ROUTE 3 CONTRACTORS CONSORTIUM

ROUTE 3 TAI LAM TUNNEL & YUEN LONG APPROACH
NORTHERN SECTION

Volume 2

Environmental Monitoring&Audit Manual

Final Report

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ACRONYMS

ACE	Advisory Council on the Environment
AIP	Approval in Principle
AQO	Air Quality Objective
CNP	Construction Noise Permit
CO	Carbon Monoxide
DEIA	Detailed Environmental Impact Assessment
DEP	Director of Environmental Protection
DO	Dissolved Oxygen
EIA	Environmental Impact Assessment
EM&A	Environmental Monitoring & Audit
EPD	Environmental Protection Department
ET	Environmental Team
HKPSG	Hong Kong Planning Standards and Guidelines
NO_2	Nitrogen Dioxides
NOx	Oxides of Nitrogen
NSR	Noise Sensitive Receiver
PDS2EA	Preliminary Design Stage 2 Environmental Assessment
PME	Powered Mechanical Equipment
R3CC	Route Three Contractors Consortium
RSP	Respirable Suspended Particulates
SR	Sensitive Receiver
SS	Suspended Solids
TAT	Trigger, Action & Target
TLT & YLA	Tai Lam Tunnel & Yuen Long Approach
TM	Technical Memorandum
TSP	Total Suspended Particulates
WC	Works Checker

1 INTRODUCTION

1.1 Background

The new Hong Kong International Airport at Chek Lap Kok on the north coast of Lantau Island is scheduled to commence operations in 1997. To serve the new airport as well as the proposed container terminals 10 and 11 (also located on Lantau Island), extensive infrastructure and transport links are required.

Route 3 Tai Lam Tunnel and Yuen Long Approach (R3 TLT&YLA) is an integral part of this supporting transport network, extending from Ting Kau to Au Tau, including the Northern Link (Au Tau Interchange to Yuen Long) and the connection to the New Territories Circular Road.

An Environmental Assessment (EA) study for the R3 TLT & YLA (including the conveyor system under a separate cover) Preliminary Design Stage 2 (PDS2) was undertaken by Freeman Fox Maunsell for Highways Department according to a brief provided by the Environmental Protection Department (EPD). This study, hereafter referred to as the PDS2EA, was completed in March 1994, was conditionally recommended for endorsement by the Advisory Council on the Environment (ACE) EIA Subcommittee on 5 July 1994 and was subsequently endorsed by the full ACE committee, subject to certain conditions.

This project is now being undertaken by a franchisee, Route 3 (CPS) Company Limited, that has delegated responsibilities for design and construction to Route 3 Contractors Consortium (R3CC). A set of Construction Requirements are given in Appendix 5 Part I of the Project Agreement, including requirements for a Detailed Environmental Impact Assessment (DEIA) for aspects which were not covered adequately by the PDS2EA or which has undergone considerable design changes.

The R3 TLT & YLA (Northern Section) DEIA fulfills the requirements of the assessment for the Northern Section of the Main Line, extending from north of the Kam Sheung Access Road to Au Tau in Yuen Long. This Manual is designed to meet the environmental monitoring and audit (EM&A) requirements of the Construction Requirements, and forms Volume 2 of the Northern Section DEIA.

1.2 Purpose of Manual

This Manual outlines the monitoring and audit programmes to be undertaken for the construction and operational phases of the northern section of the R3 TLT & YLA in accordance with the Construction Requirements, included in clauses 10.4 to 10.10. The aims of these programmes are to verify the DEIA predictions, confirm the effectiveness of environmental impact mitigation, and to ensure compliance with construction licence conditions and pertinent environmental legislation. Pro-active response is emphasised in this Manual through a series of systematic monitoring and checking procedures to detect and mitigate environmental impacts at their early stages.

1.3 Project Site and Works

The project extends northwards from the Kam Sheung Access Road (north of the proposed Tai Lam Tunnel), along the Kam Tin Valley. The western arm of the alignment

connects with Yuen Long Southern Bypass at the proposed Au Tau Interchange. The mainline of the road proceeds north to connect to the New Territories Circular Road. Two link roads (I and J) connect the alignment to the Kam Tin Road between the settlements of Ko Po Tsuen and Kat Hing Wai. Excavation, cutting and filling will be undertaken to form the road bed. A large number of superstructure works will be constructed including bridges, slip roads and interconnections. The proposed alignment requires the reclamation of fish/duck ponds around Au Tau. A large works area will be required at the Au Tau Interchange.

2 ENVIRONMENTAL IMPACT ASSESSMENT STUDIES

2.1 Summary of the PDS2EA

2.1.1 Air Quality Impacts

Construction Phase

Considering the anticipated size of the construction sites and the number of assumed concurrent construction activities taking place, both the 1-hr and 24-hr total suspended particulates (TSP) limits (500 μgm^{-3} and 260 μgm^{-3} respectively) were expected to be exceeded at nearby sensitive receivers (SRs). However construction dust generation is generally amenable to mitigation measures, and emissions can be effectively reduced through their implementation.

Operational Phase

Pollutant concentrations in close proximity to the roadway may exceed Air Quality Objective (AQO) maxima during peak hours. Where this occurs, the only practical mitigation measure is to remove affected receivers from the proximity of the roadway to a more distant position. The necessity for this will need to be confirmed during the detailed design stage through further assessment.

2.1.2 Noise Impacts

Construction Phase

During the construction phase exceedance of desirable noise levels (daytime limit 75 dB(A)) was predicted at areas adjacent to the works. Appropriate mitigation measures (including good site practice, use of barriers) and a monitoring programme were proposed to minimise the exceedances.

Operational Phase

Traffic noise levels were predicted to be high and above 70 dB(A) at several locations. Much of the exceedance was attributable to traffic on existing roads. In some sections the numbers of SRs potentially affected were such that mitigation at the receiver would be the most appropriate approach. However much of the development within the area consisted of low grade structures whereby the installation of mitigation measures at the receivers may be inappropriate. Depending on the status of the building these premises could be removed or repositioned. Further detailed noise assessment during the detailed design stage was strongly recommended.

2.1.3 Water Quality Impacts

Construction Phase

During the construction phase, the key issue was the prevention of run-off (which may be contaminated with chemicals, fuels, oils, sewage and high suspended solid concentrations) from entering water courses. Suitable clauses for inclusion in the contract documentation were recommended to ensure the control of run-off.

Operational Phase

Potential impacts arising during the operational phase would be related to road traffic accidents involving the spillage of toxic and/or hazardous materials, and the roadway run-off,which may contain high levels of suspended solids. The former would be a rare event, in common with most roads in the Territory. The suspended solid content would be especially important during the early years of operation, when the landscaping and revegetation works are not fully established. Suitable clauses should be included in the contract documentation to ensure impacts are kept to acceptable levels.

2.1.4 Ecological Impacts

The TLT and YLA (N) runs through areas that were highly disturbed in nature including fish ponds used by wading birds. On the basis of the surveys conducted, flora in the disturbance corridor comprised no known habitats of conservation significance. No terrestrial or avian wildlife of conservation importance was recorded in the survey area. The principal habitats to be disturbed were fish ponds which were abundant in the region.

2.2 Summary of the Detailed EIA

2.2.1 Air Quality Impact

Construction Phase

With the committed mitigation measures, dust levels during construction were predicted to comply with the 1-hr average TSP guideline limit and the 24-hr and annual average AQOs for TSP at all SRs. This will be confirmed through the EM&A programme.

Operational

The air quality impacts of the introduction of the Route 3 road network will be confined to the area in close proximity of the proposed road alignment. Nitrogen dioxide (NO_2) levels during the operational phase were predicted to comply with the 1-hr, 24-hr and annual average AQO for NO_2 at all SRs.

2.2.2 Noise

Construction Phase

Mitigation measures will be required to reduce construction noise. For daytime activities, the effectiveness of measures will be confirmed in practice by a rigorous EM&A programme. For restricted hours activity, Construction Noise Permits (CNP) are required. The Contractors will adhere to statutory requirements under the CNP.

Operational Phase

A comprehensive noise barrier arrangement has been proposed for the Route 3 alignment north of the Toll Plaza. However, an estimated 120 dwellings and Pok Oi Hospital will remain affected by noise levels in excess of the HKPSG standard. This is attributable to the existing roads (Castle Peak Road and Kam Tin Road) as well as the proximity and

elevation of the receivers in relation to the Route 3 alignment. Of these, 47 dwellings and Pok Oi Hospital would be eligible for indirect technical remedies.

2.2.3 Water

Construction Phase

Potential water quality impacts during construction include site run-off, sewage and wastewater generated by workers, dewatering of ponds and pond mud leachate. Mitigation measures include suspended solids removal using stilling ponds, oil and grease removal using grease traps, and the use of septic tanks and chemical toilets for sewage from the workforce.

Operational Phase

Residual impacts have been addressed, and are considered to be similar to those identified in the PDS2EA, i.e. roadway run-off. The run-off is not expected to differ from any other urban run-off from large scale vehicular transport infrastructure. The impact will be reduced through installation of silt traps and oil interceptors at strategic locations and by effective management of spillages or traffic accidents.

2.2.4 Landscaping and Visual Issues

The summary of potential landscape and visual impacts outlined in the PDS2EA remains valid, since sign revisions are minimal. In particular, the size of the Au Tau Interchange has been reduced and this should not alter the landscape and visual profile predicted in the PDS2EA.

2.2.5 Ecology

Construction Phase

Habitat loss included 0.8 ha of woodland, 3.0 ha of shrub land, and 13.09 ha of fish ponds. It was also predicted that heronries near the works boundary near Tung Shing Lei and, to a lesser extent, Ko Po Tsuen will be disturbed. One of the heronries at Tung Shing Lei may be lost due to construction of the Au Tau Interchange. Overlapping of the works period with the ardeid breeding season (March to September) may negatively impact on Tung Shing Lei and Ko Po Tsuen heronries.

Operational Phase

Ardeid use of existing heronries at Tung Shing Lei and Ko Po Tsuen following completion of construction is unknown at this stage. This is also true for egret or heron use of bamboo stands to be planted following completion of construction. Monitoring and audit will be implemented upon completion of construction.

2.3 Suggested Mitigation Measures

Mitigation measures as suggested in the PDS2EA and the R3 TLT & YLA DEIA for the Northern Section are summarised as follows:

2.3.1 Air Quality Impacts

- frequently wet or cover exposed site surfaces; use chemical wetting agents when appropriate
- use chemical stabilizers on completed areas of cut and fill
- cover and dampen truck loads
- gravel or seal unpaved site roads
- regulate traffic speed on unpaved roads
- provide wheel washing facilities at all vehicle exit points
- adopt automatic water spraying system for stone crushing and associated processes
- apply water and possibly chemical wetting agent to better wet the stockpiles.

2.3.2 Noise Impacts

- site noisy equipment and activities as far from SRs as is practical
- use quieter equipment and processes where possible
- turn off or throttle down idling equipment. Noisy equipment to be properly maintained and used no more than is necessary
- avoid parallel noisy operations and reduce the numbers of operating items of powered mechanical equipment (PME) where possible
- install mobile noise barriers around fixed items of PME. Effective barriers are typically lined on the noise-generating side with noise-absorbing material.
- use temporary noise barriers or earth embankments to screen specific receivers where necessary
- place permanent noise barriers, use friction course, and implement indirect technical remedies such as window improvements and provision of air conditioners (operational phase).

2.3.3 Water Quality Impacts

- install drainage channels and stilling ponds in site compounds to control sediment laden surface run-off
- clean and maintain silt traps regularly to ensure that they function properly
- hydroseed excavated area as soon as possible to reduce erosion
- cover short-term stockpiles with tarpaulins to reduce sediment laden run-off, where possible
- provide appropriate effluent treatment facilities at site works areas
- install oil interceptors in site compounds and empty contents regularly. Provide a by-pass to prevent flushing during rain storm events
- oil and fuel storage facilities should be drained through an oil inceptor; chemical facilities should be bunded (to hold 120% of maximum storage volume) and covered with an impervious liner
- connect all sewage discharges to either a treatment facility, or alternatively provide chemical toilet facilities on works sites
- construct a trench to divert run-off from the stream to avoid contamination.

2.3.4 Landscape and Visual Impacts

- restrict volume of construction traffic on local road network
- restrict the construction working areas to a minimum, siting them if possible in visually isolated positions

- enclose the working areas, where possible, to define boundary edge and screen low level construction activities (e.g. car/truck movement) from surrounding receivers
- restrict heights of storage materials, stock piles and spoil heaps to low levels
- minimise night-time working and lighting
- hydroseed bare ground as soon as possible

2.3.5 Ecological Impacts

- implement compensatory planting in a ratio of 3:1 (replacement area to lost area of woodland) using native species as suggested
- restore fish ponds which are used temporarily during project construction
- plant bamboo stands at restored fish ponds and at the retained Tung Shing Lei eastern nesting site to enhance or restore lost heron and egret nesting substrates
- provide adequate site drainage to minimise risk of sediment or pollution run-off from construction site into ponds outside the works boundary
- workers and works vehicles shall pay strict observance to the site limits to protect the bund structure of ponds outside the works boundary

2.3.6 General Nuisance Control Measures

In addition to the environmental impact mitigation measures outlined above, general nuisance control measures shall be implemented by the Contractor, including:

- comply with Public Cleansing and Prevention of Nuisances By-Law 1972
- maintain work sites in a clean and tidy condition, store materials for temporary works in an orderly fashion
- remove rubbish and debris from site frequently
- do not burn wastes and other materials on site
- collect and dispose wastes from grease traps by a licensed contractor
- do not deposit earth, rock or debris on public or private rights of way
- keep existing stream courses and drains within and adjacent to the site safe and free from any debris and any excavated material arising from the works
- provided adequate precautions to ensure that spoil or debris is not allowed to be pushed, washed down, fall or be deposited on land adjacent to the site.

3 PROJECT ORGANISATION

3.1 Environmental Responsibilities of the Franchisee

Under the contract, the Franchisee is required to impose specific conditions on the Contractor regarding:

- Cleanliness of works site
- Abide with the pertinent environmental legislation
  - Water Pollution Control Ordinance (WPCO)
  - Noise Control Ordinance (NCO)
  - Air Pollution Control Ordinance (APCO)
  - Waste Disposal Ordinance
- Compliance with established noise criteria/guidelines
- Maintenance of all roads, footways, access roads, streams, drains etc.
- Discharge or disposal of all water and waste products
- Construction, maintenance, removal and reinstatement of temporary drain
- Dust suppression measures
- Operation of cutting and excavation equipment and procedures for the avoidance of pollution during cutting/excavation, conveyance and removal of spoil material
- Operation of rock crushing plant
- Protection of water quality at water intakes
- Construction and working methods to ensure compliance with relevant standards and the conditions of land within the site

The above responsibilities will be discharged by setting up an Environmental Team (ET) for the task. The ET will be responsible for carrying out EM&A to the standard required by EPD as described in the Construction Requirements, Appendix 5 Part I of the Project Agreement. For design and construction works, these responsibilities have been delegated to the Route 3 Contractors Consortium (R3CC) by the Franchisee.

3.2 Project Organisation

3.2.1 Internal Organisation of the Project Team

Figure 3.1 outlines the structure of the project management team.

3.2.2 Internal Organisation of the Environmental Team

The Environmental Manager (Gael Ogilvie, of R3CC) is experienced in monitoring and audit of construction work. She will be supported by specialists in each environmental area of environmental impact concern as well as a field monitoring team. The Environmental Manager will report to R3CC on all environmental issues.

3.3 Project Programme

The project programme has been laid out in detail in the proposal agreed by Government with the Franchisee. This calls for the whole project to be completed within 38 months. The main Northern Section works will commence after control of the land is given to R3CC by the Government. A summary of the Route 3 TLT & YLA Northern Section project programme is given in Figure 3.2.

Figure 3.1 Project Team Organisation

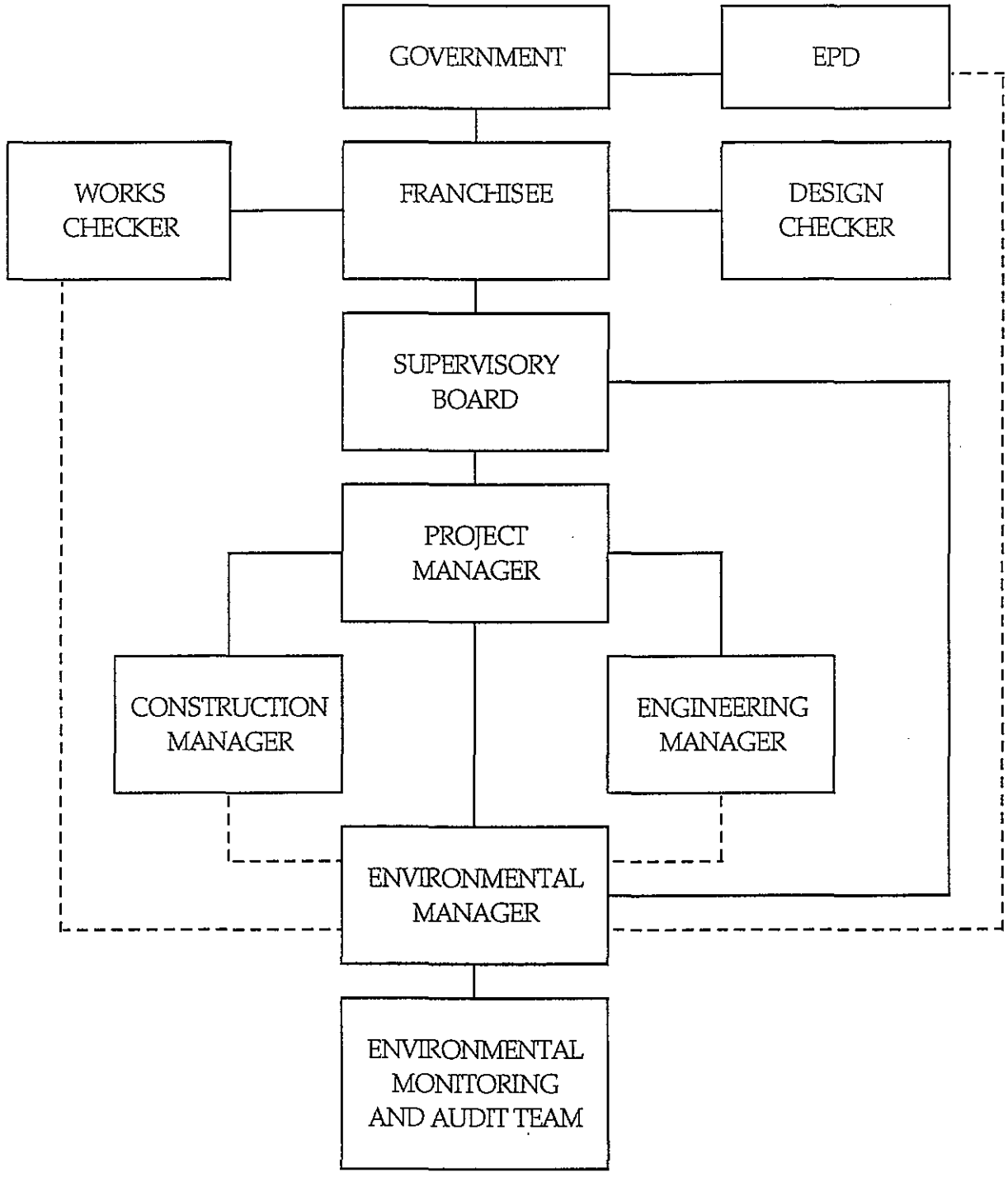

Figure 3.2 Project Programme
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4 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

4.1 Introduction

EM&A requirements set out in this section were designed to comply with those given in the Construction Requirements and the PDS2EA.

4.2 Levels of Monitoring

4.2.1 Baseline Monitoring

Baseline monitoring of noise and air quality before the project starts is required to ascertain the site area's existing conditions for setting the *trigger, action* and *target* (TAT) levels. Baseline checking will also be undertaken during construction when no construction activity is taking place.

4.2.2 Compliance Monitoring

Compliance monitoring of noise, ecology, air and water quality during both construction and operation phases will be undertaken to verify impact assessment predictions and the effectiveness of mitigation measures, and to facilitate immediate action when problems arise.

4.3 Trigger, Action, and Target Levels

The basic method of recording any change in the environmental conditions is through monitoring of noise, air and water quality. It is an accepted practice to apply a preset range of TAT levels as a framework for interpreting monitoring results. These levels are defined as follows:

Trigger - trigger levels provide an indication of deteriorating ambient environmental quality

Action - action levels indicate the necessity to adopt appropriate remedial actions to prevent the environmental quality from going beyond the target limits.

Target - target levels are stipulated in relevant pollution control ordinances, Technical Memoranda (TM), and Hong Kong Planning Standards and Guidelines (HKPSG). These are the maximum levels at which the works will proceed. If levels go above the target, appropriate remedial action, including critical review of plant and work methods would be required

Upon completion of baseline monitoring, the TAT levels for this project will be established in accordance with the criteria given in Table 4.1, subject to the existing baseline conditions and confirmation with EPD.

Table 4.1 Air, noise and water TAT levels

Parameter		Trigger Level	Action Level	Target Level
Air Quality	TSP (1hr) TSP (24 hr)	TSP(1hr): to be established on review of baseline data TSP (24hr): to be established on review of baseline data	Average of Trigger and Target Levels	500 μgm^{-3} (1 hr average) 260 μgm^{-3} (24hr average)
Noise*	$L_{Aeq\ (30\ min)}$	1 complaint	2 complaints	75 dB(A)
Fresh Water Quality	DO SS/turbidity	N/A	N/A	Technical Memorandum(TM) Standards for Group D Waters: DO: no TM standard SS: 30 mgl^{-1} Turbidity: no TM Std

Note* Applies during non-restricted hours (0700-1900 hrs weekdays, except for public holidays). During restricted hours a CNP will be required, and the conditions stipulated in the CNP will be followed.

In the event that the measured noise levels exceed the non-statutory daytime limit of 75 dB(A), the net contribution to the noise level from construction works will be calculated. In these instances a sound pressure level equal to the 95%-ile of the baseline data (in $L_{Aeq(30\ min)}$) is subtracted from the recorded value. If the remaining sound pressure level still exceeds 75 dB(A), then the target level is regarded as being exceeded.

4.4 TAT Action Plans

The action plan as determined by the frequency of complaints and/or exceedance of the compliance monitoring levels is given in Table 4.2. This is illustrated in Figures 4.1 to 4.3 with flow charts for actions taken at each level of exceedance.

4.5 Monitoring Schedule

The ET will be responsible for undertaking both baseline and compliance monitoring and audits. Specifics in terms of methodology, monitoring location and equipment required are presented in the following sections. Monitoring schedules are summarised in Table 4.3.

4.5.1 Baseline Monitoring

Air Quality

Baseline monitoring of 1-hr and 24-hr TSP at SRs will be carried out daily for two consecutive weeks prior to commencement of construction. 1-hr TSP monitoring will involve sampling three times per day when the highest dust levels are expected (as determined by the Environmental Manager). 24-hr TSP monitoring locations may be constrained by access and availability of power. If a station proves to be unsuitable due to above difficulties, an alternative site of similar nature will be used.

Table 4.2 Action plan for exceedance of TAT levels

Exceedance	Action		
	Environmental Team	Contractor	Engineer
Trigger Level - Once	• Inform Contractor & WC	• Rectify unacceptable practice	
Trigger Level - More than two consecutive sampling days	• Repeat in-situ measurement to confirm findings • Inform Contractor & WC. Identify source • Check monitoring data & site activities • Discuss mitigation with Engineer & Contractor • Assess effectiveness of mitigation	• Inform Engineer, discuss & propose mitigation with ET & Engineer • Consider changes in working practices • Implement agreed mitigation	• Discuss proposed mitigation with ET & Contractor • Agree mitigation to be implemented • Assess effectiveness of mitigation
Action Level - Once	• Repeat in-situ measurement to confirm findings • Inform Contractor & WC. Identify source • Check monitoring data & site activities • Discuss mitigation with Engineer & Contractor • Repeat measurement on following day • Assess effectiveness of mitigation	• Inform Engineer in writing, discuss & propose mitigation with ET & Engineer • Consider changes in working practices • Implement agreed mitigation	• Discuss proposed mitigation with ET & Contractor • Agree mitigation to be implemented • Assess effectiveness of mitigation
Action Level - More than two consecutive sampling days	• Repeat in-situ measurement to confirm findings • Inform Contractor & WC. Identify source • Check monitoring data & site activities • Discuss mitigation with Engineer & Contractor • Repeat measurement on following day • Prepare to increase monitoring frequency • Ensure implementation of mitigation • Assess effectiveness of mitigation	• Inform Engineer in writing, discuss & propose mitigation with ET & Engineer within 3 days of notification • Consider changes in working practices • Implement agreed mitigation	• Discuss proposed mitigation with ET & Contractor • Agree mitigation to be implemented • Assess effectiveness of mitigation
Target Level - Once	• Repeat in-situ measurement to confirm findings • Inform Contractor, EPD & WC. Identify source • Check monitoring data & site activities • Discuss mitigation with Engineer & Contractor • Repeat measurement on following day • Ensure implementation of mitigation • Monitor daily until Target no longer exceeded • Assess effectiveness of mitigation	• Inform Engineer in writing, discuss & propose mitigation with ET & Engineer within 3 days • Check site activities, rectify problems • Critically review working methods • Implement agreed mitigation	• Discuss proposed mitigation with ET & Contractor • Request Contractor to review working methods • Agree mitigation measures for implementation • Assess effectiveness of mitigation
Target Level - More than two consecutive sampling days	• Repeat in-situ measurement to confirm findings • Inform Contractor, EPD & WC. Identify source • Check monitoring data & site activities • Discuss mitigation with Engineer & Contractor • Repeat measurement on following day • Ensure implementation of mitigation • Monitor daily until Target not exceeded for 2 days • Assess effectiveness of mitigation	• Inform Engineer in writing, discuss & propose mitigation with ET & Engineer within 3 days • Check site activities, rectify problems • Critically review working methods • Implement agreed mitigation • Slow or stop activities causing exceedances according to directions from Engineer	• Discuss proposed mitigation with ET & Contractor • Request Contractor to review working methods • Agree mitigation measures for implementation • Assess effectiveness of mitigation • If necessary, instruct Contractor to slow or stop activities causing exceedances until no exceedance of Target level.

