Mouchel Asia Limited

Consulting Engineers

Territory Development Department
The Government of Hong Kong Special Administrative Region

Agreement No. CE 71/95

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Environmental and Engineering Investigation

Final Environmental Impact Assessment Report

Mouchel Asia Environmental

in association with

Aspinwall Clouston
and
MVA Asia

March 1998

Mouchel

Territory Development Department
The Government of Hong Kong Special Administrative Region

Agreement No. CE 71/95

Texaco Road Improvement between Texaco Road and Tsuen Tsing Interchange Environmental and Engineering Investigation

Final Environmental Impact Assessment Report

Document No. SVJ/90586				
	Name	Position	Signature	Date
Prepared by	H J Cochrane	Senior Environmental Scientist	Helen Cochrane	30/3/98
Checked by	S. V. Jones	Project Manager		31/3/98
Approved by	S. V. Jones	Project Director		31/3/98
Revision No.	B			
Copy No.				

Mouchel Asia Environmental

CONTENTS

TABLES

DRAWINGS

APPENDICES

1.0 Introduction

1.0 INTRODUCTION

1.1 Background

The findings of the Completion of Texaco Road/Tsuen Wan Bypass Interchange and Improvements to Texaco Road:Final Report, issued in 1986, concluded that the Texaco Road improvements should be divided into three work packages; the initial, intermediate and ultimate schemes. The initial scheme comprised the implementation of at-grade improvements to Texaco Road between Castle Peak Road and Kwai Fuk Road and construction of a 2 lane flyover over this same area, while the complementary intermediate scheme progressed the improvements in the same manner between Kwai Fuk Road and Texaco Road Roundabout. These works were completed in 1993 and 1995 respectively.

The two main elements of the third 'ultimate' stage of the overall Texaco Road improvement scheme comprise two broad elements involving the construction of a single two-lane flyover from Castle Peak Road/Texaco Road Interchange to Tsuen Tsing Interchange, approximately 700m in length, and the realignment of Tai Wo Hau Road. The ultimate scheme works were originally identified for commencement no later than January 2000 for completion by early 2002.

Mouchel Asia Limited, in association with MVA and Aspinwall Clouston, were commissioned in January 1997 to undertake an environmental and engineering investigation of the ultimate scheme proposed during the feasibility stage. The major elements of the investigation included:

(i) an environmental and visual impact assessment of the proposed works;

(ii) the preparation of a landscape layout plan;

(iii) an assessment of the existing and projected traffic flows on Texaco Road through fresh modelling with a view to confirming the required implementation date;

(iv) a traffic impact assessment;

(v) an engineering review of the preliminary design, including drainage and utilities; and

(vi) a review of the land resumption issues of the Crown of Thorns Church.

Elements (i) and (ii) only are the topic of this report with assessments made under sections (iii) to (vi) being reported in separate documents.

1.2 Objectives of the Environmental Impact Assessment

An Environmental Impact Assessment (EIA) of the remaining works was commissioned to provide information on the nature and extent of environmental impacts arising from

its construction and operation and all related activities. The broad objectives of the EIA, covering both noise and air quality assessments, are identified as follows:

(a) to identify and describe the elements of the community and environment likely to be affected by the proposed Project;

(b) to identify and quantify emission sources;

(c) to identify and evaluate the net environmental impacts and cumulative effects expected to arise during the execution of the Project in relation to the existing and planned community and neighbouring land uses;

(d) to recommend cost-effective methods and measures, and to identify standards, which may be necessary to mitigate these impacts and reduce them to acceptable levels so as to minimize pollution, nuisance and environmental disturbance arising from the Project;

(e) to design and specify environmental monitoring and audit requirements necessary to ensure the effectiveness of the environmental protection measures adopted; and

(f) to identify any necessary additional studies.

1.3 Report Structure

In meeting the objectives set out above, this report contains the following sections:

- Section 2.0 describes the project and its key elements;
- Section 3.0 presents the relevant environmental standards and guidelines for construction and operational noise and air quality and the landscape and visual aspects of the study;
- Section 4.0 details the traffic predictions used as the basis to assess the operational impacts of the study
- Section 5.0 assesses the noise impacts likely to occur during the construction and operation of the proposed alignment and recommends appropriate mitigation measures;
- Section 6.0 assesses the air pollution impacts likely to arise during the construction and operational phases, together with appropriate mitigation measures for their amelioration;
- Section 7.0 describes the environmental monitoring and audit requirements during the construction and operational phase of the project;

- Section 8.0 details the landscape and visual impact assessment findings and includes the landscape mitigation plan; and
- Section 9.0 summarises the conclusions and recommendations of this assessment.

2.0 Project Description

2.0 PROJECT DESCRIPTION

2.1 Key Work Elements and Project Programme

This Project is the remaining part of the Ultimate Scheme and consists of a single two-lane flyover from Castle Peak Road/Texaco Road Interchange to Tsuen Tsing Interchange and the realigned Tai Wo Hau Road. The layout for the Project and the Study Area are shown on Drawing 2.1.

The proposed flyover will commence just north of the present Tai Wo Hau Road and connect directly into the existing Texaco Road at this point. The structure has to climb sharply to clear the realigned Tai Wo Hau Road but after that continues southwards, parallel to the existing viaducts. After Kwai Fuk Road, which also requires to be realigned and the provision of an elevated slip road for connection between elevated and at-grade sections, the main flyover will descend to meet the southbound carriage way of the Tsing Yi North Bridge Road. The specific major work elements of this Project are described below:

(a) construction of the remaining section of a 2-lane southbound flyover at Texaco Road, approximately 700m in length including the northern approach abutment;

(b) construction of a single lane slip road from the southbound flyover for connection to the at-grade Texaco Road southbound carriageway and Kwai Fuk Road;

(c) realignment of Tai Wo Hau Road to connect to Texaco Road at its junction with Sha Tsui Road;

(d) conversion of the western flyovers, constructed under TDD Contracts No. TW 54/87 and TW 74/90, to one-way operation for northbound traffic, requiring modifications to the directional signs, traffic signs and sign gantries at these flyovers and Tsing Tsuen Road;

(e) provision of noise barriers/covers to the flyovers. These will include the provision of such barriers/covers to the flyover constructed in TDD Contracts No. TW 54/87 and TW 74/90 to the extent identified by the Environmental Impact Assessment Study and as required by the Environmental Protection Department;

(f) site formation and earth retaining structures required for (a), (b) and (c) above;

(g) diversion and augmentation of existing drainage and sewerage systems within the Project area, including the laying of a new sewer from Tai Ha Street to Sha Tsui Road via the realigned Tai Wo Hau Road; and

(h) construction of ancillary works associated with the Project including drainage, footpaths, steps, fencing, handrailing, street lighting, traffic signs and road marking, traffic signals and CCTV systems, landscape hardworks, environmental impact mitigation measures and similar ancillary works.

It was the Government's original intention to commence the construction of the remaining part of the Ultimate Scheme as soon as possible but in any event no later than January 2000, for completion by early 2002. However, the traffic and transportation study has reviewed the requirement and timing for the scheme. It showed that while there would be adequate capacity for the Texaco Road flyover in the southbound direction, the carriageway would be operating close to capacity in the northbound direction at year 2001 if the improvement works were not implemented. In addition, assessment of the design year 2011, indicated that travel times along Texaco Road would be reduced in both directions due to the implementation of this ultimate scheme. Therefore, with the improved Texaco Road flyover, the capacity and road safety aspects of the flyover would definitely be improved together with a reduction in the travel times for the through traffic.

Thus, on traffic grounds, in order to avoid the Texaco Road flyover from reaching its capacity and causing unnecessary delays to the road users, it would be appropriate to implement the project as soon after 2001 as possible. The implementation programme prepared indicates that commissioning of the project should be achievable by late 2002 or early 2003 depending upon the achievement of the interim programme milestones.

2.2 Construction Activities

One of the objectives of this Study is to review the preliminary design of the ultimate scheme which was prepared over ten years ago. The highway engineering has been reviewed and the basic highway design of the scheme originally proposed in the Texaco Road Improvements Final Report will still provide the best solution in terms of traffic, highways and structural engineering. The construction programme produced, therefore, reflects the sequence of construction activities, as outlined in the feasibility study, as follows:

(i) construct link between at-grade Texaco Road and Castle Peak Road flyover at Texaco Road interchange;
(ii) widen Texaco Road western viaduct ramp to accommodate two way traffic;
(iii) demolish the eastern viaduct ramp;
(iv) realign Tai Wo Hau Road;
(v) construct remainder of flyover and ramps south of Tai Wo Hau Road; and
(vi) convert traffic flow to one-way per viaduct.

This indicative construction phasing highlights that the majority of sensitive receivers, which are concentrated at the northern end of the project area (see Section 5.0 and 6.0 of this report) will be affected during the first four major activities and as such it will be during this time period that environmental monitoring, audit, management and mitigation will be most important.

The main construction activities of the Texaco Road Improvement Works are likely to comprise:

At-Grade Sections

- excavation;
- filling;
- construction traffic;
- road pavement; and
- retaining structures.

Flyover Sections

- viaduct foundations, substructure and superstructure; and
- road pavement.

The schedules of typical construction equipment required for these activities are shown in Tables 2.1 and 2.2 below.

Table 2.1 The Sound Power Levels of the Equipment Associated with Various Construction Activities for At-grade Sections

Activity	Noise Source	TM Reference Number (1)	Number	Sound Power Level (dB(A))
Excavation	Bulldozer	CNP030	1	115
	Dumper	CNP066	1	106
	Dump truck	CNP067	1	117
	Excavator/loader	CNP081	1	112
	Pneumatic breaker	CNP027	1	122
Filling	Excavator/loader	CNP081	1	112
	Dump truck	CNP067	1	117
	Roller	CNP186	1	108
Construction Traffic	Lorry	CNP141	Estimated 4 units/ hr. at velocity of 10 km/hr.	112
Road pavement	Road roller	CNP185	1	108
	Asphalt paver	CNP004	1	109
	Lorry	CNP141	2	112+3
Retaining structure	Vibrator	CNP170	1	113
	Crane	CNP049	1	95
	Concrete pump	CNP047	1	109
	Concrete lorry mixer	CNP044	1	109

Table 2.2 The Sound Power Levels of the Equipment Associated with Various Construction Activities for Viaduct Section

Activity	Noise Source	TM Reference Number (1)	Number	Sound Power Level (dB(A))
Viaduct Foundation, Substructure & Superstructure	Concrete lorry mixer	CNP044	1	109
	Concrete pump	CNP047	1	109
	Generator	CNP101	1	108
	Compressor	CNP001	1	100
	Vibrator	CNP170	1	113
	Tower crane	CNP049	1	95
	Piling rig (non-percussive)	CNP164	1	115
	Lorry	CNP141	1	112
	Pneumatic breaker	CNP027	1	122
Road pavement	Road roller	CNP185	1	108
	Asphalt paver	CNP004	1	109
	Lorry	CNP141	2	112+3

Note: (1) Refers to the Technical Memorandum on Noise from Construction Work other than Percussive Piling

3.0 Environmental Legislation, Standards and Guidelines

3.0 ENVIRONMENTAL LEGISLATION, STANDARDS AND GUIDELINES

3.1 Hong Kong Planning Standards and Guidelines

The Environment Chapter of the HKPSG provides guidance for including environmental considerations in the planning of both public and private developments. The document provides summary environmental guidelines for major landuses and schedules environmental concerns associated with specified community, industrial and infrastructure landuses and activities. Definitions of what constitute sensitive receivers for different environmental parameters are provided. This document, also deals with conservation and states the objective of retaining significant landscapes, with statutory landuse zoning categories affording a varying degree of protection to these.

3.2 Noise

3.2.1 Non-restricted Hours

The noise generated by the construction of the Project during the non-restricted daytime hours (07.00-19.00) will be assessed with reference to the EPD recommended criteria in the Practice Note for Professional Persons No. ProPECC DP 2/93, as shown in Table 3.1.

Table 3.1 Recommended Construction Noise Levels (Non-restricted Hours)

Noise Sensitive Receiver	Noise Level L_{eq}(30 min) dB(A)
Dwelling	75
School	70 (Normal school hours) 65 (During examination)

3.2.2 Restricted Hours

It is anticipated that there will be a need to carry out some essential minor works outside normal (unrestricted) working hours. Thus, requirements stipulated in the *Technical Memorandum on Noise from Construction Work other than Percussive Piling* and the Technical Memorandum on Noise from Construction Work in Designated Areas under the Noise Control Ordinance (NCO) will be referred to.

NCO construction noise limits in restricted hours are determined with reference to the type of area within which the Noise Sensitive Receiver (NSR) is located. For village and low-density residential areas not affected by noise an Area Sensitivity Rating (ASR) of 'A' is applied, while a low-density residential areas in which traffic noise is noticeable but not dominant, an ASR of 'B' is employed. For a similar area in which noise from traffic is readily noticeable and dominates the noise environment, an ASR of 'C' is applied. The NSRs in the project study area would be assigned an ASR of 'C'.

The NCO limits during restricted evening and night-time hours (19.00 to 07.00) and Sundays and general holidays for each sensitivity rating is given in Table 3.2 below.

Table 3.2: Basic Noise Level during the Construction Phase

Time Period	Basic Noise Level (dB(A)) for Area Sensitivity Rating		
	ASR = A	ASR = B	ASR = C
Restricted Period 1 All days during the evening (19.00-23.00) and general holidays (including Sundays) during the daytime and evening (07.00-23.00)	60	65	70
Restricted Period 2 All days during the night-time (23.00-07.00)	45	50	55

Construction noise criteria are applied to the noise arising from operation of construction equipment at the site.

3.2.3 Percussive Piling

It is not anticipated that percussive piling will be required during the contruction phase and, therefore, the criteria stipulated in the *Technical Memorandum on Noise from Percussive Piling* under the NCO will not be applicable to the Project.

3.2.4 Road Traffic Noise

The impact of operational noise has been assessed with reference to the HKPSG which stipulates maximum L_{10} (1 hour) road traffic noise levels at sensitive facades of various NSRs (Table 3.3).

Table 3.3 Acceptable Road Traffic Noise Levels

Noise Sensitive Receivers	Road traffic Noise L_{10}(1 hour) dB(A)
Domestic Premises	70
Places of Public Worship	65
Educational Institutions	65
Hospitals, Clinics, Homes for the Aged (wards & diagnostic rooms)	55

3.3 Air Quality

Air quality is regulated through the Air Pollution Control Ordinance, 1983 Cap. 311, which provides, inter alia, statutory Air Quality Objectives (AQOs) for each Air Control Zone. Air Control Zones have been declared for the whole of the Region and the associated Air Quality Objectives are provided in Table 3.4.

Table 3.4 Hong Kong Air Quality Objectives

Pollutant	Concentration $\mu g/m^3$ (i) Averaging Time				
	1 Hour (ii)	8 Hours (iii)	24 Hours (iii)	3 Months (iv)	1 Year (iv)
Sulphur Dioxide	800		350		80
Total Suspended Particulates			260		80
Respirable Suspended Particulates (v)			180		55
Nitrogen Dioxide	300		150		80
Carbon Monoxide	30000	10000			
Photochemical Oxidants (as ozone (vi))	240				
Lead				1.5	

(i) Measured at 298°K (25°C) and 101.325 KPa (one atmosphere).
(ii) Not to be exceeded more than three times per year.
(iii) Not to be exceeded more than once per year.
(iv) Arithmetic means.
(v) Respirable Suspended Particulates means suspended particulates in air with a nominal aerodynamic diameter of 10 micrometers and smaller.
(vi) Photochemical oxidants are determined by measurements of ozone only.

Source : Air Pollution Control Ordinance

In addition to the Air Quality Objectives, the Environmental Protection Department (EPD) also recommended that a maximum hourly level of 500 $\mu g/m^3$ Total Suspended Particulates should not be exceeded at the boundary of any construction site.

3.4 Landscape and Visual

The "Environmental Guidelines for Planning in Hong Kong" (containing extracts from the Hong Kong Planning Standards and Guidelines) make no specific reference to visual or landscape impacts in their "Guidelines on environmental matters which should be considered in planning and development activities in Hong Kong". The Government has,

however, published the following relevant policies and guidance.

The 1990 Government White Paper on "Pollution in Hong Kong - A Time to Act" offers general policy objectives on avoiding environmental problems by considering all environmental impacts in the early stages of the development process. The Hong Kong Environmental Protection Department's Advice Note 2/92 offers guidelines on the environmental impact process for major private sector projects. This recognises visual impact as an issue of "concern".

Chapter 10 of the Hong Kong Planning Standards and Guidelines deals with Conservation and states the objective of retaining significant landscapes. Statutory land use zoning categories afford a varying degree of protection to such landscapes. It also refers to the need to assess environmental impacts of developments, but does not specify a methodology.

Several Government Technical Circulars are concerned with retaining landscape features and safeguarding the visual environment:

- WBTC 24/94 / PELB 3/94 deals with tree preservation and minimising tree felling throughout the Territory. General Regulation 740 outlines the process whereby a tree felling application must be approved by Government in order to gain permission to fell or cut trees.

- WBTC 25/93 aims to control the visual impact of engineered slopes. This is specifically directed at public works projects and states that due consideration should be given to minimising adverse visual impacts.

The Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS) based in Highways Department reviews and comments specifically on the aesthetics of highway related structures with a view to minimising visual intrusion and impact. While outside the normal EIA review and approval process, comments provided by ACABAS are of particular relevance to this study, where the construction of several significant structures will be required.

The Environment Impact Assessment Ordinance makes environmental impact assessment part of the statutory development process. It includes a definition that an environmental impact is "a change that a proposed development may cause on the environment affecting the well-being of people, flora fauna and ecosystems". The Technical Memorandum on the EIA process issued under Section 16 of the Environmental Impact Assessment Ordinance includes guidelines for Landscape and Visual Impact Assessment (LVIA). The Study Process for the LVIA, therefore, has been adapted slightly to conform with Annex 18 of the TM entitled "Guidelines for the Landscape and Visual Impact Assessment". The Ordinance, however, does not recommend minimum standards to assess environmental impacts.

4.0 Traffic Flow Predictions

4.0 TRAFFIC FLOW PREDICTIONS

4.1 Model Structure

The key element of the investigation, under the auspices of the Traffic and Transportation Study, was the development and application of traffic models in order to provide traffic forecasts for use in the EIA.

On the stategic level, the MVCTS transport model, MVA Asia's Region-wide multi-modal transport model was used to provide the overall trip distribution pattern and traffic demand matrices. Further detail on the trips generated by the MVCTS and specific to the detailed road network within the study area, was provided using the SATURN (Simulation and Assignment of Traffic in Urban Road Networks) suite of programs to develop a study area model (SAM).

4.2 Existing Traffic Conditions

To assess the existing traffic conditions and provide a basis for the future year predictions, validation of the modelled flows for the base year of 1996 was carried out by comparison with observed traffic flows at 29 major road survey locations and 9 screenlines. In all cases, flow discrepancies for each link were less than 10%, the acceptable level for validity. Based upon this process it has been determined that the Texaco Road flyover would be operating close to capacity in the northbound direction at the year 2001 if the improvement works were not implemented.

