the monitoring results of the water quality parameters at any designated monitoring stations indicate that the water quality criteria are exceeded, the actions in accordance with the Action Plan in Table 4.2 shall be carried out.

Table 4.1 Action and Limit Levels for Water Quality

<i>Parameters</i>	<i>Action</i>	<i>Limit</i>
<i>SS in mg/l (depth-averaged)</i>	<i>95%-ile of baseline data and 120% of upstream control station's SS at the same tide of the same day</i>	<i>99%-ile of baseline, 130% of upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements (e.g. required suspended solids level for concerned sea water intakes)</i>

Notes:

- For SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

Table 4.2 Event and Action Plan for Water Quality

<i>Event</i>	<i>ET Leader</i>	<i>Contractor</i>	<i>ER</i>
<i>Action level being exceeded by one sampling day</i>	<i>Repeat SS sampling to confirm findings; Identify source(s) of impact; Inform contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with ER and Contractor; Repeat measurement on next day of exceedance.</i>	<i>Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; consider changes of working methods; Propose mitigation measures to ER and discuss with ET and ER; Implement the agreed mitigation measures.</i>	<i>Discuss with ET and Contractor on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures.</i>
<i>Action level being exceeded by more than two consecutive sampling days</i>	<i>Repeat SS sampling to confirm findings; Identify source(s) of impact; Inform contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with ER and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance.</i>	<i>Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; consider changes of working methods; Propose mitigation measures to ER within 3 working days and discuss with ET and ER; Implement the agreed mitigation measures.</i>	<i>Discuss with ET and Contractor on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures.</i>
<i>Limit level being exceeded by one sampling day</i>	<i>Repeat SS sampling to confirm findings; Identify source(s) of impact; Inform contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level.</i>	<i>Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; consider changes of working methods; Propose mitigation measures to ER within 3 working days and discuss with ET and ER; Implement the agreed mitigation measures.</i>	<i>Discuss with ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures.</i>
<i>Limit level being exceeded by more than two consecutive sampling days</i>	<i>Repeat SS sampling to confirm findings; Identify source(s) of impact; Inform contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</i>	<i>Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Propose mitigation measures to ER within 3 working days and discuss with ET and ER; Implement the agreed mitigation measures; As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities..</i>	<i>Discuss with ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures; Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit level.</i>

4.8 Water Quality Mitigation Measures

The EIA report has recommended water quality control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

- No untreated run-off should be discharged from sites.
- Re-use run-off for dust suppression.
- Use of grease and sediment traps.

If the above measures are not sufficient to restore the water quality to an acceptable levels upon the advice of the ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to ER for approval, and carry out the mitigation measures.

5. WASTE MANAGEMENT

The Contractor is responsible for waste control within the construction site, removal of the waste material produced from the site and to implement any mitigation measures to minimise waste or redress problems arising from the waste from the site. The waste material may include any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the site onto any adjoining land, storm sewer, sanitary sewer, or any waste matter or refuse to be deposited anywhere within the site or onto any adjoining land.

When handling the waste material, the following measures shall be undertaken:

- Separation and recycling of ordinary construction waste.
- Chemical waste should be handled and disposed of properly.

The Contractor shall also pay attention to the Waste Disposal Ordinance, the Dumping at Sea Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance, and carry out the appropriate waste management work. The relevant licence/permit, such as the effluent discharge licence, the chemical waste producer registration, etc. shall be obtained. The Contractor shall refer to the relevant booklets issued by EPD when applying for the licence/permit.

During the site inspections and the document review procedures as mentioned in Sections 6.1 and 6.2 of this manual, the ET Leader shall pay special attention to the issues relating to waste management, and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong.

6. SITE ENVIRONMENTAL AUDIT

6.1 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. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, the 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 inspection works. He shall submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER for approval.

Regular site inspections shall be carried out at least once per week. 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 is likely to 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 EIA recommendations 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 the ET Leader with all relevant information of the construction contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the ER and the Contractor within 24 hours, for reference and for taking immediate action. 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 if 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.

6.2 Compliance with Legal and Contractual Requirements

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 that the works are in compliance with the contractual requirements, all the 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 the 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 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 and the ER accordingly.

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

6.3 Environmental Complaints

Complaints shall be referred to the ET Leader for carrying out complaint investigation procedures. The ET Leader shall undertake the following procedures upon receipt of the complaints:

- (a) log complaint and date of receipt onto the complaint database;
- (b) investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- (c) if a complaint is valid and due to works, identify mitigation measures;
- (d) if mitigation measures are required, advise the Contractor accordingly;
- (e) review the Contractor's response on the identified mitigation measures, and the updated situation;
- (f) if the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;
- (g) undertake additional monitoring and audit to verify the situation if necessary, and review that any valid reason for complaint does not recur;
- (h) 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 time frame assigned by EPD); and
- (i) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

During the complaint investigation work, the Contractor and ER shall cooperate with the ET Leader 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 ensure that the measures have been carried out by the Contractor.

A flow chart of the complaint response procedures is shown in Figure 6.1.