Notes: 1 In the case of noise monitoring, the frequency of sample exceedance corresponds to the number of complaints received. Any follow-up monitoring will be undertaken at the affected NSRs.
In the event of creeping ambient noise levels, trigger level = 1 complaint, action level = 2 complaints.
2 All TAT exceedances will be reported in the Monthly Progress Report

Figure 4.1 Action Plan in Event of Trigger Level Exceedance
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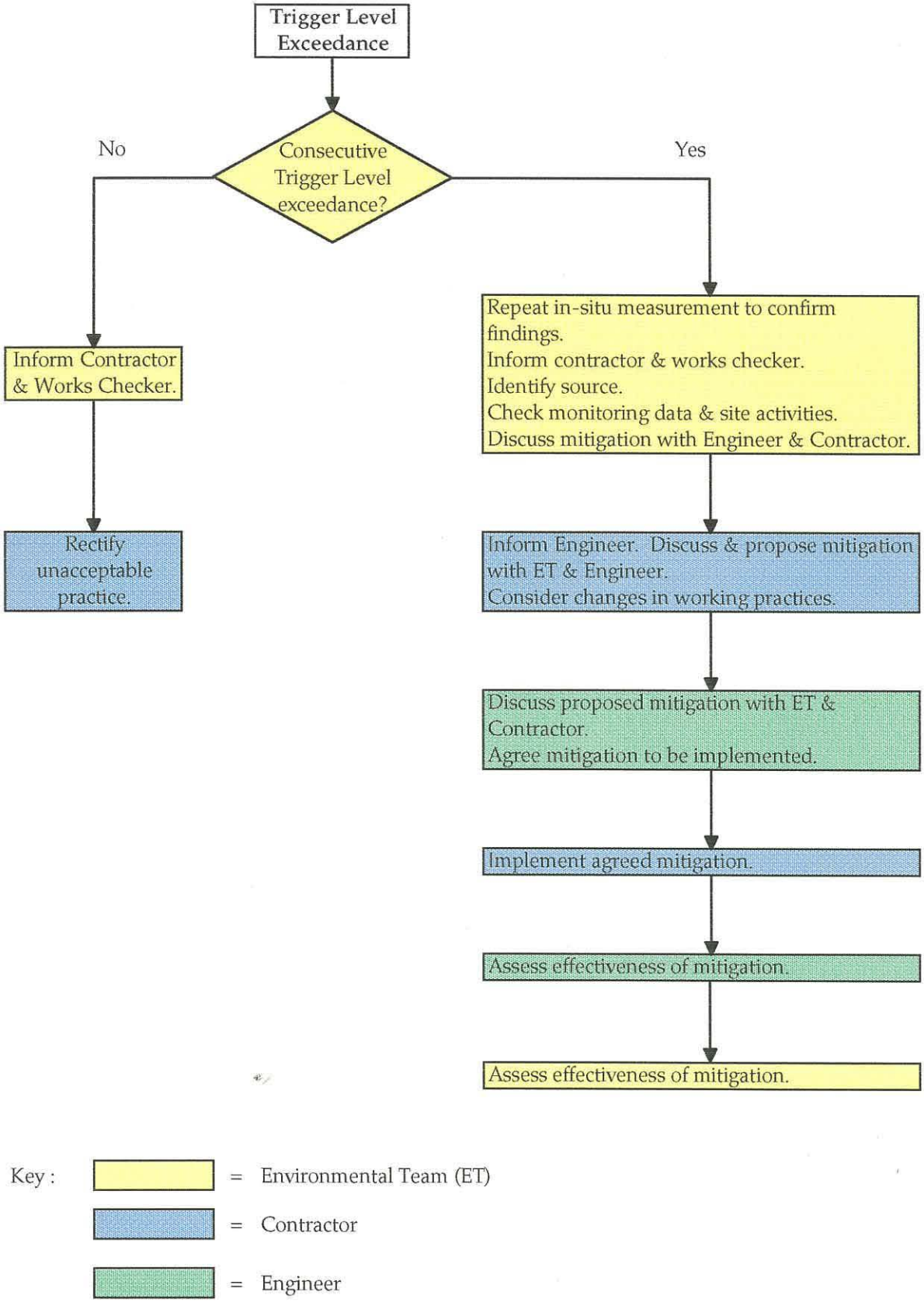

Figure 4.1A Action Plan in Event of Trigger Level Exceedance

Figure 4.2 Action Plan in Event of Action Level Exceedance
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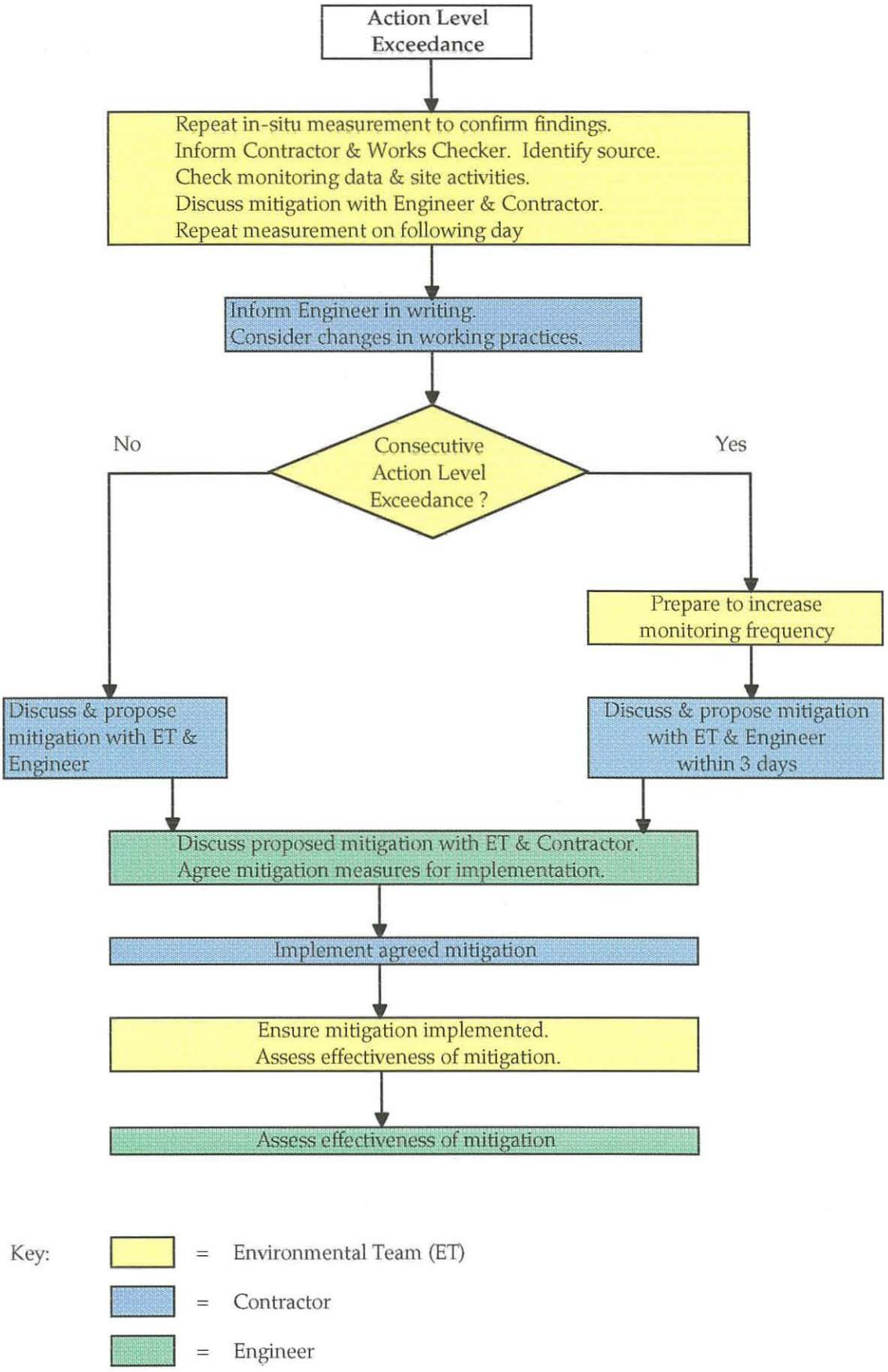

Figure 4.1B Action Plan in Event of Action Level Exceedance

Figure 4.3 Action Plan in Event of Target Level Exceedance
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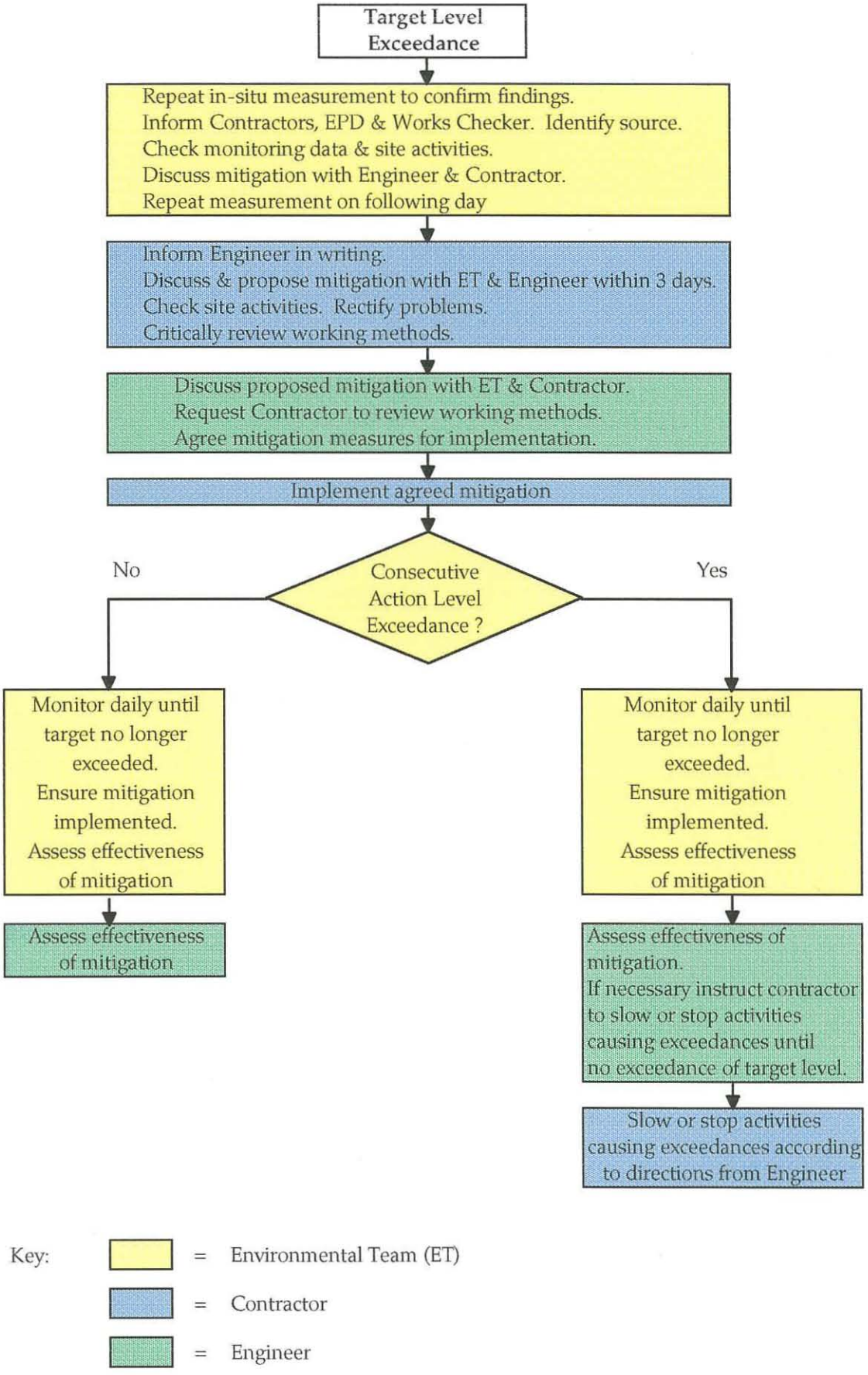

Figure 4.1C Action Plan in Event of Target Level Exceedance

Table 4.3 Summary of baseline, construction and operational monitoring programmes

Subject	Period	Parameters	Location	Frequency	Duration	Additional Requirements
Air Quality	Baseline	TSP (24 hr)	Selected SRs	Continuously	Two consecutive weeks prior to construction	
		TSP (1hr)		3 times daily	Two consecutive weeks prior to construction	
	Baseline Check			4 times a year, interval over one month	During construction phase	During periods of no construction
	Construction	TSP (24 hr)	Selected SRs	Once every 6 days	--	More frequent monitoring depending on site and wind conditions
		TSP (1 hr)		3 times every 6 days	--	
		Wind speed, direction	Monitoring station	Continuously	--	
	Operational	CO RSP NO_x	SRs	Two times per year	--	Once the project has been in operation for 3 months
Noise	Baseline	L_{10}, L_{90} $L_{Aq\ (30min)}$	SRs	Continuous	Two weeks prior to construction	
	Baseline Check			Every 3 months	One 24 hour period, during construction phase	During periods of no construction
	Construction	$L_{Aeq\ (30min)}$ (0700-1900)	SRs	3 times per week	During construction	More monitoring when appropriate in response to complaints.
		$L_{Aeq\ (5\ min)}$ (1900-0700)		3 consecutive measurements 3 times per week (if CNPs are issued)		
	Operational	$L_{10\ (peak\ hour)}$	Tunnel portal	Once per year	Throughout Franchise Period	Report results within 10 days
Fresh Water	Construction	DO, SS, turbidity	Major discharge points into stream	Twice per week		

Note: 1 The precise SR locations cannot be identified until after site inspection and agreement with owners is reached.

Checking of baseline dust levels of both 1-hr and 24-hr TSP will be carried out four times per year when construction activities are not taking place. Intervals between each check will be in excess of one month.

Noise

Continuous baseline noise monitoring of $L_{Aeq\ (30\ min)}$ at SRs will occur daily for two consecutive weeks prior to the commencement of construction. Baseline levels will be checked for one 24-hour period every three months, for a typical 24-hour period when construction activities are not taking place.

4.5.2 Construction Phase Compliance Monitoring

Air Quality

Continuous 24-hr TSP will be monitored once every six days. 1-hr TSP sampling will be carried out three times every six days. Each time, three 1-hr TSP readings will be obtained at each location. Wind speed and directions will be recorded continuously at one monitoring station.

Noise

During day time non-restricted hours (0700-1900 hr on normal weekdays), $L_{Aeq\ (30\ min)}$ will be recorded at the closest affected SRs three times per week. When works occur during restricted hours (evening and/or night time), three consecutive $L_{Aeq\ (5\ min)}$ measurements will be recorded three times per week during restricted hours (if work occurs during both evening and night time hours, at least one set of measurements will be taken for each period).

Freshwater Quality

DO, SS and turbidity will be monitored twice per week at major discharge points into streams, active duck/fish ponds and the Kam Tin River.

4.5.3 Operational Phase Compliance Monitoring

Air Quality

Air quality monitoring during operation will take place once every six months. Respirable suspended particulates (RSP) (μgm^{-3}, 24-hr), carbon monoxide (CO) (parts per million) and nitrogen dioxide (NO_2) (parts per billion) will be monitored to confirm their compliance with AQO, once the road has been operational for three months. Baseline data will be gathered just prior to the commissioning of the road.

To adequately account for the effect of meteorological conditions on air quality, the parameters (except RSP) given above will be logged at least every half hour for one week continuously. 24-hr RSP will be measured daily for one week continuously.

Reports will be produced every six months within 1 month of completion of the monitoring. The monitoring methodology, including parameters, frequency, locations and reporting requirements will be reviewed after 2 years of monitoring.

Noise

Noise monitoring during the operational phase will be carried out at the tunnel portals after the commissioning of the road. $L_{10\ (peak\ hour)}$ will be measured on a working day once per year during the Franchise Period. Reports will be produced within 10 days after completion of each monitoring event.

Freshwater Quality

There is no requirement for monitoring of freshwater quality during the operational phase.

4.6 Monitoring Locations

4.6.1 Review of Sensitive Receivers

Monitoring at various locations will be applied as a means of quantifying and controlling the environmental impacts of this project. To determine the precise monitoring locations a comprehensive SR survey was conducted in Spring 1995. All potential SRs within 300 m either side of the alignment were identified from 1 : 1000 scale maps, totalling 2,212 SR's for R3 TLT & YLA (Northern Section). A subsequent field survey confirmed that 1,935 SRs were in existence. Each SR's status was assessed as follows. The findings of the survey are given in Appendix 1.

1 Abandoned or derelict
2 Poor construction (wood / sheet / no glazing)
3 Solid construction (concrete / brick / glazing)
4 Modern (eg. village house)

4.6.2 Air and Noise

Air and noise monitoring will be carried out at three representative SRs, R350, R382, R1441 and R242 as shown in Figure 4.4. Location of samplers should be remote from influencing factors such as roads, local obstructions etc. Samplers for 24-hr TSP monitoring will be located in the vicinity of SRs depending on site access constraint and power availability,. If problems are encountered in siting the samplers near SRs, attempts will be made to site the samplers at the works boundaries downwind of the predominant wind direction.

The monitoring stations have been selected as the most affected and representative receivers, taking into consideration site access constraints and power availability. The selection has taken into account other known future developments in the area. However, should another receiver be affected by a future development that is presently unknown of, a suitable alternative will be developed.

4.6.3 Freshwater Quality

Monitoring locations will be at the points of discharge of water from the site. These will be mainly from sedimentation basins provided for settling of site run-off. Exact locations will be determined on the works site in consultation with EPD and the Environmental Manager of R3CC, since these locations will change over time.

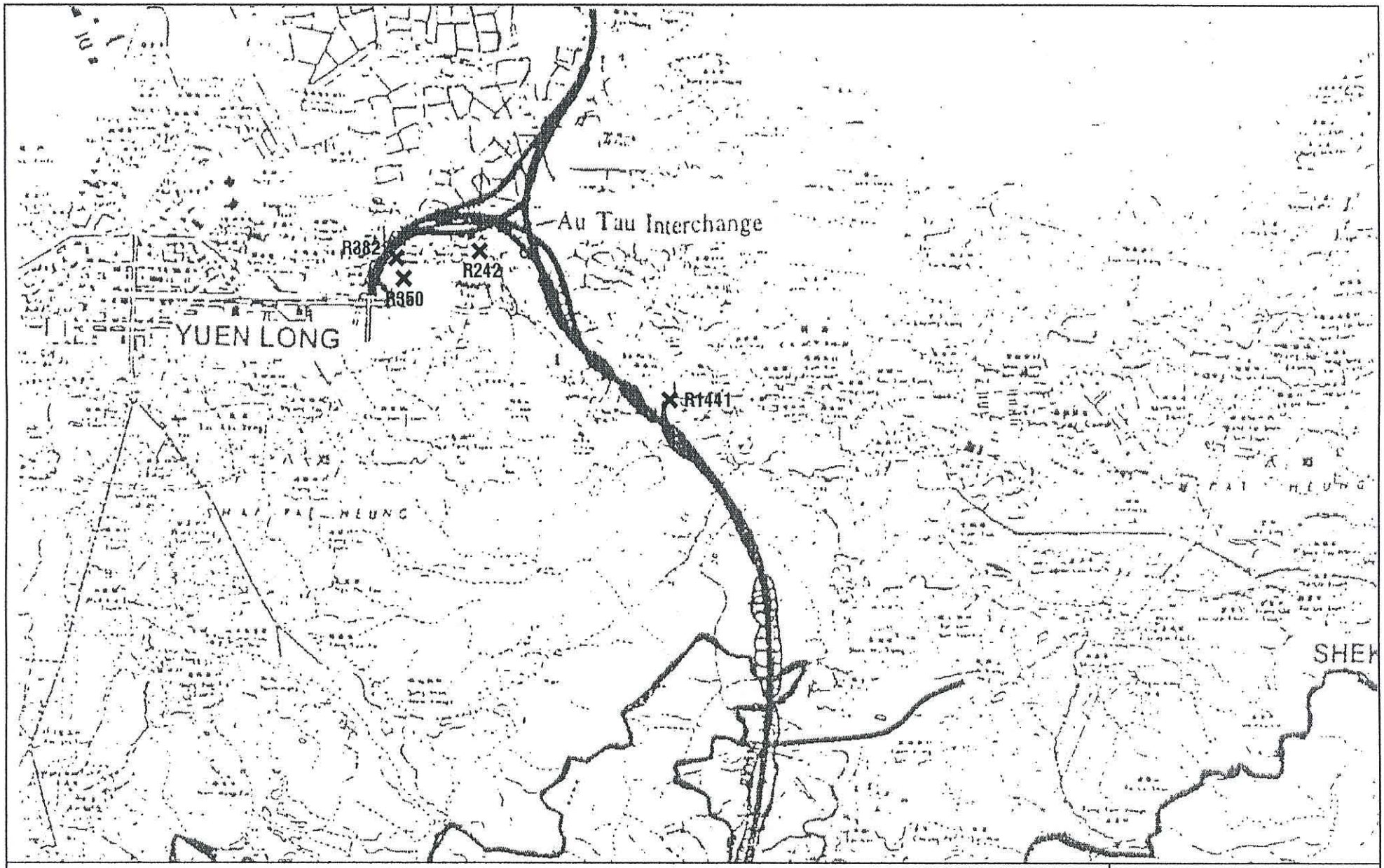

Figure 4.4 Location of Noise & Air Monitoring Stations

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4.7 Monitoring Methodology

4.7.1 Air Quality

24-hr TSP will be sampled by drawing air through a pre-conditioned, pre-weighed filter inside the high volume sampler at a controlled flow rate. After 24 hours (± 1 hr) of sampling the filter paper, with retained particulates, will be collected and returned to the laboratory for drying in a desiccator, followed by accurate weighing. TSP levels are calculated from the ratio of mass of particulates retained on the filter paper to the total volume of air sampled. The analysis process normally takes approximately two days. All equipment and procedures will follow USEPA Standard Method described in 40 CFR Part 50, Appendix B. Sample collection filters will comprise of glass fibre, quartz fibre or teflon fibre in order to minimise sample degradation.

For 1-hr TSP, a portable dust meter will be used. TSP measurement is based on the principle of light scattering. The meter will be factory calibrated against a known opacity. It will be calibrated in the field, each time prior to deployment, against known standards provided by the manufacturer.

The purpose of the 1-hr TSP monitoring is to enable a fast response action to dust problems. The use of the portable meter is preferred because it enables the ET to obtain instantaneous readouts and if necessary to assist in source identification. The high volume sampler, on the other hand, requires 24-48 hours for filter paper processing and is therefore less suitable for fast response action plans.

RSP monitoring during the operational phase will be carried out in a similar way to TSP monitoring. The difference being that the high volume sampler will be equipped with an additional PM_{10} assembly which screens out particulates of size 10 μm and above. The gain in weight of the filter will then be used to calculate the RSP level.

Wind velocity will be monitored hourly in conjunction with a data logger, which will be downloaded once a week.

4.7.2 Noise

Noise levels will be measured at the monitoring locations. Where a measurement is to be undertaken outside a building, the assessment point will normally be positioned at 1 m from the sensitive facade, but may be re-positioned at any other point considered appropriate by EPD. Where a measurement is to be made of noise being received at a place other than a building, the assessment point will be at a position 1.2 m above the ground in the free-field.

Noise measurements will be made in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}) measured with an integrating sound level meter. Such measurements will be made over a 30 minute period to give 6 consecutive L_{eq}(5 min) readings. The L_{eq}(30 minute) reading will be calculated from the L_{eq}(5 minute) readings within the noise meter. For operational noise monitoring, L_{10}(peak hour) will be measured.

4.7.3 Freshwater Quality

Samples will be taken twice per week from each main discharge point. Two consecutive readings of DO concentration and turbidity will be taken at each location. If they do not agree to within 25%, the readings will be discarded and repeated until two consecutive readings agree to within 25%.

Two water samples will be collected, stored at 4 °C in a cold box and returned to the laboratory for SS analysis within 24 hours. SS determinations will be carried out according to APHA Standard Methods for the Examination of Water and Wastewater, 17 Edition, 1989 analysis no. 2540D.

In the field each water sample taken for subsequent laboratory analysis will be given a unique sampling number, which is recorded on the sample label and the data form.

4.8 Monitoring Equipment

4.8.1 Air Quality

The following or similar equipment will be used:

Construction

- GMWL-2000 High Volume Air Sampling System
- WD401 Wind Speed and Direction Sensor connected to a MET EL8 Data Logger will be used to collect meteorological data in accordance with the monitoring programme
- HAZ-dust HD-1000 portable dust meter

Operation

- GMWL-2000 High Volume Air Sampling System fitted with Model 1200 HVPM 10 size selective inlets (For RSP < 10μm)
- WD401 Wind Speed and Direction Sensor connected to a MET EL8 Data Logger will be used to collect meteorological data in accordance with the monitoring programme
- Thermo Environmental Instrument Inc. Model 42 Chemiluminescence NO-NO_2-NO_X analyser
- Interscan Model 1148 CO analyser equipped with a CO electrochemical cell

The TSP and RSP monitor will be a high volume sampler as referenced in the USEPA Standard Method described in 40 CFR Part 50, Appendix B.

4.8.2 Noise

The sound level meter used will comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Any other noise measuring and analysis instrumentation used will be of a comparable professional quality. Standard acoustical principles and practices will be followed in the measurement and analysis of the noise under investigation.

Noise will be monitored using Bruel and Kjaer modular precision sound level meter type 2231, with statistical analysis module BE 7101 or other suitable instruments which comply

with the IECP Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications.

4.8.3 Freshwater Quality

For freshwater quality monitoring, the equipment suggested in Table 4.4 or those with similar specifications will be used.

Table 4.4 Freshwater quality monitoring equipment

Equipment Function	Manufacturer	Model Name/Number
Turbidity Measurement	Hach	2100P
Dissolved Oxygen and Temperature Measurement	YSI	Model 59 DO meter with 10m cable and YSI 5739 probe with YSI 5795A submersible stirrer for *in situ* DO measurements; YSI Model 33 conductivity meter for salinity for calibrating DO meter; YSI temperature sensor for temperature measurement.
Sampling SS Determinations	--	Appropriate plastics container

4.9 Equipment Calibration

All monitoring equipment will be maintained in calibration at all times. Re-calibration will be carried out in accordance with requirements stated in this Manual or those recommended by the manufacturers, whichever is more stringent. Calibrations will be by a HOKLAS accredited laboratory for those parameters under consideration.

4.9.1 Air Quality

The flow rate of each high volume sampler with mass flow controller will be calibrated using an orifice calibrator. Initial five point calibration will be conducted upon installation and prior to commissioning. One point flow rate calibration will be carried out every two months. Five point calibration will be carried out initially and every six months thereafter.

The nitrogen oxides analyser will be calibrated by an Ecotech dynamic calibrator Model 8300HS equipped with a MonitorLab NO_2 permeation tube. Zero and span checks will be carried out at each time of use.

The Interscan Model 1148 CO analyser will be subject to a zero and span check at each time of use. Calibration will be against a known standard as recommended by the manufacturer.

The portable dust meters will be calibrated against a known standard on each occasion the meter is used.

4.9.2 Noise Monitoring

The sound level meter will be calibrated using a Bruel and Kjaer Sound Level Calibrator Type 4230, or other similar equipment, prior to and after each set of measurements. The results of the calibration will be recorded on the field data form. The measurement will

be discarded if the calibrations before and after do not agree to within 1 dB(A), then repeated until the calibrations before and after agree to within 1 dB(A). An annual calibration check will be carried out by the manufacturer.

4.9.3 Freshwater Quality

DO Meter — The DO meter will be calibrated against the results of standard Winkler titration every 2 months. The temperature sensor will be calibrated using a standard certified reference thermometer with an accuracy of 0.5 °C.

Turbidimeter — The Turbidimeter will be calibrated every two months using standard formazin solutions. It will be standardised with reference formazin gel solutions prior to each use.

Balance — The balance will be calibrated against an internationally traceable standard at intervals recommended by the manufacturer.

4.10 Ecological Monitoring and Audit

4.10.1 Monitoring and Audit Schedule

Baseline

A baseline study of flora and fauna was completed in the course of the 12-month study and will be submitted under separate cover.

Construction and Post-construction

During construction, R3CC will monitor

- Ardeid use of Tung Shing Lei and Ko Po Tsuen egretries
- Effectiveness of on-site revegetation as part of landscape planting

For 2 years following completion of construction, R3CC will carry out audits every quarter to quantify ardeid use and twice per year (wet season and dry season) for water quality of ecologically enhanced restored ponds. Although not a contractual requirement R3CC has, nevertheless, committed to the ecological monitoring where indicated.

4.10.2 Ecology Auditing Locations

Construction

Auditing locations for ardeid use of egretries during construction will be at the Tung Shing Lei and Ko Po Tsuen egretries, and Au Tau Interchange. Sites identified in the Northern Section DEIA as sites of frequent usage by ardeids will be audited.

The effectiveness of landscaping will be checked during construction at numerous sites. Exact locations will depend on details of planting plans and specifications upon the approval in principle (AIP). At this stage the draft AIP for the Northern Section of R3 TLT&YLA has not yet been obtained. Revegetation plans, in general, follow the draft AIPs for the Southern Section (Element 390 and 192), i.e. soft slopes, soil nailed slopes,

berms, and medians.

Post-construction

Ardeid use and water quality of restored ponds will be audited in the Au Tau Interchange area.

4.10.3 Ecology Auditing Methodology

Construction - Landscaping

Auditing methods will be based on landscaping treatments described in the draft AIPs.

Soft Slope Planting: Soft slopes are slopes formed with soft materials suitable for planting. These slopes include:

- all fill slopes
- cut slopes with slope 1:1.5
- upper levels of cut and fill slope

Similarly to the draft AIPs for the Southern Section, all soft slopes will be hydroseeded with grass and tree seeds and planted with whips/seedlings of mainly native tree and shrub species at 1.5 m staggered spacing. Survival and growth of each planting species in this site will be evaluated. Twenty individuals with three duplicates of each species on soft slopes will be number-tagged. The basal diameter and main stem height of each number-tagged individual will be measured at six-month intervals. Evaluation will also be based on photos taken at six month intervals from selected permanent photo points.

Nailed Slope Planting: Nailed slopes (cut slopes formed at 1:1) will be hydroseeded with grass and tree species due to poor soil conditions and site inaccessibility. Survival and growth of vegetation will be evaluated through assessment of photographs taken at selected photo points at six month intervals.

Berm Planting: Flat berms will be constructed along cut slopes. Planters will be constructed and pit planted with trees, shrubs and trailing plants. Survival and growth of vegetation will be evaluated based on photographs taken at selected photo points at six month intervals.

Median Planting: The median along the centre of the road will be planted with native tree and shrub species. These plants will be subjected to traffic exhaust and hence their survival will be closely monitored. Due to the inaccessibility of the site, the site will be evaluated by photographs taken at selected photo points at six month intervals.

Construction - Ardeid Use of Tung Shing Lei and Ko Po Tsuen

Seasonal spatial distribution and habitat use will be audited quarterly from fixed observation points surrounding both egretries. Numbers of birds seen will be recorded at 15 minute intervals, and their locations will be plotted on 1:5000 or 1:1000 scale topographic maps. Habitat use will be recorded for all birds seen. Highway construction activity will be simultaneously recorded to develop quantitative relationships between it and bird activities and spatial distribution.

Nesting will be monitored at the egretries between April and June annually to determine the nesting species, number of nests, and nesting substrate.

Post-construction - Fish Pond Design Audit

Final pond design will be completed in consultation with the design engineer. Input will be provided on pond configuration, bank slope, water control structures, revegetation, and relationship with surrounding surface drainage. Pond maintenance plans will be developed for post-construction operation and ecological conservation maintenance. As a result of previous discussions with ACE members a draft Pond Reinstatement and Maintenance Plan has been prepared, as a stand alone document and is included in Appendix 2 of this Manual. Replanting of bamboo in the created drainage channels in the Au Tau Interchange area will be co-ordinated with the design and construction engineers.

To quantify the effectiveness of the proposed pond restoration, an ecological audit of herons and egrets utilisation of reinstated fish pond sites and replanted bamboo stands will be carried out quarterly over the first two years following construction. Birds will be recorded visually using binoculars and spotting scope from remote, elevated locations overlooking ponds. Ardeid locations will be plotted on 1:1000 or 1:5000 scale topographic maps at 15 minute intervals over 2-4 hours continuous time periods during early morning and late afternoon on three days during each quarter. Locations will be plotted using the UTM grid system. Data recorded for each pond and time interval will include identification to species, number of individuals, and activities of individual birds. Nest sites will be monitored during the period from April through June to determine species of nesting birds, count nests, and determine nest activity.