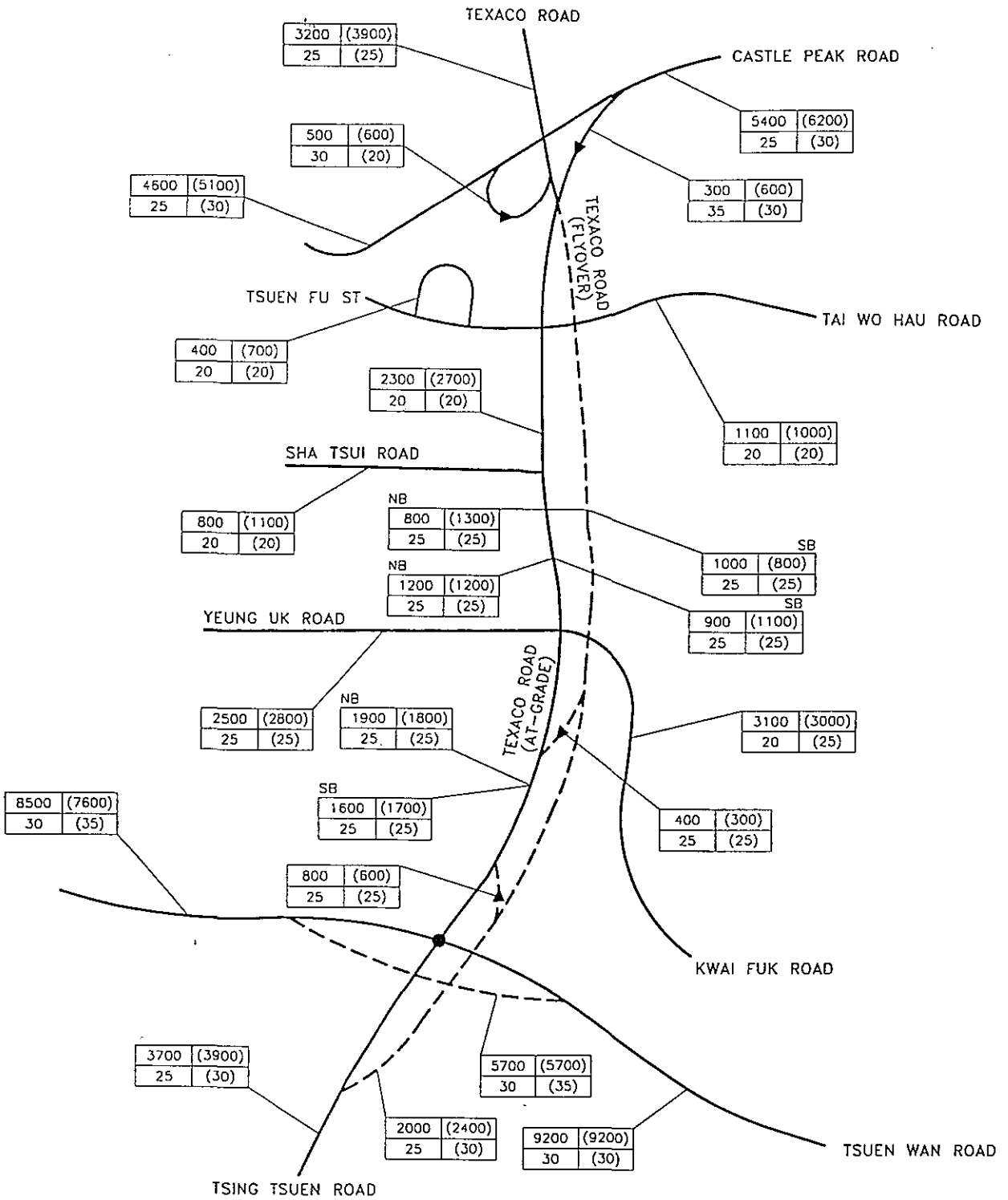
4.3 Future Year Traffic Volumes

For the noise impact assessment, traffic forecasts for the design scenario year of 15 years after opening, 2018, are compared with a baseline scenario for the year immediately before the start of construction, 1999, in order to assess the need for direct or indirect mitigation measures. Traffic volumes in 2018 also represent the worst case scenario for the traffic noise impact assessment. Drawings 4.1 and 4.2 illutrate the peak hour volumes for the years 1999 and 2018. All traffic figures have been approved for use by the Transport Department.

Development of the long term traffic forecasts for use in the noise impact assessment required special attention. The current long term planning horizon for both landuse and transport studies is 2011. Procedures for the production of data, assumptions and resultant traffic forecasts for this year have been in existence for around six years. However, similar procedures do not exist for the years after 2011.

Thus, in order to determine the scenario for fifteen years after the proposed opening of the Texaco Road flyover, results from the MVCTS model for the years 2006 and 2011 have been compared. In the absence of other planning data for the future years beyond 2011, a growth factor based on the annual growth in traffic between the years 2006 and 2011 has been applied to derive the 2018 traffic figures

The air quality impact assessment uses the traffic forecasts for 2011, where 2011 represents the worst case scenario. Drawings 4.3 show the morning peak hour volumes for 2011.



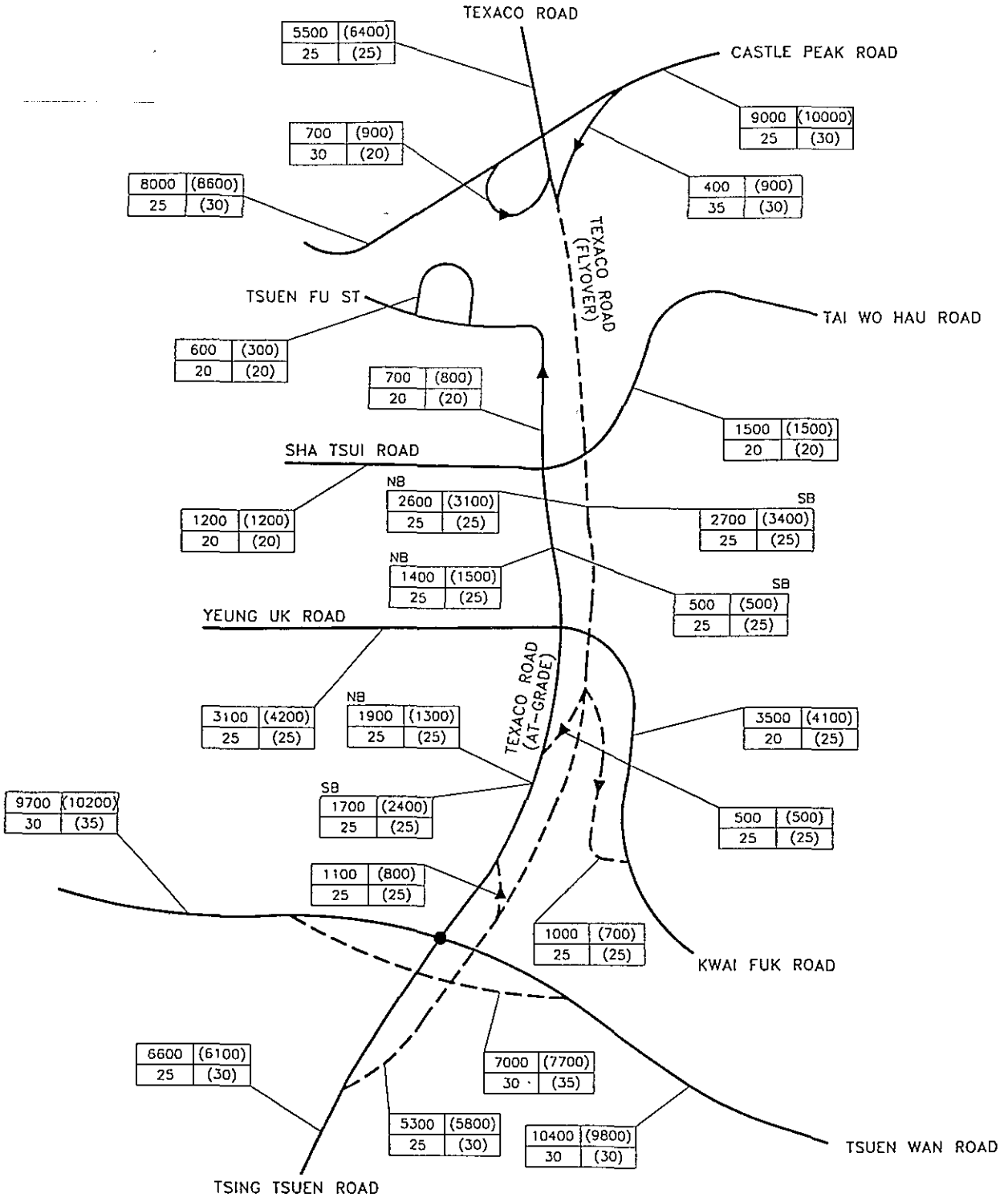
LEGEND :

9600	AM PEAK HOUR TWO-WAY FLOW (VEH/HR)
30	AM PEAK HOUR PERCENTAGE OF HEAVY VEHICLES (%)
(9600)	PM PEAK HOUR TWO-WAY FLOW (VEH/HR)
(35)	PM PEAK HOUR PERCENTAGE OF HEAVY VEHICLES (%)

Traffic Forecasts For Design Year 1999

Mouchel

Drawing No. 4.1



LEGEND :

9600	
30	

AM PEAK HOUR TWO-WAY FLOW (VEH/HR)
AM PEAK HOUR PERCENTAGE OF HEAVY VEHICLES (%)

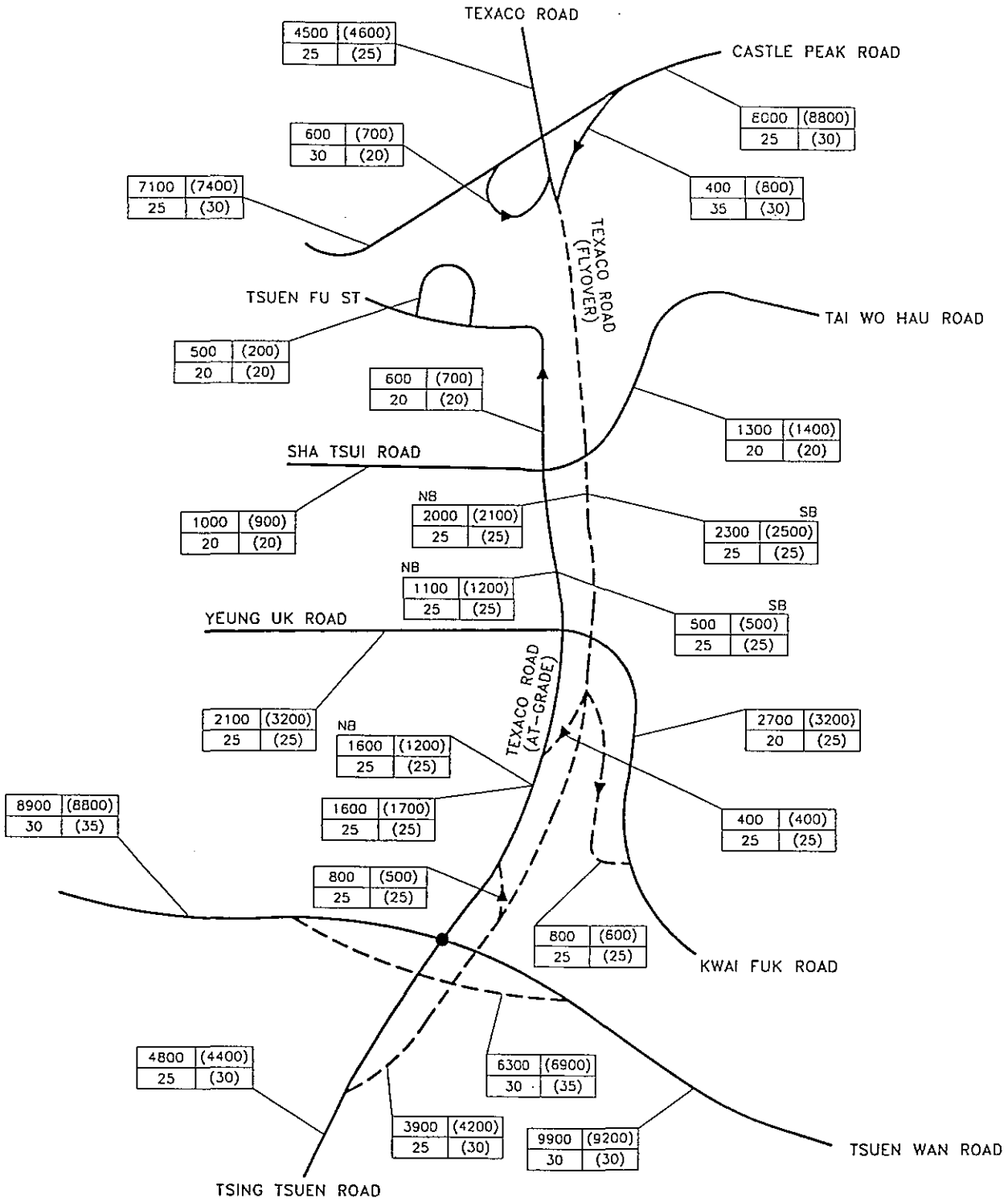
	(9600)
	(35)

PM PEAK HOUR TWO-WAY FLOW (VEH/HR)
PM PEAK HOUR PERCENTAGE OF HEAVY VEHICLES (%)

Traffic Forecasts For Design Year 2018

Mouchel

Drawing No. 4.2



LEGEND :

9600	AM PEAK HOUR TWO-WAY FLOW (VEH/HR)
30	AM PEAK HOUR PERCENTAGE OF HEAVY VEHICLES (%)
(9600)	PM PEAK HOUR TWO-WAY FLOW (VEH/HR)
(35)	PM PEAK HOUR PERCENTAGE OF HEAVY VEHICLES (%)

Traffic Forecasts For Design Year 2011

Mouchel

Drawing No. 4.3

5.0 Noise Impact Assessment

5.0 NOISE IMPACT ASSESSMENT

5.1 Noise Sensitive Receivers

The noise impacts on all existing and planned Noise Sensitive Receivers (NSR) have been considered. The majority of sensitive receivers are located in Texaco Road itself, although representative locations on Tsuen Fu Street, Tai Wo Hau Road, Tai Ha Street and Shek Tau Street have also been selected. No NSRs have been identified outside an area of 300m radius from the boundary of the proposed road. The identification and names of the representative NSRs are shown in Table 5.1 below and shown on Drawing 5.1.

Table 5.1 The Noise Sensitive Receivers

NSR Identification	Name of Building
R1	Fortune Court, Tsuen Wan Garden
R2	Jade Court
R3	Cheong Kwai Court, Wealthy Garden
R4	Cheong Fu Court, Wealthy Garden
R5	Cheung Fat House, East Asia Garden
R6	Tai Fat House, East Asia Garden
R7	Buddhist Lam Bing Yim Memorial School
R8	Fu Pak House, Tai Wo Hau Estate
R9	23-25 Texaco Road
R10	Tai Tak Court
R11	Tak Tai Building
R12	49 Texaco Road
R13	Yen Ya Building
R14	Wang Wah Building
R14a	Wang Wah Building
R14b	Wang Wah Building
R15	Fu Man House, Tai Wo Hau Estate
R16	Fu Pong House, Tai Wo Hau Estate
R17	Fu On House, Tai Wo Hau Estate
R17a	Fu On House, Tai Wo Hau Estate
R18	The Crown of Thorns Church & Kindergarden
R19	The Crown of Thorns Church & Kindergarden
R19a	The Crown of Thorns Church & Kindergarden
R20	The Crown of Thorns Church & Kindergarden
R21	Fu Keung House, Tai Wo Hau Estate
R22	Fu Wing House, Tai Wo Hau Estate
R23	Fu Tak House, Tai Wo Hau Estate
R24	Fu Yin House, Tai Wo Hau Estate
R25	Fu Yin House, Tai Wo Hau Estate
R26	Fu Tai House, Tai Wo Hau Estate
R27	Proposed Housing Development at Kwai Lok Temporary Housing Area
R28	Tai Wo Hau Community Centre and Nursery

The Crown of Thorns Church (R18, R19, R19a and R20) will have to be demolished in order for the improvement works to be completed. However, it has been agreed by relevant parties that for the purposes of this report, it will be assumed that the church will be rebuilt on its original but reduced site. In addition, the timescale for demolition of the building is unknown at this stage as this is largely dependant upon the ultimate proposal for the church property. Thus, for the purposes of this environmental impact assessment, the existing church and a proposed new church building have been included in both the construction and operational noise impact assessments, respectively.

5.2 The Existing Noise Environment

The existing noise environment in the area is dominated by noise from traffic on Texaco Road and the interchanges with this road: specifically, Tai Wo Hau Road, Castle Peak Road and Tsuen Wan Road. The current alignment hosts traffic on both at-grade and elevated sections and provides a key link between the strategic Castle Peak and Tsuen Wan Road and the Tsuen Wan Industrial area in the middle. Texaco Road is, therefore, currently well used and particularly by heavy vehicles.

Traffic figures obtained from the 1995 Annual Traffic Census demonstrate that Texaco Road as a whole has in the region of over 19,000 vehicles per day using it (annual average daily traffic figure), with smaller sections and interchanges being used at an even higher rate.

5.3 Noise Impacts during the Construction Phase

Noise during the construction phase will be generated from powered mechanical equipment (PME) being used during various construction activities. Three broad activities have been identified as having the potential to generate noise impacts at nearby NSRs. These are as follows:

- excavation;
- filling; and
- construction. This classification will include the construction of road pavement, retaining structure, viaduct foundation, substructure and superstructure.

No percussive piling is expected for the Project and all other activities will be of small scale or suitably screened such that they will not contribute more noise than the activities which have been chosen for assessment. The plant inventory and sound power levels (SWL) associated with each construction activity are based on a preliminary plant inventory and have been summarised in Tables 5.2 and 5.3.

Table 5.2 : Sound Power Level of Construction Equipment for At-grade Sections

NCO Technical Memorandum Identification Code	Description of Powered Mechanical Equipment	Number of Pieces Assumed to be Used	SWL dB(A)
CNP004	Asphalt paver	1	109

Table 5.2 Cont'd...

NCO Technical Memorandum Identification Code	Description of Powered Mechanical Equipment	Number of Pieces Assumed to be Used	SWL dB(A)
CNP027	Breaker, pneumatic	1	122
CNP030	Bulldozer	1	115
CNP044	Concrete lorry mixer	1	109
CNP047	Concrete pump	1	109
CNP049	Crane	1	95
CNP066	Dumper	1	106
CNP067	Dump truck	1	117
CNP081	Excavator/loader	1	112
CNP141	Lorry	4	112
CNP170	Vibrator	1	113
CNP185	Road roller	1	108
CNP186	Roller	1	108

Table 5.3 : Sound Power Level of Construction Equipment for Viaduct Sections

NCO Technical Memorandum Identification Code	Description of Powered Mechanical Equipment	Number of Pieces Assumed to be Used	SWL dB(A)
CNP001	Compressor	1	100
CNP004	Asphalt paver	1	109
CNP027	Breaker, pneumatic	1	122
CNP044	Concrete lorry mixer	1	109
CNP047	Concrete pump	1	109
CNP049	Crane, tower	1	95
CNP101	Generator	1	108
CNP141	Lorry	2	112
CNP164	Piling rig, non-percussive	1	115
CNP170	Vibrator	1	113
CNP185	Road roller	1	108

The construction noise at the NSRs has been assessed in accordance with the methodology of the *Technical Memorandum on Noise from Construction Work Other than Percussive Piling.* The construction plant to be used has been divided into seven working scenarios based upon types of equipment which will be used at any one time. These scenarios are summarised below.