7. REPORTING

7.1 General

The following reporting requirements based upon a paper documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the ER and EPD. This would enable a transition from a paper/historic and reactive approach to an electronic/real time proactive approach.

7.2 Baseline Monitoring Report

The ET Leader shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report shall be submitted to each of the three parties: the Contractor, the ER and the EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies they want. 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 shall include 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 (and depth);
 - 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.

7.3 Monthly EM&A Reports

The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET Leader. A register of environmental prosecution, offences, and/or, conviction under APCO, NCO, WPCO, and/or, WDO should be included in each monthly EM&A report. The EM&A report shall be prepared and submitted within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. A maximum of 4 copies of each monthly EM&A report shall be submitted to each of the three parties: the Contractor, the ER and the EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium requirement.

The ET leader 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.

7.3.1 First Monthly EM&A Report

The first monthly EM&A report shall include 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 EIA study final report;
 - environmental requirements in contract documents;
- (d) advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
- (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 (and depth)
 - monitoring date, time, frequency, and duration;
- (g) graphical plots of trends of monitored parameters 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;
- (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 media, 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.

7.3.2 Subsequent EM&A Reports

The subsequent monthly EM&A reports shall include the following :

- (a) Title Page
- (b) Executive Summary (1-2 pages)
 - Breaches of AL 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 mitigatory measures and the corresponding effectiveness of the measures
- (f) Future Key Issues
- (g) Appendix
 - AL 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:
 - i) major activities being carried out on site during the period;
 - ii) weather conditions during the period; and
 - iii) 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

7.4 Quarterly EM&A Summary Reports

The quarterly EM&A summary report which should generally be around 5 pages (including about 3 of text and tables and 2 of figures) should contain at least the following information:

- (a) up to half a page executive summary;
- (b) basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;

- (c) a brief summary of EM&A requirements including:
- monitoring parameters;
 - environmental quality performance limits (Action and Limit levels); and
 - environmental mitigation measures, as recommended in the project EIA study final report;
- (d) advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
- (e) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (f) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated 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;
- (g) advice on the solid and liquid waste management status;
- (h) a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (i) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- (j) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- (k) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (l) comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
- (m) proponents' contacts and any hotline telephone number for the public to make enquiries.

7.5 Data Keeping

The site document such as the monitoring field records, laboratory analysis 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 Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. The monitoring data shall also be recorded in magnetic media form, and the software copy can be available upon request. The water quality data software format shall be agreed with EPD. All the documents and data shall be kept for at least one year after completion of the construction contract.

7.6 Interim Notifications of Environmental Quality Limit Exceedances

With reference to Event/Action Plans in Tables 2.2, 3.2 and 4.2, when the environmental quality limits are exceeded, the ET Leader shall immediately notify the ER & EPD, as appropriate. The notification shall be followed up with advice to EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in Fig. 1.4.