Post-construction - Fish Pond Contamination By Metals

Water samples will be collected twice per year (once during the dry season and once during the wet season) from at least 2 of the 3 fish ponds to be formed in the Au Tau Interchange area and from 2 ponds to be designated as controls over a period of two years following construction. The control ponds will be selected on the basis that they would be expected to represent prevailing local background concentrations of the specified metals. Water samples will be analysed by an accredited laboratory to determine concentrations of metals including cadmium, copper, lead, nickel, and zinc. The results will be issued to interested parties.

4.11 Data Recording

Standard pro-formas will be used for recording field data (See Appendix 3 for sample field data pro-formas). The data will then be input into a computerised database. These will serve as a systematic method of recording and storing data. In the event of complaints or evidence of unacceptable environmental impacts being obtained from the monitoring results, these data will be easy to reference.

Monitoring staff will record observations and events on the data forms to allow later interpretation of the results obtained.

4.12 Pollution Control Requirements

4.12.1 Site Environmental Inspection and Control Procedures

During construction, an Environmental Site Inspector (ESI) will carry out routine inspections to ensure all committed impact control measures are implemented. Details of the construction schedule will be reviewed by the ESI and the R3CC Construction Manager each week and used to plan the environmental site inspection activities. This will ensure that inspection activities are based on actual construction activities, particularly those in close proximity to sensitive receivers.

All committed impact control measures will be summarised in a Field Inspection Report to be used as a checklist by the ESI and will highlight any non-compliance.

The inspection reports will be summarised and included in the monthly EM&A reports to be submitted to EPD.

Air Quality

- Weather condition
- Maintenance and/or use of:
  - wheel washing troughs
  - water spray on construction sites, assess roads and stockpiles
  - dust covers on stockpiles and trucks
  - site cleanliness
  - plant with filtration equipment
- Vehicle speed on unpaved site roads

Noise

- Weather condition
- Use and maintenance of construction plant
- Use, maintenance and effectiveness of noise enclosures and barriers
- Hours of operation
- Location of noise emitting plant on site and distance from SRs
- Presence of any significant noise source beyond the site boundary
- Number of powered plant used on site
- Compliance with permit conditions in the event of evening and night time work

As described in Section 4 of the Northern Section DEIA, R3CC is committed to a detailed list of noise control measures to ensure that construction activities do not generate noise levels at nearby sensitive receivers that are above the 75 dB(A) guideline limit. These commitments are reproduced in Tables 4.5 and 4.6 below. All these commitments will be included in the environmental inspection checklist and will be checked regularly by the ESI at locations dictated by the construction schedule. As an additional check, the ESI will take spot checks of % operating times of all equipment operating in close proximity to noise sensitive receivers.

Table 4.5 Summary of committed noise mitigation measures for earthworks

Area of Action	R3CC Committed Mitigation
Chainage 280 - 680	• haul traffic is confined to the centre of the alignment • water pumps are acoustically screened
CH680 - Various Link Roads	• haul traffic is confined to the centre of the alignment • water pumps are acoustically screened
CH4150 - 4800	• water pumps are acoustically screened
NSRs; R171, R1441, R1512, R2182	• Acoustic barrier provided at NSR to screen line of sight of construction activities, subject to agreement with occupants

Table 4.6 Summary of committed noise mitigation measures for structural works

R3CC Committed Mitigation
• Bored piling is not undertaken concurrently with other structural operations at the construction site nearest to the NSR[1]
• Hand held breakers used within 100 m of R171 are acoustically screened at source[2]
• Hand held breakers used within 60 m of R1512 are acoustically screened at source[2]

Note: 1 Mitigation only required for R90, R171, R1441 & R1512 if NSR not already screened
2 Mitigation only required if NSR not already screened

Water Quality and Waste Management

- Weather condition
- Operation of sedimentation, and sewage treatment facilities
- Volume of sediments/oil in the basins and drains
- Direct discharge of sediment loaded washwater/run-off, if any
- Discolouration of water
- Storage and maintenance of fuel and chemicals
- Spillage/leakage of oil, fuel, or paint within the site
- Appropriate disposal of waste oils
- Cooling water for air conditioning
- Appropriate disposal of vegetation waste

4.12.2 Remedial Action

In the event of any breaches of the TAT levels, the ET will notify the Contractor/WC and necessary remedial action will be taken. The effectiveness of the action, and possible recommendations will be addressed in the Monthly Monitoring and Audit Reports.

4.12.3 Solid Liquid and Chemical Waste Control Procedures

The requirements are summarised as follows:

- The different categories of wastes will be segregated, stored, transported and disposed

of separately in accordance with EPD's required procedures. For instance, chemical and maintenance wastes will be collected by authorised collectors and sludge by hygiene services companies.

- As only a small amount of sludge will be produced on sites requiring periodic disposal, temporary on-site storage facilities may be required. Sludge/waste will be stored in enclosed containers to prevent odour emission.

- If transportation of hazardous materials is necessary, R3CC will ensure that hazardous materials, chemical wastes and fuel are packed or stored in containers or vessels of suitable design and construction to prevent leakage, spillage or escape.

- R3CC will prevent the uncontrolled disposal of hazardous materials and chemical waste to the air, soil, surface water, groundwater and coastal water.

- Dangerous materials including fuel, oil and lubricants as defined under the Dangerous Goods Ordinance will be stored in specially designed areas and be properly labelled on site. If leak, spill or discharge occurs, it can be contained more effectively in these specially prepared areas.

4.12.4 Contaminated Pond Mud - Testing

Timing

R3CC is currently in the process of attempting to obtain early access to the pond areas, prior to the land-handover (anticipated to be 1 December 1995), in order to obtain samples of the pond mud. Where access is unavailable the testing will be carried out immediately after the land-handover.

On obtaining the samples they will be analysed for a suite of parameters (see Testing Criteria below) by an accredited laboratory. The mud will remain *in situ* until the results have been received and advise from EPD on possible disposal/re-use options (see Disposal/Re-use Options below) has been obtained.

Testing Criteria

R3CC has discussed with EPD the methods of testing and the Practice Note, ProPECC PN 3/94 "*Contaminated Land Assessment and Remediation*" has been discussed as a reference document. This guideline document makes reference to the Dutch Indicative Index which provides comprehensive reference values for varying chemicals/hazardous substances in soils. The suitability of this guideline document (issued by EPD) will be discussed with EPD with particular reference to potential contaminants in pond mud.

In agreement with Appendix II of the aforementioned Practice Note, R3CC proposes to carry out simple on-site screening tests to identify the parameters of major concern. Although the pond mud is not envisaged to be contaminated the following parameters will be tested for as part of the screening exercise: copper, cadmium, chromium, lead, zinc, nickel and mercury. The above samples will be handled and stored in such a way as to prevent cross contamination (samplers will also be cleaned after each sampling event), they will then be sealed and labeled prior to dispatch to an accredited laboratory for chemical analysis.

Disposal/Re-use Options

Once the levels of contaminants and estimated quantities of possibly contaminated mud have been ascertained, R3CC will discuss with EPD in order to work towards a disposal/re-use solution. As a result of previous discussions with EPD:

- where the mud is shown to have acceptable levels of contaminants it will be re-used on R3CC's site (or others');
- where the mud is shown to have unacceptable levels of contaminants the most likely disposal option will be the Pillar Point Landfill. Should Pillar Point Landfill no longer be in a position to receive the mud, WENT Landfill will be assessed as an option. The details of the disposal route for the mud will be discussed with EPD when appropriate and reported in the relevant EM&A Monthly Report.

4.13 Construction Phase Audit

Construction phase audit will be carried out in conjunction with the construction compliance monitoring programme. The audit will be conducted every month by the Environmental Manager as part of the preparation for the monthly report. The audit will check:

- Records of monitoring procedures
- Records of monitoring results
- Records of exceedance of any regulatory requirements/target levels
- Control and mitigation taken in response to unacceptable environmental impacts
- Records of any complaints from SRs and actions taken
- Inspection of waste handling
- Contractor malpractice
- Activities against contract requirements

Audit findings by the Environmental Manager will be presented in the Monthly Monitoring and Audit Report. The report will identify any unanticipated impacts and improvements required for future monitoring programme.

4.14 Operational Phase Audit

A post-project audit will be carried out when the road becomes operational (e.g. 3 months after completion of construction). The audit will:

- Review environmental management practises in terms of achieving environmental performance requirements
- Review the effectiveness of mitigation measures
- Review the effectiveness of, and requirements for, the on-going monitoring programme
- Recommend improvements in environmental control in the event of non-compliance.

A post-audit report will be submitted to EPD within 10 days after completion of the audit. All correspondence between the WC or the ET and Director of Environmental Protection (DEP) will be copied to the Director's Representative.

4.15 Impact Prediction Review

A review will be undertaken on a monthly basis by the Environmental Manager, of where and when environmental impacts are likely to occur during the following month. This will be based on work schedule information, to be updated and supplied monthly by R3CC, giving locations and dates relative to described activities. The impact prediction review will be included in the EM&A Monthly Report.

4.16 Reporting

A monthly Monitoring and Audit Report will be prepared within 14 calendar days of the end of each monthly monitoring period (set at the 20th of each month) with the first report due in the month after construction commences. Reports will be submitted to the WC and EPD. The report should include:

Executive Summary - A brief summary of the main points of the report.

Monitoring & Audit Requirement - Summary of monitoring parameters, TAT levels and an implementation status report will be provided indicating the level of implementation of those requirements.

Monitoring Methodology - Monitoring locations, duration and frequency, as well as equipment calibration schedule.

Monitoring Results - Parameter, date, time, environmental conditions and locations. Results will be presented as full page graphs of each parameters over the previous 4 months at all the stations with TAT levels clearly shown on the graph. Graphs will be annotated where appropriate with the major activities carried out on site during the period, weather conditions and any other factors that may affect the results.

Audit Result - Review of pollution sources and working procedures in the event of non-compliance with environmental monitoring levels; action taken in the event of non-compliance; and follow up procedures related to earlier non-compliance actions. Summary of the number of TAT level exceedances in the month. List of active construction noise permits.

Site Inspection Report - Findings of site investigations, identification of deficiencies and action taken. Advice on solid and liquid waste management status.

Complaints Received - Liaison and consultation undertaken, subsequent action, database of complaints received, location of complaints, action plan, and follow-up procedures.

Schedule - Programme of site activities and a monitoring schedule for the next reporting period.

Impact Prediction Review - Revision of the predicted impacts related to an updated work schedule for the following reporting period.

Appendices - Appropriate drawings/tables of monitoring locations, SR locations, calibrated certificates from a HOKLAS accredited laboratory, environmental monitoring results (tabulated), audit check sheets and an implementation status report.

A disk containing all the measured data will be submitted with the monthly report. The format of the data will be agreed with EPD prior to the first report.

It should be noted that under normal circumstances, non-compliance and remedial action will be addressed in the Monthly EM&A reports, but would also need to be dealt with on a day to day basis through the issue of action plans, detailing deviations from the specification and requesting the contractor to correct the deviations.

APPENDIX 1
SENSITIVE RECEIVER SURVEY

5 ENVIRONMENTAL COMPLAINTS RESPONSE PROCEDURES

5.1 Complaint Response Procedures

Complaints regarding environmental quality arising from the project area will be received from the EPD Hotline and direct enquiries to Government, the Franchisee or R3CC. Direct Hotlines will also be provided by R3CC. The following steps will be taken upon receipt of complaints. These are illustrated graphically in Figure 5.1.

- 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 recurring works activities;
- If complaint is valid and due to works, identify mitigation measures;
- Undertake additional monitoring and audit to verify the situation as necessary, and address the issue in the Monthly Monitoring and Audit report; and
- Log the monitoring data and results of the investigation onto the database.

5.2 Complaint Response Action Plan

Experience has shown that complaints received are generally based on the complainants perception of the environmental situation. Verification of complaints following the above outlined procedures is therefore advisable prior to undertaking any remedial action.

Depending on the severity of the complaint, individual complaint cases may be referred to the Deputy Project Manager and the Construction Manager. The Deputy Project Manager with the Environmental Manager will be responsible for determining the appropriate mitigation measures required. Both the project and the environmental teams will follow up on the implementation of mitigation measures.

5.3 Complaint Response Audit Follow-up Procedures

Investigation of the complaints will be initiated by R3CC within 24 - 48 hr after receiving the complaint. and the complainants notified of this also within 24 - 48 hours. The complainants shall be notified of results of complaint investigation. Audit response procedures will ensure that any valid reason for complaint does not recur.

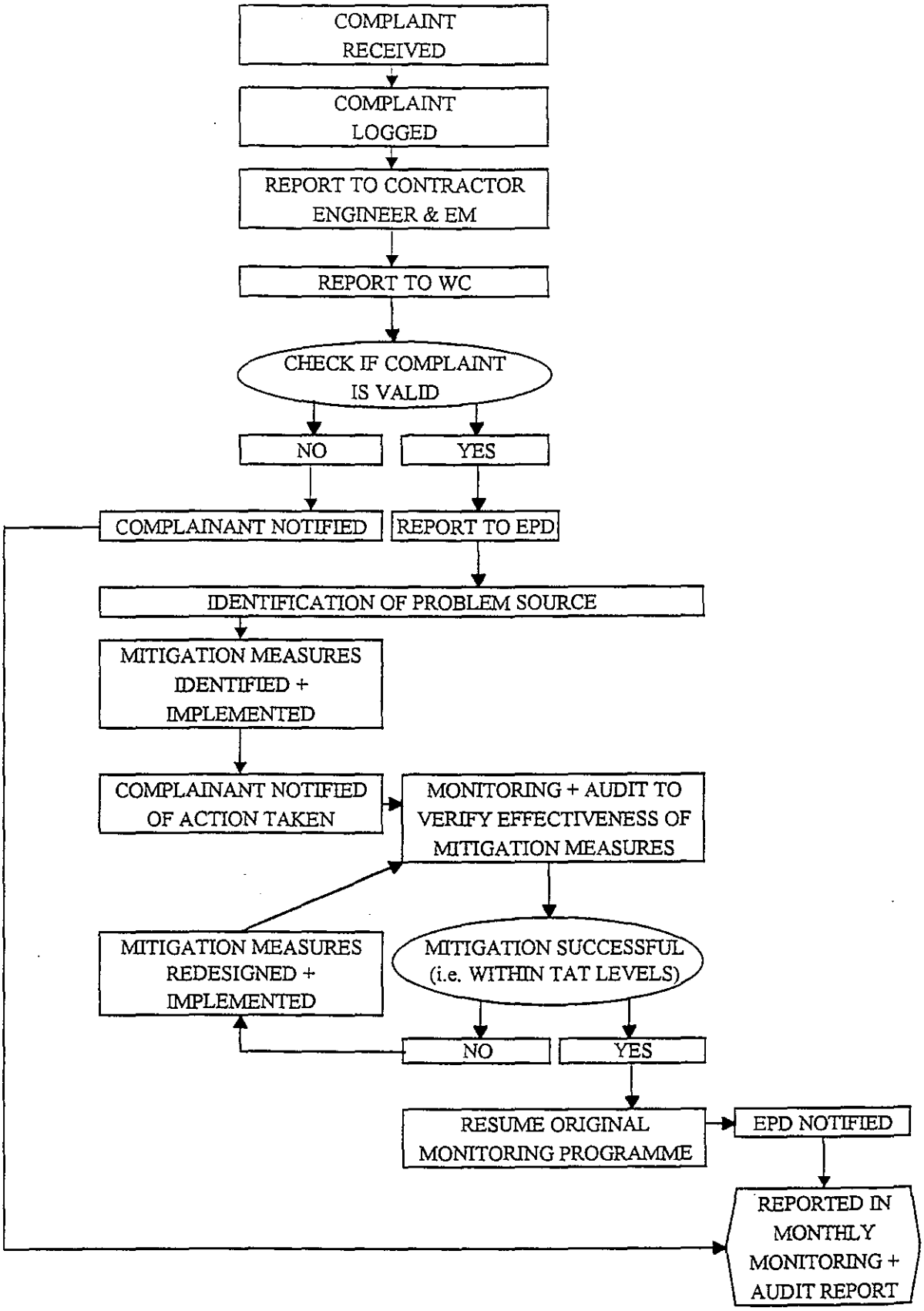

Figure 5.1 **Complaints Response Procedure**

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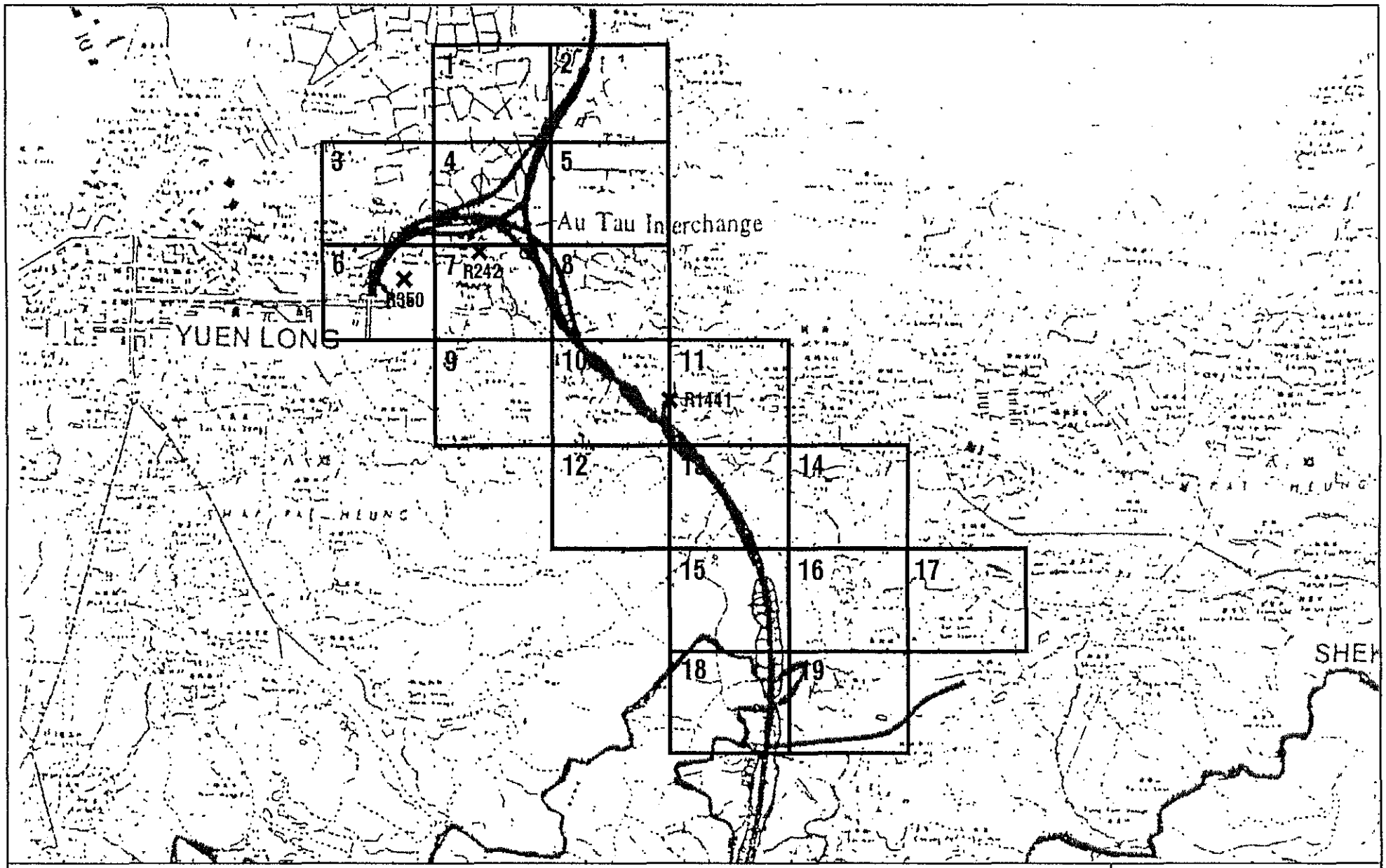

Appendix 1 Location of Survey Maps

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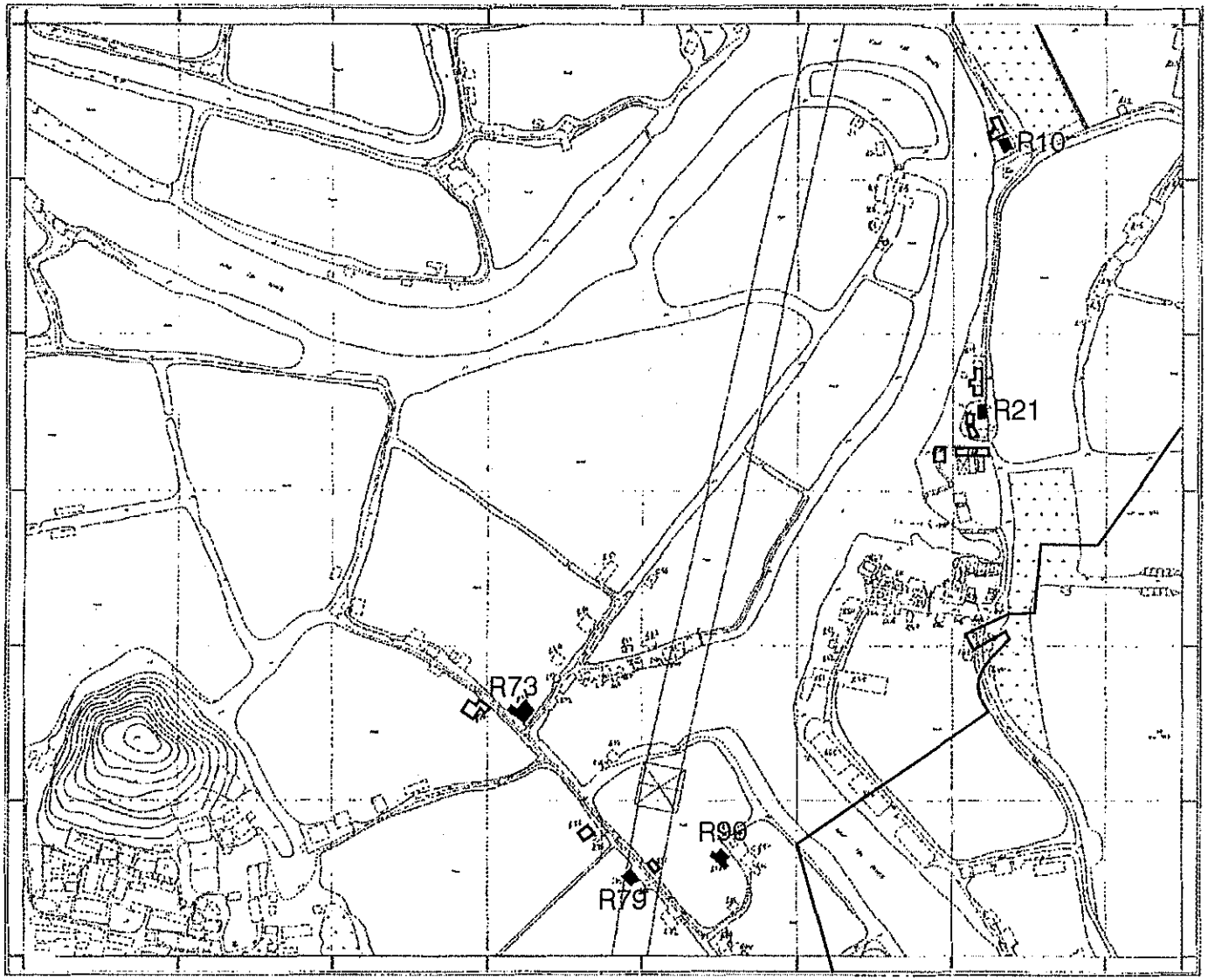

LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary

Survey Map 1

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 1

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R1	N				
R2	N				
R3	N				
R4	N				
R5	N				
R6	N				
R7	N				
R8	N				
R9	Y	Y	2	2	A24
R10	Y	Y	2	3	A24
R11	Y	N	1	2	N
R12	Y	N	1	3	N
R13	Y	Y - FACTORY	3	4	A25
R14	N				
R15	N				
R16	N				
R17	N				
R18	N				
R19	N				
R20	Y	Y	2	3	A8
R21	Y	Y	1	2	A9
R22	Y	Y	1	2	A9
R23	Y	Y	2	2	A9
R24	Y	Y	1	3	A9
R25	Y	Y	2	3	A10
R26	Y	N	1	2	
R27	N				
R28	N				
R29	N				
R30	N				
R31	N				
R32	N				
R33	N				
R34	N				
R35	N				
R36	N				
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R38	N				
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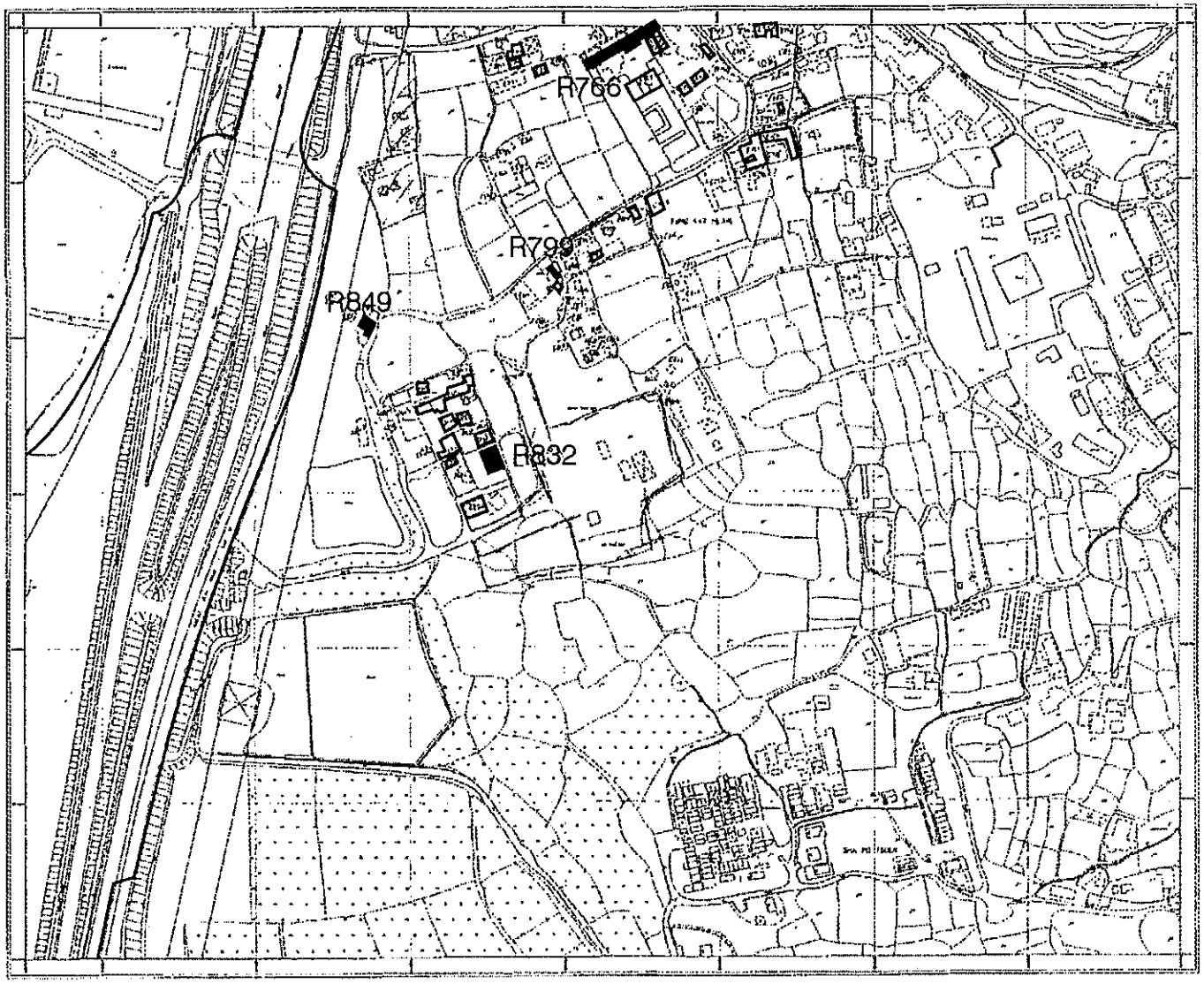
R41	N				
R42	N				
R43	N				
R44	N				
R45	N				
R46	N				
R47	N				
R48	N				
R49	N				
R50	N				
R51	N				
R52	N				
R53	N				
R54	N				
R55	N				
R56	N				
R57	N				
R58	N				
R59	N				
R60	N				
R61	N				
R62	N				
R63	N				
R64	N				
R65	N				

	R66	N					
	R67	N					
	R68	N					
	R69	N					
	R70	N					
	R71	Y	N	1	1	N	
	R72	Y	N	1	1	N	
	R73	Y	Y	1	2	A11	
	R74	Y	Y	1	2	A12	
	R75	N					
	R76	N					
	R77	Y	Y	1	1	A13	
	R78	Y	N	1	1		
	R79	Y	Y	1	2	A14	
	R80	Y	N	1	2	N	
	R81	Y	Y	2	2	A15	
	R82	N					
	R83	N					
	R84	N					
	R85	N	N	1	1	N	
	R86	N					
	R87	N					
	R88	N					
	R89	Y	N	1	2		
	R90	Y	Y	2	2	A16	