At-grade Construction Work

Scenario 1 :	Excavation	Bulldozer Dumper Dump truck Excavator/loader Pneumatic breaker
Scenario 2 :	Filling	Excavator/loader Dump truck Roller
Scenario 3 :	Construction traffic	Lorry
Scenario 4 :	Road pavement	Road roller Asphalt paver Lorry
Scenario 5 :	Retaining structure	Vibrator Crane Concrete pump Concrete lorry mixer

Viaduct Construction Work

Scenario 6 :	Viaduct foundation, Substructure & Super-structure	Concrete lorry mixer Concrete pump Generator Compressor Vibrator Crane, tower Piling rig, non-percussive Lorry Breaker, pneumatic
Scenario 7 :	Road pavement	Road roller Asphalt paver Lorry

It is expected that the combined noise levels of activities will be limited to these plant. The maximum noise levels at the NSRs during the construction phase without noise mitigation measures are shown below in Table 5.4. The complete set of noise modelling results for the construction phase are provided in Appendix A.

Table 5.4: Maximum Noise Levels (dB(A)) at the Noise Sensitive Receivers During Construction Phase without Noise Mitigation Measures

NSR	Scenario Number						
	1	2	3	4	5	6	7
R1	81	75	75	74	72	81	74
R2	96	90	90	89	87	96	89
R3	93	87	87	85	84	93	85
R4	82	77	76	75	74	82	75
R5	91	86	85	84	83	91	84
R6	91	85	85	83	82	91	83
R7*1	95	89	88	87	86	94	87
R8	81	75	75	73	72	81	73
R9	98	92	92	90	89	98	90
R10	94	89	88	87	86	94	87
R11	95	89	89	87	86	95	87
R12	95	90	89	88	87	95	88
R13	89	83	83	81	80	89	81
R14	97	92	91	90	89	97	90
R14a	92	86	86	84	83	92	84
R14b	89	84	83	82	81	89	82
R15	82	77	76	75	74	82	75
R16	87	82	81	80	79	87	80
R17	73	68	67	74	65	73	74
R18*2	99	94	93	90	91	99	90
R19*2	95	89	89	87	86	95	85
R19a*2	98	92	92	90	89	98	90
R20*2	92	86	86	84	83	92	82
R21	91	85	84	83	82	90	83
R22	80	74	73	72	71	79	72
R23	82	76	76	74	73	82	74
R24	85	79	79	77	76	85	77
R25	84	78	78	76	75	84	76
R26	78	72	71	70	69	77	70

Table 5.4 Cont'd...

NSR	Scenario Number						
	1	2	3	4	5	6	7
R27	75	69	69	57	66	75	57
R28*1	91	85	84	83	82	90	83

*1 The school (NSR7) and nursery (NSR28) have already been installed with air-conditioners.
*2 As the demolition timescale for the Crown of Thorns Church (NSR 18-20) is not known, this NSR has been included in the assessment of construction noise impacts.

These results indicate that maximum noise levels at some of the NSRs during the Texaco Road construction works will exceed the day time noise criteria of 75dB(A) and 70dB(A) for the school and nursery. Mitigation measures are, therefore, required to reduce the noise levels to meet the standards. Recommended mitigation measures include the incorporation of silencers on exhaust pipes, the use of mufflers and construction of temporary noise barrier and enclosure, as detailed in Sections 5.4 below.

5.4 Noise Mitigation Measures During Construction

As detailed in Table 5.4, construction of the project has the potential to create adverse daytime noise impacts at the NSRs and, therefore, mitigation measures will be required during the construction phase. The following forms of mitigation are assumed during the calculation of residual noise levels and are recommended for incorporation into the Contract Specifications. A summary of the construction noise mitigation is provided in the Enfvironmental Mitigation Implementation Schedule in Appendix D.

(i) the construction activities should be carried out in the daytime period (07.00-19.00) only;

(ii) silencers should be installed at the exhaust pipes of the dump trucks, excavators, loaders and the noise levels can be reduced by 5dB(A);

(iii) mufflers should be installed at the rock drills (hydraulic) and pneumatic breakers and the noise levels can be reduced by 5-7dB(A);

(iv) acoustic enclosures should be installed for the concrete pumps and generators and the noise levels can be reduced by 10dB(A); and

(v) construction of either temporary noise barriers/enclosures along the site boundary such that the equipment will be totally screened. The barriers or enclosures should have no opening or gaps and have minimum transmission loss of 10dB.

Noise levels can be further reduced by the following methods:

(vi) good site practice to limit noise emission at source;

(vii) avoidance of simultaneous noisy activities;

(viii) selection of quiet plant and working methods; and

(ix) reduction in the numbers of plant operating in critical areas close to NSRs.

In addition, the Contractor will be requested to ensure that the aforesaid noise level limits will not be exceeded when the construction works are being undertaken and, if necessary, work near the secondary school and nursery during school hours should be suspended. The maximum noise levels at the NSRs during the construction phase with noise mitigation measures applied are shown in Table 5.5. Application of the recommended mitigation measures enables noise levels at the NSRs to be reduced to within the noise criteria.

Table 5.5 Maximum Noise Levels (dB(A) at the Noise Sensitive Receivers During Construction Phase with Noise Mitigation Measures

NSR	Scenario Number						
	1	2	3	4	5	6	7
R1	67	73	70	55	71	67	55
R2	73	69	75	70	67	73	70
R3	70	74	72	66	73	70	66
R4	68	74	71	56	72	69	56
R5	68	73	70	65	71	68	65
R6	68	73	70	64	71	68	64
R7*[1]	71	67	73	68	74	72	68
R8	67	73	70	54	61	67	54
R9	74	70	68	71	69	75	71
R10	71	67	73	68	74	71	68
R11	72	68	74	68	75	72	68
R12	72	68	74	69	75	72	69
R13	66	61	68	62	69	66	62
R14	74	70	67	71	68	75	71
R14a	69	65	62	65	63	69	65
R14b	66	62	59	63	60	66	63
R15	68	74	71	56	62	68	56
R16	64	69	66	72	67	64	72
R17	69	65	62	58	63	70	58
R18*[2]	75	72	69	69	70	75	69
R19*[2]	72	67	74	68	66	71	68
R19a*[2]	75	70	68	71	69	74	71

Table 5.5 Cont'd...

NSR	Scenario Number						
	1	2	3	4	5	6	7
R20*2	69	73	71	65	63	69	65
R21	67	72	69	64	70	67	64
R22	65	71	68	53	69	65	53
R23	68	73	71	55	72	68	55
R24	70	66	74	58	75	70	58
R25	70	75	73	57	74	69	57
R26	63	69	66	51	67	63	51
R27	71	66	64	38	65	70	38
R28*1	67	70	69	64	70	67	64

*1 The school (NSR7) and nursery (NSR28) have already been installed with air-conditioners.
*2 As the demolition timescale for the Crown of Thorns Church (NSR 18-20) is not known, this NSR has been included in the assessment of construction noise impacts.

5.5 Noise Impacts during the Operational Phase

Operational noise is attributable solely to road traffic. The impact of road noise arising from Texaco Road, Castle Peak Road, Tsuen Wan Road and other minor roads have been calculated at the facades of the representative NSRs in terms of $L_{10(1hour)}$ in dB(A) using the SoundPlan package. The calculation methodology was based on the "Calculation of Road Traffic Noise" (CTRN) methodology, issued by the UK Department of Transport in 1988.

The following assumptions have been made for the modelling:

(i) peak hour traffic flows and vehicle mix in the year 2018 were obtained from the transportation modelling studies and input into the noise modelling. All the traffic data has been approved for use by the Transport Department. Noise levels for the year 2018 have been predicted in the assessment as this year represents 15 years after the opening of the improvement works based upon the current work programme (see Section 4.0);

(ii) in view of the proximity of sensitive receivers to the noise sources, effects due to the absorption by air have not been included;

(iii) meteorological conditions have not been allowed for due to the proximity of the receivers to the noise sources; and

(iv) the following design speeds were used in the assessment; 70km/hr for the proposed elevated carriageway and 50km/hr for all other sections of road.

The $L_{10(1hour)}$ noise levels in dB(A) at the representative NSRs during the operational phase without noise mitigation measures applied are shown in Table 5.6 below. Values at every five floors for each sensitive receiver, if applicable, are given below but a complete set of modelling results are provided in Appendix B.

Table 5.6: Noise Levels, $L_{10\,(1hour)}$, dB(A), at the Noise Sensitive Receivers During Operation Phase Without Noise Mitigation Measures in the Year 2018

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (without Noise Mitigation)
R1	5	83
	10	82
	15	81
R2	5	86
	10	84
	15	83
R3	6	84
	11	83
	16	82
	21	81
	26	80
R4	5	75
	10	75
	15	75
	20	75
	25	75
R5	5	84
	10	83
	15	82
	20	81
	25	80
R6	5	84
	10	83
	15	82
	20	81
	25	80
R7	1	86
R8	2	74

Table 5.6 Cont'd...

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (without Noise Mitigation)
R8	7	77
	12	79
	17	79
	22	79
	27	78
R9	2	85
R10	4	85
	9	84
	14	83
	19	82
R11	5	85
	10	84
	15	82
	20	81
R12	2	86
R13	3	77
	8	71
	13	76
	18	77
R14	2	87
	7	85
	12	83
R14a	2	79
	7	79
	12	79
R14b	2	74
	7	73
	12	72
R15	2	65
	7	71
	12	73
	17	73
	22	73
	27	73
R16	2	66

Table 5.6 Cont'd...

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (without Noise Mitigation)
R16	7	71
	12	73
	17	74
	22	74
	27	74
R17	5	78
	10	76
	15	75
17a	5	77
	10	76
	15	75
R18	1	87
R19	1	82
R19a	1	80
R20	1	77
R21	1	79
	6	78
	11	77
	16	76
	21	75
R22	1	73
	6	73
	11	73
	16	72
	21	72
	26	72
R23	1	61
	6	71
	11	76
	16	77
	21	77
	26	77
	31	77
	36	77
R24	1	64

Table 5.6 Cont'd...

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (without Noise Mitigation)
R24	6	76
	11	79
	16	79
	21	79
	26	78
	31	78
	36	78
R25	1	67
	6	76
	11	77
	16	78
	21	78
	26	77
	31	77
	36	77
R26	1	73
	6	75
	11	75
	16	75
	21	75
	26	75
	31	75
	36	75
R27	1	62
R28	1	77

5.6 Noise Mitigation Measures During the Operational Phase

5.6.1 Noise Mitigation Recommendations

The noise modelling has concluded that direct mitigation measures will be required for all NSRs with the exception of R27 and some of the lower floors of R15, R16, R23, R24 and R25, which will experience noise levels within the HKPSG criteria of 70 dB(A).

A full range of mitigation options have been considered for the protection of the NSRs subject to operational noise levels greater than the 70 dB(A) standard in order to provide the best practicable direct mitigation measures. Details of the mitigation options assessed and the ultimate optimum mitigation measures recommended are provided below. The

locations and extents of the recommended mitigation measures are shown in Drawing 5.2.

(i) Texaco Road Northbound Carriageway - Noise Sensitive Receivers R1 to R6

NSRs R2 (Jade Court), R4 (Cheong Kwai Court), R5(Cheung Fat House) and R6 (Tai Fat House) are situated adjacent to the northbound carriageway of Texaco Road, with R1 (Fortune Court) and R4 (Cheong Fu Court) being closer to Castle Peak Road and Tsuen Fu Street respectively. The section of existing flyover between Jade Court and Cheung Fat House, as indicated on Drawing 2.1, will be required to be demolished and reconstructed as part of the Texaco Road Improvement Works and, thus, can be designed to accommodate direct mitigation measures.

Any mitigation structure cannot, however, be extended any further south than Cheung Fat House, as this would require the demolition of the existing flyover (not required for the scheme) and have serious traffic management constraints; this has been judged as impracticable from a highway engineering perspective. A free standing noise mitigation structure is also unfeasible due to space constraints created by the inclusion of the at-grade slip road. In addition, the limit of mitigation at the northern edge of this section of road is constrained by the presence of the Texaco Road Interchange slip road merging with the flyover traffic flows, requiring set back to ensure adequate sight-lines.

Top-bent barriers with 1.0m and 4.0m overhangs have been assessed but a top-bent barrier with an 8.0m overhang, extending over the full length of the dual carriageway, has been determined as the measure providing the maximum benefit to NSRs R2, R3 and partially R5. However, the significant attenuation achieved does not reduce the noise levels of these NSRs to below the HKPSG criteria and as such their eligibility for indirect remedies has been assessed. A barrier along the parapet in the middle of the two flyovers was considered to reduce the noise levels at the opposite sensitive receivers (R7, R9, R10, R11 and R12) but discounted because reverberated noise would build up between this barrier and the proposed top-bent barrier and, thus, degrade the top-bent barrier performance. Therefore, the 8.0m overhang top-bent barrier will be absorptive along its full length to reduce the noise reflection towards these NSRs.

Due to the constraints on the extent of the structure to the south of R5 as detailed above, the barrier provides negligible protection for R6 and as such this NSR has been tested for its eligibility for indirect technical remedies. In addition, the barrier provides negligible attenuation for NSRs R1 and R4 and, thus, these NSRs have also been included in the test for indirect measures eligibility.

The presence of this barrier does, however, restrict the adequate emergency vehicular access (EVA) for Jade Court. Thus, in order to preserve the necessary EVA, the area to the side of Jade Court, access via Tsuen Kwai Street to the rear, will need to be levelled and the landscape planter removed.

(ii) Texaco Road Southbound Carriageway - Noise Sensitive Receivers R7 to R14, R14a and R16

NSRs R7, R9, R10, R11, R12, R13 and R14 are situated adjacent to the proposed new

southbound flyover, with R8 and R16 located on Tai Ha Street. No mitigation is provided for the southbound carriageway between the Buddhist Memorial School (R7) and the end of the block represented by R12, 49 Texaco Road. All direct mitigation measures proposed in front of R7, R9, R11 and R12 have been discounted by Fire Services Department on the grounds that the structures would compromise essential emergency access to the buildings. Thus, no mitigation has been recommended for these areas and the existing EVA for these buildings has been preserved.

FSD have not objected, however, to mitigation in front of Tai Tak Court (R10) and the Tak Tai Path and Wang Wah building (R14). The maximum means for protection of these sensitive receivers was determined to be two sections of full enclosure over both southbound and northbound carriageways; this would replace the 8.0m top-bent barrier on the northbound carriageways at these two locations. However, further analysis determined that the marginal benefit provided to R10 would be outweighed by the negative effect produced by the tunnel effect on adjacent NSRs and, thus, this enclosure was considered impracticable. Other measures including top-bent barrier and straight barrier were concluded to have an insignificant benefit. Thus, NSRs R7, R9, R10, R11, R12 and R13 have been tested for their eligibility for indirect technical measures.

In view of the negative effect on R11 and 12 from the full enclosure in front of the Wang Wah building (R14) and the minimal additional benefit afforded to R14 over a top-bent barrier, the full enclosure was considered to be impracticable. An absorptive top-bent barrier with an 8.0m overhang covering the front of the Wing Wah building and the existing Tai Wo Hau Road junction will provide the best practicable means in this location. The top-bent barrier will be part of the structure discussed in item (iii) below. This barrier affords a significant 2 dB(A) noise attenuation at R14a and 3-4dB(A) at R14 but noise levels remain in excess of the HKSPG criteria. Therefore, these NSRs eligibility for indirect technical remedies has been assessed.

R8 and R16 receive negligible benefit from the barrier and thus, their eligibility for indirect technical remedies has also been assessed.

(iii) Texaco Road Southbound Carriageway - Noise Sensitive Receivers R23 to R27

R27 does not require mitigation as the predicted noise level with the new flyover in place is within the HKPSG criteria.

A top-bent barrier with an 8.0m overhang from the Wang Wah building (R14) to opposite the Symphone Industrial Building has been determined as providing the best attenuation for the relevant NSRs. This barrier provided a significant benefit to the lower floors of R23 (Fu Tak House) and R24 (Fu Yin House) as compared to a 5.3m overhang which was also assessed. In addition, overhangs of 1.0m and 3.0m have been investigated but these were found to be less effective than the 8.0m overhang top-bent barrier. At the southern end of the mitigation scheme a 2m barrier was considered but extending the top-bent barrier southwards was shown to provide significantly more benefit to R23, R24, R25 and R26 of the Tai Wo Hau Estate. The top-bent barrier cannot be extended any further south, however, due to constraints presented by the slip road access to Kwai Fuk Road. The limit of the barrier in relation to the slip road access can be seen in detail in

Drawing 5.2a. The barrier does provide a significant attenuation of the operational noise but the not to below the HKPSG limit for the majority of the floors of these sensitive receivers and thus, the eligibility of these NSRs for indirect technical measures has been assessed.

Direct mitigation on the existing flyover to provide additional noise attenuation for the Tai Wo Hau Estate has also been investigated. However, the existing flyover in this location is between 18 and 20m high and as construction of a noise barrier would require the demolition of the flyover and have serious traffic management implications, it is engineeringly impracticable to undertake any retrofitting works. Building a free-standing noise barrier at this location is equally unfeasible due to the height required and constraints on the space required for the foundations.

A central barrier to attenuate the noise at Cheung Fat House (R5) and Tai Fat House (R6) was also considered but discounted because reverberated noise would build up between this barrier and the proposed top-bent barrier and, thus, degrade the barrier performance. Thus, the proposed barrier will be absorptive between R14 and Tsuen Wing Street, where the buildings on the opposite side of the road become industrial in nature, to reduce the noise reflection towards these properties.

(iv) Tai Wo Hau Road - Noise Sensitive Receivers R15 and R17 to R22

Assuming the Crown of Thorns Church (represented by R18, R19, R19a and R20) will be rebuilt on the existing site, the new building will be protected on one side by the absorptive 8.0m overhang top-bent barrier along Texaco Road as discussed in the above section (iii). However, a non-absorptive top-bent barrier with a 1.0m overhang has been determined as the best practicable means to protect the church from the operational noise on the realigned Tai Wo Hau Road, providing significantly better attenuation than a 5m straight barrier. The barrier cannot be extended further north due to slight-line problems and the need to provide and emergency vehicular access into the open space area left after the Tai Wo Hau Road realignment. In addition, overhangs of 3.0m, 6.0m and over the full width of both carriageways were shown to provide negligible additional benefit. The barrier is also the best practicable means to attenuate the noise at the side facade of Wang Wah building denoted by R14a and will, therefore, remain in the mitigation scenario irrespective of the plans for the church. As R14a still exceeds the HKPSG criteria, it has been included in the test of eligibility for indirect technical remedies. Indirect mitigation is not applicable to future developments and thus the eligibility of the assumed new church building is not relevant.

An absorptive top-bent barrier with a 6.0m overhang in front of Fu Keung House (R21) and an absorptive top-bent barrier with a 3.0m overhang in front of Fu Man House (R15) have been determined as being the best practicable means for these sensitive receivers. The 6.0m overhang top-bent barrier is set at the back of the footpath and, thus, has an effective overhang of 3m, the section covering the Tai Wo Hau Road. The set-back is necessary to ensure adequate sight-lines at this stretch of the road. An overhang of 1.0m has been evaluated and determined to be ineffective. An effective overhang of 6.0m and a full enclosure over both carriageways of the dual two road have also been assessed but these were determined not to provide any significant additional benefit for R21, R15 and

R14a.

The noise attenuation achieved at R21 and R15 is approximately 4 and 2 dB(A) respectively but the levels are not reduced to below the HKSPG criteria. As such these NSRs have been tested for their eligibility for indirect technical remedies.

Two aborptive top-bent barriers with 3.0m overhangs on either side of Tai Wo Hau Road have been determined as the best practicable means for protecting R17, R22 and R28. Barriers with overhangs of 1.0m where also assessed but determined to be less effective than the 3.0m overhang. In addition, 6.0m overhangs were shown to have negligible additional attenuation.