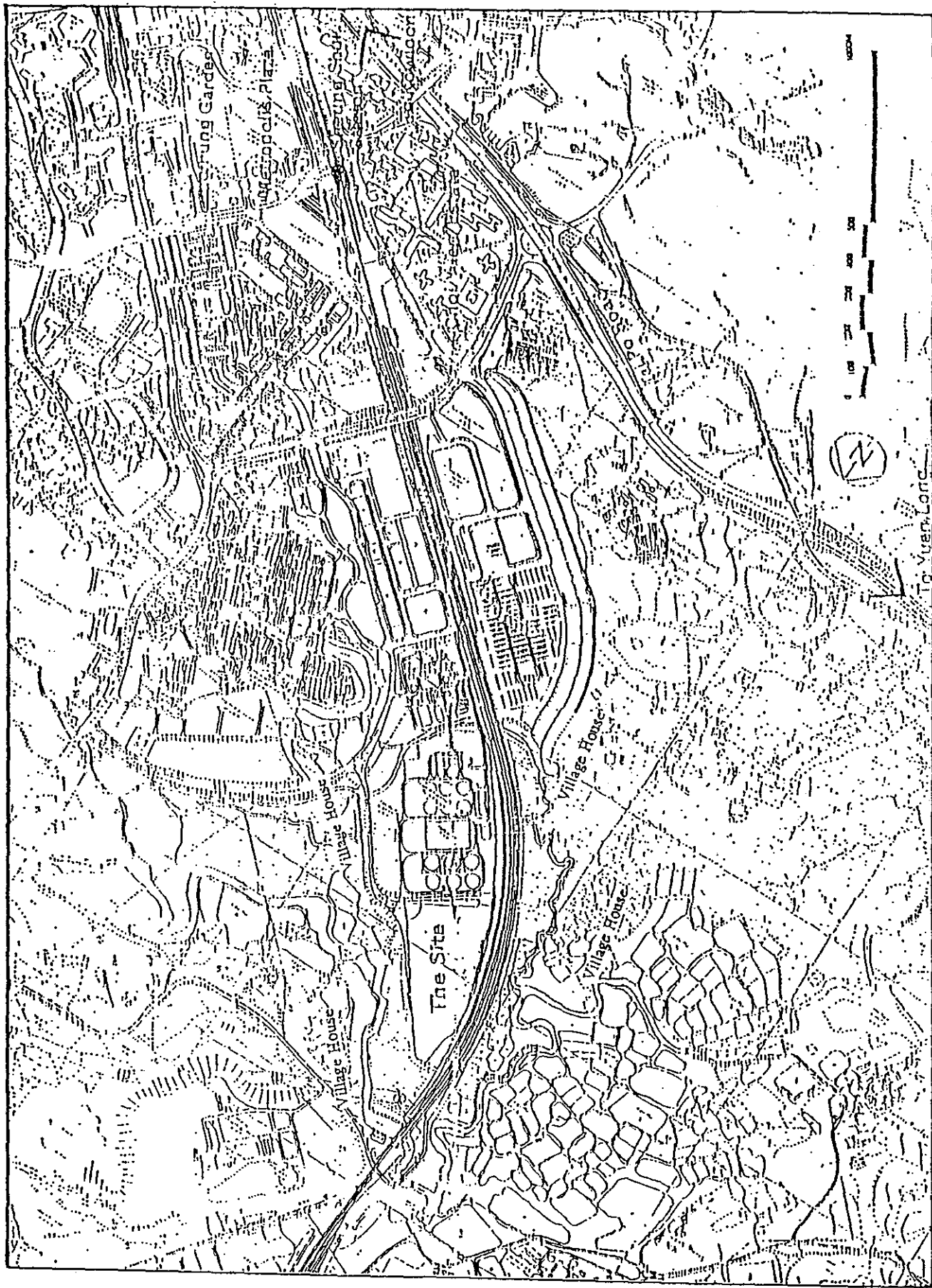
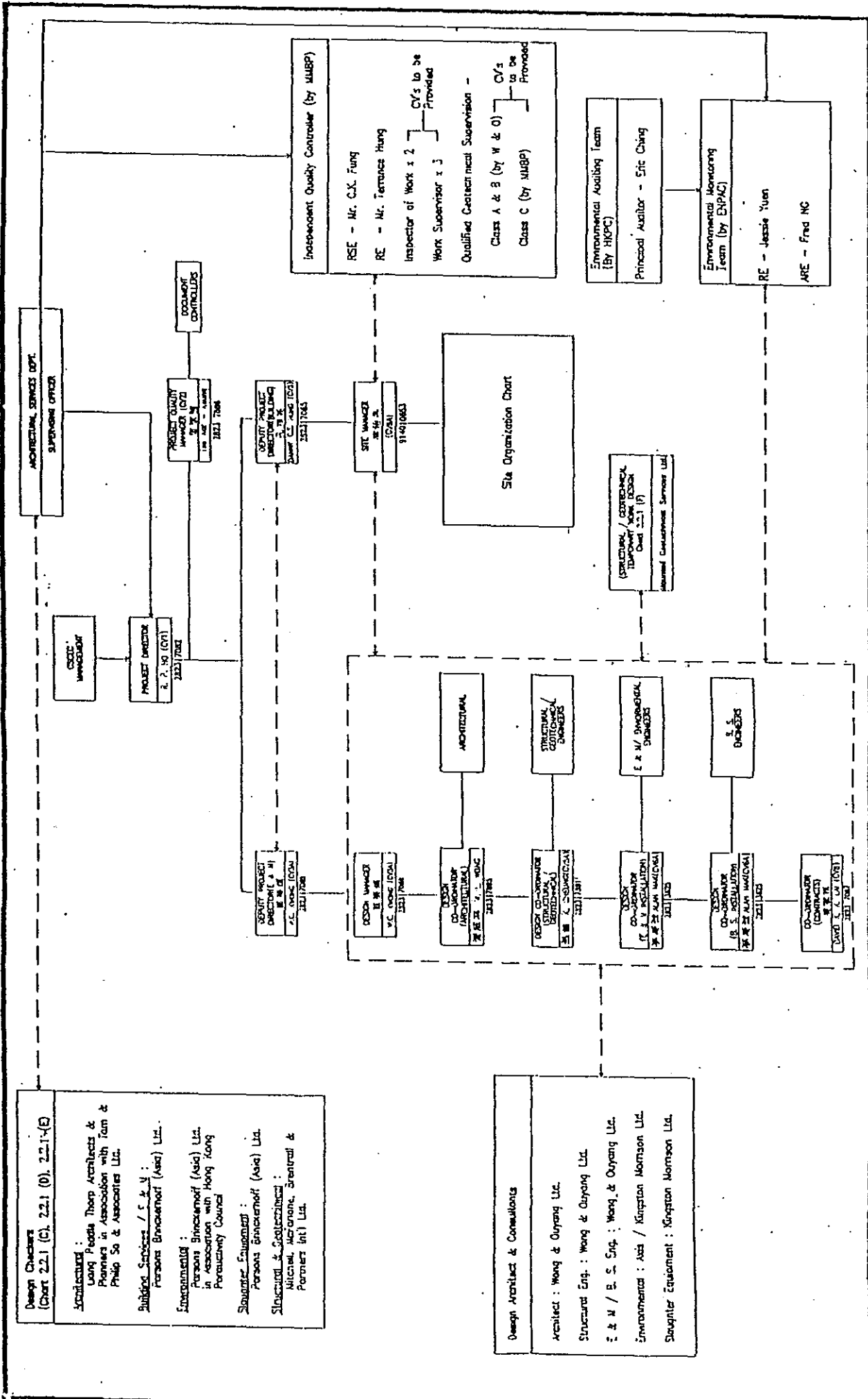