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary

Survey Map 2

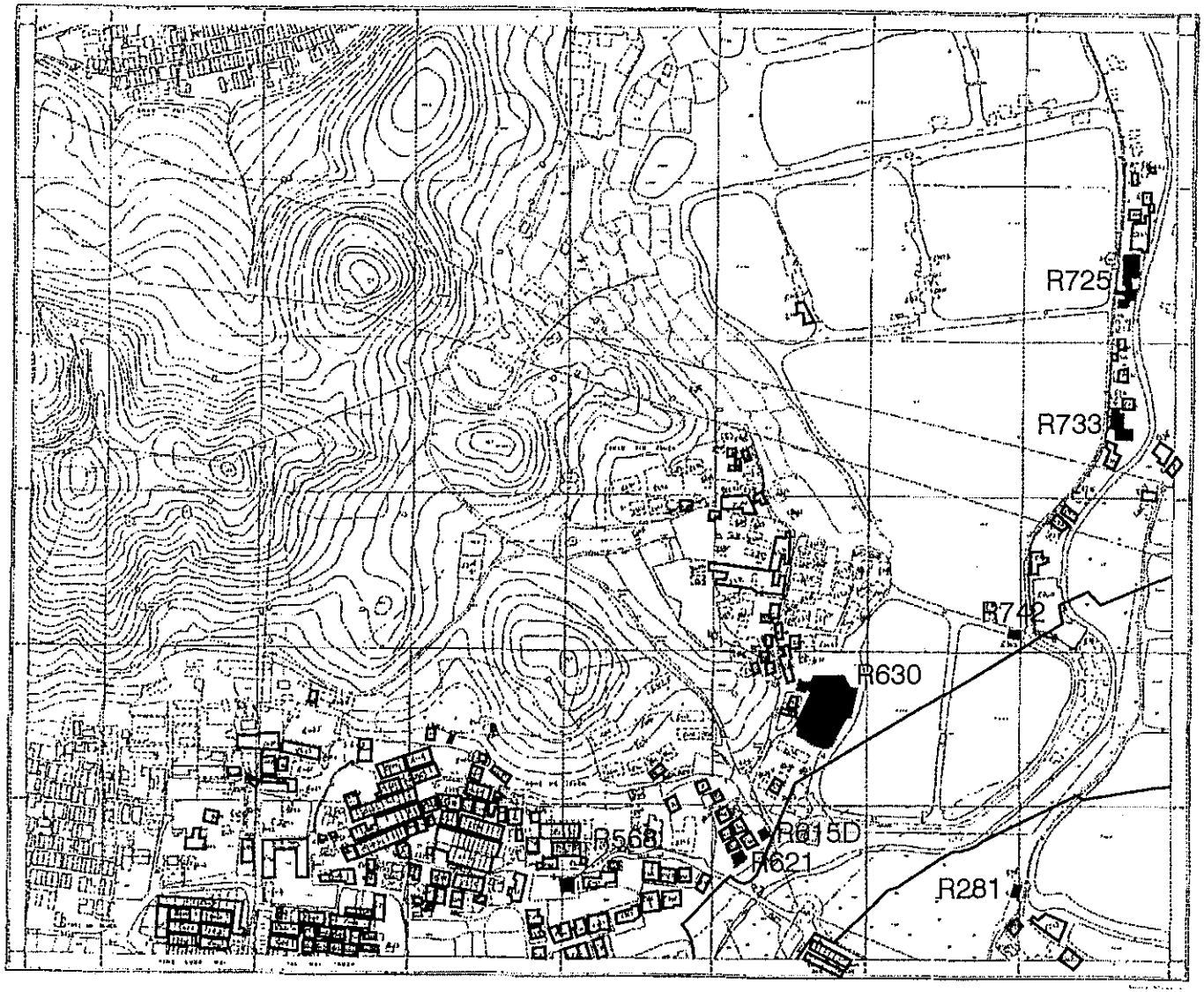
CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 2

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R744	Y	N	1	4	N
R745	Y	N	1	2	N
R746	Y	N - POND	0	3	N
R747	Y	N	1	4	N
R748	Y	Y	2	3	J6
R749	Y	N - WORKSHOP	2	3	J5
R750	Y	Y	2	3	J6
R751	Y	N	1	2	N
R752	Y	Y	1	2	J11
R753	not linked to a building, miss labeled.				-
R754	Y	N	1	2	N
R755	N				
R756	N				
R757	N				
R758	Y	N - WORKSHOP	2	2	J9
R759	Y	N	1	2	N
R760	Y	N	1	2	N
R761	Y	N	1	2	N
R762	Y	N	2	2	N
R763	Y	N	2	2	N
R764	Y	N	2	3	J12
R765	Y	N	1	2	N
R766	Y	Y	2	3	J13
R767	Y	Y	1	2	AS J13
R768	Y	Y	1	2	AS J13
R769	Y	Y	3	3	J14
R770	Y	Y	1	3	J16
R771	Y	Y	1	3	J16
R772	Y	Y	2	4	J15
R773	Y	N - WORKSHOP	2	2	J17
R774	Y	N	2	1	N
R775	Y	N	1	2	N
R776	Y	N	1	2	N
R777	Y	Y	1	3	J18
R778	Y	N	1	2	N
R779	Y	N	1	2	N
R780	Y	N	1	2	N
R781	Y	N	1	2	N
R782	Y	N	1	2	N
R783	Y	Y	1	3	J19
R784	Y	N	1	2	N
R785	Y	N	1	2	N
R786	Y	N	1	2	N
R787	Y	Y	2	2	J20
R788	Y	N	1	2	N
R789	Y	Y	1	2	J21
R790	Y	N	1	2	N
R791	Y	N	1	2	N
R792	Y	N - FACTORY	1	2	J22
R793	Y	Y	1	2	J23
R794	Y	Y	2	3	J23
R795	Y	N	1	2	N
R796	Y	N	1	1	N
R797	Y	N	1	2	N
R798	Y	N	1	2	N
R799	Y	Y	2	4	J24
R800	Y	Y	2	4	AS J24
R801	Y	N	1	1	N
R802	Y	N	2	1	N
R803	Y	N	1	1	N
R804	Y	Y	2	3	J25
R805	Y	N	1	1	N
R806	Y	N	1	1	N
R807	Y	N	1	1	N
R808	Y	N	1	1	N

	R809	Y	N	1	1	N	
	R810	Y	N	1	1	N	
	R811	Y	N	1	1	N	
	R812	Y	N	1	1	N	
	R813	Y	N	1	1	N	
	R814	Y	N	1	1	N	
	R815	Y	N	1	1	N	
	R816	Y	N	1	1	N	
	R817	Y	N	1	1	N	
	R818	Y	N	1	2	N	
	R819	Y	N	1	1	N	
	R820	Y	N	1	1	N	
	R821	Y	N	1	1	N	
	R822	Y	N	1	1	N	
	R823	Y	N	1	1	N	
	R824	Y	N	1	1	N	
	R825	Y	N - FACTORY	2	4	K4	
	R826	N					
	R827	N					
	R828	N					
	R829	N					
	R830	Y	Y	1	2	K1	
	R831	Y	N	4	2	N	
	R832	Y	Y	3	4	J10, K2	
	R833	Y	Y	1	4	K3	
	R834	Y	Y	2	3	J10, K3	
	R835	Y	N	1	1	N	
	R836	Y	N	1	1	N	
	R837	Y	Y	1	2	K5	
	R838	Y	N	1	2	N	
	R839	Y	Y	2	2	K6	
	R840	Y	Y	2	3	K5	
	R841	Y	N	1	1	N	
	R842	Y	Y	2	3	J8	
	R843	Y	N	2	1	N	
	R844	Y	Y	2	3	J7	
	R845	Y	N - FACTORY	1	1	N	
	R846	Y	N	1	3	N	
	R847	Y	N	1	2	N	
	R848	Y	N	1	1	N	
	R849	Y	Y	1	2	J9	
	R850	Y	N	1	2	J9	
	R851	Y	N	1	2	J9	
	R852	Y	N	1	2	J9	
	R853	Y	N	1	2	J9	



Survey Map 3

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 3

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

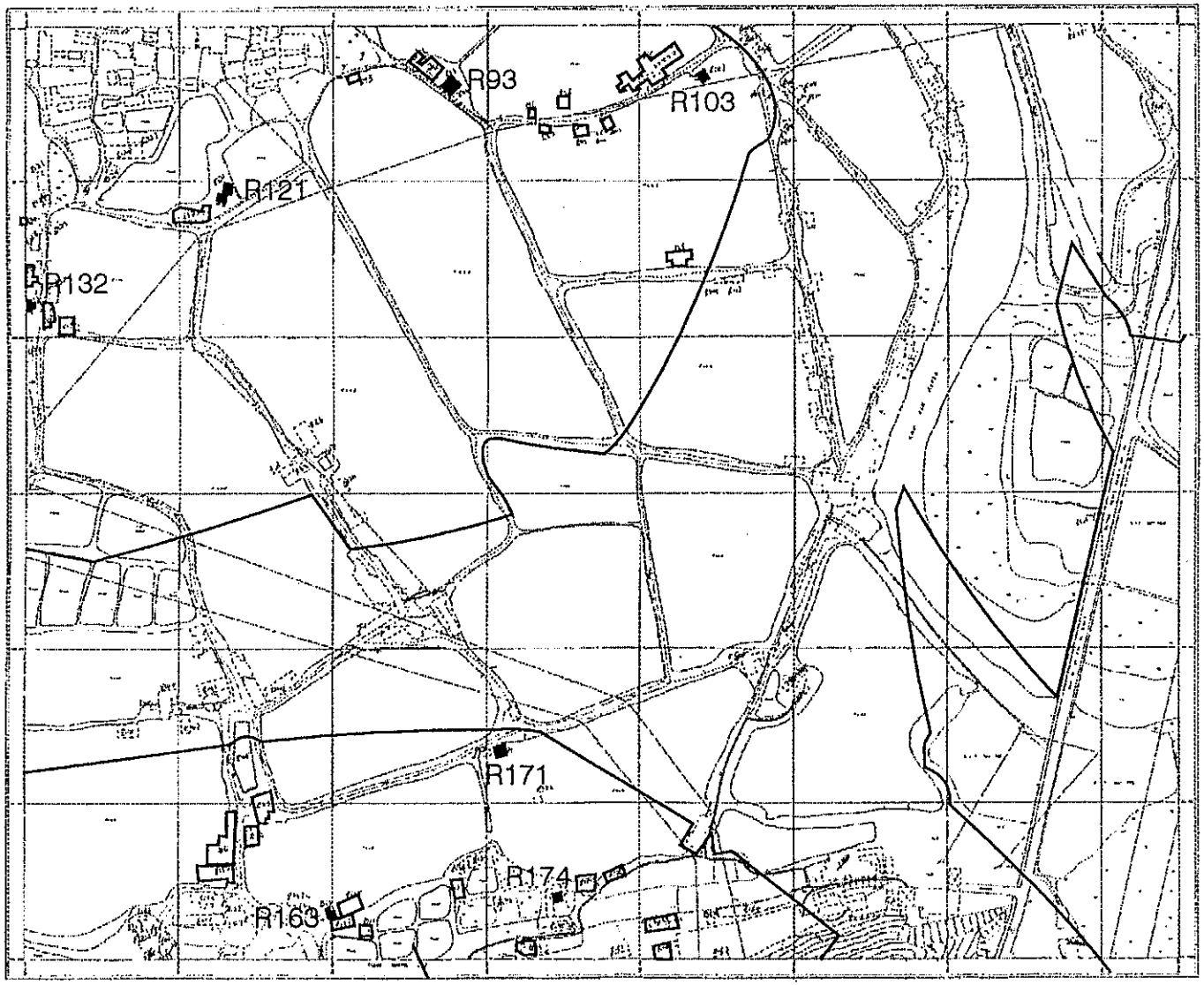
Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R137	Y	Y	1	2	B2
R138	Y	Y	2	2	B2
R139	Y	Y	2	2	B1
R140	Y	N	1	2	
R280	Y	N	1	2	N
R281	Y	Y	2	3	E12
R282	Y	Y	2	3	E10
R283	Y	Y	1	2	E11
R284	Y	N	1	3	N
R285	Y	Y	1	2	E13
R433	Y	N	1	2	N
R434	Y	Y	4	4	F27
R435	Y	Y	3	4	3
R436	Y	Y	1	4	2
R437	Y	Y	5	4	1
R438	Y	Y	3	4	1
R439	Y	Y	4	4	3
R440	Y	Y	4	4	3
R441	Y	Y	1	4	3
R442	Y	Y	1	4	2
R443	Y	Y	4	4	3
R444	Y	Y	3	4	1
R445	Y	Y	3	4	1
R446	Y	Y	5	4	F28
R447	Y	Y	5	4	3
R448	Y	Y	3	4	1
R449	Y	Y	2	4	1
R450	Y	Y	3	4	F29
R460	Y	Y	4	4	3
R461	Y	Y	4	4	3
R462	Y	Y	4	4	3
R463	Y	Y	3	4	1
R464	Y	Y	4	4	1
R465	Y	Y	3	4	3
R466	Y	Y	3	4	3
R467	Y	Y	4	4	3
R468	Y	N	1	2	N
R469	Y	Y	1	2	F33
R470	Y	Y	2	4	F34
R471	Y	N	1	2	N
R472	Y	N	1	2	N
R473	Y	KINDERGARTEN	1	4	G6
R474	Y	N	2	1	N
R475	Y	N	1	2	N
R476	Y	Y	2	4	F35
R477	Y	Y	1	3	F36
R478	Y	Y	3	4	G1
R479	Y	Y	3	4	F37
R480	Y	Y	2	2	G4
R481	Y	N	1	1	N
R482	Y	Y	1	2	G2
R483	Y	Y	2	2	G3
R484	Y	N	1	2	N
R485	Y	N	1	2	N
R486	Y	Y	2	3	G5
R487	Y	N	1	2	N
R488	Y	N - TEMPLE	1	4	G17
R489	Y	N	1	1	N
R490	Y	N	1	1	N
R491	Y	N	1	1	N
R492	Y	N	1	1	N
R493	Y	SCHOOL	1	4	N
R494	Y	N	1	4	G7

	R495	Y	N	1	2	N	
	R496	Y	Y	3	4	G8	
	R497	Y	Y	3	4	G9	
	R498	Y	N	3	4	G10	
	R499	Y	Y	2	4	G11	
	R500	Y	Y	1	4	G15	
	R501	Y	Y	1	3	G14	
	R502	Y	N	1	1	N	
	R503	Y	N - TEMPLE	1	3	G12	
	R504	Y	Y	4	4	G13	
	R505	Y	Y	4	4	AS G13	
	R506	Y	Y	4	4	AS G13	
	R507	Y	Y	2	4	G16	
	R508	Y	Y	3	4	AS G13	
	R509	Y	Y	3	4	G18	
	R510	Y	Y	3	4	AS G18	
	R511	Y	Y	1	3	G19	
	R512	Y	Y	4	4	AS G18	
	R513	Y	Y	4	4	AS G18	
	R514	Y	Y	3	4	G20	
	R515	Y	Y	2	4	G21	
	R516	Y	N	1	3	N	
	R517	Y	Y	2	4	G23	
	R518	Y	Y	3	4	G24	
	R519	Y	Y	3	4	AS G24	
	R520	Y	Y	3	4	H1	
	R521	Y	N	1	4	N	
	R522	Y	Y	2	4	G25	
	R523	Y	Y	2	4	H2	
	R524	Y	Y	2	4	H3	
	R525	Y	N	1	2	N	
	R526	Y	Y	3	4	H4	
	R527	Y	Y	4	4	1	
	R528	Y	Y	3	4	1	
	R529	Y	Y	2	4	H11	
	R530	Y	Y	1	2	H12	
	R531	Y	N	1	4	N	
	R532	Y	Y	2	3	G22	
	R533	Y	Y	3	4	3	
	R534	Y	Y	3	4	3	
	R535	Y	Y	2	4	1	
	R536	Y	Y	2	4	1	
	R537	Y	Y	3	4	1	
	R538	Y	Y	3	4	1	
	R539	Y	N	1	1	N	
	R540	Y	Y	3	4	1	
	R541	Y	Y	3	4	3	
	R542	Y	N	1	3	N	
	R543	Y	Y	3	4	1	
	R544	Y	Y	3	4	H6	
	R545	Y	Y	1	4	H5	
	R546	Y	N	1	2	N	
	R547	Y	Y	3	4	H7	
	R548	Y	N	0	1	N	
	R549	Y	Y	2	4	H8	
	R550	Y	N	1	2	N	
	R551	Y	Y	1	2	H19	
	R552	Y	Y	1	4	H10	
	R553	Y	Y	3	4	1	
	R554	Y	N	1	1	N	
	R555	Y	Y	2	4	1	
	R556	Y	Y	3	4	1	
	R557	Y	Y	2	4	1	
	R558	Y	Y	2	4	1	
	R559	Y	N	2	4	N	
	R560	Y	Y	3	4	3	
	R561	Y	Y	2	4	1	
	R562	Y	Y	1	3	2	
	R563	Y	Y	3	4	1	
	R564	Y	Y	0	3	N	
	R565	Y	Y	2	2	H13	
	R566	Y	Y	2	2	H14	
	R567	Y	N	1	2	N	
	R568	Y	Y	3	4	H18	
	R569	Y	Y	1	3	H15, H16	

	R570	Y	Y	1	3	H12	
	R571	Y	N	0	3	N	
	R572	Y	Y	3	4	H19	
	R573	Y	Y	3	4	H19	
	R574	Y	Y	3	4	H26	
	R575	Y	Y	3	4	H19	
	R579	Y	Y	3	4	H24	
	R580	Y	Y	3	4	H27	
	R581	Y	Y	3	4	H26	
	R582	Y	Y	3	4	H28	
	R583	Y	Y	3	4	H31	
	R589	Y	Y	3	4	H32	
	R590	Y	Y	3	4	H33	
	R591	Y	Y	3	4	H35	
	R592	Y	Y	3	4	H37	
	R593	Y	Y	3	4	H36	
	R594	Y	Y	1	2	I1	
	R595	Y	WORKSHOP	1	2	I2	
	R596	N					
	R597	N					
	R598	N					
	R599	N					
	R600	Y	N	1	2	AS I4	
	R601	Y	N	1	2	AS I4	
	R602	Y	Y	1	2	I3	
	R603	Y	N	1	2	AS I4	
	R604	Y	N	1	2	AS I4	
	R605	Y	N	1	2	AS I4	
	R606	Y	N	1	2	AS I4	
	R607	Y	N	1	2	AS I4	
	R608	Y	N	1	2	AS I4	
	R609	Y	N	1	2	AS I4	
	R610	Y	N	1	2	AS I4	
	R611	Y	N	1	2	AS I4	
	R612	Y	N	1	2	AS I4	
	R613	Y	N	1	2	AS I4	
	R614	Y	N	1	3	N	
	R615	Y	Y	3	4	AS I6, I7	
	R615A	Y	Y	3	4	AS I5	
	R615B	Y	Y	3	4	AS I6, I7	
	R615C	Y	Y	3	4	AS I6, I7	
	R615D	Y	Y	3	4	AS I6, I7	
	R616	Y	Y	2	4	AS I6, I7	
	R617	Y	Y	3	4	AS I6, I7	
	R618	Y	Y	3	4	AS I6, I7	
	R619	Y	Y	3	4	AS I6, I7	
	R620	Y	Y	3	4	AS I6, I7	
	R621	Y	Y	3	4	I6, I7	
	R622	Y	N	1	4	N	
	R623	Y	N	1	2	N	
	R624	Y	Y	2	4	I8	
	R625	Y	N	1	2	N	
	R626	Y	N	1	2	N	
	R627	Y	N	1	2	N	
	R628	Y	N	1	2	N	
	R629	Y	N	1	1	N	
	R630	Y	Y	1	2	I10	
	R631	Y	Y	1	2	I9	
	R632	Y	Y	1	3	I9	
	R633	Y	Y	1	2	I11	
	R634	Y	Y	2	4	I11	
	R635	Y	Y	1	2	I11	
	R636	Y	N	1	1	N	
	R637	Y	N	1	1	N	
	R638	Y	Y	2	4	I12	
	R639	Y	N	1	3	N	
	R640	Y	Y	2	4	I11	
	R641	Y	Y	1	4	I14	
	R642	Y	Y	2	4	I13	
	R643	Y	N	1	2	N	
	R644	Y	N	1	2	N	
	R645	Y	N	1	2	N	
	R646	Y	N	1	2	N	

	R647	Y	N	1	2	N	
	R648	Y	N	1	2	N	
	R649	Y	N	1	2	N	
	R650	Y	N	1	2	N	
	R651	Y	N	1	2	N	
	R652	Y	N	1	2	N	
	R653	Y	N	1	2	N	
	R654	Y	N	1	2	N	
	R655	Y	N	1	2	N	
	R656	Y	N	1	2	N	
	R657	Y	N	1	2	N	
	R658	Y	N	1	2	N	
	R659	Y	N	1	2	N	
	R660	Y	N	1	2	N	
	R661	Y	N	1	2	N	
	R662	Y	N	1	2	N	
	R663	Y	N	1	2	N	
	R664	Y	N	1	1	N	
	R665	Y	Y	2	4	I24	
	R666	Y	N	1	2	N	
	R667	Y	Y	1	2	I23	
	R668	Y	N	1	2	N	
	R669	Y	N	1	2	N	
	R670	Y	N	1	2	N	
	R671	Y	Y	1	2	I22	
	R672	Y	N	1	2	N	
	R673	Y	N	1	2	N	
	R674	Y	N	1	2	N	
	R675	Y	N	1	2	N	
	R676	Y	Y	1	3	I21	
	R677	Y	N	1	2	N	
	R678	Y	N	1	2	N	
	R679	Y	N	1	2	N	
	R680	Y	N	1	2	N	
	R681	Y	N	1	1	N	
	R682	Y	N	1	1	N	
	R683	Y	Y	2	3	I15	
	R684	Y	Y	1	3	I20	
	R685	Y	Y	1	2	N	
	R686	Y	N	1	2	N	
	R687	Y	N	1	2	N	
	R688	Y	N	1	2	N	
	R689	Y	N	1	2	N	
	R690	Y	Y	2	3	INACCESSIBLE	
	R691	Y	N	1	2	N	
	R692	Y	N	1	2	N	
	R693	Y	N	1	2	N	
	R694	Y	N	1	2	N	
	R695	Y	N	1	2	N	
	R696	Y	N	1	2	N	
	R697	Y	N	1	2	N	
	R698	Y	N	1	2	N	
	R699	Y	N	1	2	N	
	R700	Y	N	1	2	N	
	R701	Y	N	1	2	N	
	R702	Y	Y	2	2	I18	
	R703	Y	N	1	2	N	
	R704	Y	N	1	2	N	
	R705	Y	N	1	2	N	
	R706	Y	Y	1	4	I16	
	R707	Y	Y	1	4	I17	
	R708	N					
	R709	Y	N	1	2	N	
	R710	Y	Y	1	2	I19	
	R711	N					
	R712	N					
	R713	Y	N	1	1	N	
	R714	Y	N	1	2	I25	
	R715	Y	N	1	1	N	
	R716	N					
	R717	Y	N	1	2	N	
	R718	Y	N	1	2	N	
	R719	Y	Y	1	2	I26	
	R720	Y	Y	1	2	I27	
	R721	Y	Y	1	2	I28	

	R722	Y	Y	2	2	I29	
	R723	Y	Y	1	1	I30	
	R724	Y	N - RESTAURANT	1	2	I30	
	R725	Y	Y	1	2	I30	
	R726	Y	N	1	1	N	
	R727	Y	N	1	1	N	
	R728	Y	Y	2	2	I31	
	R729	Y	Y	2	2	I31	
	R730	Y	Y	2	2	I31	
	R731	Y	N	1	2	N	
	R732	Y	Y	2	2	I32	
	R733	Y	Y	2	2	I33	
	R734	Y	Y	1	2	I34	
	R735	N					
	R736	Y	Y	1	2	I35	
	R737	Y	Y	1	2	I35	
	R738	N					
	R739	Y	Y	1	2	I36	
	R740	Y	Y	1	2	I36	
	R741	N					
	R742	Y	Y	1	2	I37	
	R743	Y	Y	2	2	I37	



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary

Survey Map 4

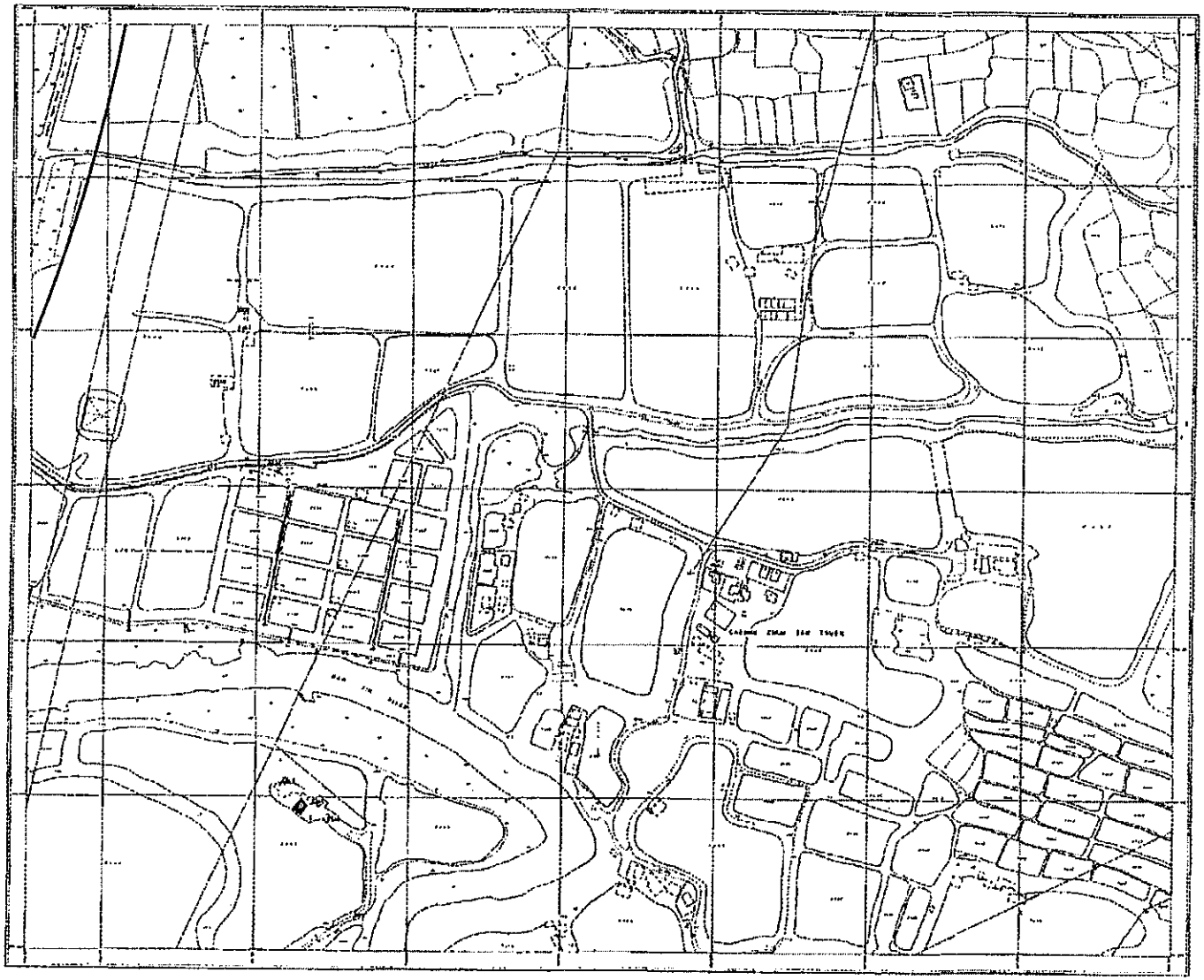
CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 4

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R91	Y	Y	1	2	A23
R92	Y	Y	1	2	A23
R93	Y	Y	1	2	A23
R94	Y	Y	1	2	A23
R95	Y	Y	1	2	N
R96	Y	Y	1	2	A22
R97	Y	Y	1	2	A19
R98	Y	Y	1	2	A_2
R99	Y	Y	1	2	A19
R100	Y	N	1	2	
R101	Y	Y	1	2	A19
R102	Y	Y	1	2	A21
R103	Y	Y	1	2	A20
R104	N				
R105	N				
R106	N				
R107	N				
R108	N				
R109	N				
R110	N				
R111	N				
R112	N				
R113	Y	Y	1	2	A18
R114	Y	Y	1	2	A18
R115	Y	Y	1	2	A17
R116	Y	N	1	2	N
R117	Y	N	1	3	N
R118	Y	N	1	2	N
R119	Y	N	1	3	N
R120	Y	N	1	2	N
R121	Y	Y	2	2	B9
R122	Y	Y	2	2	B9
R123	Y	N	1	2	N
R124	Y	N	1	2	N
R125	Y	N	1	2	B8
R126	Y	N	1	1	N
R127	Y	N	1	3	N
R128	Y	N	1	3	N
R129	Y	N	1	2	N
R130	Y	Y	1	2	B7
R131	Y	Y	2	2	B6
R132	Y	Y	2	2	B5
R133	Y	N	1	2	N
R134	Y	Y	1	2	B4
R135	Y	Y	1	2	B3
R136	-	-	-	-	-
R141	Y	N	1	2	B12
R142	Y	N	1	2	N
R143	Y	Y	1	2	B10
R144	Y	Y	2	3	B11
R145	Y	N	1	1	N
R146	Y	N	1	1	N
R147	Y	N	1	1	N
R148	Y	Y	2	2	B13
R149	Y	Y	2	2	B14
R150	Y	Y	2	2	B15
R151	Y	Y	1	2	B16
R152	Y	Y	1	2	B16
R153	Y	N	1	1	N
R154	Y	N	1	1	N
R155	Y	N	1	1	N
R156	Y	N	2	3	N
R157	Y	N	2	3	N
R158	Y	N	2	3	N