The barrier in front of Fu On House (R17) and the Tai Wo Hau Estate Community Centre and nursery (R28) cannot be extended further west to protect R17a due to the presence of a signalled junction. The barrier protects R17 to within the 70 dB(A) criteria. However, the standard for the nursery is 65 dB(A) and the barrier does not provide attenuation to below this limit. Extension of the overhang has negligible benefit as mentioned above and extension further east also provides negligible benefit. Thus, NSR28 has been tested for its eligibility for indirect techncial remedies. A minmium of 6.5m operational emergency vehicular access for R17 will be maintained between the noise barrier and the building facade. In addition, a minimum of 4.5m clearance will be provided over the full length of the structure to allow sufficient vehicle egress without reversing.

The barrier on the opposite side of Tai Wo Hau Road is constrained at one end by the road corner. Extension of the barrier further west provides negligible additional benefit due to the natural barrier effect presented by the steep cut slope in this area. However, the proposed barrier provides attenuation to R22 to within the 70 dB(A) standard.

5.6.2 Summary of Noise Mitigation Measures

The recommended direct mitigation scenario for the Texaco Road improvement works are summarised below. The locations and extend of these barriers can be seen in Drawing 5.2. All the barriers described above will have a minimum 5.5m clearance as shown in the cross-sections provided in Drawings 5.3a, 5.3b and 5.3c. In addition, the air quality impact assessment (Section 6.0) has determined that inclusion of these noise mitigation structures would not result in pollutant levels above the Air Quality Objectives.

- an absorptive top-bent barrier with 8.0m overhang between Jade Court and Cheung Fat House on the northbound carriageway of Texaco Road;
- an absorptive/non-absorptive top-bent barrier with 8.0m overhang between Wang Wah Building and Symphone Industrial Building on the southbound carriageway of Texaco Road; absorptive section between R14 and Tsuen Wing Street;
- a non-absorptive cantilevered barrier with a 1.0m overhang adjacent to the Crown of Thorns Church on Tai Wo Hau Road;
- an absorptive top-bent barrier with a 6.0m overhang in front of Fu Keung House on Tai Wo Hau Road; the effective overhang of this barrier is 3.0m as it is set to the back of the 3.0m footpath;

- an absorptive top-bent barrier with a 3.0m overhang in front of Fu Man House on Tai Wo Hau Road;
- an adsorptive top-bent barrier with a a 3.0m overhang in front of Fu On House on Tai Wo Hau Road; and
- an adsorptive top-bent barrier with a a 3.0m overhang opposite Fu On House on Tai Wo Hau Road.

5.6.3 Mitigated Noise Results

The noise levels, L_{10} (1 hour), dB(A), at the NSRs during the operational phase with the recommended noise mitigation measures applied are shown in Table 5.7. Values at every five floors for each sensitive receivers, if applicable, are given below but a complete set of modelling results are provided in Appendix B.

Table 5.7: Noise Levels, $L_{10\,(1hour)}$, dB(A), at the Noise Sensitive Receivers During Operation Phase With Noise Mitigation Measures in the Year 2018

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (with Noise Mitigation)
R1	5	83
	10	82
	15	81
R2	5	77
	10	79
	15	80
R3	6	75
	11	79
	16	79
	21	78
	26	78
R4	5	75
	10	74
	15	74
	20	74
	25	74
R5	5	84
	10	83
	15	82
	20	81
	25	80
R6	5	84

Table 5.7 Cont'd...

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (with Noise Mitigation)
R6	10	83
	15	82
	20	81
	25	80
R7	1	86
R8	2	74
	7	77
	12	79
	17	79
	22	79
	27	78
R9	2	82
R10	4	85
	9	84
	14	83
	19	82
R11	5	85
	10	84
	15	82
	20	81
R12	2	86
R13	3	57
	8	71
	13	76
	18	77
R14	2	86
	7	84
	12	83
R14a	2	75
	7	77
	12	77
R14b	2	72
	7	72
	12	71
R15	2	64

Table 5.7 Cont'd...

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (with Noise Mitigation)
R15	7	69
	12	71
	17	71
	22	71
	27	71
R16	2	66
	7	71
	12	73
	17	74
	22	74
	27	74
R17	5	70
	10	69
	15	69
R17a	5	73
	10	72
	15	72
R18	1	78
R19	1	73
R19a	1	75
R20	1	70
R21	1	73
	6	73
	11	72
	16	72
	21	72
R22	1	68
	6	68
	11	68
	16	68
	21	69
	26	69
R23	1	60
	6	69
	11	74

Table 5.7 Cont'd...

Sensitive Receiver	Floor	Predicted L_{10} Noise Level (1hour) (with Noise Mitigation)
R23	16	75
	21	75
	26	75
	31	75
	36	75
R24	1	63
	6	75
	11	76
	16	76
	21	76
	26	76
	31	76
	36	75
R25	1	67
	6	75
	11	76
	16	76
	21	76
	26	76
	31	76
	36	75
R26	1	72
	6	74
	11	74
	16	74
	21	74
	26	74
	31	74
	36	74
R27	1	62
R28	1	70

5.6.4 Dwellings Benefitting from the Mitigation Measures

Table 5.8 below provides a summary of the number of dwellings affected by adverse noise, that is, are subject to noise levels above the HKSPG 70 dB(A) or 65 dB(A) criteria,

before and after the implementation of the direct noise mitigation measures. The figures show a reduction of 544 dwellings as a result of the direct mitigation. In addition, the number of dwellings which have benefitted from the mitigation structures are also provided in Table 5.8.

Table 5.8 Summary of Dwellings Affected by Adverse Noise and Benefitting from the Direct Mitigation Measures

Sensitive Receiver	Number of Floors	Number of Dwellings per floor Facing New Roads	Number of Dwelling Experiencing Noise >70/65 dB(A) without Mitigation Applied	Number of Dwelling Experiencing Noise >70/65 dB(A) with Mitigation Applied	Number of Dwellings Benefitting from the Direct Mitigtion
R1	15	3	45	45	12
R2	14	4	56	56	56
R3	24	4	96	96	96
R4	21	4	84	84	64
R5	16	4	64	64	36
R6	25	4	100	100	0
R7	4	6	24	24	0
R8	30	10	300	300	0
R9	4	2	8	8	2
R10	20	2	40	40	0
R11	20	4	80	80	0
R12	4	6	24	24	12
R13	20	2	30	30	4
R14	15	4	148	148	20
R14a	15	5	75	75	75
R14b	15	1	15	14	15
R15	30	2	50	44	60
R16	30	15	375	375	0
R17	12	10	120	0	120
R17a	12	2	24	24	24
R18	5	1	5	5	5

Table 5.8 Cont'd...

Sensitive Receiver	Number of Floors	Number of Dwellings per floor Facing New Roads	Number of Dwelling Experiencing Noise >70/65 dB(A) without Mitigation Applied	Number of Dwelling Experiencing Noise >70/65 dB(A) with Mitigation Applied	Number of Dwellings Benefitting from the Direct Mitigtion
R19	5	1	5	5	5
R19a	5	1	5	4	5
R20	5	1	5	5	5
R21	21	19	399	399	399
R22	26	15	390	0	390
R23	38	8	264	256	304
R24	38	6	210	204	228
R25	38	6	222	210	198
R26	38	8	304	304	160
R27	1	26	0	0	0
R28	5	1	5	5	5
Total:			**3572**	**3028**	**2300**

5.7 Residual Impacts

The results in Table 5.7 and Appendix B show that, even with the application of direct mitigation measures, only R27 (Kwai Lok Temporary Housing Area), R22 (Fu Wing House), some of the dwellings of R17 (Fu On House) and some of the lower floors of R15, R16, R23, R24 and R25 will experience noise within the 70 dB(A) standard. Thus, the majority of NSRs still exceed the HKPSG criteria.

The test according to the three Eligibility Criteria for Indirect Technical Remedies defined under the ExCo directive *"Equitable Redress for Persons Exposed to Increased Noise Resulting from the Use of New Roads"* has been applied to these NSRs. The three criteria are:

(i) the predicted overall noise level from the new road together with other traffic noise in the vicinity must be above 70 dB(A) for domestic premises and 65 dB(A) for school;

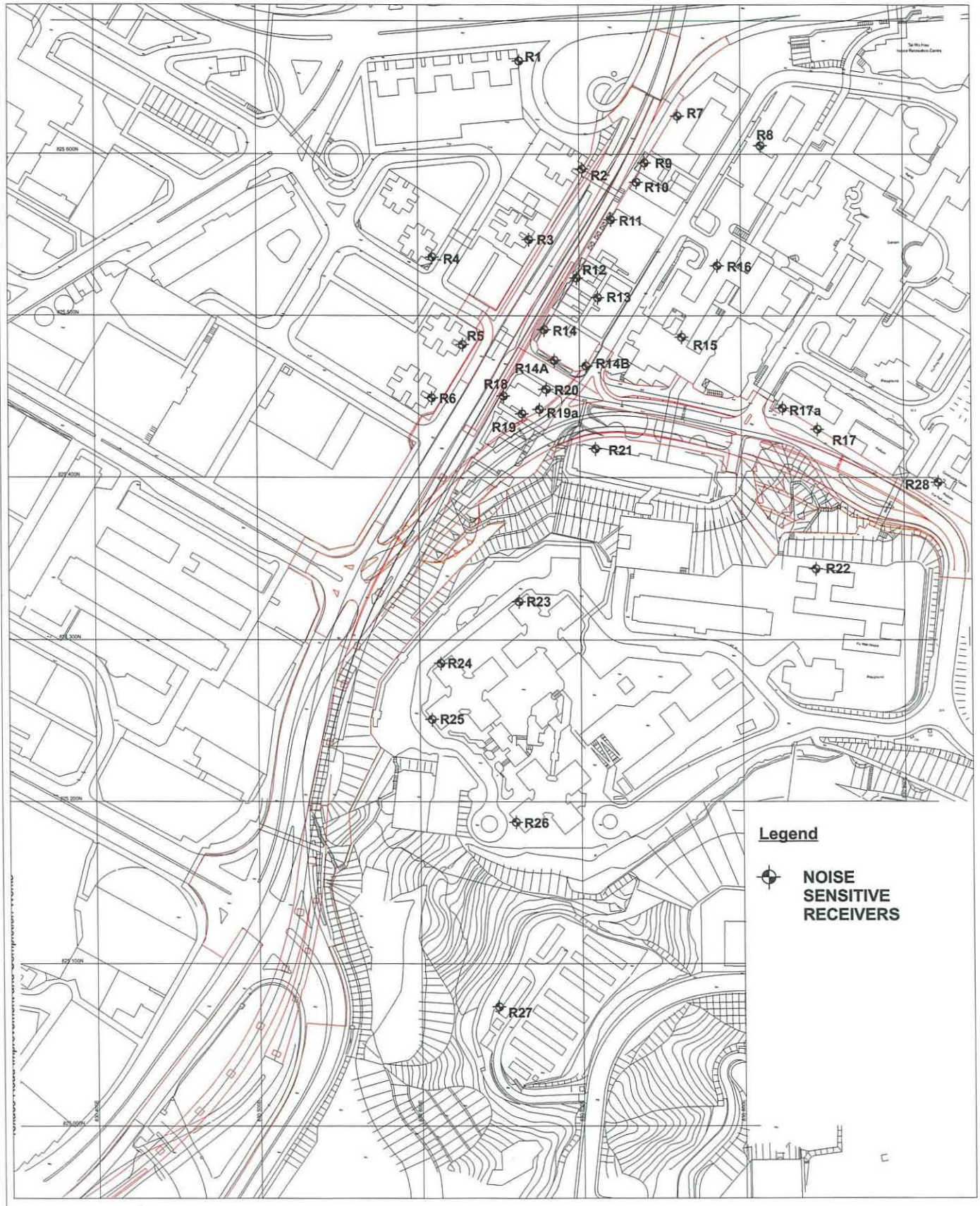
(ii) the predicted overall noise level is at least 1.0 dB(A) more than the prevailing traffic noise level; i.e. the total traffic noise level existing before the works to construct the road were commenced; and

(iii) the contribution to the increase in the predicted overall noise level from the new road must be at least 1.0 dB(A).

The three eligibility criteria test for the maximum noise levels at the NSRs are shown in Appendix C. It is concluded that approximately 1400 dwellings will be eligible for indirect noise mitigation remedies in the form of acoustic insulation and air conditioning systems subject to ExCo approval. This value does not include the Buddhist Memorial School (R7) as indirect mitigation in the fromof double glazing and air conditioners are already installed and additonal measures are not required. The majority of NSRs, including the nursery at R28 are not eligible for indirect techncial remedies due to the continuing influence of traffic from the exisitng roads as the dominant noise source.

5.8 Environmental Mitigation Implementation Schedule

A summary of the mitigation measures, both direct and indirect, are provided in the Environmental Mitigation Implementation Schedule in Appendix D.

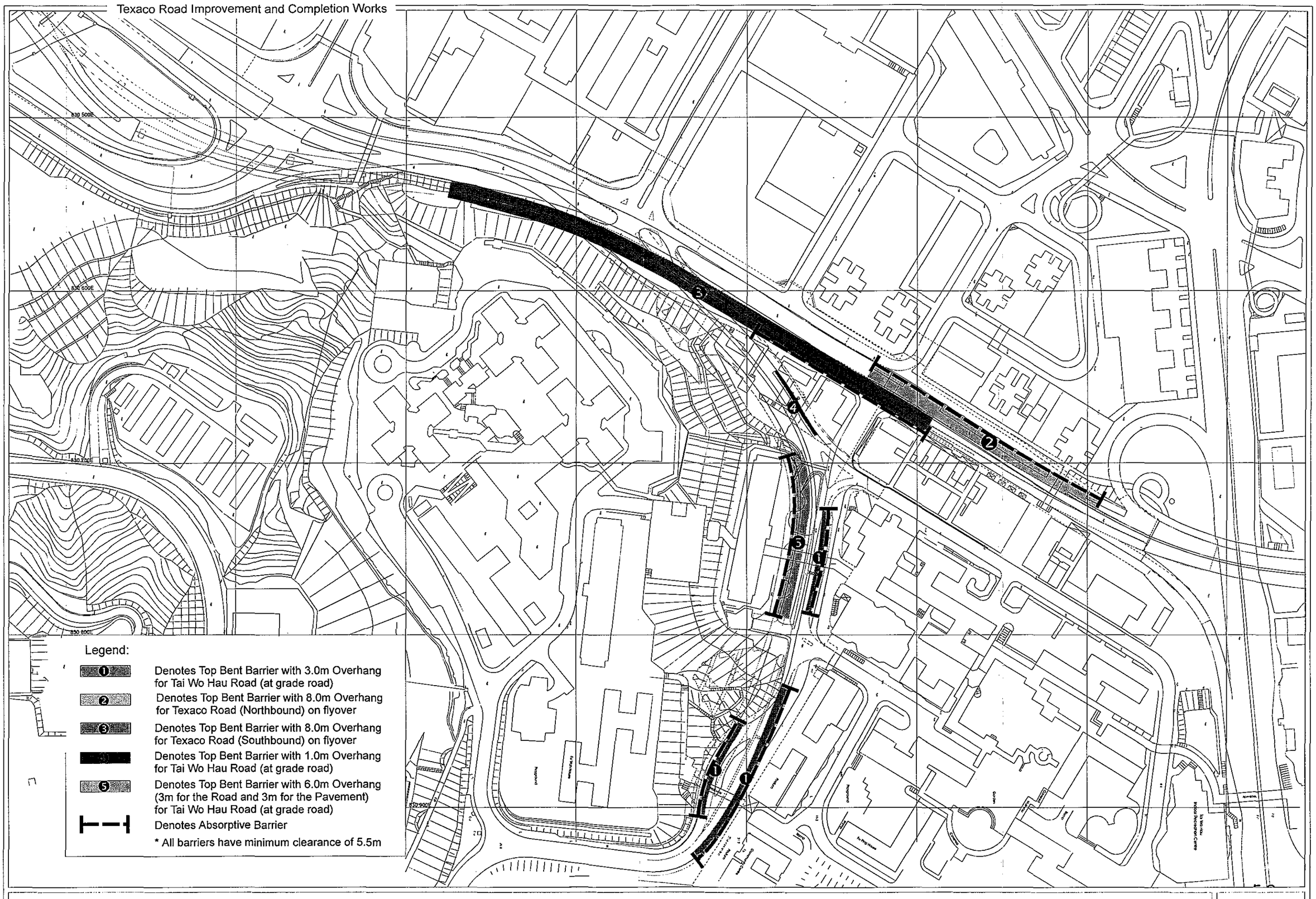


Noise Sensitive Receivers

Mouchel

Drawing No. 5.1

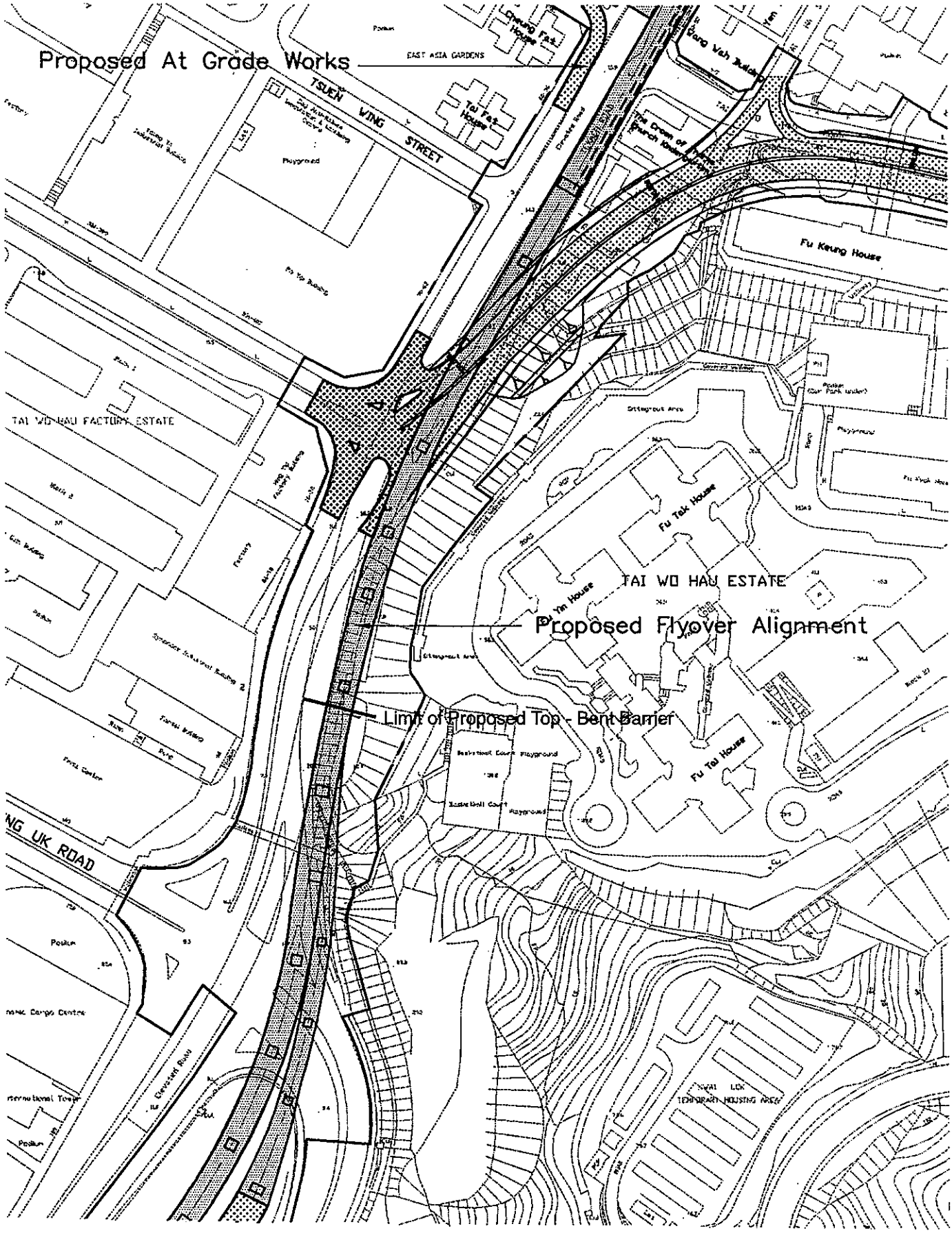
Texaco Road Improvement and Completion Works