Figure 1.1 Site Plan of Sheung Shui Slaughter House



Design Checkers
(Chart 2.2.1 (C), 2.2.1 (D), 2.2.1 (E))

Structural :
Lung Pehoa Thorp Architects & Planners in Association with Tam & Philip So & Associates Ltd.

Building Services / E & M :
Persons Brnoemhoff (Asia) Ltd.

Environmental :
Persons Brnoemhoff (Asia) Ltd. in Association with Hong Kong Permaculture Council

Slaughter Equipment :
Persons Brnoemhoff (Asia) Ltd.

Structural & Geotechnical :
Mitsui, Mersons, Brentral & Partners Int'l Ltd.

Design Architect & Consultants

Architect : Wong & Ouyang Ltd.

Structural Eng. : Wong & Ouyang Ltd.

E & M / B. S. Eng. : Wong & Ouyang Ltd.

Environmental : Axi / Kingston Morrison Ltd.

Slaughter Equipment : Kingston Morrison Ltd.

Fig. 1.2 The Project Organization

Figure 1.3 Tentative Work Programme of the Project

	TASK NAME	DURATION	START	FINISH
1.0	SLAUGHTER BLOCK / ADMINISTRATION BLOCK	753 d	11/3/97	2/4/99
1.1	Slaughter / Administration Block (SUPERSTRUCTURE)	208 d	1/7/97	24/1/98
1.1.1	Area 'A' Grid 22 - 31 / K-S (Dirty Area)	158 d	1/7/97	5/12/97
1.1.2	Area 'B' Grid 31 - 39 / K-S (Clean Area)	160 d	20/7/97	26/12/97
1.1.3	Area 'C' Grid 22 - 39 / G-K (Cattle and goat line)	126 d	21/9/97	24/1/98
1.2	Builder Work Group	580 d	16/7/97	15/2/98
1.2.1	Steel and Metal Works	376 d	5/12/97	15/12/98
1.2.2	EM / BS Installation	732 d	1/4/97	2/4/98
2.0	LAIRAGE BLOCK	752 d	12/3/97	2/4/99
2.1	Lairage Block (SUPERSTRUCTURE)	282 d	10/5/97	15/2/98
2.2	Builder Work	610 d	1/4/97	2/4/98
2.3	EM / BS Installation	732 d	1/4/97	2/4/98
3.0	MEAT DISPATCH BLOCK	832 d	16/3/97	16/6/99
3.1	Meat Dispatch Block (SUPERSTRUCTURE)	112 d	1/11/97	20/2/98
3.2	Builder Work	503 d	1/10/97	15/2/99
3.3	EM / BS Installation	685 d	1/8/97	1/3/99
4.0	WASTE WATER TREATMENT PLANT	777 d	1/5/97	16/6/99
4.1	Builder Work	457 d	16/9/97	16/12/98
4.2	EM / BS Installation	777 d	1/5/97	16/6/99
5.0	EXTERNAL WORKS	761 d	1/3/97	31/3/99
6.0	KCRC SIDING / PLATFORM AREA	763 d	28/2/97	1/5/99
6.1	Builder Work	488 d	16/10/97	15/2/99
6.2	EM / BS Installation	701 d	1/4/97	2/3/99
7.0	KCRC WORKING AREA	793 d	28/2/97	1/5/99

Figure 1.4 Sample Template for Interim Notifications of Environmental Quality Limits Exceedances

Incident Report on Action Level or Limit Level Non-compliance

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

Location Plan

Prepared by : _____

Designation : _____

Signature : _____

Date : _____

Figure 2.1: Data Sheet for TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti (°C)	
	Hi (in.)	
	Qsi (Std. m ³)	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf (°C)	
	Hf (in.)	
	Qsf (Std. m ³)	
Average Flow Rate (Std. m ³)		
Total Volume (Std. m ³)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final Wt. of Filter (g)		
Measured TSP Level (µg/m ³)		

	Name & Designation	Signature	Date
Field Operator :	_____	_____	_____
Laboratory Staff :	_____	_____	_____
Checked by :	_____	_____	_____