	R159	Y	N	2	3	N	
	R160	Y	N	2	3	N	
	R161	Y	N	2	3	N	
	R162	Y	N	1	1	N	
	R163	Y	Y	1	2	B17	
	R164	Y	Y	1	2	B17	
	R165	Y	Y	1	2	B17	
	R166	Y	Y	1	2	B17	
	R167	Y	Y	1	2	B18	
	R168	Y	N	1	2	N	
	R169	Y	N	1	2	N	
	R170	Y	N	1	2	N	
	R171	Y	Y	1	2	C2	
	R172	N					
	R173	Y	N	1	2	N	
	R174	Y	Y	2	2	B20	
	R175	Y	N	1	2	N	
	R176	Y	Y	1	2	B19	
	R177	Y	Y	1	2	B21	
	R178	Y	Y	1	2	B22	
	R179	Y	Y	1	2	B23	
	R180	N					
	R181	Y	Y	1	2	C5	
	R182	Y	N	1	2	N	
	R183	Y	N	1	1	N	
	R184	Y	Y	1	2	C3	
	R857	N					
	R858	N					
	R859	N					
	R860	-	-	-	-	-	
	R861	-	-	-	-	-	
	R862	-	-	-	-	-	
	R863	-	-	-	-	-	
	R864	-	-	-	-	-	
	R865	-	-	-	-	-	



LEGEND

- Potential Sensitive Receiver
- Project Site Boundary

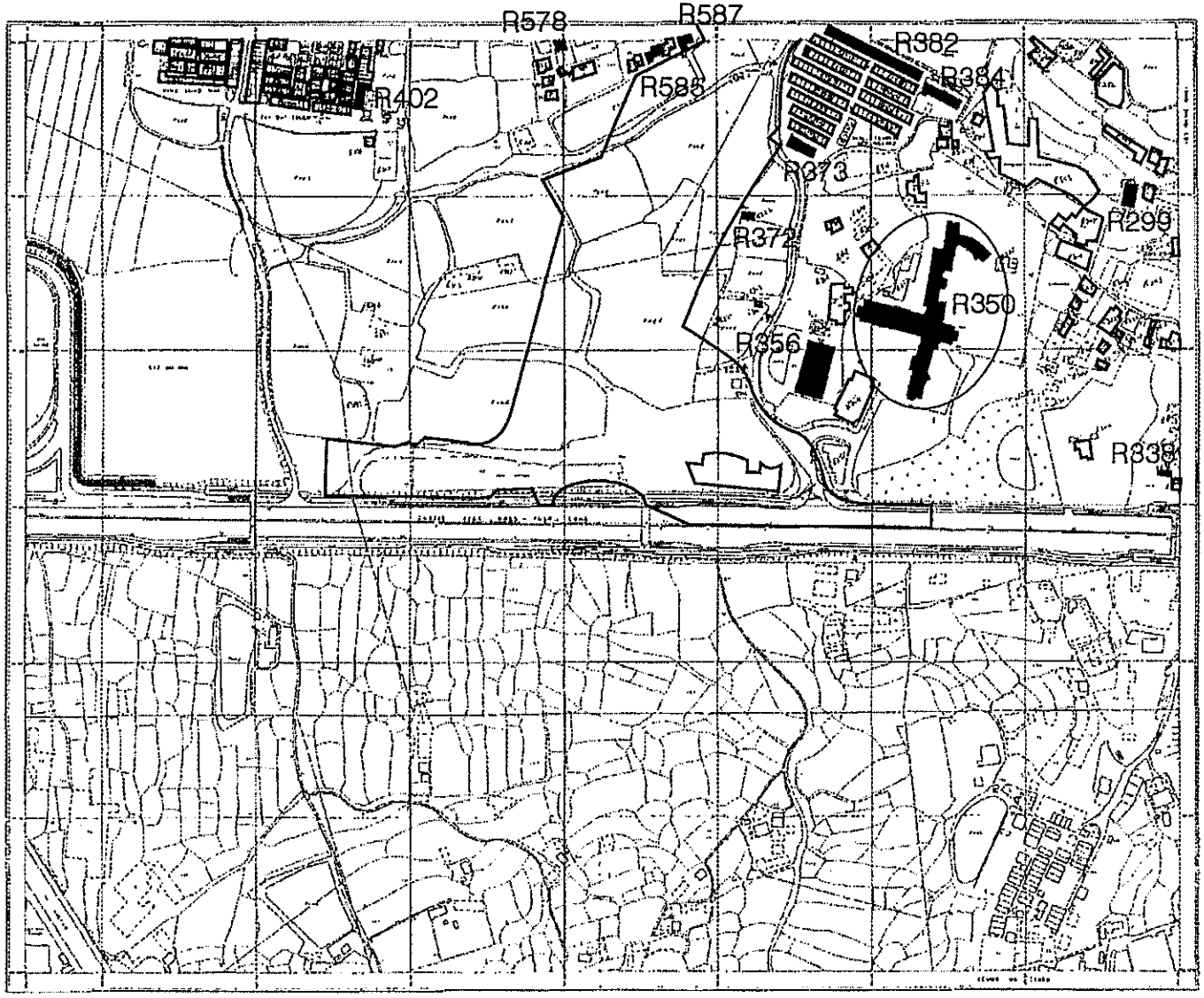
Survey Map 5

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 5

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R854	Y	N	1	1	N
R855	Y	N	1	1	N
R856	Y	N	1	1	N
R866	Y	N	1	2	N
R867	Y	Y	2	3	K7
R868	Y	N	1	2	N
R869	Y	N	1	2	N
R870	-	-	-	-	-



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary
- Monitoring Station

Survey Map 6

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

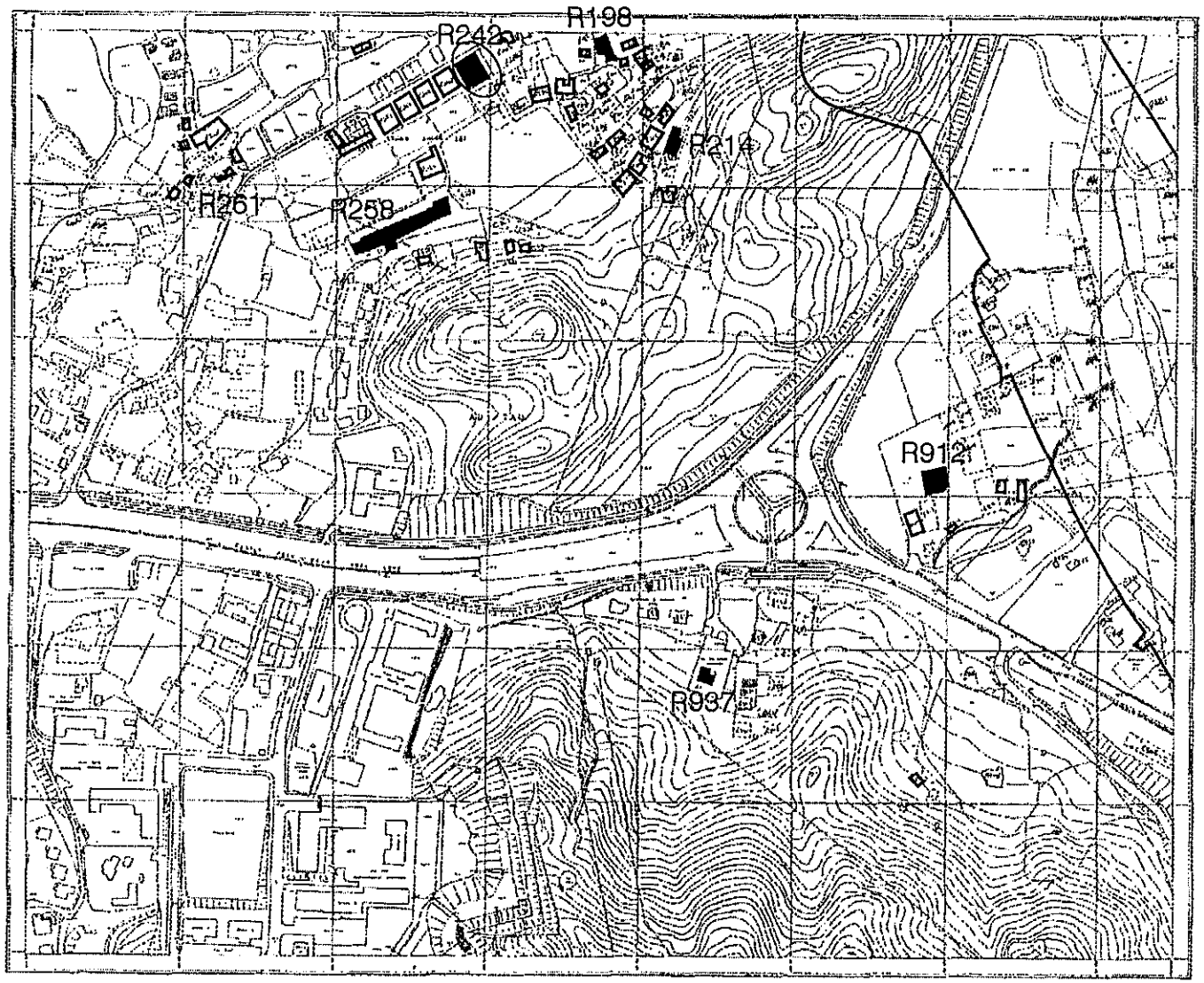
SURVEY SHEET - EXISTING SR'S SHEET 6

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R286	Y	N	1	2	N
R287	Y	N	1	2	N
R288	Y	N	1	2	N
R289	Y	Y	1	2	E9
R290	Y	N	1	2	N
R291	Y	Y	1	2	E8
R292	Y	Y	1	2	E7
R293	Y	Y	1	2	E6
R294	Y	Y	1	2	E5
R295	Y	Y	1	2	E4
R296	Y	Y	1	2	E3
R297	Y	Y	1	2	E2
R298	Y	N	1	1	N
R299	Y	Y	2	3	E1
R300	Y	N	1	2	N
R301	Y	N	2	3	N
R302	Y	Y	1	2	D20
R303	Y	N	2	1	N
R304	Y	N	2	1	N
R305	Y	N	1	1	N
R306	Y	N	1	1	N
R307	Y	Y	2	2	D37
R308	Y	Y	2	3	D30
R309	Y	Y	1	2	E14/E15
R310	Y	Y	1	3	E20
R311	Y	N	1	1	N
R312	Y	Y	2	3	E19
R313	Y	Y	1	3	E18
R314	Y	Y	1	3	E17
R315	Y	N	2	3	N
R316	Y	N	1	2	N
R317	Y	Y	2	3	E15
R318	Y	N	1	1	N
R319	Y	Y	1	2	D33
R320	Y	Y	2	3	D34
R321	Y	N	1	2	N
R322	Y	Y	1	2	D32
R323	Y	N	1	3	N
R324	Y	N	1	2	N
R325	Y	Y	1	3	D28
R326	Y	Y	1	3	D28
R327	Y	Y	1	3	D27
R328	Y	N	1	3	N
R329	Y	Y	1	3	D29
R330	Y	N	1	3	N
R331	Y	Y	2	3	D30
R332	Y	Y	1	3	D31
R333	Y	N	1	2	N
R334	Y	N	1	2	N
R335	Y	N	1	2	N
R336	Y	N	2	2	N
R337	Y	N	2	2	N
R338	Y	Y	3	4	D26
R339	Y	HOTEL	3	4	D24
R340	Y	N	1	3	N
R341	Y	Y	1	3	D25
R342	Y	N	1	2	N
R343	Y	N	1	2	N
R344	Y	N	1	2	N
R345	Y	N	1	2	N
R346	Y	N	1	1	N
R347	Y	N	1	1	N
R348	Y	Y	2	3	D35
R349	Y	N	1	2	N
R350	Y	HOSPITAL	8	4	E23

	R351	Y	N	1	4	N	
	R352	Y	N	1	4	N	
	R353	Y	Y	2	3	E21	
	R354	Y	HOSPITAL (Under Construction)	7	4	E24	
	R355	Y	N	1	1	N	
	R356	Y	Y	1	3	E22	
	R357	N					
	R358	N					
	R359	N					
	R360	N					
	R361	Y	Y	1	2	E25	
	R362	Y	N	1	2	N	
	R363	Y	N	1	1	N	
	R364	Y	Y	1	2	E26	
	R365	N					
	R366	Y	N	1	2	N	
	R367	Y	Y	1	2	E29	
	R368	Y	N	1	2	N	
	R369	Y	N	1	2	N	
	R370	Y	N	1	2	N	
	R371	Y	Y	1	3	E28	
	R372	Y	Y	1	2	E27	
	R373	Y	Y	2	3	E30	
	R374	Y	Y	2	3	E31	
	R375	Y	Y	2	3	E32	
	R376	Y	Y	2	3	E33	
	R377	Y	Y	2	3	E34	
	R378	Y	Y	2	3	E35	
	R379	Y	Y	2	3	E36	
	R380	Y	Y	2	3	E37	
	R381	Y	Y	2	3	F1	
	R382	Y	Y	2	3	F2	
	R383	Y	N	1	4	N	
	R384	Y	SCHOOL	1	3	F3	
	R385	Y	Y	2	3	F5	
	R386	Y	Y	2	3	F7	
	R387	Y	Y	2	3	F4	
	R388	Y	Y	2	3	F5	
	R389	N					
	R390	N					
	R391	N					
	R392	N					
	R393	N					
	R394	N					
	R395	N					
	R396	Y	N	1	1	N	
	R397	Y	SITTING OUT AREA	0	3	N	
	R398	Y	Y	1	2	F8	
	R399	Y	N	0	3	N	
	R400	Y	N	1	3	N	
	R401	Y	N	1	3	N	
	R402	Y	Y	3	4	F9	
	R403	Y	Y	3	4	F10	
	R404	Y	Y	4	4	F11	
	R405	Y	Y	4	4	F12	
	R406	Y	Y	3	4	F13	
	R407	Y	Y	4	4	F14	
	R408	Y	Y	3	4	F15	
	R409	Y	Y	3	4	F16	
	R410	Y	Y	3	4	F17	
	R411	Y	Y	3	4	F18	
	R412	Y	Y	3	4	F19	
	R413	Y	Y	2	4	F20	
	R414	Y	Y	3	4	F21	
	R415	Y	Y	3	4	F22	
	R416	Y	Y	3	4	F23	
	R417	Y	Y	5	4	F24	
	R418	Y	Y	3	4	F25	
	R419	Y	Y	1	4	F26	
	R420	Y	Y	2	4	3	
	R421	Y	Y	3	4	1	
	R422	Y	Y	3	4	1	
	R423	Y	Y	1	4	2	
	R424	Y	Y	5	4	1	
	R425	Y	Y	1	4	2	

	R426	Y	Y	5	4	1	
	R427	Y	Y	3	4	1	
	R428	Y	Y	3	4	3	
	R429	Y	Y	4	4	3	
	R430	Y	Y	4	4	1	
	R431	Y	Y	4	4	3	
	R432	N					
	R451	Y	Y	4	4	F30	
	R452	Y	Y	4	4	F31	
	R453	Y	Y	4	4	1	
	R454	Y	Y	3	4	3	
	R455	Y	Y	4	4	1	
	R456	Y	Y	4	4	3	
	R457	Y	Y	4	4	3	
	R458	Y	Y	4	4	F32	
	R459	Y	Y	4	4	1	
	R576	Y	Y	3	4	H25	
	R576A	Y	Y	3	4	H21	
	R576B	Y	Y	3	4	H20	
	R576C	Y	Y	3	4	H22	
	R577	N					
	R578	Y	Y	3	4	H23	
	R584	Y	Y	3	4	H29	
	R585	Y	Y	3	4	H34	
	R586	Y	Y	3	4	H30	
	R587	Y	Y	3	4	H30	
	R588	Y	Y	1	1	N	



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary
- Monitoring Station

Survey Map 7

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 7

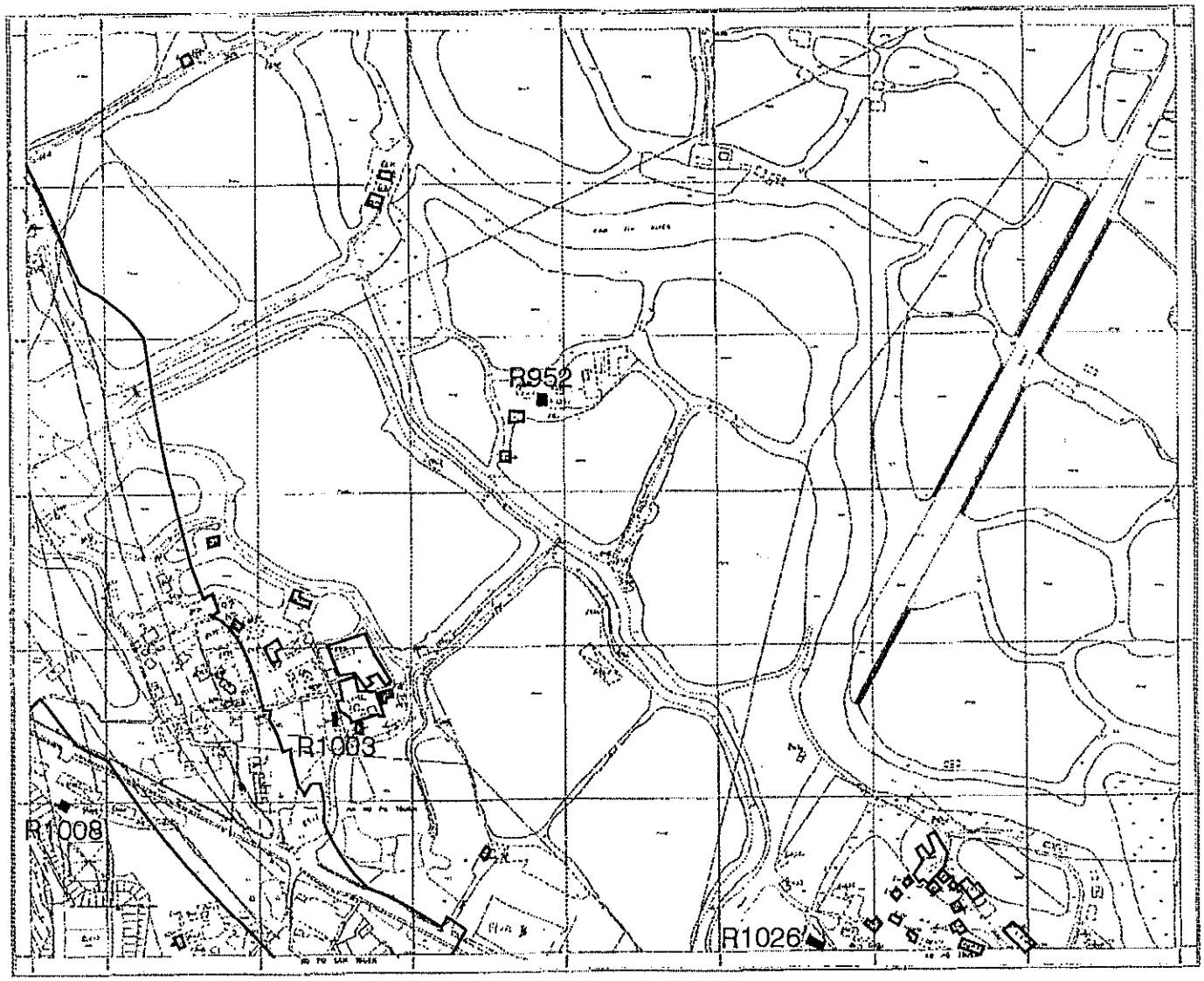
Key Used to Rate Condition of the Sensitivie Receivers :

1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Posts (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R185	Y	N	1	2	N
R186	Y	N	1	2	N
R187	Y	N	1	2	N
R188	Y	Y	1	2	C4, B24
R189	Y	N	1	2	N
R190	Y	N	1	2	N
R191	Y	N	1	2	N
R192	Y	N	1	2	N
R193	Y	N	1	2	N
R194	Y	N	1	2	N
R195	Y	Y	1	2	C15
R196	Y	Y	1	2	C14
R197	Y	Y	1	2	C13
R198	Y	Y	1	2	C12
R199	Y	N	1	2	N
R200	Y	Y	1	2	C10
R201	Y	N	1	3	N
R202	Y	N	1	1	N
R203	Y	N	1	1	N
R204	Y	Y	1	3	C11
R205	Y	N	1	1	N
R206	Y	N	1	1	N
R207	Y	Y	1	2	C8
R208	Y	Y	1	2	C9
R209	Y	N	1	1	N
R210	Y	N	1	1	N
R211	Y	N	1	1	N
R212	Y	Y	1	2	C18
R213	Y	Y	1	2	C23
R214	Y	Y	1	2	C24
R215	Y	Y	1	2	D1
R216A	Y	Y	1	2	C17
R216B	Y	Y	1	2	C19
R217	Y	N	1	1	N
R218	Y	Y	1	2	C16
R219	Y	N	1	2	N
R220	Y	Y	1	2	C20
R221	Y	Y	1	2	C22
R222	Y	N	1	2	N
R223	Y	N	1	2	N
R224	Y	N	1	1	N
R225	Y	Y	1	2	C21
R226	Y	N	1	2	N
R227	Y	N	1	2	N
R228	Y	Y	2	2	C25
R229	Y	N	1	2	N
R230	Y	N	1	2	N
R231	Y	N	1	2	N
R232	Y	Y	1	3	D14
R233	Y	N	1	2	N
R234	Y	Y	1	3	D13
R235	Y	N	1	1	N
R236	Y	N	1	1	N
R237	Y	Y	2	2	D12
R238	Y	N	1	2	N
R239	Y	Y	1	2	C7
R240	Y	N	1	2	N
R241	Y	N	1	2	N
R242	Y	Y	1	2	C6
R243	Y	N	1	2	N
R244	Y	N	1	2	N
R245	Y	N	1	2	N
R246	Y	N	1	1	N
R247	Y	TEMPLE	2	3	N
R248	Y	Y	2	3	D13

	R249	Y	Y	2	3	D4	
	R250	Y	Y	2	3	D5	
	R251	Y	Y	2	3	D6	
	R252	Y	N	1	3	N	
	R253	Y	Y	1	3	D8	
	R254	Y	Y	1	3	D9	
	R255	Y	Y	2	2	C1	
	R256	Y	Y	1	2	D7	
	R257	Y	N	1	2	N	
	R258	Y	Y	1	2	D10	
	R259	Y	Y	1	3	D11	
	R260	Y	Y	1	3	D16	
	R261	Y	Y	1	2	D17	
	R262	Y	Y	1	2	D15	
	R263	Y	N	1	2	N	
	R264	Y	Y	2	3	D18	
	R265	Y	Y	1	3	D19	
	R266	N					
	R267	N					
	R268	Y	Y	1	2	D23	
	R269	Y	Y	1	2	D22	
	R270	Y	Y	1	2	D22	
	R271	Y	N	2	1	N	
	R272	Y	N	2	1	N	
	R273	Y	N	2	1	N	
	R274	Y	N	2	1	N	
	R275	Y	N	2	1	N	
	R276	Y	N	2	1	N	
	R277	Y	N	2	1	N	
	R278	Y	N	2	1	N	
	R279	Y	N	2	1	N	
	R879	-	-	-	-	-	
	R880	Y	Y	2	2	K10	
	R881	Y	N - SCARPYARD	2	2	K11	
	R882	-	-	-	-	-	
	R883	-	-	-	-	-	
	R884	-	-	-	-	-	
	R885	Y	N	1	2	N	
	R886	-	-	-	-	-	
	R887	-	-	-	-	-	
	R888	-	-	-	-	-	
	R889	-	-	-	-	-	
	R890	-	-	-	-	-	
	R891	-	-	-	-	-	
	R892	Y	N	1	2	N	
	R893	Y	Y	2	3	K12	
	R894	Y	N	1	3	N	
	R895	Y	N	1	2	N	
	R896	Y	Y	2	3	K13	
	R897	-	-	-	-	-	
	R898	Y	Y	1	3	K13	
	R899	Y	N	1	2	N	
	R900	Y	N	1	2	N	
	R901	-	-	-	-	-	
	R902	Y	N	1	2	N	
	R903	-	-	-	-	-	
	R904	Y	N	1	2	N	
	R905	Y	N	1	2	N	
	R906	Y	N	1	2	N	
	R907	Y	N	1	2	N	
	R908	Y	N	1	2	N	
	R909	Y	N	1	2	N	
	R910	Y	N	1	2	N	
	R911	-	-	-	-	-	
	R912	Y	Y	1	3	K16	
	R913	Y	N	1	2	N	
	R914	Y	Y	1	3	K16	
	R915	Y	N	1	2	N	
	R916	Y	Y	1	3	K16	
	R917	Y	N	1	2	N	
	R918	Y	Y	2	3	K15	
	R919	Y	Y	1	2	K14	
	R920	Y	N	1	2	N	
	R921	N					

	R922	Y	N	1	1	N	
	R923	N					
	R924	Y	N	1	1	N	
	R925	Y	N	2	1	N	
	R926	Y	N	1	1	N	
	R927	Y	N	1	1	N	
	R928	Y	N	1	1	N	
	R929	Y	N	1	1	N	
	R930	Y	N	2	1	N	
	R931	Y	N - OFFICE	1	4	K18	
	R932	Y	N - OFFICE	1	4	K18	
	R933	Y	N	2	2	N	
	R934	Y	N - OFFICE	2	2	K19	
	R935	N					
	R936	Y	N - OFFICE	1	3	K19	
	R937	Y	N -SCOUTS CENTRE	3	4	K21	
	R938	Y	N - OFFICE	2	4	K20	
	R939	Y	N	1	3	N	
	R940	Y	N	1	3	N	
	R941	N					
	R942	N					
	R943	N					
	R944	N					
	R945	Y	N	2	2	N	
	R946	Y	N	1	1	N	
	R947	Y	Y	2	3	K22	
	R948	Y	N	1	1	N	
	R949	Y	N	1	2	N	



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary

Survey Map 8

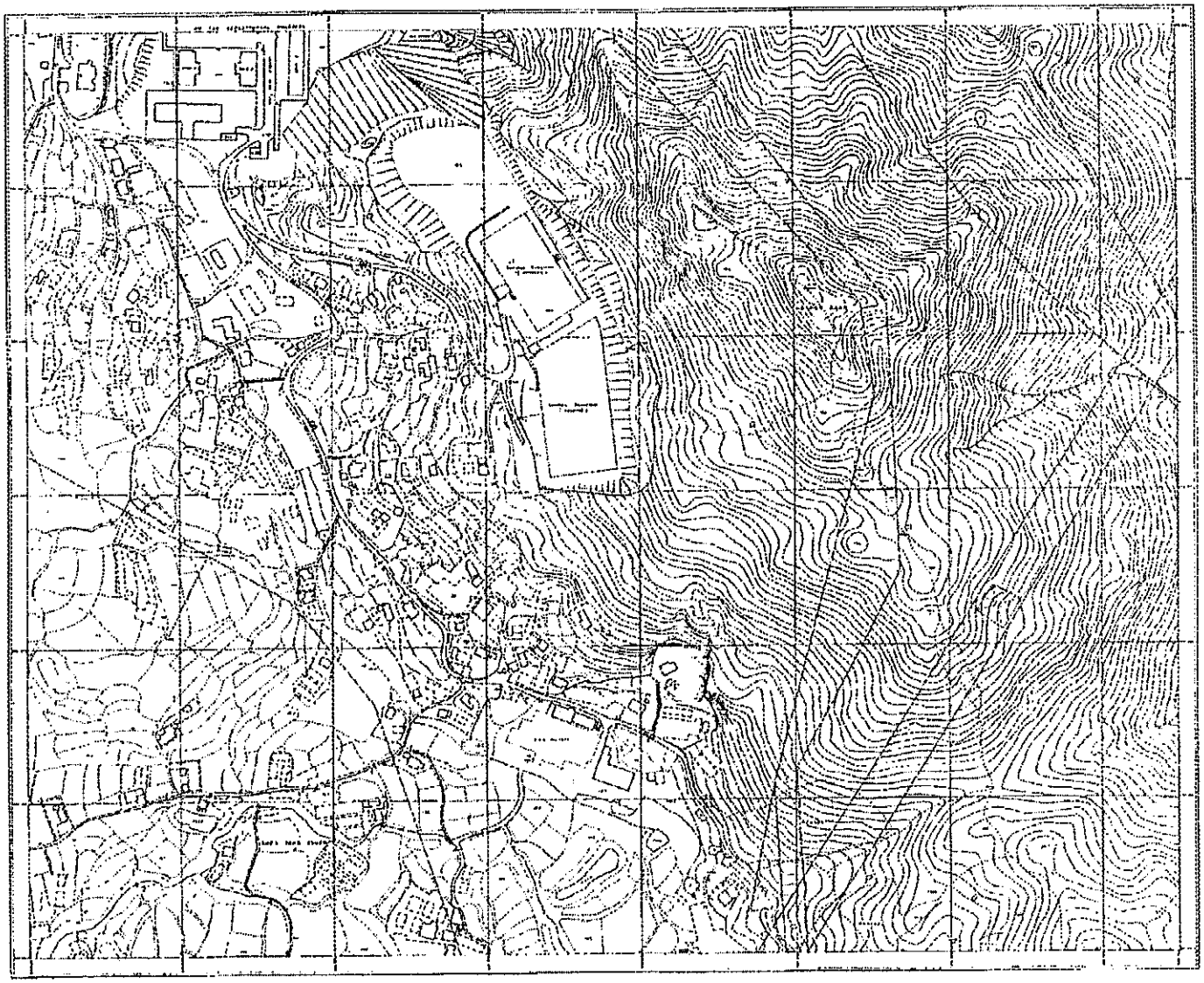
CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 8