Proposed Direct Noise Mitigation Measures

Mouchel

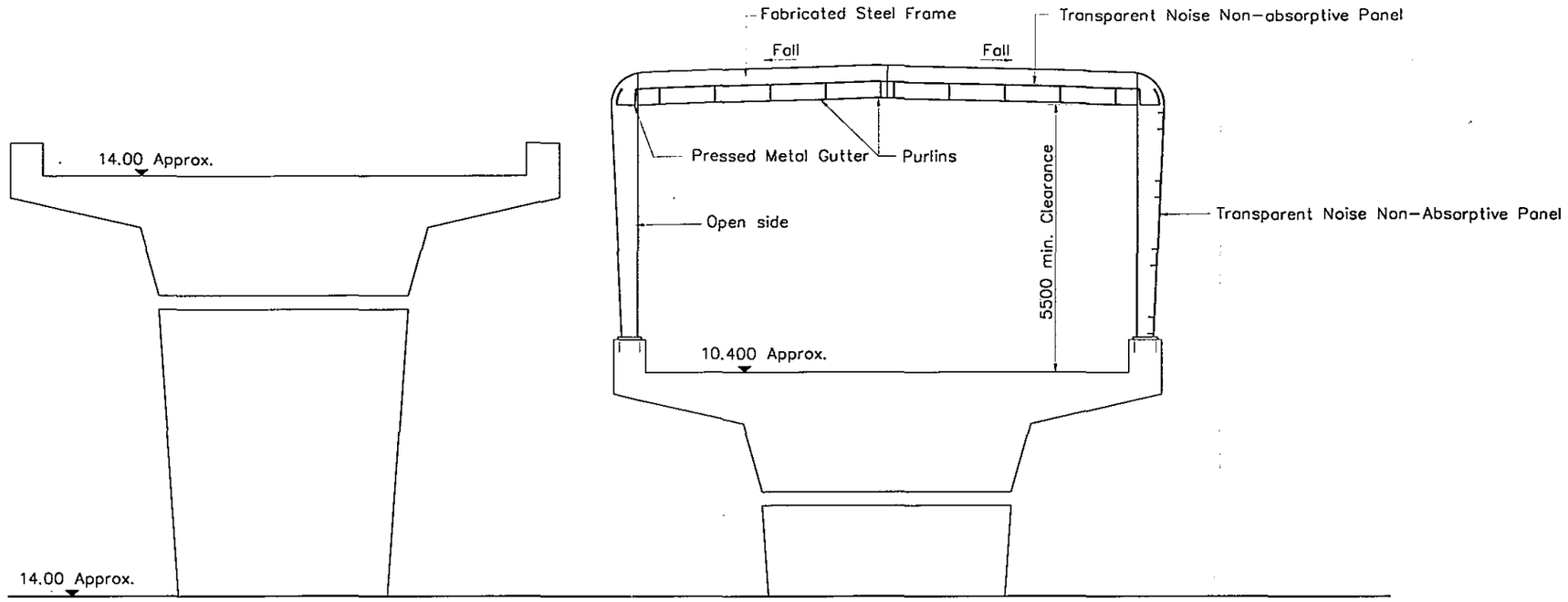
Drawing No. 5.2



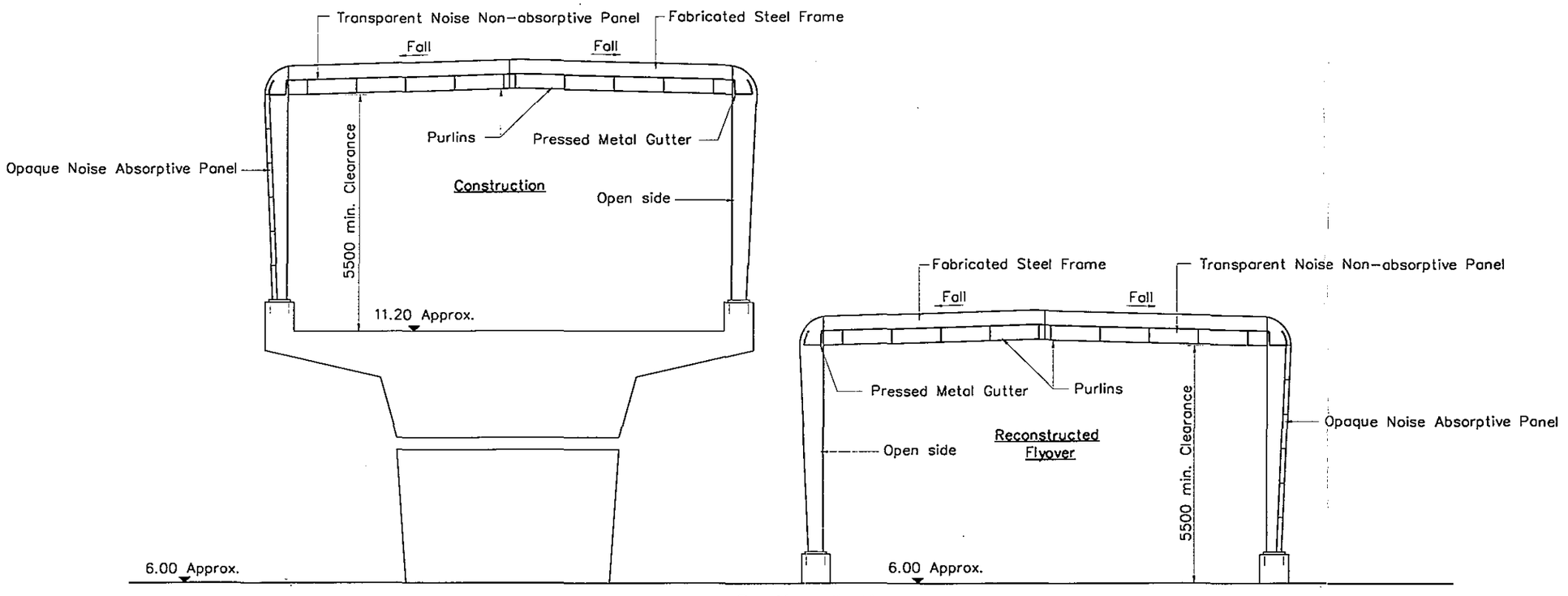
Relative Locations of Texaco Road Southbound Carriageway Top-Bent Barrier and Kwai Fuk Road Slip Road

Mouchel

Drawing No. 5.2a



Section A-A
1:100

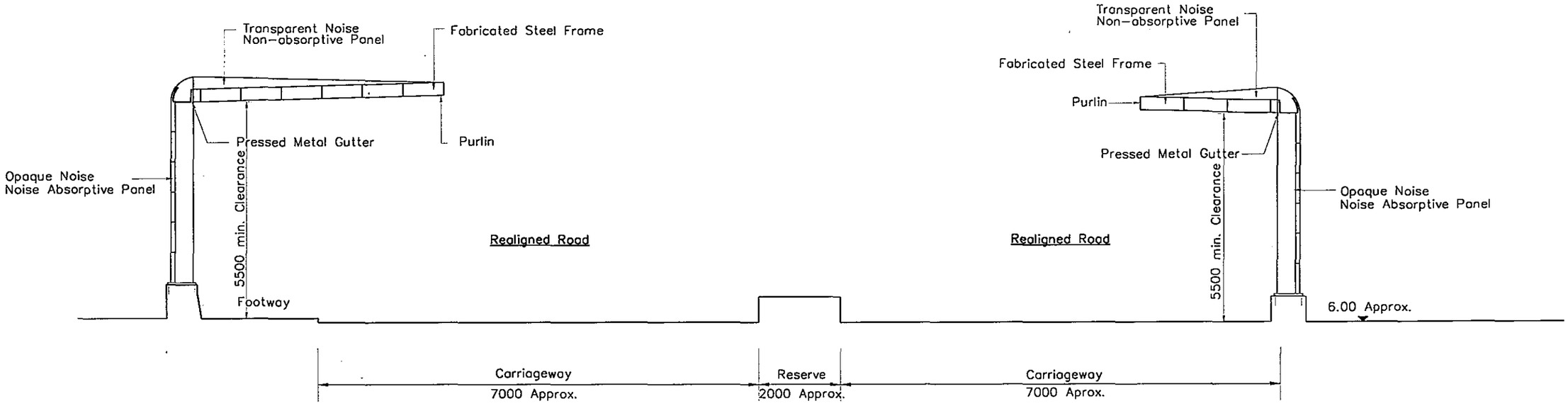


Section B-B
1:100

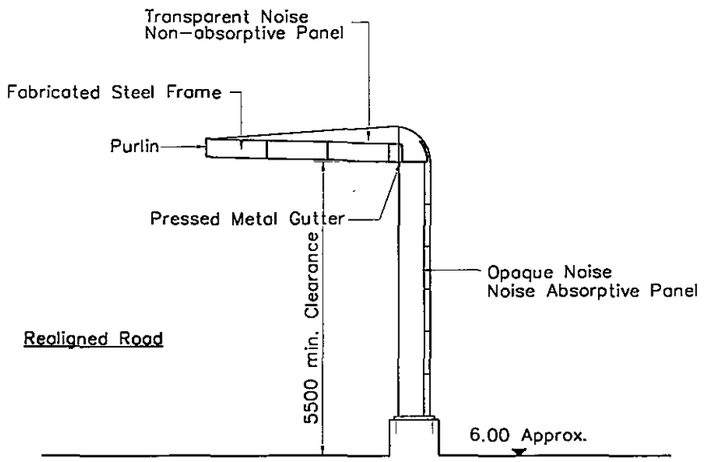
Typical Sections of Noise Mitigation Measures

Mouchel

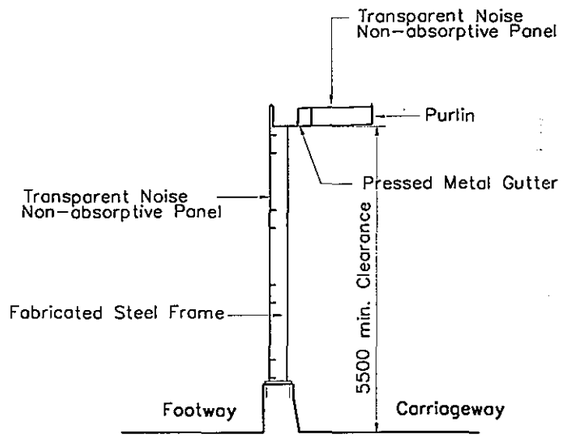
Drawing No. 5.3a



Section C-C
1:100



Typical Section for Barrier 1
1:100



Typical Section for Barrier 4
1:100

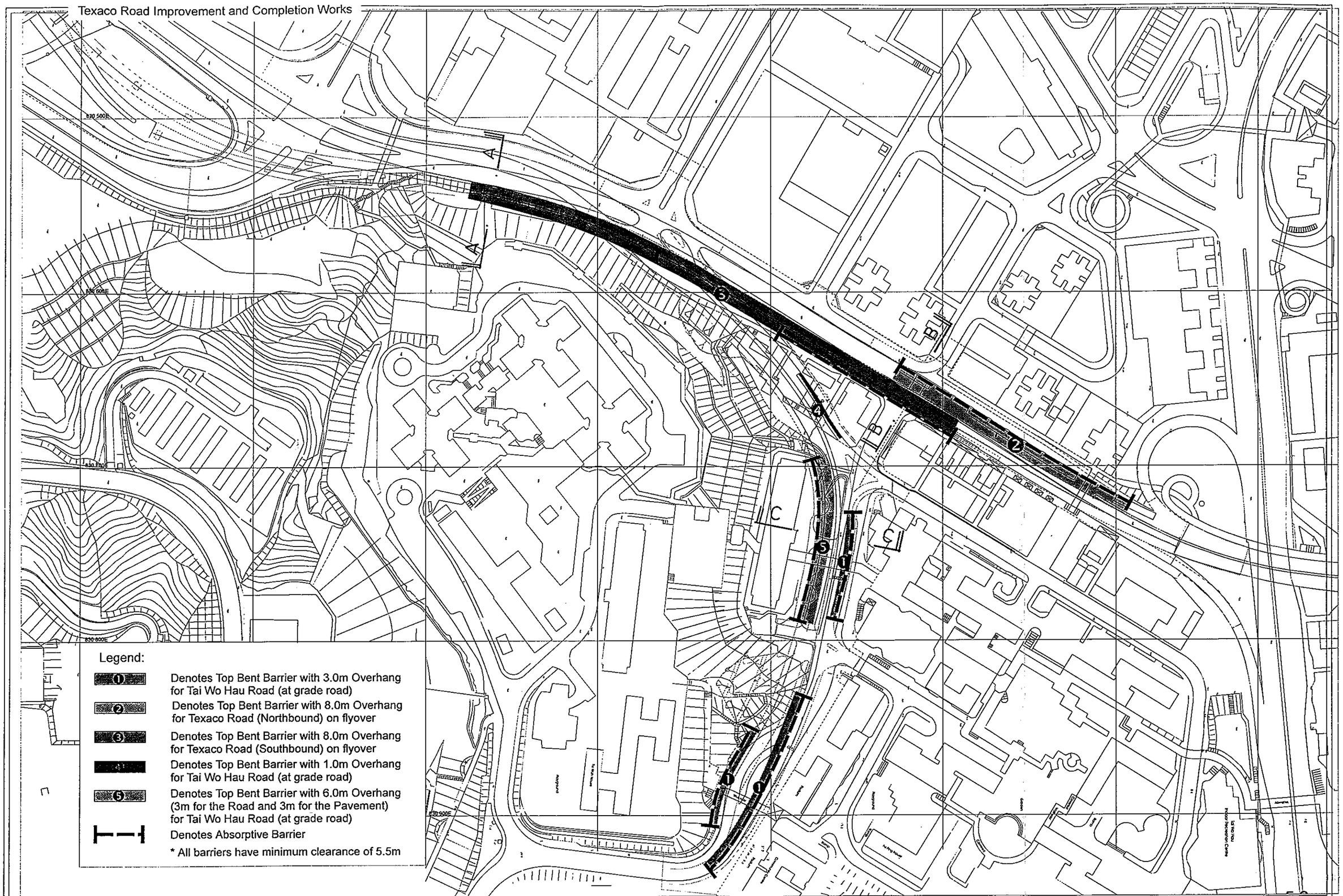
Typical Sections of Noise Mitigation Measures

Mouchel

Drawing No. 5.3b

K:\F90586\FIG-53B.DWG

Texaco Road Improvement and Completion Works



Location of Noise Mitigation Section

Mouchel

Drawing No. 5.3c

6.0 Air Impact Assessment

6.0 AIR IMPACT ASSESSMENT

6.1 Air Sensitive Receivers

Representative Air Sensitive Receivers (ASRs) have been identified according to the criteria set out in the Hong Kong Planning Standards and Guidelines and the Air Pollution Control Ordinance (APCO), through site inspections and review of landuse plans of the Study Area. The air impacts on all existing and planned ASRs have been considered. The majority of sensitive receivers are located in Texaco Road itself, although representative locations on Tsuen Fu Street, Tai Wo Hau Road, Tai Ha Street and Shek Tau Street have also been selected. The identification and names of the representative ASRs are shown in Table 6.1 below and shown on Drawing 6.1.

Table 6.1 The Air Sensitive Receivers

ASR Identification	Name of Building
A1	Fortune Court, Tsuen Wan Garden
A2	Jade Court
A3	Cheong Kwai Court, Wealthy Garden
A4	Cheong Fu Court, Wealthy Garden
A5	Cheung Fat House, East Asia Garden
A6	Tai Fat House, East Asia Garden
A7	Buddhist Lam Bing Yim Memorial School
A8	Fu Pik House, Tai Wo Hau Estate
A9	23-25 Texaco Road
A10	Tai Tak Court
A11	Tak Tai Building
A12	49 Texaco Road
A13	Yen Ya Building
A14	Wang Wah Building
A15	Fu Man House, Tai Wo Hau Estate
A16	Fu Pong House, Tai Wo Hau Estate
A17	Fu On House, Tai Wo Hau Estate
A18	The Crown of Thorns Church & Kindergarden
A19	The Crown of Thorns Church & Kindergarden
A20	The Crown of Thorns Church & Kindergarden
A21	Fu Keung House, Tai Wo Hau Estate
A22	Fu Wing House, Tai Wo Hau Estate
A23	Fu Tak House, Tai Wo Hau Estate
A24	Fu Yin House, Tai Wo Hau Estate
A25	Fu Yin House, Tai Wo Hau Estate
A26	Fu Tai House, Tai Wo Hau Estate
A27	Proposed Housing Development at Kwai Lok Temporary Housing Area

Table 6.1 Cont'd....

ASR Identification	Name of Building
A28	Lin Fung Centre
A29	Sandoz Centre
A30	Tak Fung Industrial Centre
A31	Allied Cargo Centre
A32	Lung Shing Factory Building
A33	Podium
A34	EW International Tower
A35	Dynamic Cargo Centre
A36	Shun Hing Centre
A37	Proposed Industrial Centre
A38	Proposed Industrial Centre
A39	Proposed Industrial Centre
A40	Sunley Centre
A41	Fritz Centre
A42	Fortei Building
A43	Symphone Industrial Building
A44	Factory
A45	Hing Yip Factory Building
A46	Po Yip Building

The Crown of Thorns Church (A18, A19 and A20) will have to be demolished in order for the improvement works to be completed. However, it has been agreed by relevant parties that air modelling work should be carried out at the church site based upon the assumption that the church will be rebuilt on the reduced site. In addition, the timescale for demolition of the building is unknown at this stage as this is largely dependant upon the ultimate proposal for the church property. Thus, for the purposes of this report, the existing building and proposed new church have been included in both the construction and operational air impact assessment, respectively.

6.2 The Existing Air Pollution Environment

The air monitoring data at the nearest EPD monitoring stations to Texaco Road can be used as the background air quality data for the air impact assessment. Air monitoring data for 1994 were requested from the Air Services Group of EPD. The background air quality data of 1994 at the Tsuen Wan and Kwai Chung EPD monitoring stations are shown in Table 6.2.

Table 6.2 The Background Air Quality Data of 1994 at the Nearest EPD Monitoring Stations

Pollutant	Air Monitoring Station	Annual Average Concentration($\mu g/m^3$)
Nitrogen Dioxide (NO_2)	Tsuen Wan	59 (1hour)

Table 6.2 Cont'd...

Pollutant	Air Monitoring Station	Annual Average Concentration($\mu g/m^3$)
Carbon Monoxide (CO)	Kwai Chung	500 (1hour)
Respirable Suspended Particulates (RSP)	Tsuen Wan	62 (24 hour)
Total Suspended Particulates (TSP)	Tsuen Wan	101 (24 hour)

6.3 Impacts During Construction

The likely air quality impact arising from the construction of Texaco Road is related to dust nuisance and gaseous emissions from construction plant and vehicles.