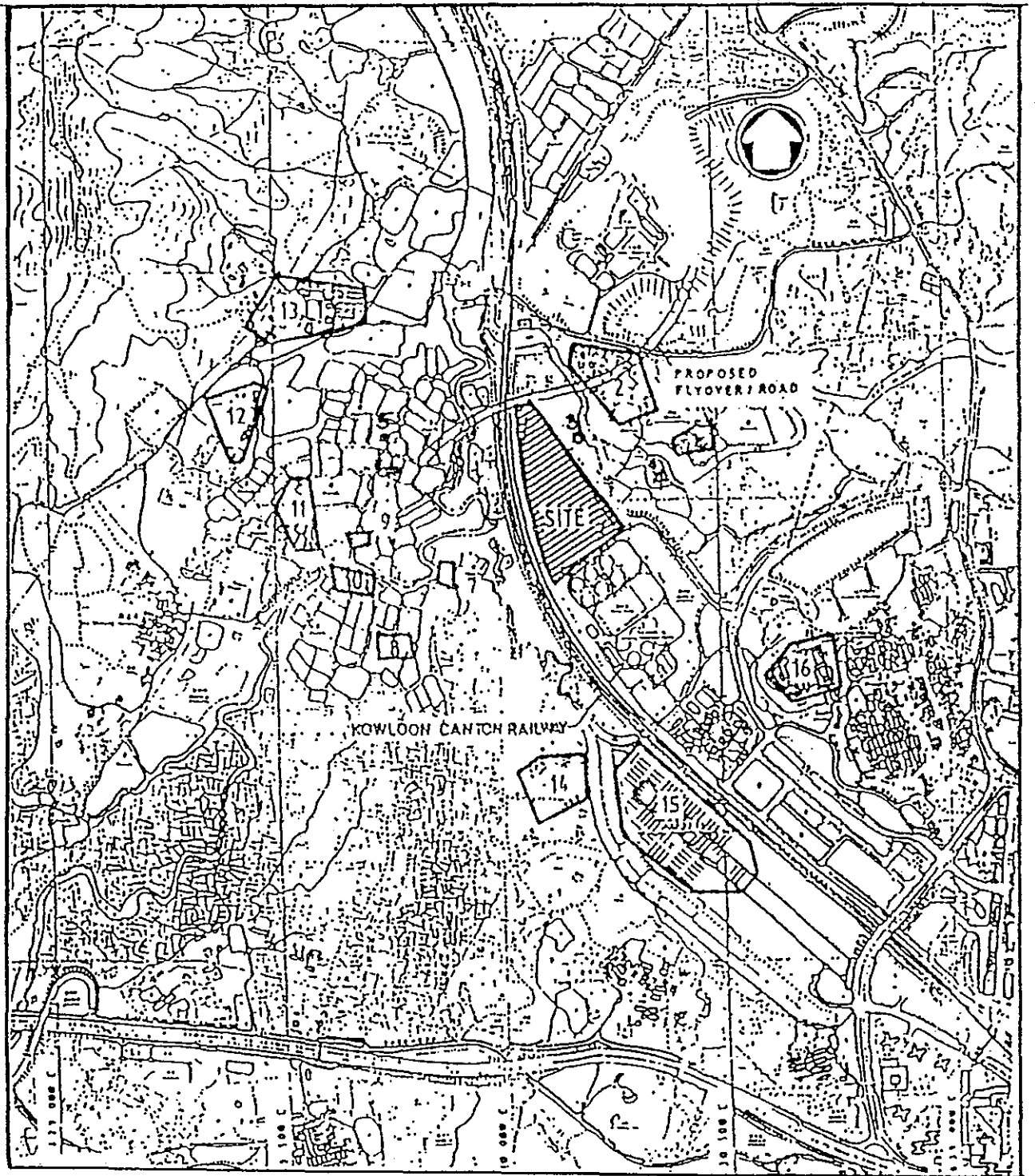


Figure 2.2 Locations of Sensitive Receivers

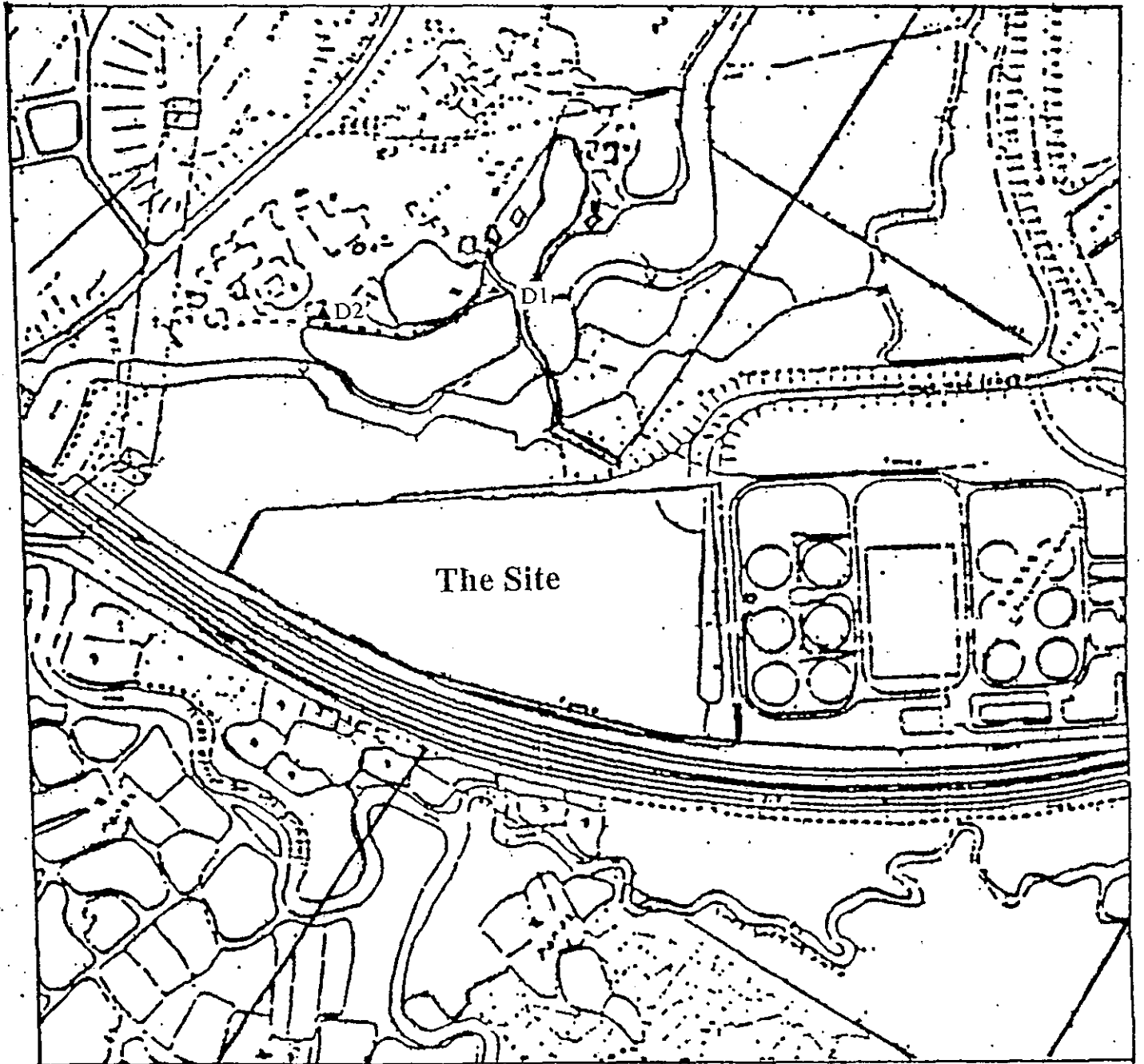


Figure 2.3 Dust Monitoring Locations

Figure 3.1: Noise Monitoring Field Record Sheet

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time (hh:mm)		
Measurement Time Length (min.)		
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L ₉₀ (dB(A))	
	L ₁₀ (dB(A))	
	Leq (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks		

Name & Designation

Signature

Date

Recorded By :

Checked By :