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R871	Y	Y	2	3	K8
R872	Y	N	1	2	N
R873	Y	Y	1	2	K8
R874	N				
R875	N				
R876	Y	N	1	2	N
R877	Y	Y	1	2	K9
R878	Y	N	1	2	N
R950	Y	N	1	2	N
R951	Y	N	1	2	N
R952	Y	Y	2	3	K23
R953	Y	N	1	2	N
R954	Y	N	1	2	N
R955	Y	Y	2	2	K23
R956	Y	Y	1	2	K23
R957	N				
R958	Y	N - WAREHOUSE	1	2	K24
R959	Y	N	1	2	K24
R960	Y	N	1	2	K24
R961	Y	Y	1	2	K25
R962	Y	N	1	1	N
R963	Y	N	1	1	N
R964	Y	Y	1	3	K17
R965	Y	Y	1	2	L1
R966	Y	N	1	2	N
R967	Y	N - WAREHOUSE	2	4	L15
R968	Y	Y	2	2	L2
R969	N				
R970	Y	N	1	1	N
R971	Y	N	1	2	N
R972	Y	N	1	2	N
R973	Y	Y	1	3	L4
R974	Y	N	1	2	N
R975	Y	Y	1	2	L3
R976	Y	N	1	2	N
R977	Y	N	1	2	N
R978	Y	N	1	2	N
R979	Y	Y	1	2	L13
R980	Y	N	1	2	N
R981	Y	Y	3	4	L10
R982	Y	Y	1	4	L14
R983	Y	N	1	2	N
R984	Y	N	1	3	N
R985	Y	N	1	3	N
R986	Y	Y	1	2	L12
R987	Y	Y	1	1	L11
R988	Y	N	1	1	N
R989	Y	N	1	1	N
R990	Y	N	1	2	N
R991	Y	N	1	2	N
R992	Y	Y	2	4	L5
R993	Y	N	2	1	N
R994	Y	N	1	1	N
R995	Y	N	1	2	N
R996	Y	N	1	2	N
R997	Y	N	1	2	N
R998	Y	Y	1	3	L6
R999	Y	Y	2	3	L7
R1000	Y	N	1	2	N
R1001	Y	Y	1	3	L8
R1002	Y	N	1	2	N
R1003	Y	Y	2	3	L9
R1004	Y	Y	1	2	L16
R1005	Y	N -WORKSHOP	1	2	L19

	R1006A	Y	Y	2	3	L20	
	R1006B	Y	SCRAPYARD	1	2	AS L20	
	R1007	Y	N	1	2	NN	
	R1008	Y	Y	2	4	L17	
	R1009	Y	N	1	2	N	
	R1010	Y	N	1	2	N	
	R1011	Y	N	1	1	N	
	R1012	Y	N	1	1	N	
	R1013	Y	CHINA LIGHT PO	4	4	L18	
	R1014	Y	N	1	2	N	
	R1015	Y	N	1	2	N	
	R1016	Y	N	1	3	N	
	R1017	Y	N	1	2	N	
	R1018	Y	Y	2	3	L21	
	R1019	Y	N	1	2	N	
	R1020	N					
	R1021	Y	N	0	3	N	
	R1022	Y	N	1	2	N	
	R1023	Y	N	1	3	N	
	R1024	Y	N	1	2	N	
	R1025	Y	N	1	1	N	
	R1026	Y	Y	3	4	AS L35	
	R1027	Y	N	1	2	N	
	R1028	Y	Y	1	2	L22	
	R1029	Y	N	1	2	N	
	R1030	Y	N	1	2	N	
	R1031	Y	Y	1	2	L22	
	R1032	Y	Y	1	3	L22	
	R1033	Y	Y	1	2	N	
	R1034	Y	Y	1	2	N	
	R1035	Y	Y	1	2	N	
	R1036	Y	Y	1	2	N	
	R1037	Y	Y	1	4	L23	
	R1038	Y	Y	1	4	N	
	R1039	Y	Y	1	2	N	
	R1040	Y	Y	1	2	N	
	R1041	Y	Y	1	2	L25	
	R1042	Y	N	1	2	N	
	R1043	Y	Y	3	4	L27	
	R1044	Y	N	1	3	N	
	R1045	Y	Y	2	2	L26	



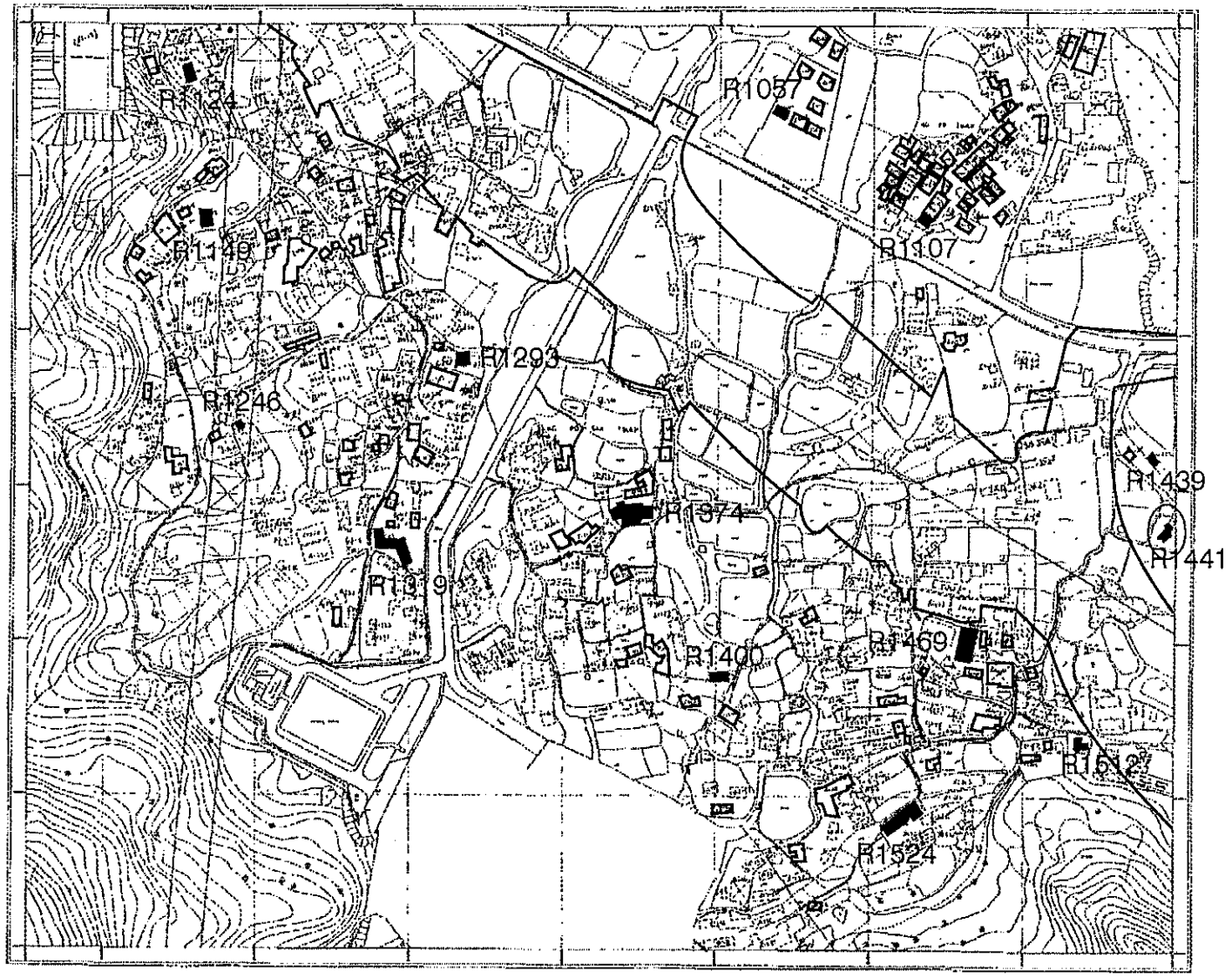
Survey Map 9

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 9

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
No receivers					



Survey Map 10

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 10

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R1006C	Y	N - SCRAPYARD	1	2	AS L20
R1006D	Y	N - SCRAPYARD	1	2	AS L20
R1046	Y	Y	3	4	L28
R1047	Y	Y	3	4	L28
R1048	Y	N	1	1	N
R1049	Y	N	1	1	N
R1050	Y	N	1	1	N
R1051	Y	N	1	2	N
R1052	Y	Y	3	4	AS L35
R1053	Y	Y	3	4	AS L35
R1054	Y	Y	3	4	AS L35
R1055	Y	Y	3	4	AS L35
R1056	Y	Y	3	4	AS L35
R1057	Y	Y	3	4	AS L35
R1058	Y	Y	3	4	AS L35
R1059	Y	Y	3	4	AS L35
R1060	Y	N	1	2	N
R1061	Y	Y	1	2	L29
R1062	Y	N	1	2	N
R1063	Y	N	1	4	N
R1064	N	N	1	1	N
R1065	Y	N	1	2	N
R1066	Y	N - FACTORY	2	3	L30
R1067	Y	Y	3	4	AS L33, L34
R1068	Y	Y	3	4	AS L33, L34
R1069	Y	Y	1	3	L32
R1070	Y	N	1	2	N
R1071	Y	N - WAREHOUSE	1	2	L31
R1072	Y	Y	3	4	AS L33, L34
R1073					
R1074					
R1075					
R1076	Y	N	1	4	N
R1077					
R1078					
R1079					
R1080	Y	N	1	2	N
R1081					
R1082					
R1083					
R1084					
R1085					
R1086					
R1087	Y	N	1	2	N
R1088					
R1089					
R1090					
R1091					
R1092					
R1093					
R1094					
R1095					
R1096					
R1097					
R1098					
R1099					
R1100	Y	N	1	2	N
R1101					
R1102					
R1103					
R1104					
R1105					
R1106					
R1107					

	R1108						
	R1109						
	R1110	Y	N	1	2	N	
	R1111	Y	N	1	2	N	
	R1112	Y	N	1	2	N	
	R1113	N					
	R1114	Y	N	1	2	N	
	R1115	Y	N	1	3	N	
	R1116	Y	N	1	3	N	
	R1117	Y	N	1	2	N	
	R1118	N					
	R1119	Y	Y	3	4	L36	
	R1120	Y	N	1	2	N	
	R1121	Y	N	1	2	N	
	R1122	Y	N	1	3	N	
	R1123	Y	N	1	2	N	
	R1124	Y	Y	3	4	L37	
	R1125	Y	N	1	2	N	
	R1126	Y	N	0	3	N	
	R1127	Y	N	1	3	N	
	R1128	Y	N	1	2	N	
	R1129	Y	N	1	2	N	
	R1130	Y	N	1	2	N	
	R1131	Y	N	1	2	N	
	R1132	Y	N	1	2	N	
	R1133	Y	N	1	2	N	
	R1134	Y	N	1	2	N	
	R1135	Y	N	1	2	N	
	R1136	Y	N	1	2	N	
	R1137	Y	N	1	2	N	
	R1138	Y	N	1	2	N	
	R1139	Y	N	1	2	N	
	R1140	Y	N	1	2	N	
	R1141	Y	N	1	2	N	
	R1142	Y	N	2	3	N	
	R1143	Y	N	1	2	N	
	R1144	Y	N	1	2	N	
	R1145	Y	N	1	2	N	
	R1146	Y	Y	1	3	M1	
	R1147	Y	N	1	2	N	
	R1148	Y	Y	2	4	M3	
	R1149	Y	Y	3	4	M2	
	R1150	Y	N	1	3	N	
	R1151	Y	Y	1	2	M5	
	R1152	Y	N	1	2	N	
	R1153	Y	N	1	2	N	
	R1154	Y	N	1	2	N	
	R1155	Y	Y	1	2	M6	
	R1156	Y	Y	2	4	M4	
	R1157	Y	N	1	2	N	
	R1158	Y	N	1	2	N	
	R1159	Y	N	1	1	N	
	R1160	Y	N	1	1	N	
	R1161	Y	N	1	1	N	
	R1162	Y	N	1	2	N	
	R1163	Y	Y	1	2	M7	
	R1164	Y	N	1	2	N	
	R1165	Y	N	1	2	N	
	R1166	Y	N	1	2	N	
	R1167	Y	N	1	2	N	
	R1168	Y	N	1	2	N	
	R1169	Y	N	1	2	N	
	R1170	Y	N	1	2	N	
	R1171	Y	Y	2	3	M9	
	R1172	Y	Y	1	2	M10	
	R1173	Y	N	1	2	N	
	R1174	Y	Y	1	2	M17	
	R1175	Y	Y	1	2	M18	
	R1176	Y	N	1	2	N	
	R1177	Y	N	1	2	N	
	R1178	Y	N	1	2	N	
	R1179	Y	Y	1	3	M11	
	R1180	Y	N	1	3	N	
	R1181	Y	N	1	1	N	
	R1182	Y	N	1	1	N	

	R1183	Y	Y	1	1	N	
	R1184	Y	N	1	2	M15	
	R1185	Y	Y	1	2	M14	
	R1186	Y	N	1	1	N	
	R1187	Y	N	1	1	N	
	R1188	Y	N	1	1	N	
	R1189	Y	N	1	1	N	
	R1190	Y	Y	1	3	M13	
	R1191	Y	Y	1	3	M12	
	R1192	Y	Y	1	2	M16	
	R1193	Y	N	1	1	N	
	R1194	Y	N	1	1	N	
	R1195	Y	N	1	1	N	
	R1196	Y	N	1	2	N	
	R1197	Y	N	1	1	N	
	R1198	Y	N	1	1	N	
	R1199	Y	N	1	1	N	
	R1200	Y	N	1	1	N	
	R1201	Y	N	1	1	N	
	R1202	Y	N	1	1	N	
	R1203	Y	Y	2	3	M18	
	R1204	Y	Y	1	2	M19	
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	R1206	Y	N	1	2	N	
	R1207	Y	N	1	2	N	
	R1208	Y	N	1	2	N	
	R1209	Y	N	1	2	N	
	R1210	Y	N	1	2	N	
	R1211	Y	N	1	2	N	
	R1212	Y	N	1	2	N	
	R1213	Y	N	1	2	N	
	R1214	Y	N	1	2	N	
	R1215	Y	N	1	2	N	
	R1216	Y	N	1	2	N	
	R1217	Y	N	1	2	N	
	R1218	Y	N	1	2	N	
	R1219	Y	N	1	2	N	
	R1220	Y	N	1	2	N	
	R1221	Y	N	1	2	N	
	R1222	Y	N	1	2	N	
	R1223	Y	N	1	2	N	
	R1224	Y	Y	1	2	M20	
	R1225	Y	N	1	2	N	
	R1226	Y	N	1	2	N	
	R1227	Y	Y	2	4	M21	
	R1228	Y	N	1	3	N	
	R1229	Y	N	1	2	N	
	R1230	Y	N	1	2	N	
	R1231	Y	N	1	2	N	
	R1232	Y	N	1	2	N	
	R1233	Y	N	1	2	N	
	R1234	Y	N	1	2	N	
	R1235	Y	N	1	2	N	
	R1236	Y	N	1	2	N	
	R1237	Y	N	1	2	N	
	R1238	Y	N	1	2	N	
	R1239	Y	Y	1	2	M22	
	R1240	Y	N	1	2	N	
	R1241	N					
	R1242	Y	Y	2	3	M24	
	R1243	N					
	R1244	Y	N	1	2	N	
	R1245	Y	N	1	2	N	
	R1246	Y	Y	2	3	M23	
	R1247	Y	N	1	2	N	
	R1248	Y	N	1	2	N	
	R1249	N					
	R1250	Y	N	1	2	N	
	R1251	Y	N	1	2	N	
	R1252	Y	N	1	2	N	
	R1253	Y	N	1	2	N	
	R1254	Y	N	1	2	N	
	R1255	Y	N	1	2	N	
	R1256	Y	N	1	2	N	
	R1257	Y	N	1	2	N	

	R1258	Y	N	1	2	N	
	R1259	Y	N	1	2	N	
	R1260	Y	N	1	2	N	
	R1261	Y	N	1	2	N	
	R1262	Y	N	1	2	N	
	R1263	Y		1	2	N	
	R1264	Y	Y	1	1	N5	
	R1265	Y	N	1	2	N	
	R1266	Y	N	1	2	N	
	R1267	Y	N	1	2	N	
	R1268	Y	N	1	2	N	
	R1269	Y	N	1	2	N	
	R1270	Y	Y	1	2	N3	
	R1271	Y	Y	1	2	N4	
	R1272	Y	Y	1	3	M25	
	R1273	Y	N	1	2	N	
	R1274	Y	N	1	2	N	
	R1275	Y	N	1	2	N	
	R1276	Y	N	1	2	N	
	R1277	Y	Y	2	3	N1	
	R1278	Y	N	1	2	N	
	R1279	Y	N	1	2	N	
	R1280	Y	N	1	2	N	
	R1281	Y	N	1	2	N	
	R1282	Y	N	1	2	N	
	R1283	Y	N	1	2	N	
	R1284	Y	N	1	1	N	
	R1285	Y	N	1	1	N	
	R1286	Y	N	1	1	N	
	R1287	Y	N	1	1	N	
	R1288	Y	N	1	1	N	
	R1289	Y	N	1	1	N	
	R1290	Y	N	1	1	N	
	R1291	Y	Y	1	2	N6	
	R1292	Y	N	1	2	N	
	R1293	Y	Y	1	2	N6	
	R1294	Y	N	1	2	N	
	R1295	Y	N	1	2	N	
	R1296	Y	N	1	2	N	
	R1297	Y	N	1	2	N	
	R1298	Y	N	1	2	N	
	R1299	Y	Y	1	2	N2	
	R1300	Y	N	1	2	N	
	R1301	Y	N	1	2	N	
	R1302	Y	N	1	2	N	
	R1303	Y	N	1	2	N	
	R1304	Y	Y	1	2	N8	
	R1305	Y	N	1	2	N	
	R1306	Y	N	1	2	N	
	R1307	Y	Y	2	4	N7	
	R1308	Y	N	1	2	N	
	R1309	Y	N	1	2	N	
	R1310	Y	N	1	2	N	
	R1311	Y	N	1	2	N	
	R1312	Y	Y	1	2	N9	
	R1313	Y	N	1	2	N	
	R1314	N					
	R1315	Y	Y	2	2	N10	
	R1316	Y	Y	1	3	N11	
	R1317	Y	N	1	2	N	
	R1318	Y	Y	1	2	N10	
	R1319	Y	Y	1	2	N12	
	R1320	Y	N	1	1	N	
	R1321	N					
	R1322	N					
	R1323	N					
	R1324	N					
	R1325	N					
	R1326	N					
	R1327	N					
	R1328	Y	N	1	2	N	
	R1329	Y	N	1	2	N	
	R1330	N	N	1	2	N	
	R1331	N	Y	1	3	N13	
	R1332	N					

	R1333	N					
	R1334	N					
	R1335	N					
	R1336	N					
	R1337	N					
	R1338	N					
	R1339	N					
	R1340	N					
	R1341	N					
	R1342	N					
	R1343	N					
	R1344	N					
	R1345	N					
	R1346	N					
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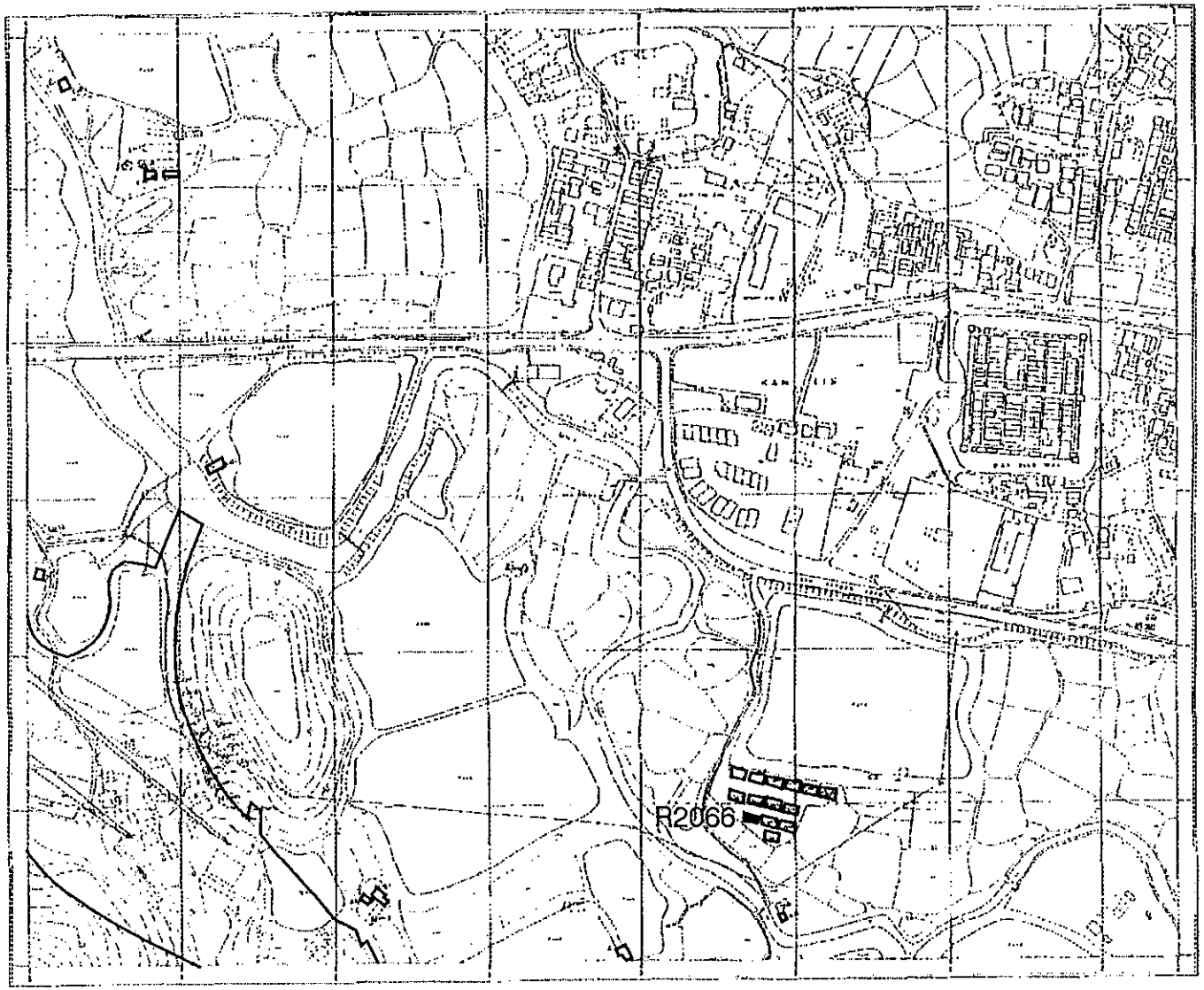
	R1349	N					
	R1350	N					
	R1351	N					
	R1352	N					
	R1353	N					
	R1354	N					
	R1355	Y	N	1	1	N	
	R1356	Y	N	1	1	N	
	R1357	Y	N	1	1	N	
	R1358	Y	Y	2	2	N17	
	R1359	Y	N	1	2	N	
	R1360	Y	N	1	2	N	
	R1361	Y	N	1	1	N	
	R1362	Y	Y	1	2	N16	
	R1363	Y	N	1	2	N	
	R1364	N					
	R1365	Y	N	1	1	N	
	R1366	Y	N	1	1	N	
	R1367	Y	N	1	1	N	
	R1368	N					
	R1369	N					
	R1370	N					
	R1371	Y	Y	2	2	N14	
	R1372	Y	N	0	3	N	
	R1373	Y	N	1	2	N	
	R1374	Y	Y	1	2	N18	
	R1375	Y	Y	1	2	N15	
	R1376	N					
	R1377	Y	N	1	2	N	
	R1378	Y	N	1	2	N	
	R1379	Y	Y	1	2	N	
	R1380	Y	Y	1	2	N	
	R1381	Y	Y	1	2	N22	
	R1382	Y	Y	1	2	N	
	R1383	Y	Y	1	2	N23	
	R1384	Y	Y	1	2	N	
	R1385	N					
	R1386	Y	Y	2	2	N27	
	R1387	Y	N	1	2	N	
	R1388	Y	N	1	2	N	
	R1389	Y	N	1	2	N	
	R1390	N					
	R1391	N					
	R1392	N					
	R1393	N					
	R1394	N					
	R1395	Y	Y	1	2	N20	
	R1396	Y	Y	2	2	N21	
	R1397	Y	N	1	2	N	
	R1398	Y	N	1	2	N	
	R1399	Y	N	1	2	N	
	R1400	Y	Y	2	2	N25	
	R1401	Y	Y	1	2	N26	
	R1402	Y	N	1	2	N	
	R1403	N					
	R1404	N					
	R1405	N					
	R1406A	Y	N - GARAGE	2	2	N28	
	R1406B	AS R1406A					

	R1406C	AS R1406A					
	R1407	Y	N	1	2	N	
	R1408	Y	Y	1	2	N29	
	R1409	Y	N	1	1	N	
	R1410	Y	N	1	2	N	
	R1411	Y	N	1	1	N	
	R1412	Y	N	1	1	N	
	R1413	Y	Y	1	2	N30	
	R1414	N					
	R1415	N					
	R1416	N					
	R1417	N					
	R1418	N					
	R1419	N					
	R1420	N					
	R1421	N					
	R1422	Y	N	1	2	N	
	R1423	Y	N	1	2	N	
	R1424	Y	AS R1406A				
	R1425	N					
	R1426	N					
	R1427	Y	N	1	2	N	
	R1428	Y	N	1	2	N	
	R1429	Y	N	1	2	N	
	R1430	Y	N	1	2	N	
	R1431	Y	Y	1	2	N23	
	R1432	Y	Y	1	2	N34	
	R1433	Y	N	1	2	N	
	R1434	Y	N	1	1	N	
	R1435	N					
	R1436	Y	Y	2	3	N31	
	R1437	Y	N	2	2	N	
	R1438	Y	Y	2	4	N32	
	R1439	Y	Y	2	4	N33	
	R1440	Y	N	1	2	N	
	R1441	Y	Y	2	4	N32	
	R1442	Y	N	1	2	N	
	R1443	Y	Y	1	2	N24	
	R1444	Y	N	1	1	N	
	R1445	Y	N	1	1	N	
	R1446	Y	N	1	1	N	
	R1447	Y	N	1	1	N	
	R1448	Y	N	1	1	N	
	R1449	Y	N	1	1	N	
	R1450	-	-	-	-	-	
	R1451	Y	N	1	1	N	
	R1452	Y	N	1	1	N	
	R1453	Y	N	1	1	N	
	R1454	Y	N	1	1	N	
	R1455	Y	N	1	1	N	
	R1456	Y	N	1	1	N	
	R1457	Y	N	1	1	N	
	R1458	Y	N	1	1	N	
	R1459	Y	N	1	2	N	
	R1460	Y	Y	1	2	O12	
	R1461	Y	N	1	2	N	
	R1462	Y	N	1	2	N	
	R1463	Y	N	1	2	N	
	R1464	Y	N	1	2	N	
	R1465	Y	N	1	2	N	
	R1466	Y	N	1	2	N	
	R1467	Y	N	1	2	N	
	R1468	Y	N	1	2	N	
	R1469	Y	Y	1	3	O2	
	R1470	Y	N	1	2	N	
	R1471	Y	N	1	2	N	
	R1472	Y	Y	1	3	N37	
	R1473	Y	Y	1	3	O1	
	R1474	Y	N	1	2	N	
	R1475	Y	N	1	1	N	
	R1476	Y	N	1	2	N	
	R1477	Y	Y	2	4	N36	
	R1478	Y	N	1	2	N	
	R1479	Y	N	1	2	N	
	R1480	Y	Y	1	2	N36	