SO_2 and NO_2 will be emitted from the diesel-powered equipment used. However, since the numbers of such plant required on-site will be limited, their gaseous emissions will be minor and the Air Quality Objectives (AQOs) for these gases are not expected to be exceeded.

Potential dust nuisance will be the major concern from the construction of the Texaco Road Improvements. The major sources of dust on site have been assumed to be from construction, vehicular movement over unpaved haul roads and erosion based on the preliminary implementation programme discussed in Section 2 of this report.

The Fugitive Dust Model (FDM) was used to predict the likely dust impacts at the ASRs from the construction of Texaco Road. Particulate emission rates for the identified potential dust sources were determined based on the USEPA publication *Compilation of Air Pollution Emission Factors (AP42) (USEPA, 4th & 5th edition, 1985 & 1995).* The following assumptions have been made for the assessment of construction dust impacts based on the emission information for different activities listed in AP42:

- 80% of particulates will have a size equal to 30 μm and the remaining 20% are in the respirable fraction with a size of 10 μm or less;
- a silt content of 4.8%;
- a moisture content of 4%;
- an average dust density of 2500 kg/m^3 ; and
- a background TSP(24 hour) concentration used in the impact assessment of 101 $\mu g/m^3$.

Meteorological data for 1994 has been obtained from the Hong Kong Observatory for the weather station at the Ching Pak House on Tsing Yi Island, while mixing height information for 1994 used in the study was obtained from the weather station at King's Park.

Both 1-hour and 24-hour TSP concentrations at the representative ASRs have been determined. A conservative approach has been adopted, in the assessment, assuming the worst case scenario that all activities would be carried out in parallel with a 12 hour working day. In reality, the activities are of limited duration and could vary in time.

6.4 Mitigation Measures During Construction

The construction work could cause dust impacts at some of the air sensitive receivers in excess of the 1 hour 500$\mu g/m^3$ standard unless mitigation is applied. The dust control measures detailed below should be incorporated in the Contract Specification as an integral part of good construction practice and implemented to minimise dust nuisance to within acceptable levels arising from the works. These measures are summarised in an Environmental Mitigation Implementation Schedule in Appendix D.

(i) watering of unpaved roads, which results in road dust suppression by forming moist cohesive films among the discrete grains of road surface material. An effective watering programme, i.e. twice daily watering with complete coverage, is estimated to reduce erosion and unpaved roads by 50%;

(ii) watering at every 1.5 hours during construction is estimated to reduce dust emissions by 70%;

(iii) where breaking of oversize rock/concrete is required, watering should be implemented to control dust. Water spray should be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created;

(iv) dropping heights for excavated materials should be controlled to a practical height to minimize the fugitive dust arising from unloading;

(v) during transportation by truck, materials should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport;

(vi) all stockpiles of aggregate or spoil should be enclosed or covered and water applied in dry or windy condition; and

(vii) effective water sprays should be used on the site at potential dust emission sources.

Impact modelling has been undertaken to estimate the dust impacts with these mitigation measures in place and with the background air quality concentrations included. The maximum concentrations of dust impacts at the nearest air sensitive receivers during construction with these general control requirements applied are shown in Table 6.3.

Table 6.3: Concentrations of Dust Impacts during the Construction Phase with General Control Requirements

Air Sensitive Receiver	Concentration of Total Suspended Particulates (including background levels) ($\mu g/m^3$)	
	1 hour	24 hour
A1	173	137
A2	371	244
A3	289	179
A4	192	153
A5	279	177
A6	296	176
A7	368	164
A8	170	124
A9	393	218
A10	379	223
A11	366	227
A12	380	235
A13	213	164
A14	447	240
A15	287	161
A16	190	133
A17	141	112
A18	432	234
A19	394	218
A20	152	119
A21	193	150
A22	113	104
A23	112	103
A24	113	103
A25	114	104
A26	114	104
A27	105	102
A28	126	111
A29	125	111
A30	129	112
A31	135	114
A32	147	117

Table 6.3 Cont'd.....

Air Sensitive Receiver	Concentration of Total Suspended Particulates (including background levels) ($\mu g/m^3$)	
	1 hour	24 hour
A33	161	121
A34	193	127
A35	212	131
A36	113	106
A37	131	111
A38	139	116
A39	133	113
A40	212	162
A41	194	135
A42	256	150
A43	272	154
A44	301	162
A45	374	177
A46	283	203

The results show that with the general control measures detailed above, the dust impacts at the ASRs are within the Air Quality Objectives.

6.5 Impacts During Operation

6.5.1 Assessment Methodology

Impacts on air quality during operation of the improved Texaco Road will be due to vehicular emissions from the existing roads, together with the open sections and side openings of the semi-enclosures (proposed in the noise impact assessment) of the new sections of road. The worst case emissions are assumed to be in the year 2011 based upon the consolidation of increasing traffic flows and decreasing emission factors. As a result, afternoon peak hour traffic flows and vehicle mixes for 2011 have been taken from the transportation modelling study for use in the assessment as detailed in Section 4.0 of this report. The predicted traffic flows used in the assessment have been approved by the Transport Department. Vehicular emission factors of nitrogen oxides (NO_x), respirable suspended particulates (RSP) and carbon monoxide (CO) for each vehicle type in the year 2011 have been obtained from data supplied by the EPD. Nitrogen dioxide (NO_2) has been assumed to be 7.5% of total NO emissions, based upon the ozone limiting method.

In order to provide a full assessment of the operational air pollution impacts from vehicles, we have assessed scenarios for both with and without noise mitigation as follows:

(i) the air pollution concentrations in the year 2011 with the new road in place but without the presence of the noise mitigation measures detailed in Section 5.0 of this report. For this scenario, the existing roads and the whole length of the new road as open sections have been modelled; and

(ii) the air pollution concentrations in the year 2011 with the new road in place and including the recommended direct noise mitigation measures. This scenario requires the modelling of vehicular air pollutants from the existing roads, open sections of the new road and side openings of semi-enclosures on the new road.

The background concentrations assumed for use in the impact assessment as detailed in Table 6.2 are:

NO_2 (1 hour)	:	59 $\mu g/m^3$
CO (1 hour)	:	500 $\mu g/m^3$
RSP (24 hour)	:	62 $\mu g/m^3$

In addition, a background ozone concentration of 64.78 $\mu g/m^3$, dervied from the annual average of the daily maximum from EPD's Kwai Chung monitoring station, was provided by EPD's Air Policy Group for use in the assessment.

6.5.2 Vehicular Emissions from Open Sections and Side Openings of Semi-enclosures

Traffic emissions on the open sections of road and the side openings of semi-enclosures, have been modelled using the traffic pollution model CALINE4. Because the peak hour traffic occurs during daytime, neutral meterological conditions were assumed. Typical input parameters for the CALINE4 model are listed below:

Wind Speed:	1 metre per second
Wind Direction:	worst case for each receiver
Wind Direction Standard Deviation	18.3 Degrees
Stability Class	D
Mixing Height	1000 metres
Temperature	25 Deg. C
Surface Roughness	100 cm
Height of discrete receptors	1.5, 5 and 10 metres above ground level
Height of grid receptors	1.5 metres above ground level

CALINE4 is only a screening model and so it is not possible to obtain results over an averaged 24-hour period. However, maximum concentrations for a 24 hour period can be calculated by multiplying the maximum 1-hour concentrations obtained from the model with the multiplication factor of 0.4 (+/-0.2).

This factor is generally used to convert short term concentrations estimated by screening models to long term concentrations and is accepted by regulatory agencies in the U.S.A.[1]

The NO_x results obtained from the CALINE4 model have been subject to the Tier 2 screening level analysis of the Ozone Limiting Method[2]. This utilised the background ozone concentration of 64.78 $\mu g/m^3$ and a NO_x to NO_2 conversion of 7.5%.

6.6 Cumulative Impacts

The vehicular emissions at each of the ASRs are superimposed on the background air quality data to predict the total air impacts. The results for both with and without noise mitigation for the three emissions factors, CO, NO_2 and particulate matter, are shown in Table 6.4 below and can be seen as pollution contours in Drawings 6.2, 6.3 and 6.4 respectively.

The results show that all parameters, both with and without the noise mitigation measures recommended in Section 5.0 of this report applied, comply with the relevant AQOs.

1 a) "Practical Guide to Atmospheric Dispersion Modelling", Trinity Consultants, Inc., U.S.A. Table 10-5, p.10-16.
b) Brode, R.W., 1988: Screening Procedures for Estimating the Air Quality Impact of Stationary Sources. EPA-450/4-88-010, U.S.A Environmental Protection Agency, Research Triangle Park, N.C, U.S.A, p.4-17

2 Use of Ozone Limiting Method for Estimating Nitrogen Dioxide Concentrations, Draft for Comment, OLM/ARM Work Group, U.S.A Environmental Protection Agency, November 1997.

Table 6.4 Concentrations of Air Pollutants at the Air Sensitive Receivers During the Operational Phase in 2011

Air Sensitive Receiver	Height (m)	CO ug/m3 (1 hour)		NO2 ug/m3 (1 hour)		Particulate Matter ug/m3 (24 hour)	
		2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures
ASR1	1.5	5305	5276	299	298	160	159
	5.0	4749	4722	279	278	147	147
	10.0	3742	3717	241	240	126	126
ASR2	1.5	3682	3610	237	234	129	127
	5.0	3725	3602	238	234	130	127
	10.0	3797	3520	238	229	129	123
ASR3	1.5	3727	3637	233	230	126	124
	5.0	3699	3591	232	228	125	123
	10.0	3543	3413	227	222	121	118
ASR4	1.5	2537	2542	193	193	101	101
	5.0	2507	2514	192	192	100	100
	10.0	2415	2423	189	189	98	98
ASR5	1.5	4104	4171	243	246	132	134
	5.0	3927	3989	238	241	129	130
	10.0	3568	3618	228	230	121	123
ASR6	1.5	4072	4096	242	243	131	132
	5.0	3874	3899	237	238	127	128
	10.0	3480	3503	225	226	119	120
ASR7	1.5	4062	4149	252	255	137	139
	5.0	4039	4133	251	254	136	139
	10.0	3836	3937	244	247	131	134
ASR8	1.5	2713	2743	204	204	108	108
	5.0	2644	2672	201	201	106	106
	10.0	2469	2496	194	195	101	102

Table 6.4 Concentrations of Air Pollutants at the Air Sensitive Receivers During the Operational Phase in 2011

Air Sensitive Receiver	Height (m)	CO ug/m3 (1 hour)		NO2 ug/m3 (1 hour)		Particulate Matter ug/m3 (24 hour)	
		2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures
ASR9	1.5	3714	3810	239	242	130	132
	5.0	3768	3874	241	245	134	136
	10.0	4004	4132	252	256	138	141
ASR10	1.5	3592	3694	234	238	128	130
	5.0	3690	3737	240	243	132	134
	10.0	3913	4026	247	251	135	137
ASR11	1.5	3673	3790	234	238	127	129
	5.0	3827	3913	241	244	132	133
	10.0	4170	4281	254	258	138	141
ASR12	1.5	3902	3978	242	245	132	134
	5.0	4059	4158	248	252	136	138
	10.0	4448	4603	263	269	144	147
ASR13	1.5	3434	3476	226	228	121	122
	5.0	3391	3434	225	226	120	121
	10.0	3227	3270	219	220	116	117
ASR14	1.5	4111	4195	249	252	136	138
	5.0	4293	4405	256	260	140	143
	10.0	4870	5044	279	285	153	157
ASR15	1.5	2738	2728	202	202	106	106
	5.0	2690	2685	200	200	104	105
	10.0	2542	2555	195	196	101	102
ASR16	1.5	2540	2530	196	195	102	102
	5.0	2507	2499	194	194	101	101
	10.0	2402	2401	191	190	99	99

Table 6.4 Concentrations of Air Pollutants at the Air Sensitive Receivers During the Operational Phase in 2011

Air Sensitive Receiver	Height (m)	CO ug/m3 (1 hour)		NO2 ug/m3 (1 hour)		Particulate Matter ug/m3 (24 hour)	
		2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures
ASR17	1.5	2325	2181	189	183	97	95
	5.0	2232	2149	185	182	95	94
	10.0	2027	2053	178	179	91	92
ASR18	1.5	4300	4394	256	259	140	142
	5.0	4440	4561	261	265	143	146
	10.0	4975	5131	283	288	155	158
ASR19	1.5	4188	4248	251	253	136	138
	5.0	4013	4077	245	247	132	134
	10.0	3643	3706	233	235	124	126
ASR20	1.5	3929	3976	242	243	131	132
	5.0	3759	3807	236	238	127	128
	10.0	3407	3452	225	226	119	120
ASR21	1.5	3015	3407	212	227	113	122
	5.0	2372	2333	190	189	98	99
	10.0	2245	2255	185	186	95	96
ASR22	1.5	1883	1888	173	173	88	88
	5.0	1877	1880	173	173	88	88
	10.0	1851	1854	172	172	87	87
ASR23	1.5	2628	2629	199	199	103	103
	5.0	2542	2542	196	196	101	101
	10.0	2394	2396	191	191	98	98
ASR24	1.5	3101	3045	216	214	113	112
	5.0	2958	2909	211	209	110	109
	10.0	2722	2685	203	201	105	104

Table 6.4 Concentrations of Air Pollutants at the Air Sensitive Receivers During the Operational Phase in 2011

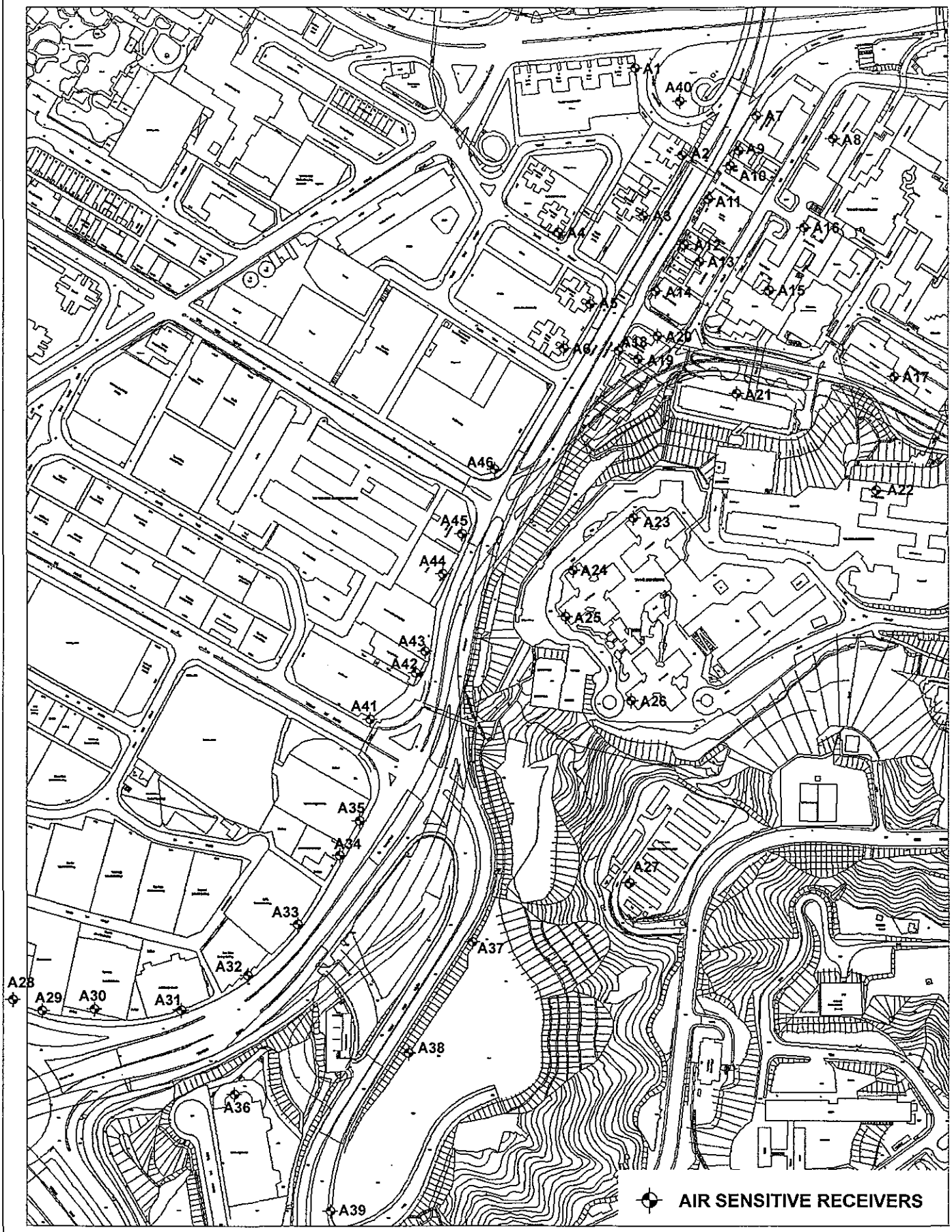
Air Sensitive Receiver	Height (m)	CO ug/m3 (1 hour)		NO2 ug/m3 (1 hour)		Particulate Matter ug/m3 (24 hour)	
		2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures
ASR25	1.5	3137	3090	218	216	114	113
	5.0	2990	2950	213	211	110	103
	10.0	2752	2718	204	203	105	104
ASR26	1.5	2699	2687	203	202	105	104
	5.0	2603	2594	199	199	103	102
	10.0	2445	2437	194	193	99	99
ASR27	1.5	2473	2462	195	195	100	100
	5.0	2383	2371	192	191	98	98
	10.0	2231	2220	186	186	95	95
ASR28	1.5	2445	2448	197	197	104	104
	5.0	2414	2416	195	196	103	103
	10.0	2315	2317	191	192	101	101
ASR29	1.5	2541	2544	200	200	106	106
	5.0	2510	2513	199	199	105	105
	10.0	2407	2409	195	195	102	103
ASR30	1.5	2690	2693	206	206	109	109
	5.0	2660	2662	204	204	108	108
	10.0	2557	2560	200	200	105	106
ASR31	1.5	3273	3275	227	227	123	123
	5.0	3323	3326	229	229	124	124
	10.0	3321	3323	229	229	123	123
ASR32	1.5	3937	3937	239	239	131	131
	5.0	3630	3629	234	234	127	127
	10.0	3535	3538	237	237	127	127

Table 6.4 Concentrations of Air Pollutants at the Air Sensitive Receivers During the Operational Phase in 2011

Air Sensitive Receiver	Height (m)	CO ug/m3 (1 hour)		NO2 ug/m3 (1 hour)		Particulate Matter ug/m3 (24 hour)	
		2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures
ASR33	1.5	4143	4141	247	247	135	135
	5.0	4065	4062	247	247	135	135
	10.0	4146	4143	254	254	139	139
ASR34	1.5	3995	3998	244	244	134	134
	5.0	3829	3833	241	241	132	132
	10.0	3648	3651	237	237	128	128
ASR35	1.5	4125	4131	248	248	136	137
	5.0	3927	3932	243	244	133	133
	10.0	3606	3611	234	234	126	126
ASR36	1.5	3196	3196	217	217	115	115
	5.0	3160	3160	216	216	114	114
	10.0	3027	3027	211	211	111	111
ASR37	1.5	5224	5218	296	296	158	157
	5.0	4025	4018	252	252	132	132
	10.0	2998	2991	215	215	112	112
ASR38	1.5	4267	4265	260	260	137	137
	5.0	3702	3699	236	236	123	123
	10.0	2881	2877	206	206	106	106
ASR39	1.5	3190	3188	218	218	113	113
	5.0	3075	3073	214	214	110	110
	10.0	2776	2775	203	203	104	104
ASR40	1.5	4979	4929	286	285	154	153
	5.0	4631	4583	273	272	146	145
	10.0	3870	3824	245	243	129	128