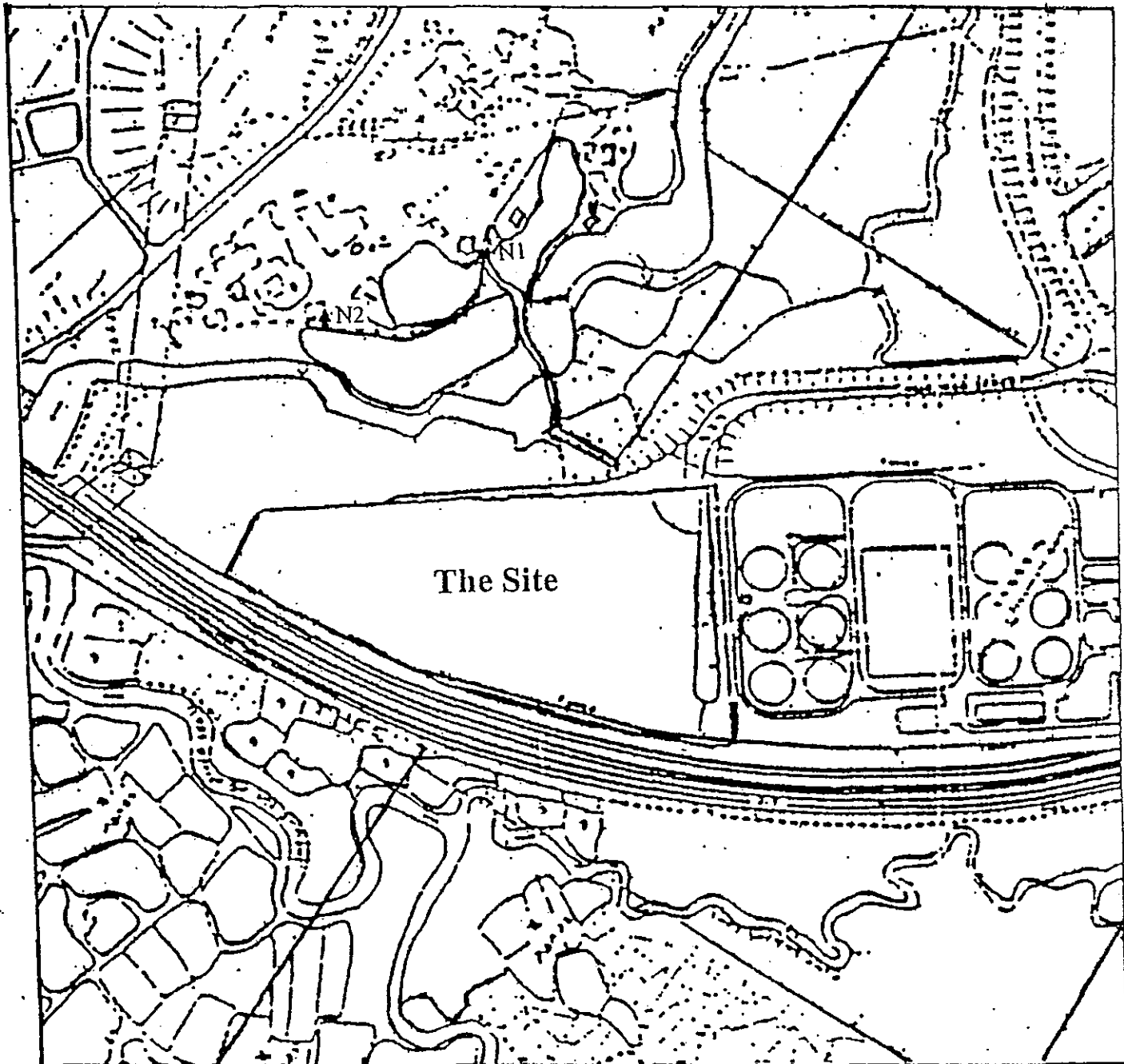


Figure 3.2 Noise Monitoring Locations

Figure 4.1: Water Quality Monitoring Data Record Sheet

Location		
Date		
Start Time (hh:mm)		
Weather		
Monitoring Depth		
SS Sample Identification		
SS (mg/l)		
Observed Construction Activities	<100m from location	
	>100m from location	
Other Observations		

Name & Designation

Signature

Date

Recorded By :

Checked By :

Note: The SS results are to be filled up once they are available from the laboratory.