	R1481	Y	Y	1	2	O3	
	R1482	Y	N	1	2	N	
	R1483	Y	N	1	2	N	
	R1484	Y	N	1	2	N	
	R1485	Y	Y	1	2	O4	
	R1486	Y	N	1	1	N	
	R1487	Y	N	1	1	N	
	R1488	Y	N	1	2	N	
	R1489	Y	N	1	2	N	
	R1490	Y	N	1	2	N	
	R1491	Y	Y	1	2	O5	
	R1492	Y	N	1	1	N	
	R1493	Y	N	1	1	N	
	R1494	Y	N	1	1	N	
	R1495	Y	N	1	1	N	
	R1496	Y	N	1	1	N	
	R1497	Y	Y	1	2	O8	
	R1498	Y	N	1	1	N	
	R1499	Y	N	1	2	N	
	R1500	Y	N	1	2	N	
	R1501	Y	N	1	2	N	
	R1502	Y	N	1	2	N	
	R1503	Y	N	1	2	N	
	R1504	Y	N	1	2	N	
	R1505	Y	N	1	2	N	
	R1506	Y	N	1	2	N	
	R1507	Y	N	1	2	N	
	R1508	Y	N	1	2	N	
	R1509	Y	Y	1	3	O6	
	R1510	Y	Y	1	3	O6	
	R1511	Y	N	1	2	N	
	R1512	Y	Y	1	3	O7	
	R1513	Y	N	1	2	N	
	R1514	Y	N - SCHOOL	1	4	O37, O38	
	R1515	Y	Y	1	2	O17	
	R1516	Y	N	1	2	N	
	R1517	Y	N	1	1	N	
	R1518	Y	N	1	1	N	
	R1519	Y	N	1	1	N	
	R1520	Y	N	1	1	N	
	R1521	Y	N	1	1	N	
	R1522	Y	N	1	2	N	
	R1523	Y	N	1	2	N	
	R1524	Y	Y	1	2	O18	
	R1525	Y	Y	1	3	O9	
	R1526	Y	N	1	2	N	
	R1527	Y	N	1	2	N	
	R1528	Y	N	1	3	N	
	R1529	Y	Y	2	3	O10	
	R1530	Y	N	1	2	N	
	R1531	Y	Y	1	3	O11	
	R1532	Y	N	1	2	N	
	R1533	Y	N	1	2	N	
	R1534	Y	N	1	2	N	
	R1535	Y	N	1	1	N	
	R1536	Y	N	1	1	N	
	R1537	Y	N	1	1	N	
	R1538	Y	N	1	1	N	
	R1539	Y	N	1	2	N	
	R1540	Y	Y	1	2	O13	
	R1541	Y	N	1	1	N	
	R1542	Y	N	1	1	N	
	R1543	Y	N	1	2	N	
	R1544	Y	N	1	2	N	
	R1545	Y	N	1	2	N	
	R1546	Y	Y	1	3	O14	
	R1547	Y	N	1	1	N	
	R1548	Y	N	1	1	N	
	R1549	Y	N	1	2	N	
	R1550	Y	N	1	2	N	
	R1551	Y	N	1	2	N	
	R1552	Y	N	1	2	N	
	R1553	Y	N	1	1	N	
	R1554	Y	N	1	2	N	
	R1555	N					

	R1556	Y	Y	1	2	O16	
	R1557	Y	N	1	2	N	
	R1558	Y	N	1	2	N	
	R1559	Y	N	1	2	N	
	R1560	Y	N	1	2	N	
	R1561	Y	Y	2	2	O15	
	R1562	N					
	R1563	N					
	R1564	N					
	R1565	N					
	R1566	N					
	R1567	N					
	R1568	N					
	R1569	N					
	R1570	N					
	R1571	N					
	R1572	Y	Y	2	3	O19	



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary

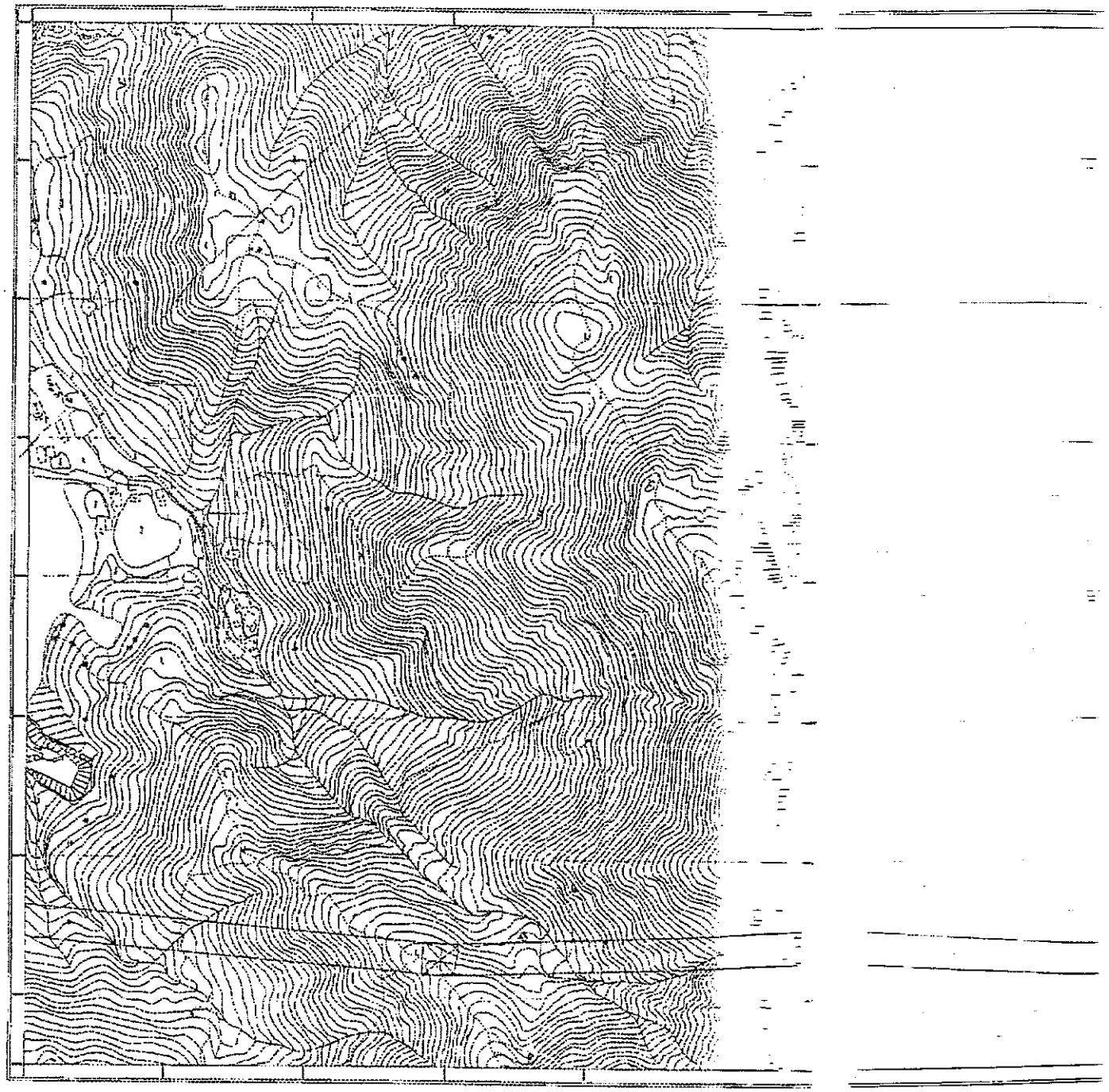
Survey Map 11

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 11

Key Used to Rate Condition of the Sensitivie Receivers :		
	1	Abandoned or Derelict
	2	Poor Construction (Wood / Sheet / No Glazing)
	3	Solid Construction (Concrete / Brick / Glazing)
	4	Modern (e.g. Village House)

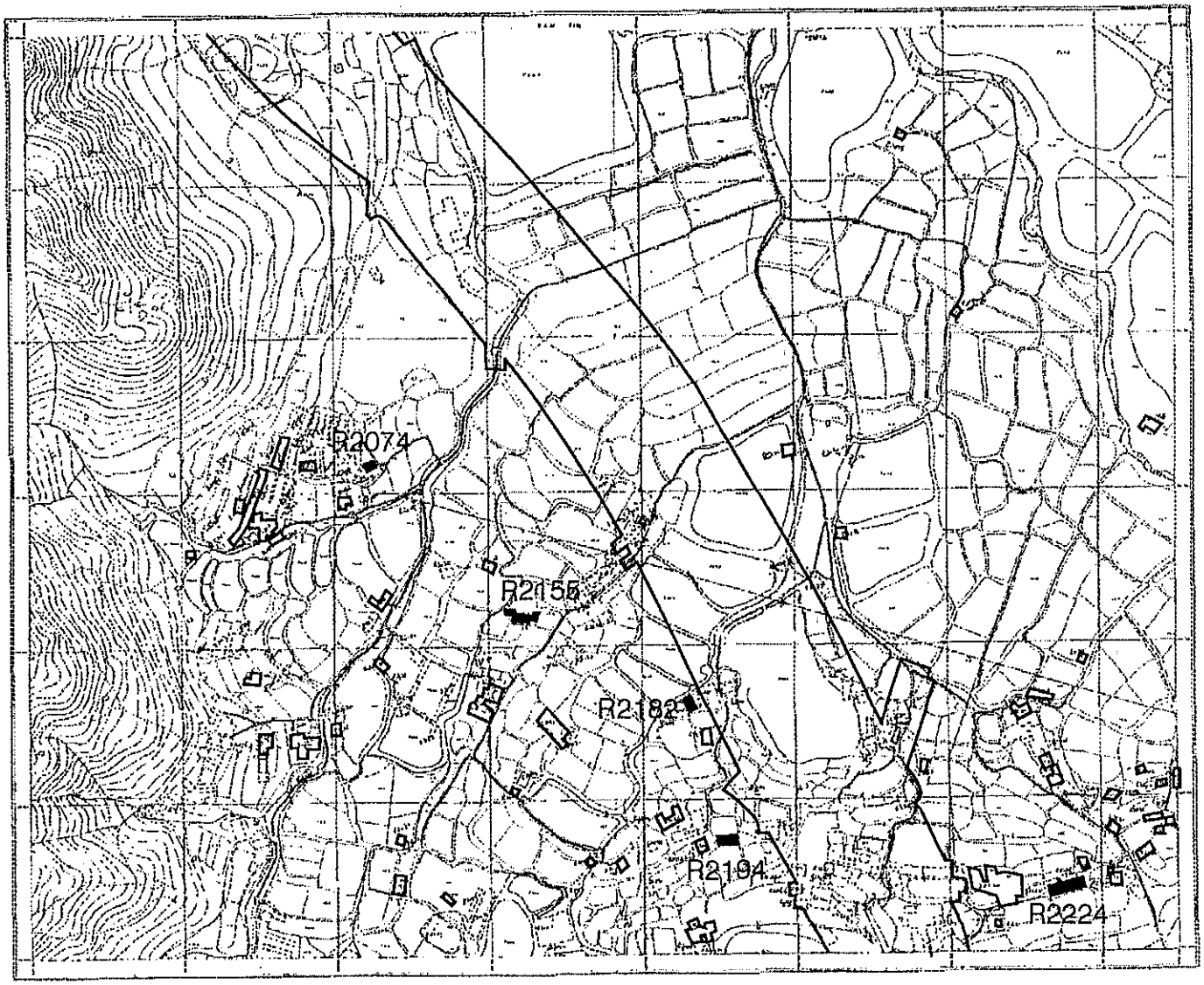
Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R2022	Y	Y	2	4	R13
R2023	Y	N	1	3	N
R2024	Y	N	1	2	N
R2025	Y	N	1	2	N
R2026	Y	N	1	3	N
R2027	Y	Y	2	4	R14
R2028	Y	Y	1	4	R14
R2029	Y	- 3 SCRAPYARD	2	4	R15
R2030	Y	N - SCARPYARD	2	4	R16
R2031	Y	Y	1	2	R17
R2032	Y	N	1	2	N
R2033	Y	Y	1	2	R18
R2034	Y	N	1	2	N
R2035	Y	N	1	2	N
R2036	N				
R2037	N				
R2038	N				
R2039	Y	Y	1	2	R19
R2040	Y	N	1	2	N
R2041	Y	Y	1	2	R20
R2042	Y	N	1	2	N
R2043	Y	N	1	2	N
R2044	Y	N	1	2	N
R2045	Y	N	1	2	N
R2046	Y	N	1	2	N
R2047	Y	N	1	2	N
R2048	Y	Y	2	3	R21
R2049	Y	N	1	2	N
R2050	Y	N	1	2	N
R2051	Y	Y	1	2	R23
R2052	Y	Y	1	2	R23
R2053	N				
R2054	Y	N	1	2	N
R2055	Y	Y	1	2	S1
R2056	Y	Y	3	4	R25
R2057	Y	Y	3	4	R25
R2058	Y	Y	3	4	R25
R2059	Y	Y	3	4	R25
R2060	Y	Y	3	4	R25
R2061	Y	Y	3	4	R25
R2062	Y	Y	3	4	R25
R2063	Y	Y	3	4	R25
R2064	Y	Y	3	4	R25
R2065	Y	Y	3	4	R25
R2066	Y	Y	3	4	R25
R2067	Y	Y	3	4	R25
R2068	Y	Y	3	4	R25
R2069	Y	Y	3	4	R25
R2070	Y	N	1	2	N
R2071	Y	Y	2	2	R24



SURVEY SHEET - EXISTING SR'S SHEET 12

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R1571	N	(Overlaps onto Sheet 10)			
R1573	N				



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling
- Project Site Boundary

Survey Map 13

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

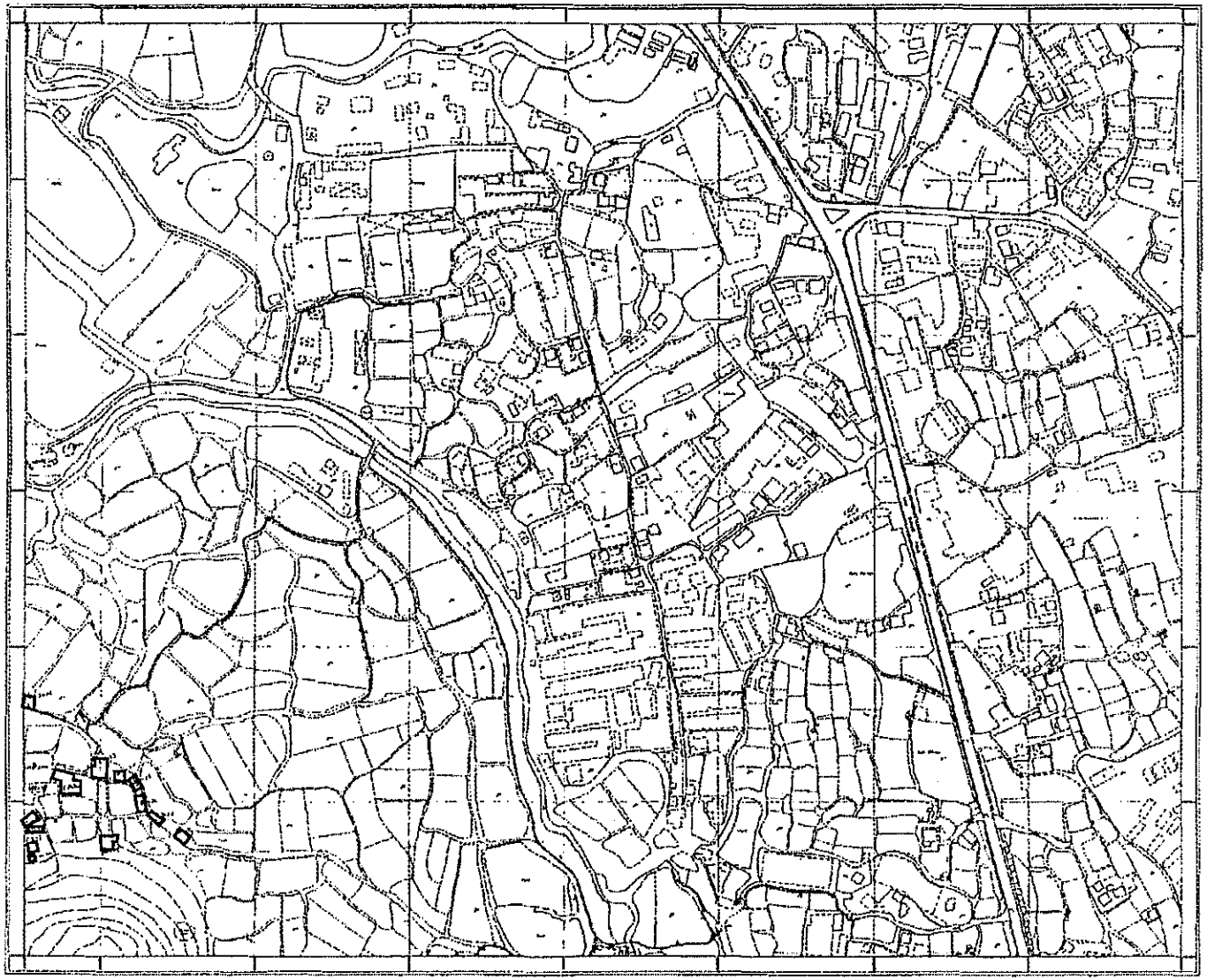
SURVEY SHEET - EXISTING SR'S SHEET 13

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R2072	Y	N	1	2	N
R2073	Y	N	1	2	N
R2074	Y	Y	1	2	S4
R2075	Y	N	1	2	N
R2076	Y	N	1	2	N
R2077	Y	N	1	2	N
R2078	Y	N	1	2	N
R2079	Y				
R2080	Y	N	1	2	N
R2081	Y	Y	1	2	S5
R2082	Y	N	1	2	N
R2083	Y	N	1	2	N
R2084	Y	N	1	2	N
R2085	Y	N	1	2	N
R2086	Y	N	1	2	N
R2087	Y	N	1	2	N
R2088	Y	N	1	2	N
R2089	Y	Y	1	2	S6
R2090	Y	N	1	2	N
R2091	Y	N	1	2	N
R2092	Y	Y	1	2	S7
R2093	Y	N	1	2	N
R2094	Y	N	1	1	N
R2095	Y	N	1	2	N
R2096	Y	N	1	2	N
R2097	Y	N	1	2	N
R2098	Y	Y	1	2	S12
R2099	Y	Y	1	2	S11
R2100	Y	N	1	2	N
R2101	Y	N	1	2	N
R2102	Y	N	1	2	N
R2103	Y	Y	2	2	S8, S10
R2104	Y	N	1	2	N
R2105	N				
R2106	Y	Y	1	2	S9
R2107	Y	N	1	1	N
R2108	Y	N	1	1	N
R2109	Y	N	1	2	N
R2110	Y	Y	2	2	S13
R2111	Y	Y	1	2	S14
R2112	Y	N	1	2	N
R2113	Y	N	1	2	N
R2114	Y	N	1	2	N
R2115	Y	N	1	2	N
R2116	Y	Y	1	2	S18
R2117	Y	N	1	2	N
R2118	Y	N	1	2	N
R2119	Y	N	1	2	N
R2120	Y	N	1	2	N
R2121	Y	N	1	2	N
R2122	Y	Y	1	2	
R2123	Y	Y	1	2	S19
R2124	Y	Y	1	2	S20
R2125	Y	Y	1	2	S17
R2126	Y	N	1	1	N
R2127	Y	Y	1	2	S15
R2128	Y	N	1	3	N
R2129	Y	N	1	2	N
R2130	Y	N	1	2	N
R2131	Y	N	1	2	N
R2132	Y	N	1	2	N
R2133	Y	Y	1	2	S22
R2134	Y	N	1	2	N
R2135	Y	N	1	2	N
R2136	Y	Y	1	2	S23

	R2137	Y	N	1	2	N	
	R2138	Y	Y	1	2	S24	
	R2139	Y	N	1	2	N	
	R2140	Y	Y	1	2	S25	
	R2141	Y	N	1	2	NN	
	R2142	Y	N	1	2	N	
	R2143	Y	N	1	2	N	
	R2144	Y	N	1	2	N	
	R2145	Y	N	1	2	N	
	R2146	Y	Y	1	2	T1	
	R2147	Y	Y	1	2	T1	
	R2148	Y	Y	1	3	T2	
	R2149	Y	N	1	3	N	
	R2150	Y	N	1	2	N	
	R2151	Y	Y	1	2	T3	
	R2152	Y	Y	2	4	T4	
	R2153	Y	N	1	1	N	
	R2154	Y	N	1	1	N	
	R2155	Y	Y	1	2	T5	
	R2156	N					
	R2157	N					
	R2158	Y	N	1	2	N	
	R2159	Y	N	1	2	N	
	R2160	Y	N	1	2	N	
	R2161	Y	N	1	2	N	
	R2162	Y	N	1	2	N	
	R2163	Y	N	1	2	N	
	R2164	Y	N	1	2	N	
	R2165	Y	N	1	2	N	
	R2166	Y	N	1	2	N	
	R2167	Y	Y	2	2	T6	
	R2168	Y	Y	2	3	T7	
	R2169	Y	Y	1	2	T7	
	R2170	Y	N	1	2	N	
	R2171	Y	N	1	1	N	
	R2172	Y	Y	2	2	T8	
	R2173	Y	N	1	1	N	
	R2174	Y	N	1	1	N	
	R2175	Y	N	1	1	N	
	R2176	Y	Y	1	2	T9	
	R2177A	Y	Y	1	2	S2	
	R2177B	Y	Y	1	2	S3	
	R2177C	Y	Y	1	2	T10	
	R2178A	Y	Y	1	2	T11	
	R2178B	Y	Y	2	3	U25	
	R2179	Y	Y	2	3	T12	
	R2180	Y	N	1	2	N	
	R2181	N					
	R2182	Y	Y	1	2	T13	
	R2183	Y	N	1	2	N	
	R2184	Y	N	1	2	N	
	R2185	Y	Y	2	2	T14	
	R2186	Y	N	1	2	N	
	R2187	Y	N	1	2	N	
	R2188	Y	Y	1	2	T17	
	R2189	Y	N	1	2	N	
	R2190	Y	N	1	2	N	
	R2191	Y	N	1	2	N	
	R2192	Y	N	1	2	N	
	R2193	Y	Y	1	2	T16	
	R2194	Y	Y	1	2	T15	
	R2195	Y	Y	1	2	T18	
	R2196	Y	N	1	2	N	
	R2197	Y	N	1	2	N	
	R2198	Y	N	1	2	N	
	R2199	Y	Y	1	2	T19	
	R2200	Y	N	1	1	N	
	R2201	Y	N	1	1	N	
	R2202	Y	N	1	1	1	
	R2203	Y	N	1	1	1	
	R2204	Y	N	1	1	1	
	R2205	Y	N	1	1	1	
	R2206	Y	N	1	1	1	
	R2207	Y	N	1	1	1	
	R2208	Y	Y	2	3	T25	

	R2209	Y	N	1	1	1	
	R2210	Y	N	1	1	1	
	R2211	Y	Y	1	2	T20	
	R2212	Y	Y	1	2	T20	
	R2213	Y	Y	1	2	T22	
	R2214	Y	Y	1	3	T21	
	R2215	Y	Y	1	3	T23	
	R2216	Y	N	1	1	N	
	R2217	Y	N	1	1	N	
	R2218	Y	Y	1	2	T24	
	R2219	Y		1	1	N	
	R2220	Y	Y	2	2	U1	
	R2221	Y	Y	1	2	U2	
	R2222	Y	N - TEMPLE	1	3	U3	
	R2223	Y	N	1	2	N	
	R2224	Y	Y	1	2	U15	
	R2225	Y	N	1	3	N	
	R2226	Y	Y	1	2	U13	
	R2227	Y	N	1	2	N	
	R2228	Y	Y	1	3	U12	
	R2229	Y	N	1	2	N	
	R2230	Y	N	1	2	N	
	R2231	Y	Y	1	3	U14	
	R2232	Y	Y	1	2	U11	
	R2233	Y	Y	1	2	N	
	R2234	Y	Y	1	2	N	
	R2235	Y	Y	2	3	U16	
	R2236	N					
	R2237	N					
	R2238	Y	Y	1	2	U19	
	R2239	Y	Y	1	2	U10	
	R2240	Y	N	1	2	N	
	R2241	Y	N	1	2	N	
	R2242	Y	Y	1	2	U10	
	R2243	Y	Y	2	2	U9	
	R2244	Y	N	1	2	N	
	R2245	Y	N	1	2	N	
	R2246	Y	Y	1	2	U8	
	R2247	Y	Y	1	2	U7	
	R2248	Y	N	1	2	N	
	R2249	Y	Y	1	2	U6	
	R2250	Y	Y	1	2	U5	
	R2251	Y	Y	1	2	U4	



LEGEND

Potential Sensitive Receiver

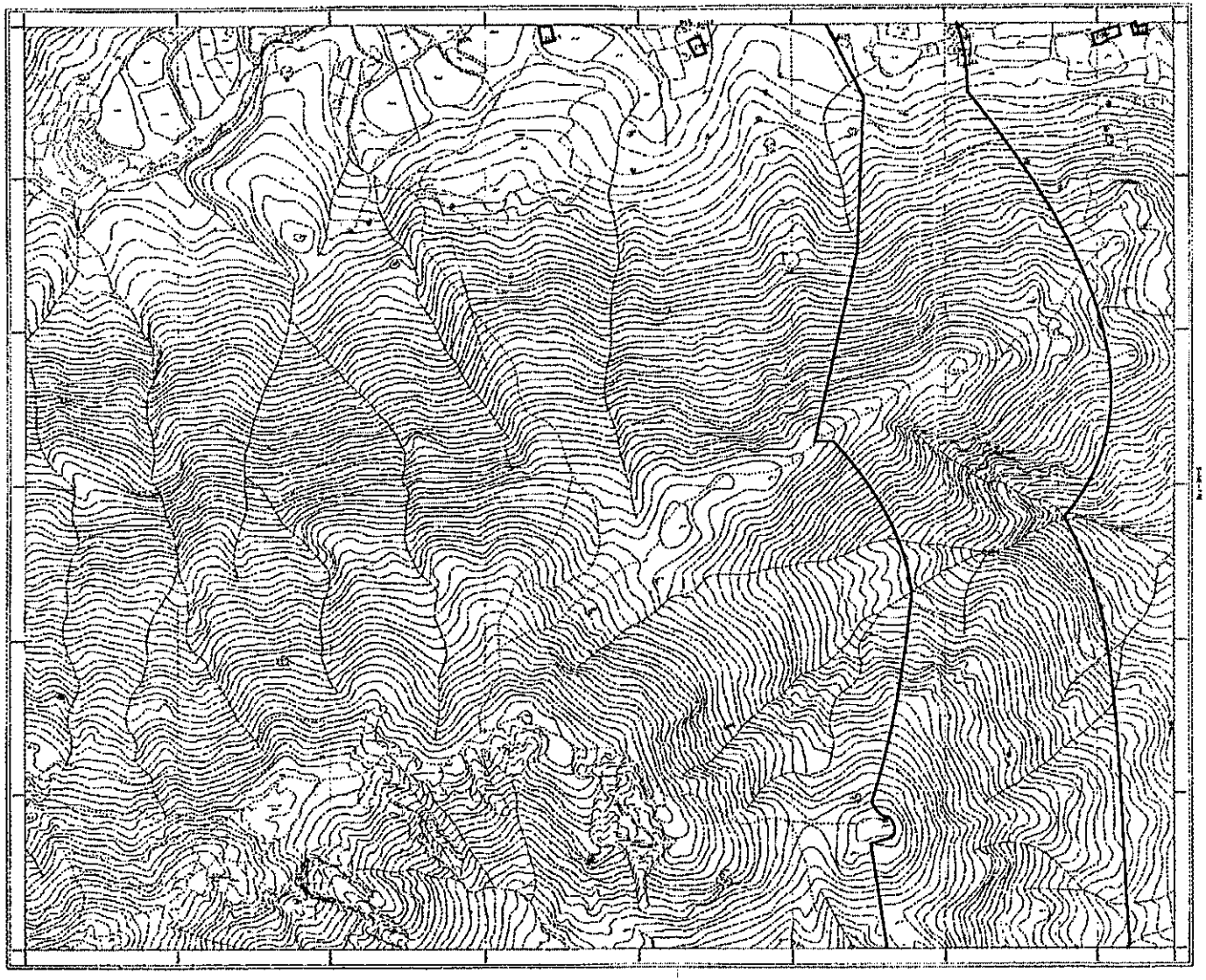
Survey Map 14

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 14

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R2419	Y	N	1	2	N
R2420	Y	N	1	2	N
R2421	Y	N	1	3	N
R2422	Y	Y	1	2	U24
R2423	Y	Y	1	2	U23
R2424	Y	Y	1	3	U23
R2425	Y	Y	1	3	U23
R2426	Y	Y	1	3	U23
R2427	Y	Y	1	2	U22
R2428	Y	Y	2	2	U21
R2429	Y	Y	1	2	U20
R2430	Y	Y	1	2	U18
R2431	Y	N	1	2	N
R2432	Y	Y	1	3	U17
R2433	Y	Y	1	3	U17
R2434	Y	N	1	2	N