Table 6.4 Concentrations of Air Pollutants at the Air Sensitive Receivers During the Operational Phase in 2011

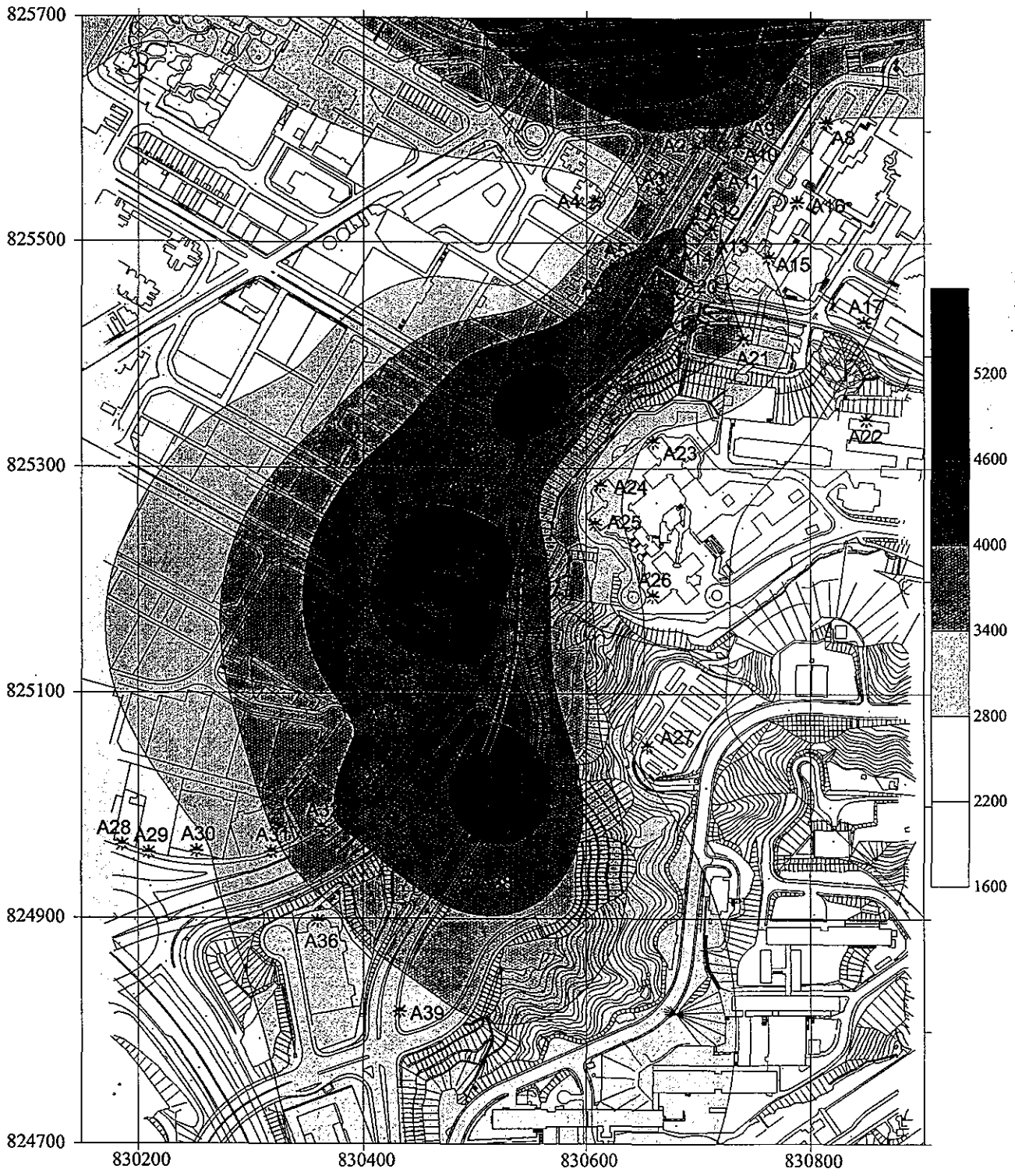
Air Sensitive Receiver	Height (m)	CO ug/m3 (1 hour)		NO2 ug/m3 (1 hour)		Particulate Matter ug/m3 (24 hour)	
		2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures	2011 - without noise mitigation measures	2011 - with noise mitigation measures
ASR41	1.5	5172	5207	286	287	156	156
	5.0	4220	4255	253	254	136	136
	10.0	3016	3050	211	212	111	112
ASR42	1.5	4731	4810	267	270	145	147
	5.0	4342	4420	255	258	138	140
	10.0	3764	3840	237	240	127	128
ASR43	1.5	5185	5277	279	283	153	155
	5.0	4446	4537	258	261	139	141
	10.0	3797	3882	238	241	127	129
ASR44	1.5	4066	4140	243	246	130	132
	5.0	3791	3863	235	237	125	127
	10.0	3355	3422	222	224	117	119
ASR45	1.5	4379	4461	252	255	136	138
	5.0	3933	4013	239	242	128	130
	10.0	3427	3503	224	227	118	120
ASR46	1.5	5062	5156	275	278	150	152
	5.0	4235	4328	250	253	134	136
	10.0	3526	3613	227	230	120	122



Air Sensitive Receivers

Mouchel

Drawing No. 6.1

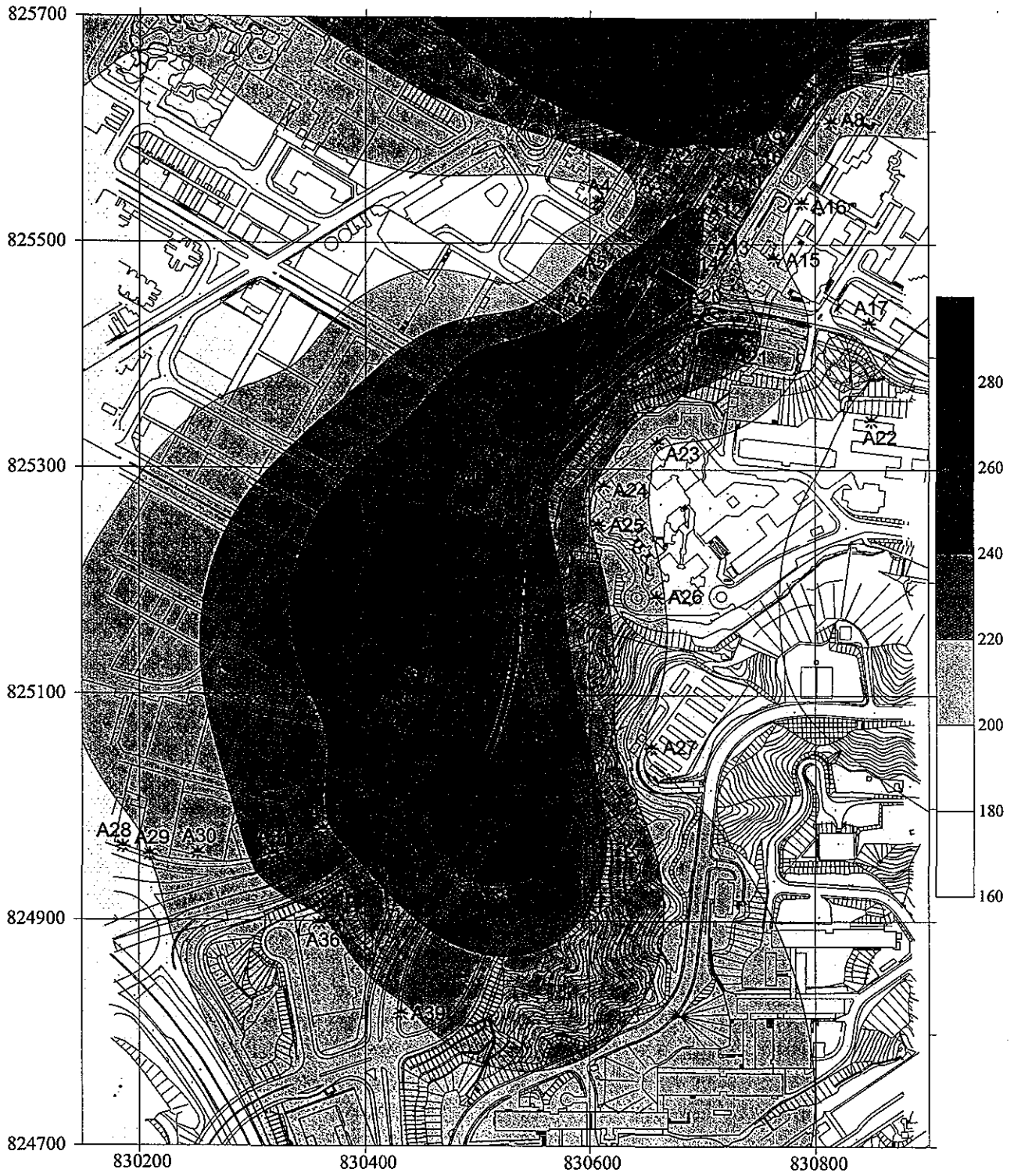


CO(1-hour)μg/m³

Pollution Contours during Operation in Year 2011

Mouchel

Drawing No. 6.2

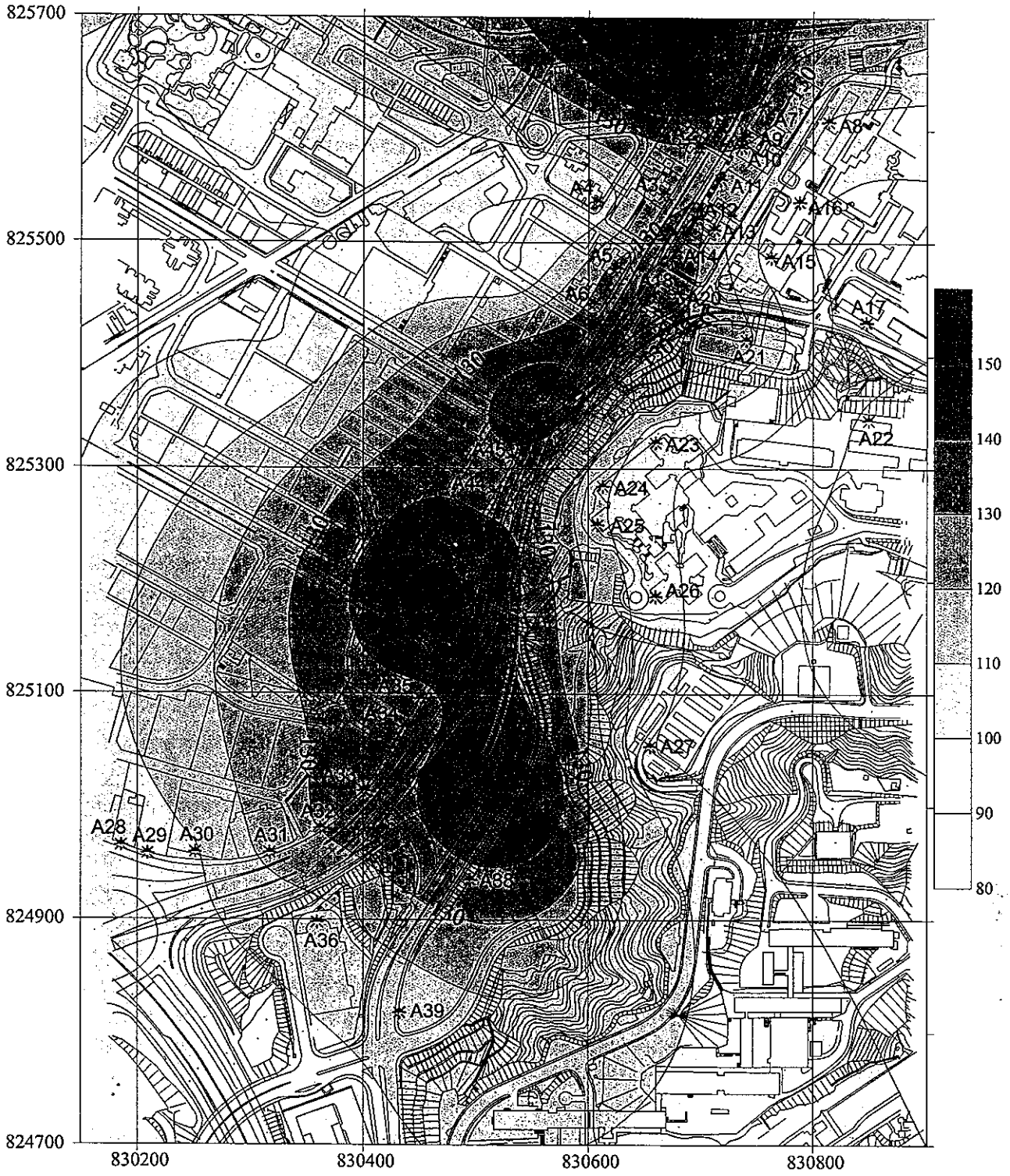


NO_2(1-hour)μg/m^3

Pollution Contours during Operation in Year 2011

Mouchel

Drawing No. 6.3



RSP(24-hour)μg/m³

Pollution Contours during Operation in Year 2011

Mouchel

Drawing No. 6.4

7.0 Environmental Monitoring and Audit

7.0 ENVIRONMENTAL MONITORING AND AUDIT

7.1 Objectives

The objective of this chapter is to outline the procedures of the EM&A programme for monitoring the environmental performance of the Texaco Road Improvements construction activities necessary to ensure compliance with the Environmental Impact Assessment (EIA) study recommendations, assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action that may be required. However, an EM&A programme is not needed during the operation phase of the Texaco Road flyover and monitoring and audit works are not required for the landscaping mitigation proposals during the construction or operation phases.

The Hong Kong Government's applicable environmental regulations for noise and air quality, the Hong Kong Planning Standards and Guidelines and recommendations in the Texaco Road Improvement Works EIA study have served as guidance documents in the preparation of this Manual. This chapter fulfills the requirements of the Study Agreement, Clause 6.5(j), and follows the approach recommended in EPD's Generic EM&A Manual.

This chapter provides the following information as specified in the Agreement:

(i) identification and recommendations for monitoring requirements for all phases of development, including:

- identification of sensitive receivers;
- monitoring locations;
- monitoring parameters and frequencies;
- monitoring equipment to be used;
- programmes for baseline monitoring and impact monitoring; and
- data management of monitoring results.

(ii) the organisation management structure and procedures for auditing of the Project and implementation of mitigation measures that are recommended for the Project;

(iii) the environmental quality performance limits for compliance auditing for each of the recommended monitoring parameters to ensure compliance with relevant environmental quality objectives, statutory or planning standards;

(iv) organisation and management structure and procedures for reviewing the design submissions, monitoring results and auditing the compliance of the monitoring data with the environmental quality performance limits, contractual and regulatory requirements and environmental policies and standards;

(v) Event and Action plans for impact and compliance procedures;

(vi) complaints handling, liaison and consultation procedures; and

(vii) interim notification of exceedances, reporting procedures, report formats and reporting frequency including periodical quarterly summary reports and annual reviews to cover all construction, post-Project and operational phases of the development as required.

7.2 Project Organisation

For the purpose of this EM&A Manual, the Territories Development Department of the Hong Kong SAR Government is referred to as the "Employer" and the Project "Engineer" defined as the Employer designated Engineer's Representative who will be responsible for the supervision of the construction of the Project.

As part of the resident site staff, an Environmental Specialist is to be employed along with required support staff for carrying out the environmental monitoring including field measurements, sampling, laboratory testing, analysis of monitoring work results, reporting and auditing. The Environmental Specialist shall be approved by the Engineer's Representative and the Director of the Environmental Protection Department (DEP). The Environmental Specialist shall be competent and shall have relevant environmental monitoring and audit experience on projects of a similar scale and nature.

The Environmental Specialist shall report directly to the Engineer's Representative and the DEP and shall have the responsibility of carrying out the environmental monitoring and reporting. As part of his duties, the Environmental Specialist will provide an assessment of all environmental work and the Contractor's implementation of environmental mitigation measures required as part of the EIA.

As part of the Project Organisation, the Contractor will be responsible for the collection of samples and laboratory testing of the samples for the environmental monitoring works as required in this Manual and as directed and audited by the Environmental Specialist.

7.3 Construction Programme

The construction works for the Texaco Road Improvement works are anticipated to commence in mid to late 2000 and shall cover a total period of approximately two and a half years finishing in early 2003. The construction activities are expected to be carried out for 12 hours per day between the hours of 7:00 and 19:00. There may be a need for limited works in the evenings and at night but these works will be subject to requirements of a Construction Noise Permit issued under the Noise Control Ordinance. The environmental monitoring works should start at the commencement of the construction contract and up to the issue of the completion certificate and cover any restricted period works as appropriate.

7.4 Noise

7.4.1 Noise Parameters

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

As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference and shall be recorded by the Environmental Specialist. A sample data record sheet is shown in Drawing 7.1 for reference.

7.4.2 Monitoring Equipment

As given in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring.

Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0dB.

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

The Contractor will be responsible for the provision of the monitoring equipment. The Contractor shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

7.4.3 Monitoring Locations

The areas for establishing representative noise monitoring stations are shown in Drawing 7.2. The specific locations of the monitoring stations are to be determined by the Environmental Specialist and approved by DEP prior to monitoring. If the status or locations of noise sensitive receivers change after issuing this manual, the Environmental Specialist shall propose the updated monitoring locations and seek approval from the Engineer's Representative and agreement from DEP of the proposal to amend the monitoring locations.

When alternative monitoring locations are proposed, the monitoring locations shall be

chosen based on the following criteria:

(i) monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts;

(ii) monitoring at the noise sensitive receivers as defined in the Technical Memorandum; and

(iii) assurance of minimal disturbance to any occupants during monitoring.

The monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above the ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen and a correction to the measurements shall be made.

After carrying out noise measurements, noise levels shall be corrected in accordance with Section 2.10, 2.11 and 2.13 of the "Technical Memorandum on Noise From Construction Works Other Than Percussive Piling". The Environmental Specialist shall agree with the Engineer's Representative on the monitoring position and the corrections adopted.

The baseline monitoring and the impact monitoring shall be carried out at the same positions. The Contractor shall establish the construction equipment list and construction schedule which shall be checked and approved by the Engineer's Representative. The timing of the noise impact monitoring work shall be developed by the Environmental Specialist and approved by the Engineer's Representative and DEP and shall be based on the Contractors construction schedule.

7.4.4 Baseline Monitoring

The Environmental Specialist shall carry out baseline noise measurements at each monitoring station prior to the commencement of the construction work over a 24 hour period. The baseline monitoring shall be carried out daily for a period of at least two weeks and shall be taken no earlier than three weeks prior to construction works being carried out.

In no circumstance should construction works be carried out within the range of the monitoring stations during the two weeks of baseline monitoring. The schedule on the baseline monitoring shall be submitted to the Engineer's Representative for approval before the monitoring starts. Any non Project related construction activities in the vicinity of the stations during the baseline monitoring shall be noted and the source and location recorded.

7.4.5 Impact Monitoring

Noise monitoring shall be carried out at each of the designated monitoring stations once every 6 days after construction has commenced.

During construction works, one set of measurements between 0700-1900 hours on normal weekdays shall be taken. If construction works are extended to include works during the hours of 1900-0700, additional weekly impact monitoring shall be carried out during evening and nighttime works and applicable permits shall be obtained by the Contractor.

In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Action Plan in Section 7.4.6 shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be unrelated to the construction activities.