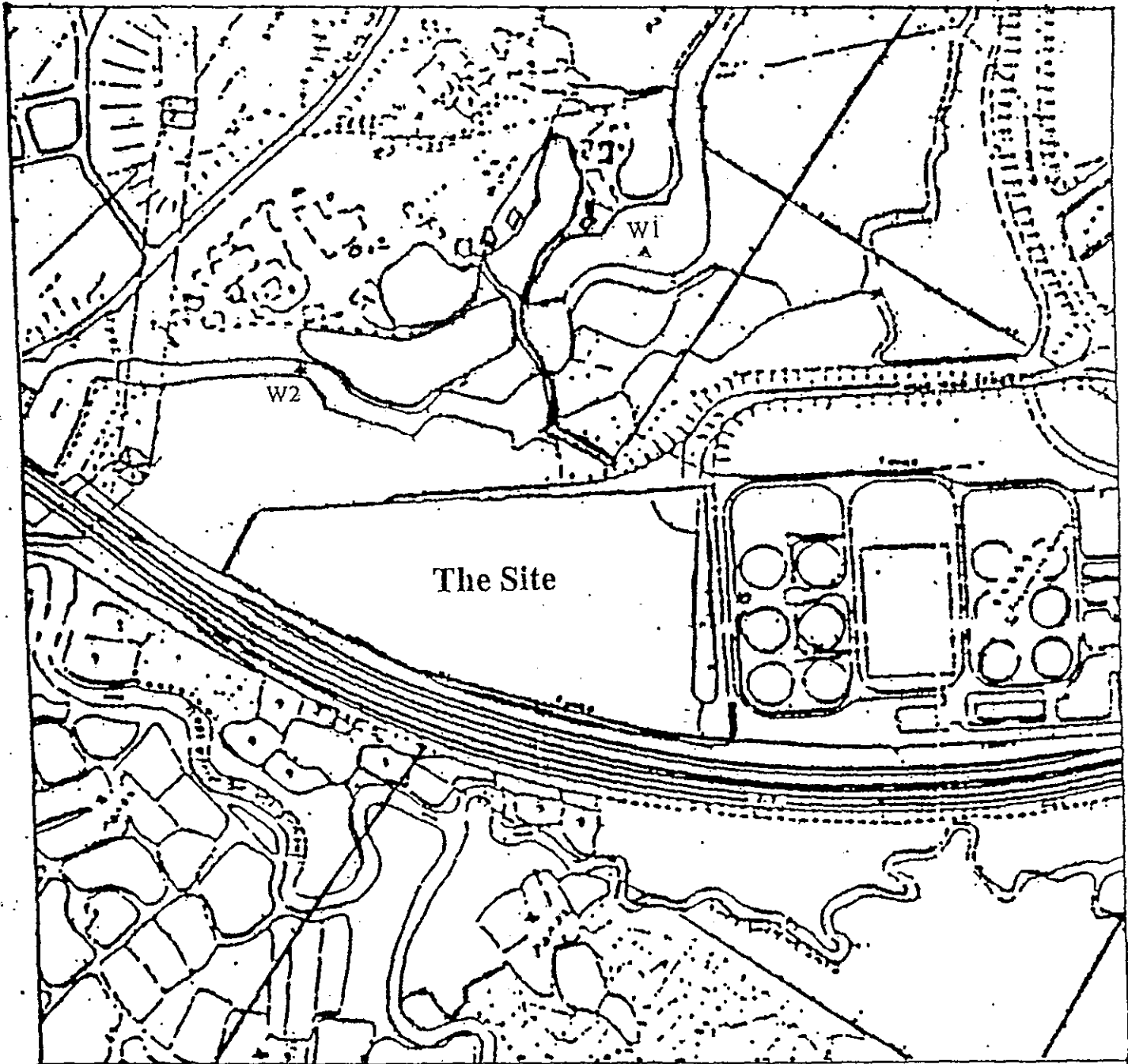


Figure 4.2 Water Quality Monitoring Locations

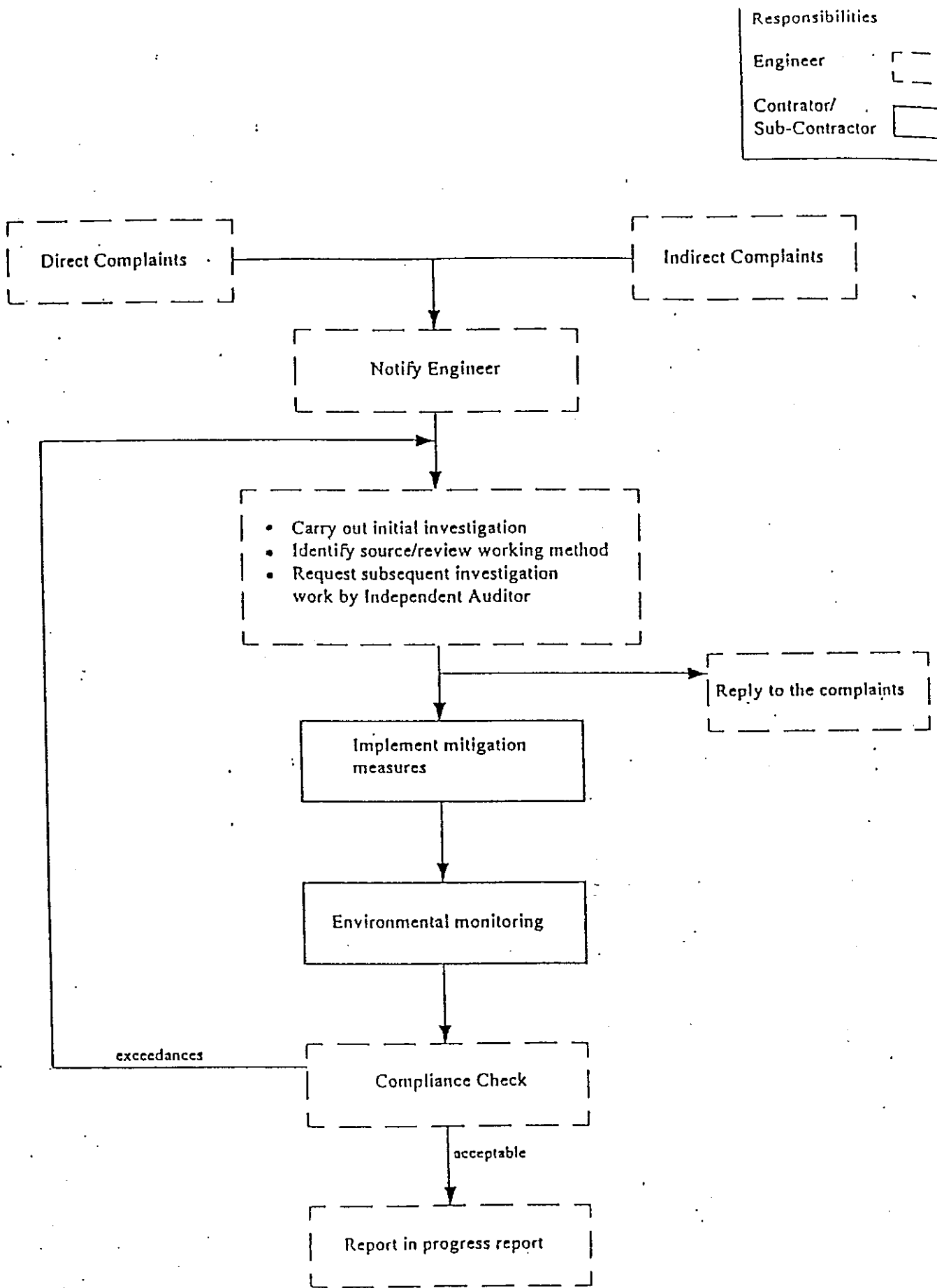


Figure 6.1 Complaint Response Procedures