LEGEND

Potential Sensitive Receiver

Project Site Boundary

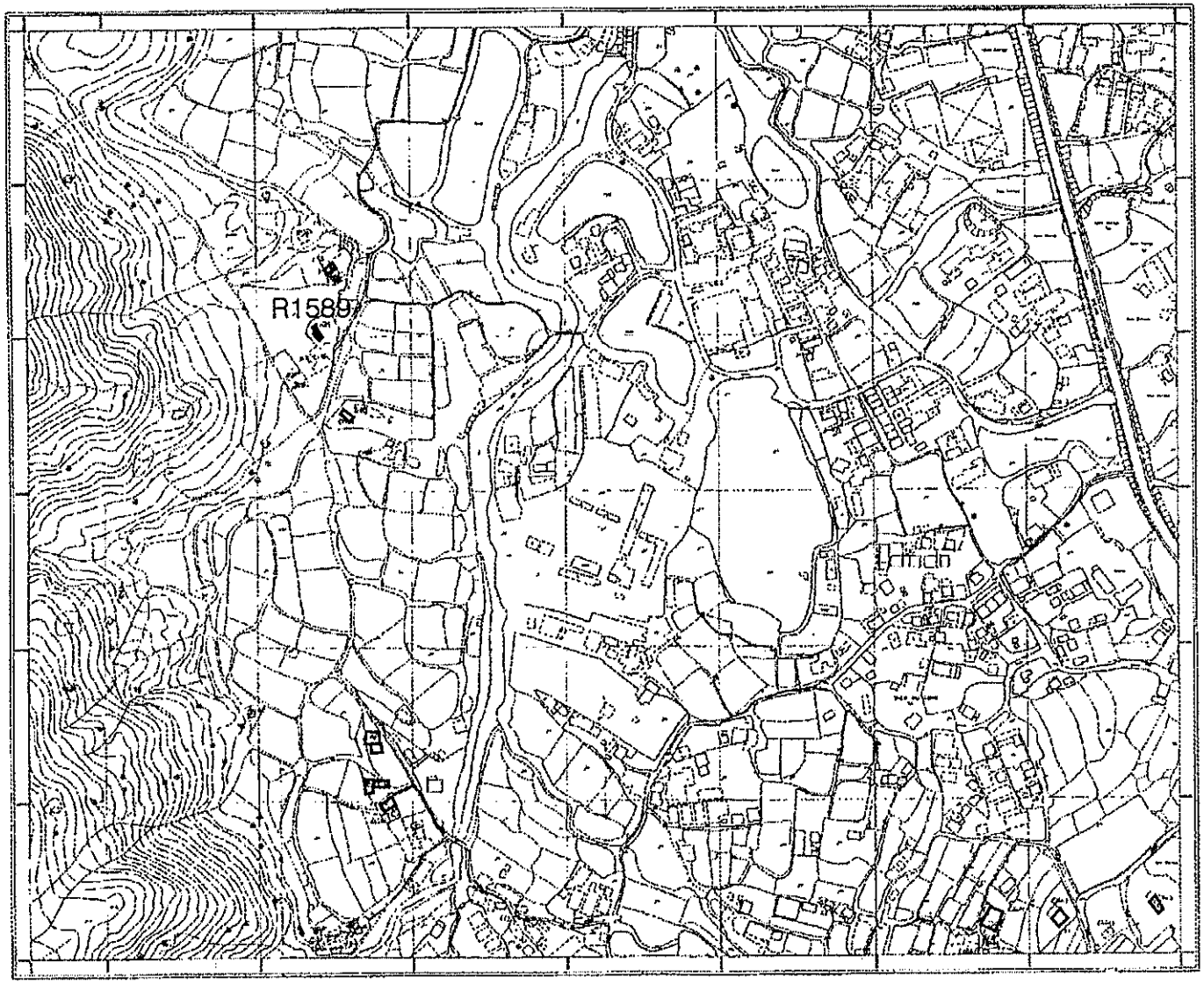
Survey Map 15

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 15

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R1574	Y	N	1	2	N
R1575	Y	Y	2	2	O21
R1576	Y	N	1	2	N
R1577	Y	N	1	2	N
R1578	Y	Y	2	2	O20
R1579	Y	N	1	2	N
R1580	Y	Y	1	2	O24
R1581	Y	N	1	2	N
R1582	Y	Y	1	2	O24
R1583	Y	Y	1	2	N
R1584	Y	Y	1	2	O23
R1585	Y	Y	1	2	O27



LEGEND

- Potential Sensitive Receiver
- Included in Noise/Air Modelling

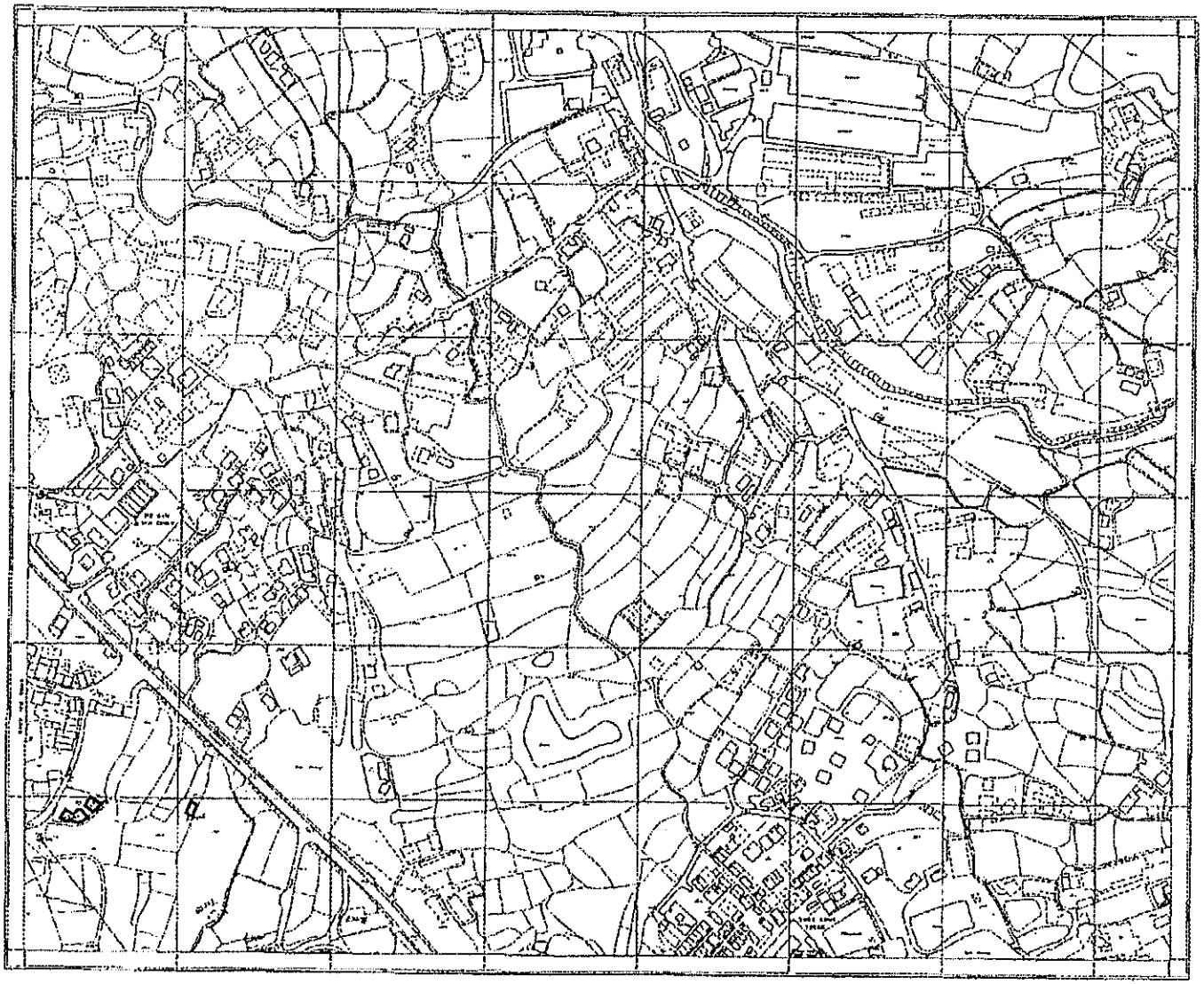
Survey Map 16

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 16

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R1586	Y	N	1	2	N
R1587	Y	Y	2	3	O27
R1588	Y	N	2	3	N
R1589	Y	Y	1	3	O26
R1590	Y	N	1	2	N
R1591	Y	N	1	2	N
R1592	Y	N	1	1	N
R1593	Y	N	1	1	N
R1594	Y	Y	2	3	O25
R1595	Y	N	1	2	N
R1596	Y	N	1	1	N
R1597	Y	N	1	2	N
R1598	Y	Y	2	3	O28
R1599	Y	Y	1	3	O29
R1600	Y	Y	2	3	O30
R1601	Y	N	1	3	N
R1602	Y	N	1	1	N
R1603	Y	N	1	1	N
R1604	Y	N	1	1	N
R1605	Y	N	1	1	N
R1606	Y	N	1	1	N
R1607	Y	N	1	1	N
R1608	Y	N	1	1	N
R1609	Y	N	1	1	N
R2412	Y	N - TEMPLE	1	3	V2
R2413	Y	Y	3	4	V3
R2414	Y	N	1	3	N
R2415	Y	Y	3	4	V5
R2416	Y	N	1	2	N
R2417	N				
R2418	N				



LEGEND

Potential Sensitive Receiver

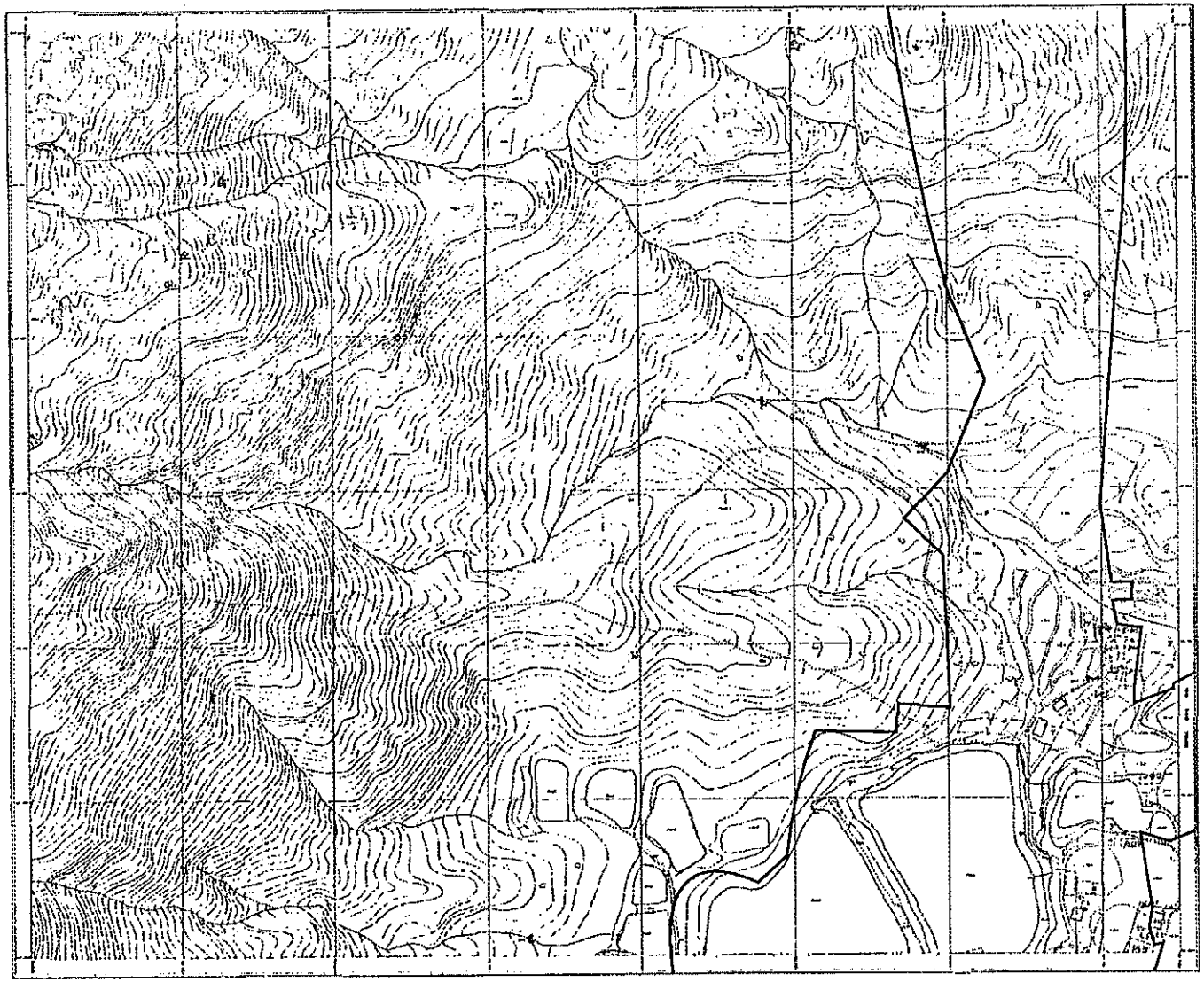
Survey Map 17

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING SR'S SHEET 17

Key Used to Rate Condition of the Sensitivie Receivers :	
1	Abandoned or Derelict
2	Poor Construction (Wood / Sheet / No Glazing)
3	Solid Construction (Concrete / Brick / Glazing)
4	Modern (e.g. Village House)

Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R2252	Y	N	1	1	N
R2274	Y	N	1	1	N
R2275	Y	N - FACTORY	2	2	V7
R2408A	Y	Y	2	4	V6
R2408B	Y	NN	1	1	N
R2409	Y	Y	1	2	V1
R2410	Y	Y	1	3	V1
R2411	Y	N	1	3	N



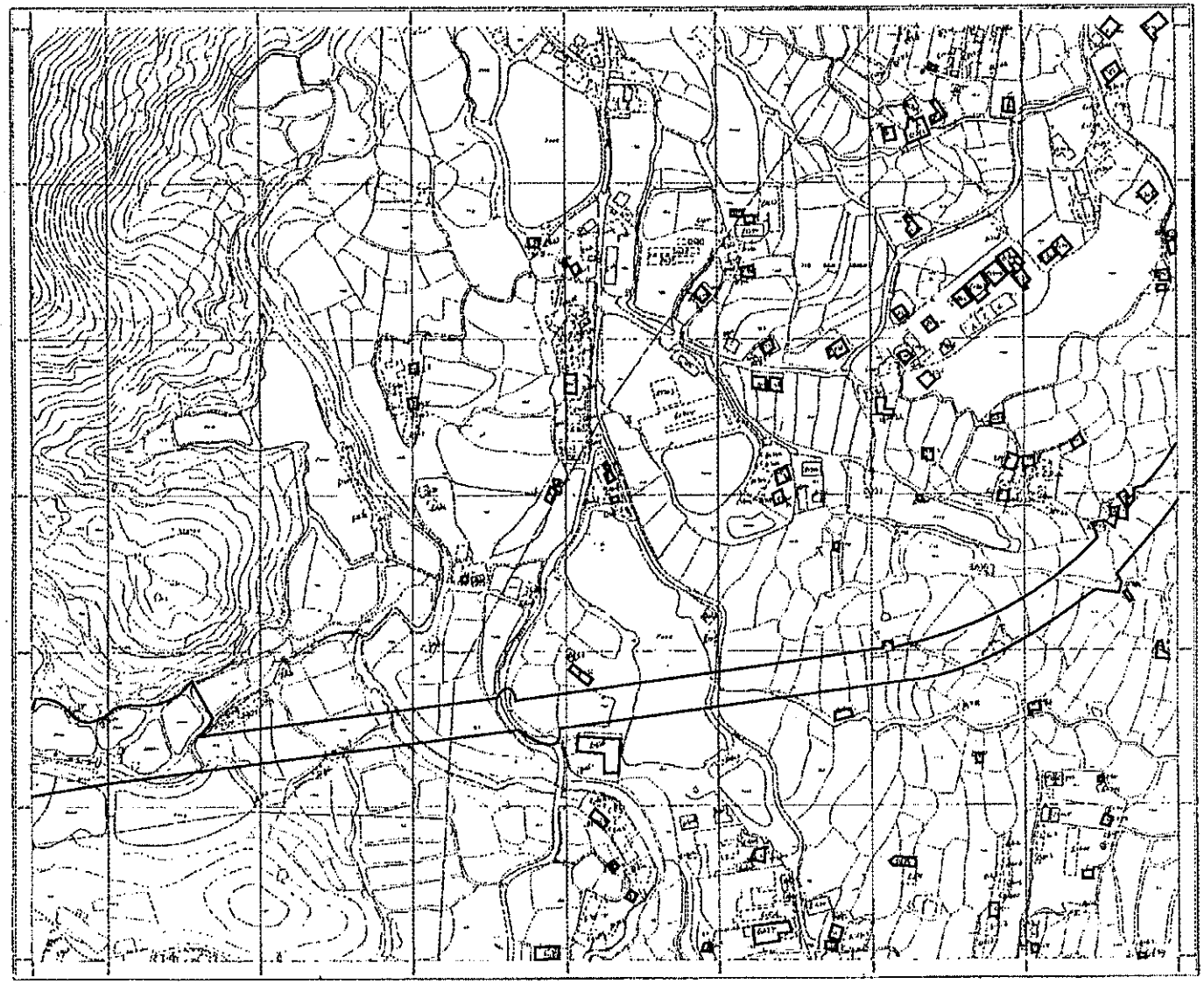
LEGEND

— Project Site Boundary

Survey Map 18

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

SURVEY SHEET - EXISTING NSR'S SHEET 18					
Reference	Exists (Y/N)	Residential (Y/N)	No. of Storeys	Condition	Photo Reference
R1610	Y	N	1	2	N
R1611	Y	N	1	2	N
R1612	Y	N	1	2	N
R1613	Y	N	1	2	N
R1614	Y	N	1	2	N
R1615	Y	N	1	2	N
R1616	Y	N	1	2	N
R1617	Y	N	1	2	N
R1618	Y	N	1	2	N
R1619	Y	N	1	2	N
R1620	Y	N	2	2	N
R1621	Y	N	2	2	N
R1622	Y	N	2	2	N
R1623	Y	N	2	2	N
R1624	Y	N	2	2	N



* Please note that Kam Sheung Access Road has been assessed in Route 3 TLT & YLA (Southern Section) DEIA

LEGEND

- Potential Sensitive Receiver
- Project Site Boundary

Survey Map 19

CONSULTANTS IN ENVIRONMENTAL SCIENCES (ASIA) LTD

APPENDIX 2
REINSTATEMENT AND MAINTENANCE PLAN FOR FISH PONDS AT AU TAU INTERCHANGE

Reinstatement and Maintenance Plan for Fish Ponds at Au Tau Interchange

Route 3 TLT & YLA - Northern Section

1 REGULATORY BACKGROUND

1.1 Construction Clauses and Wetland Mitigation

Construction Requirements of the Route 3 Project contain clauses 9.3.2 and 9.3.3 which specify maintenance of fish ponds affected by the project. These clauses are:

Clause 9.3.2 *The Franchisee shall be responsible for maintaining during the Construction Period those portions of ponds which form part of the Works Area and are not required for construction of the Works. Government is to hand these portions of ponds back to their former owners on completion of the Construction Period and the Franchisee is required to return the ponds to their original condition including the quality of the water.*

Clause 9.3.2 *The Franchisee shall be responsible for maintaining during the Construction Period all other ponds within the Works Sites which are not required for the Works. Ponds required temporarily during construction of the Works but not require do for the on-going maintenance and operation of the Constructed Facilities shall be reinstated to their original conditions including provision of suitable enhancements to improve their ecological value as determined by the Detailed Environmental Impact Assessment. As part of his construction proposals the Franchisee shall also design and re-provide permanent access equivalent to that in existence at the date of the execution of the Project Agreement, to these ponds at his own cost.*

Ponds meeting the criteria of both clauses are located within the northern section of the Route 3 Project. Ponds at the periphery of the Au Tau Interchange and alongside the alignment meet the criteria of Clause 9.3.2, and will revert to fish culture following completion of the project. Long-term maintenance of such ponds will be regulated by the agricultural leases under which the ponds are operated. Under these leases there are no provisions relating to wildlife conservation management.

Pond operators may choose to pursue alternate land uses involving conversion of fish ponds to other forms of agriculture or horticulture.

Ponds within the Au Tau Interchange area will not revert to fisheries management, but will be designated for use as wetland impact mitigation sites. These ponds meet the criteria of Clause 9.3.3, therefore must be restored with provision for enhanced ecological value.

1.2 Required Regulatory Guidance

1.2.1 Enhancement of "Ecological Value"

The phrase "ecological value' referred to in the Construction Requirements is qualitative and is potentially ambiguous. Characteristics of the water body, the pond contour, the surrounding topography, pond drainage, and the aquatic and pondside vegetation all influence the ecological value of the pond for various species of wild fauna. Ecological value may be high for some species of fauna, yet low for others. Changes in the physical or chemical characteristics of a pond may, therefore, benefit some species while discouraging use by others. For example, a shallow, reed-choked wetland would provide suitable cover and foraging habitat for birds of the Rallidae family (rails and crakes), but would discourage feeding by some birds of the Ardeidae family (herons and egrets). Shallow open water with peripheral vegetation would yield the opposite result.

Prior to release of the Planning Department study on the ecological value of fish ponds in the Deep Bay area, and for the purpose of this proposal, it is assumed that the ecological value to be enhanced is the ability of the ponds to support various species of birds which feed or nest in ponds or in wetland vegetation at the pond periphery or on the pond bunds.

1.2.2 Wildlife Management Versus Fisheries Management

Fish ponds which are covered by Clause 9.3.2 of the Construction Requirements are to be temporarily resumed during the construction phase, restored to their original condition, and then returned to their former owners for continued operation. These ponds are expected to provide ecological value equivalent to that provided prior to construction of the Route 3 Project. Because these ponds will revert to fisheries management, no wildlife conservation measures intended to enhance ecological value will be implemented. This is appropriate in that neither R3CC nor government will have authority to ensure that lessees will maintain or manage any such conservation measures.

Fish ponds covered by Clause 9.3.3 of the Construction Requirements will not revert to fish culture, but will be under the maintenance of the Hong Kong Government immediately following completion of construction. Because there is no requirement for fish culture in these ponds, the physical characteristics of the ponds and surrounding bunds will be designed and constructed to encourage use by birds of the groups indicated above. Design, construction, vegetation restoration, and maintenance measures for these ponds are described below.

2 POND DESIGN : ECOLOGICAL ENHANCEMENT

2.1 Drainage Design

2.1.1 Drainage Between Ponds

Drainage between ponds 1 and 2 is shown conceptually in Figure 1. Pond 2 would receive surface flow via box culvert C24. Overflow would be channelled to Pond 1 via underground pipeline. The overflow outlet level would be designed to prevent water from entering the

ponds from the Kam Tin River under high tide conditions, with some flexibility for altering pond water levels should this be required to optimise the ecological habitats.

Overflow from Pond 1 would be channelled through an underground pipeline through the Kam Tin River bank to Kam Tin River. As for Pond 2, the overflow outlet level would be a one-way gate to prevent Kam Tin River water from flowing into Pond 1 during high tides or periods of high stormwater levels.

Maintenance of the overflow structures would be the responsibility of the Hong Kong Government. Maintenance is anticipated to entail cleaning of any accumulation of debris from the water control structures.

2.1.2 Drainage Within Pond Catchments

Ponds 1 and 2 will be fed by short "stream" channels which will receive surface run-off from the slopes within the pond catchments. Stream channel beds will consist of coarse gravels with interspersed boulders to minimise risk of soil erosion.

2.2 Bank Slopes and Bottom Contours

2.2.1 Pond Banks

Pond banks will be gently sloped at the stream inlets to a gradient of approximately 1:10 (vertical:horizontal) (Kentula *et al.* 1992). The objective will be to provide a shallow zone at the stream inlet for water bird foraging. This will facilitate establishment of bank vegetation over a broad zone, and encourage use by water birds. Slightly steeper slopes would be acceptable at the outset because natural sedimentation would tend to reduce pond depth over time.

Pond banks which are continuations of highway fill slopes will be steeper (1:3) based on the contour of the fill slope.

2.2.2 Pond Bottom Contours

Pond bottom contours will be gently sloping to flat near the inlets of the constructed "stream channels". At the base of steeper fill slopes the bottom contours will be steeper. Inlet and overflow structures will be installed in ponds 1 and 2, but will not be required in pond 3. These will be designed to allow for a minimum channel size necessary to discharge the design level flood.

2.3 Revegetation

Revegetation, and landscaping of fill slopes, pond banks, and stream channels will be accomplished by hydroseeding and transplanting of whips of shrubs, trees, and bamboo. Only shrubs and short trees (such as *Gordonia axillaris*) will be used on upper pond banks to avoid interference with highway line of sight requirements.

Species of trees used for revegetation of the constructed "stream channels" leading to ponds 1 and 2 will include the following :

- *Sterculia lanceolata*
- *Celtis sinensis*
- *Sapium sebiferum*
- *Cleistocalyx operculata*
- *Syzygium jambos*
- *Bamboo (various species)*

Pond margins will be planted with a mixture of wetland shrubs and bamboo. As noted in the Northern Section Detailed EIA (Section 7.8.4), bamboo is a preferred nest substrate of herons and egrets in the Kam Tin area.

3 MAINTENANCE

Contractually, R3CC will hand over responsibility to maintain the restored ecologically enhanced ponds immediately following completion of construction. At that time, maintenance responsibilities will be transferred to the Hong Kong Government. As described in Section 4.10, R3CC will complete a regular audit of the success of pond restoration quarterly with respect to ardeid use and twice per year for water quality, for 2 years following construction.

3.1 Planting

Pond bank and stream channel vegetation restoration will be audited as part of the EM&A programme (refer to Section 4.10). Tree and shrub survival will be assessed, following which replacement plantings will be made as needed.

3.2 Water Control Structures

Water control inlets and outlets will be maintained to remove accumulated debris and to adjust water levels. The one-way flow gate at the Kam Tin River bank will be maintained to ensure that reverse flow of Kam Tin River water into pond 1 is not possible.

4 REFERENCES CITED

Kentula, M. E., R. P. Brooks, S. E. Gwin, C. C. Holland, A. D. Shennan, and J. C. Sifneos. 1992. *An Approach to Improving Decision Making in Wetland Restoration and Creation.* Edited by A. J. Hairston, U. S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon, USA. 151pp.

APPENDIX 3
FIELD DATA PRO-FORMAS

ROUTE 3 AIR MONITORING FIELD DATA SHEET

1. General

Test Number	
Date of sampling	
Station ID	

Sampler type	
Serial number	

2. Weather summary

Observed estimate during sampling

Weather station ID

Rainfall (Y/N)

Nil	
Trace	
Low	
Medium	
High	

Location of nearest weather data logger

South of Tunnel (Y/N)	

Wind speed (Y/N)

Nil	
Low	
Medium	
High	

North of Tunnel (Y/N)	

Wind direction (degrees)* ____

* NB this is the direction from which wind originates

3. Observed potential dust sources during monitoring

All boxes to be filled Y/N

Burning		Stockpile		Road/track surface	
Construction					
Other		Source if 'Other'			

4. 1-Hour Average TSP Results

Parameter	TSP (µg per cubic metre)		
	Hour 1	Hour 2	Hour 3
Monitoring commenced			
Zero point reading			
Recorded result			
Final corrected result			

Field staff: _____ Checked by: _____

Date: _____ Date: _____

ROUTE 3 NOISE MONITORING FIELD DATA SHEET

1. General

Test Number	
Date of sampling	
Station ID	

Sampler type	
Serial number	

2. Weather summary

Observed estimate during sampling *Weather station ID*

Wind speed (Y/N)

Nil	
Low	
Medium	
High	

Location of nearest weather data logger

South of Tunnel (Y/N)	

Rainfall (Y/N)

Nil	
Trace	
Low	
Medium	
High	

North of Tunnel (Y/N)	

Wind direction (degrees)*

* NB this is the direction from which wind originates

3. Calibration

	Calibrator type	Calibrator noise level dB	Signal frequency KHz	Result dB(A)
Before				
After				

4. Observed noise sources during monitoring

All boxes to be filled Y/N

Source	None	Impulsive	Intermittent	Continuous
Construction*				
Traffic				
Other				

* Other than Route 3

Description if 'Other'	

5. Results

	Start	End
Monitoring period		

Sample	Leq (5min), dB(A)
1	
2	
3	
4	
5	
6	

Equivalent Leq (30 min), dB(A)	

Field staff: _____ Checked by: _____

Date: _____ Date: _____

ROUTE 3 - COUNTRY PARK SECTION

Fresh Water Quality Monitoring
Suspended Solids Concentration

Date : _____ Test No.: _____

	Sample Identification			Filtered Sample Vol (mL)	Initial Weight of Filter (g)	Final Weight of Filter (g)	Weight Difference (g)	SS Conc (mg/L)
	Location	Sample No.	Filter Paper No.					
Fresh Water Discharge								
Batching Plant Discharge								

Date : _____ Test No.: _____

	Sample Identification			Filtered Sample Vol (mL)	Initial Weight of Filter (g)	Final Weight of Filter (g)	Weight Difference (g)	SS Conc (mg/L)
	Location	Sample No.	Filter Paper No.					
Fresh Water Discharge								
Batching Plant Discharge								

Tested by : _____/_____ Checked by : _____

Date : _____ Date : _____

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ROUTE 3 COMPLIANCE WATER MONITORING FIELD DATA SHEET - FRESH WATER QUALITY

1. General

Date		Test number	

2. Weather summary

	Sunny		Cloudy		Rain	
Observed conditions (Y/N)						
Royal Observatory data	Hours/day		Oktas		(mm)	

3. Calibration

(a) DO Meter Calibration
(Meter S/N: ; Probe S/N:)

Testing	% Saturation
Before Measurement ("Cal" mode can be adjusted to 100%)	
After Measurement ("Cal" mode cannot be adjusted to 100%)	

(b) Turbidity Meter Calibration
(Meter S/N:)

Turbidity (NTU)	Distilled Water
Before Measurement	
After Measurement	

4. Results

Station Type	Station ID	Sample ID	Sampling time		Temperature °C		DO (mg/l)		DOS (%)		Turbidity (NTU)		pH		Comments
			Start	End	1	2	1	2	1	2	1	2	1	2	
FRESH WATER DISCHARGE															
BATCHING PLANT DISCHARGE															

Field staff: _____ Checked by: _____

Date: _____ Date: _____