7.4.6 Event and Action Plan for Noise

The Action and Limit levels for construction noise are defined in Table 7.1. Should non-compliance of the criteria occur, action in accordance with Section 7.6.3 shall be carried out for exceedance of the Action Level and the Action Plan shown in Drawing 7.3 shall be carried out for exceedance of the limit level.

Table 7.1 Action and Limit Levels for Construction Noise

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

* reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.
** to be selected based on Area Sensitivity Rating.

7.4.7 Noise Mitigation Measures

The EIA report has recommended construction noise control and mitigation measures to reduce noise levels from Project construction. The Contractor shall be responsible for the design and implementation of the measures below. The recommended construction noise mitigation measures are summarised in the Environmental Mitigation Implementation Schedule presented in Appendix D.

(i) the construction activities should be carried out in the daytime period (07.00-19.00) wherever practical;

(ii) good site practice to limit noise emissions at source;

(iii) avoidance of simultaneous noisy activities;

(iv) selection of quiet plant and working methods;

(v) silencers should be installed at the exhaust pipes of the dump trucks, air compressors, mobile cranes, excavators, lorries;

(vi) mufflers should be installed on pneumatic breakers;

(vii) construction of temporary noise barriers along the construction site boundary to screen the equipment;

(viii) acoustic enclosures should be installed for pumps and generators; and

(ix) minimising the numbers of plant operating in critical areas close to NSRs.

Mitigation in the form of noise enclosures around noisy activities will require consideration during any evening and night time working. The design of the temporary noise enclosures will be the responsibility of the Contractor who will be required to submit his design to the Engineer for approval before carrying out the work. The design will also have to be submitted to DEP, as the Authority under the Noise Control Ordinance, with the Contractor's application for a Construction Noise Permit.

If the above measures are not sufficient to restore the construction noise quality to an acceptable level, upon advice from the Environmental Specialist, the Contractor shall liaise and gain approval from the Engineer's Representative on other mitigation measures proposed to reduce noise levels to an acceptable level and carry out these measures. The measures may include but not be limited to amendments to the construction schedule to restrict noisy equipment to certain time periods and restricting the type of equipment that can be used during construction at any one time.

7.4.8 Monitoring During the Operational Phase

The residual noise levels under our study have been estimated using the traffic data up to the year 2018 which is the worst case scenario within 15 years after the commissioning of the new carriageways. By the year 2018, the traffic flow along the Texaco Road will be nearly saturated. We are confident, therefore, that the calculated residual noise levels under our study will be an upper bound on the actual noise levels at the NSRs after the operation of the flyover and noise levels will not be greater than those predicted in our study. Thus, it is considered that noise monitoring works under the EM&A programme are not required during the operational phase

7.5 Air Quality

7.5.1 Air Quality Parameters

Monitoring of the Total Suspended Particulates (TSP) levels shall be carried out by the Environmental Specialist to ensure that construction works are not generating dust which

exceeds the acceptable level. Timely action should be taken to rectify the situation if an exceedance is detected.

1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval by the Engineer's Representative and DEP, 1-hour TSP levels may be measured by direct reading methods.

All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, any other special phenomena and work progress of the concerned site shall be recorded in detail by the Environmental Specialist. A sample data sheet is shown in Drawing 7.4.

7.5.2 Monitoring Equipment

A high volume sampler in compliance with the following specifications shall be used for carrying out the 1-hr and 24-hr TSP monitoring:

(i) 0.6-1.7 m^3/min (20-60 SCFM) adjustable flow range;

(ii) equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;

(iii) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;

(iv) capable of providing a minimum exposed area of 406 cm^2 (63 in^2);

(v) flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;

(vi) equipped with a shelter to protect the filter and sampler;

(vii) incorporating an electronic mass flow rate controller or equivalent device;

(viii) equipped with a flow recorder for continuous monitoring;

(ix) provided with a peaked roof inlet;

(x) equipped with a manometer;

(xi) able to hold and seal the filter paper to the sampler housing in a horizontal position;

(xii) easily changed filter; and

(xiii) capable of operating continuously for 24-hr period.

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

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

The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and recorded in the data sheet as described in Section 7.5.1.

If the Environmental Specialist proposes to use a direct reading dust meter to measure 1-hr TSP levels, sufficient information shall be provided to the Engineer's Representative to prove that the instrument is capable of achieving a comparable result with the high volume sampler. The instrument should also be calibrated regularly, and the 1-hr sampling shall be checked periodically by the high volume sampling to check the validity and accuracy of the results measured by the direct reading method.

Wind data monitoring equipment shall also be provided by the Contractor and set up at appropriate locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the Environmental Specialist and agreed with by the Engineer's Representative.

For installation and operation of wind data monitoring equipment, the following points shall be observed:

(i) the wind sensors should be installed on masts at an elevated level 10 m above ground so that they are clear of obstructions or turbulence caused by the buildings;

(ii) the wind data should be captured by a data logger to be down-loaded for processing at least once a month;

(iii) the wind data monitoring equipment should be re-calibrated at least once every six months; and

(iv) wind direction should be divided into 16 sectors of 22.5 degrees each.

In exceptional situations, the Environmental Specialist may propose alternative methods to obtain representative wind data upon approval from the Engineer's Representative and agreement from the DEP.

7.5.3 Laboratory Measurement/Analysis

A clean laboratory with constant temperature and humidity control and equipped with necessary measuring and conditioning instruments shall be used for sample analysis and equipment calibration and maintenance. The laboratory shall be HOKLAS accredited.

If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the Engineer's Representative. The Environmental Specialist shall provide the Engineer's Representative with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for reference.

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

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

All the collected samples shall be kept in a good condition for 6 months before disposal.

7.5.4 Monitoring Locations

The air quality sensitive receivers as determined by the EIA and recommended dust monitoring locations are shown in Drawing 7.5. The specific locations of the monitoring stations are to be determined by the Environmental Specialist and approved by DEP prior to monitoring. The status and locations of dust sensitive receivers may change after the issue of this manual. If this happens, the Environmental Specialist shall propose updated monitoring locations and seek approval from the Engineer's Representative and agreement from DEP on the proposal.

When alternative monitoring locations are proposed, the following preferred locations and factors shall be considered:

(i) the site boundary or locations close to the major dust emission source;

(ii) close to the sensitive receptors; and

(iii) prevailing meteorological conditions.

The Environmental Specialist shall agree with the Engineer's Representative the position of the high volume samplers. When positioning the samplers, the following points shall be noted:

(i) a horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;

(ii) the distance between the sampler and an obstacle, such as buildings, shall be at least twice the height that the obstacle protrudes above the sampler;

(iii) a minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;

(iv) a minimum of 2 metre separation from any supporting structure, measured horizontally is required;

(v) no furnace or incinerator flue is nearby;

(vi) airflow around the sampler is unrestricted;

(vii) the sampler is more than 20 metres from the dripline;

(viii) any wire fence and gate to protect the sampler, shall not cause any obstruction during monitoring;

(ix) permission must be obtained to set up the samplers and to obtain access to the monitoring stations;

(x) a secured supply of electricity is needed to operate the samplers; and

(xi) no two samplers should be placed less than 2 metres apart.

Prior to Project construction, the construction schedule shall be established and the dust monitoring schedule shall be developed by the Environmental Specialist. The environmental monitoring schedule shall be approved by the Engineer's Representative.

7.5.5 Baseline Monitoring

The Environmental Specialist shall carry out baseline monitoring at six representative locations (A6, A9, A21, A24, A34 and A42) for at least 14 consecutive days prior to the start of the construction works to obtain daily 24-hr TSP samples. 1-hr sampling shall also be carried out at least 3 times per day during the same period. Monitoring shall take place within a 3 week period prior to the commencement of construction works.

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

In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the Environmental Specialist shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the Engineer's Representative and agreed with DEP.

In the event that insufficient baseline monitoring data or questionable results are obtained, the Environmental Specialist shall liaise with the DEP to agree on an appropriate set of data to be used as a baseline reference and submit this data to the Engineer's Representative for approval.

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

7.5.6 Impact Monitoring

The Environmental Specialist shall carry out impact monitoring during the course of the works. For regular impact monitoring, the sampling frequency of at least once in every six days shall be strictly observed at *four* of the designated monitoring stations for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six days should be undertaken at *four* locations when the highest dust impact occurs. The stations to be monitored should be selected based on the prevailing wind direction and their proximity to the active construction works.

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

In case of non-compliance with the air quality criteria, more frequent monitoring, as specified in the Action Plan in Section 2.5.7, shall be conducted within 24 hours after the non compliance is detected. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

7.5.7 Event and Action Plan for Air Quality

The baseline monitoring results will form the basis for determining the air quality criteria for the impact monitoring. The Environmental Specialist shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. Table 7.2 shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance with the air quality criteria occur, the Environmental Specialist, the Engineer's Representative and the Contractor shall undertake their specified actions in accordance with the Action Plan shown in Drawings 7.6a to 7.6d.

Table 7.2 Action and Limit Levels for Air Quality

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

7.5.8 Dust Mitigation Measures

The EIA report has recommended dust control and mitigation measures. The Contractor shall be responsible for the design and implementation of the measures below. The recommended constuction dust mitigation measures are summarised in the Environmental Mitigation Implementation Schedule provided in Appendix D.

(i) watering of unpaved roads, which results in road dust suppression by forming moist cohesive films among the discrete grains of road surface material. An effective watering programme, i.e. twice daily watering with complete coverage, is estimated to reduce erosion on unpaved roads by 50%;

(ii) watering of open areas every 1.5 hours is estimated to reduce dust emissions by 70%;

(iii) watering should be implemented to control dust where breaking of oversize rock/concrete is required. Water spray should be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created;

(iv) dropping heights for excavated materials should be controlled to a practical height to minimize the fugitive dust arising from unloading;

(v) materials being transported by truck should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport;

(vi) all stockpiles of aggregate or spoil should be enclosed or covered and water applied in dry or windy condition;

(vii) effective water sprays should be used on the site at potential dust emission sources;

If the above measures are not sufficient to restore the air quality to acceptable levels upon the advice of the Environmental Specialist, the Contractor shall liaise with the Environmental Specialist on other mitigation measures, propose these measures to the Engineer's Representative for approval, and implement the measures.

7.6 Site Environmental Audit

7.6.1 Site Inspections

Site inspections shall be undertaken routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

The Environmental Specialist is responsible for carrying out site inspections.

Regular site inspections shall be carried out at least three times per week. The areas of inspection shall not be limited to the site area and should also include the environmental conditions outside the site which are likely to be affected, directly or indirectly, by the site activities.

The Environmental Specialist shall make reference to the following information while conducting the inspections:

(i) the EIA recommendations on environmental protection and pollution control mitigation measures as stated in the EIA report;

(ii) work progress and programme;

(iii) individual works methodology proposals;

(iv) the contract specifications on environmental protection;

(v) the relevant environmental protection and pollution control laws;

(vi) previous site inspection results; and

(vii) environmental monitoring data.

The Contractor shall update the Environmental Specialist with all relevant information on the construction works prior to carrying out the site inspections. The site inspection results and associated recommendations on improvements to the environmental protection and pollution control works shall be submitted by the Environmental Specialist to the Engineer's Representative and the Contractor within 24 hours for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection.

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

7.6.2 Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which the construction activities shall comply.

In order that the works are in compliance with the contractual requirements, all the works method statements submitted by the Contractor to the Engineer's Representative for approval shall be sent to the Environmental Specialist for vetting to see whether sufficient environmental protection and pollution control measures have been included.

The Environmental Specialist shall also review the progress and programme of the works to check that relevant environmental laws have not been violated and that any foreseeable potential for violating the laws can be prevented.

The Contractor shall regularly copy relevant documents to the Environmental Specialist so that the checking work can be carried out. The document shall include at minimum the updated Work Progress Reports, the updated Works Programme, the application letters for different licences/permits under the environmental protection laws and all valid licences/permits. The site diaries shall also be available for the Environmental Specialist's inspection upon request.

After reviewing the document, the Environmental Specialist shall advise the Engineer's Representative and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. The Environmental Specialist shall advise the Contractor and the Engineer's Representative on the current status on licence/permit application and any environmental protection and pollution control preparation works that may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements.

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

7.6.3 Environmental Complaints

Complaints shall be referred to the Environmental Specialist for carrying out complaint investigation procedures.

The Environmental Specialist shall undertake the following procedures upon receipt of the complaints:

(i) log complaint and date of receipt into the complaint database;

(ii) investigate the complaint and discuss with the Contractor to determine its validity and to assess whether the source of the problem is due to works activities;

(iii) if a complaint is considered valid by the Engineer's Representative or DEP and due to the works, the Environmental Specialist shall identify mitigation measures;

(iv) if mitigation measures are required, the Environmental Specialist shall advise the Contractor accordingly;

(v) review the Contractor's response on the identified mitigation measures and the updated situation;

(vi) if the complaint is transferred from DEP, submit interim report to DEP on status of the complaint investigation and follow-up action within the time frame assigned by DEP;

(vii) undertake additional monitoring and audit to verify the situation if necessary and ensure that any valid reason for complaint does not recur;

(viii) report the investigation results and the subsequent actions on the source of the complaint for responding to complainant (If the source of complaint is DEP, the results should be reported within the time frame assigned by DEP); and

(ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

During the complaint investigation work, the Contractor and Engineer's Representative shall cooperate with the Environmental Specialist in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation measures. The Environmental Specialist and Engineer's Representative shall approve of the proposed mitigation measures and check that the measures have been carried out by the Contractor.

7.7 Reporting

7.7.1 General

The following reporting requirements are based upon a paper documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the Engineer's Representative and DEP. The reports are required to be prepared by the Environmental Specialist and shall be approved in writing by DEP.

7.7.2 Baseline Monitoring Report

The Environmental Specialist shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of baseline monitoring. Copies of the Baseline Environmental Monitoring Report shall be submitted to three parties: the Contractor, the Engineer's Representative and the DEP. The Environmental Specialist shall liaise with the relevant parties on the exact number of copies required.

The baseline monitoring report shall include at least the following:

(i) up to half a page executive summary;

(ii) background information;

(iii) drawings showing locations of the baseline monitoring stations;

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

- monitoring methodology;
- name of laboratory and equipment used and calibration details;
- parameters monitored;
- monitoring locations (and depth);
- monitoring date, time, frequency and duration; and
- QA/QC results and detection limits.

(v) details on influencing factors, including:

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

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

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

(viii) comments and conclusions.

7.7.3 Monthly EM&A Reports

The results and findings of all EM&A work required in this Manual shall be recorded in the Monthly EM&A Reports prepared by the Environmental Specialist. The Monthly EM&A Reports shall be prepared and submitted within 10 working days of the end of each reporting month, with the first report due one month and 10 days after construction commences.

A maximum of 4 copies of each Monthly EM&A Report shall be submitted to each of the three parties: the Contractor, the Engineer's Representative and the DEP. Before submission of the first EM&A Report, the Environmental Specialist shall liaise with the parties on the exact number of copies and format of the reports in both hard copy and electronic medium.

The Environmental Specialist shall review the monitoring programme every 6 months or on as needed basis in order to cater for any changes in the surrounding environment and nature of works in progress and shall document all observation in the monthly report.

7.7.4 First Monthly EM&A Report

The first monthly EM&A report shall include at least the following :

(i) 1-2 pages executive summary;

(ii) basic Project information including a synopsis of the Project organisation (including key personnel, contact names and telephone numbers), a drawing of the Project area showing the environmentally sensitive receivers and the locations of monitoring and control stations, programme, management structure and the work undertaken during the month;

(iii) a brief summary of EM&A requirements including:

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

(iv) advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project EIA study report and summarised in the updated implementation schedule;

(v) drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

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

- monitoring methodology;
- name of laboratory and equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency, and duration; and
- QA/QC results and detection limits.

(vii) graphical plots of trends of monitored parameters at the representative monitoring stations annotated against the following:

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

(viii) advice on the solid and liquid waste management status;

(ix) a summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(x) a review of the reasons for and the implications of noncompliance including a review of pollution sources and working procedures;

(xi) a description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance;

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

(xiii) an account of the future key issues as assessed from the works programme and work method statements.

7.7.5 Subsequent Monthly EM&A Reports

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

(i) title page

(ii) executive summary (1-2 pages):

- breaches of all Action and Limit levels;
- complaint log;
- reporting changes; and
- future key issues

(iii) contents page

(iv) environmental status:

- drawing showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- summary of non-compliance with the environmental quality performance limits; and
- summary of complaints

(v) environmental issues and actions

- review issues carried forward and any follow-up procedures related to earlier non-compliance (complaints and deficiencies);
- description of the actions taken in the event of noncompliance and deficiency reporting;
- recommendations (should be specific and target the appropriate party for action); and
- implementation status of the mitigatory measures and the corresponding effectiveness of the measures

(vi) future key issues

(vii) appendix

- action and limit levels;
- graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following: major activities being carried out on site during the period; weather conditions during the period; and any other factors which might affect the monitoring results;
- monitoring schedule for the present and next reporting period;
- cumulative complaints statistics; and
- details of complaints, outstanding issues and deficiencies.

7.7.6 Quarterly EM&A Summary Reports

The Environmental Specialist shall submit Quarterly EM&A Summary Reports which should be around 5 pages (including about 3 of text and tables and 2 of figures) and shall contain at minimum the following information:

(i) up to half a page executive summary;

(ii) basic Project information including a synopsis of the Project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;

(iii) a brief summary of EM&A requirements including:

- monitoring parameters;
- environmental quality performance limits (Action and Limit levels); and
- environmental mitigation measures, as recommended in the Project EIA study final report;

(iv) advice on the implementation status of environmental protection and pollution control/mitigationmeasures as recommended in the Project EIA study report and summarised in the updated implementation schedule;

(v) drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(vi) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:

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

(vii) advice on the solid and liquid waste management status;

(viii) a summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(ix) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;

(x) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;

(xi) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xii) comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and

(xiii) proponents' contacts and any hotline telephone number for the public to make enquiries.

7.7.7 Annual/Final EM&A Review Reports

The annual/final EM&A report should contain at least the following information:

(i) Executive Summary (1-2 pages);

(ii) drawings showing the project area any environmental sensitive receivers and the locations of the monitoring and control stations;

(iii) basic project information including a synopsis of the project organization, contacts for key management staff and a synopsis of work undertaken during the course of the project or past twelve months;

(iv) a brief summary of EM&A requirements including:

- environmental mitigation measures as recommended in the project EIA study final report;
- environmental impact hypotheses tested;
- environmental quality performance limits (Action and Limit Levels);
- all monitoring parameters;
- Event-Action Plans;

(v) a summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report and summarised in the updated implementation schedule;

(vi) graphical plots and the statistical analysis of the trends of monitored parameters over the course of the projects including the post-project monitoring (or the past twelve months for annual reports) for all monitoring stations annotated against;

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

(vii) a summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(viii) a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;

(ix) a description of the actions taken in the event of non-compliance;

(x) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xi) a summary record of notifications of summonses and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches investigation, follow-up actions taken and results;

(xii) a review of the validity of EIA predictions and identification of shortcomings in the EIA recommendations; and

(xiii) a review of the effectiveness and efficiency of the mitigation measures;

(xiv) a review of the success of the EM&A programme to identify any deterioration and to initiate prompt effective mitigatory action when necessary cost effectively.

7.7.8 Data Keeping

The site documents such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the Monthly EM&A Reports for submission. However, the documents shall be kept by the Environmental Specialist and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the documents. The monitoring data shall also be recorded in magnetic media, and the software copy shall be available upon request. All the documents and data shall be kept for at least one year after completion of the construction contract.

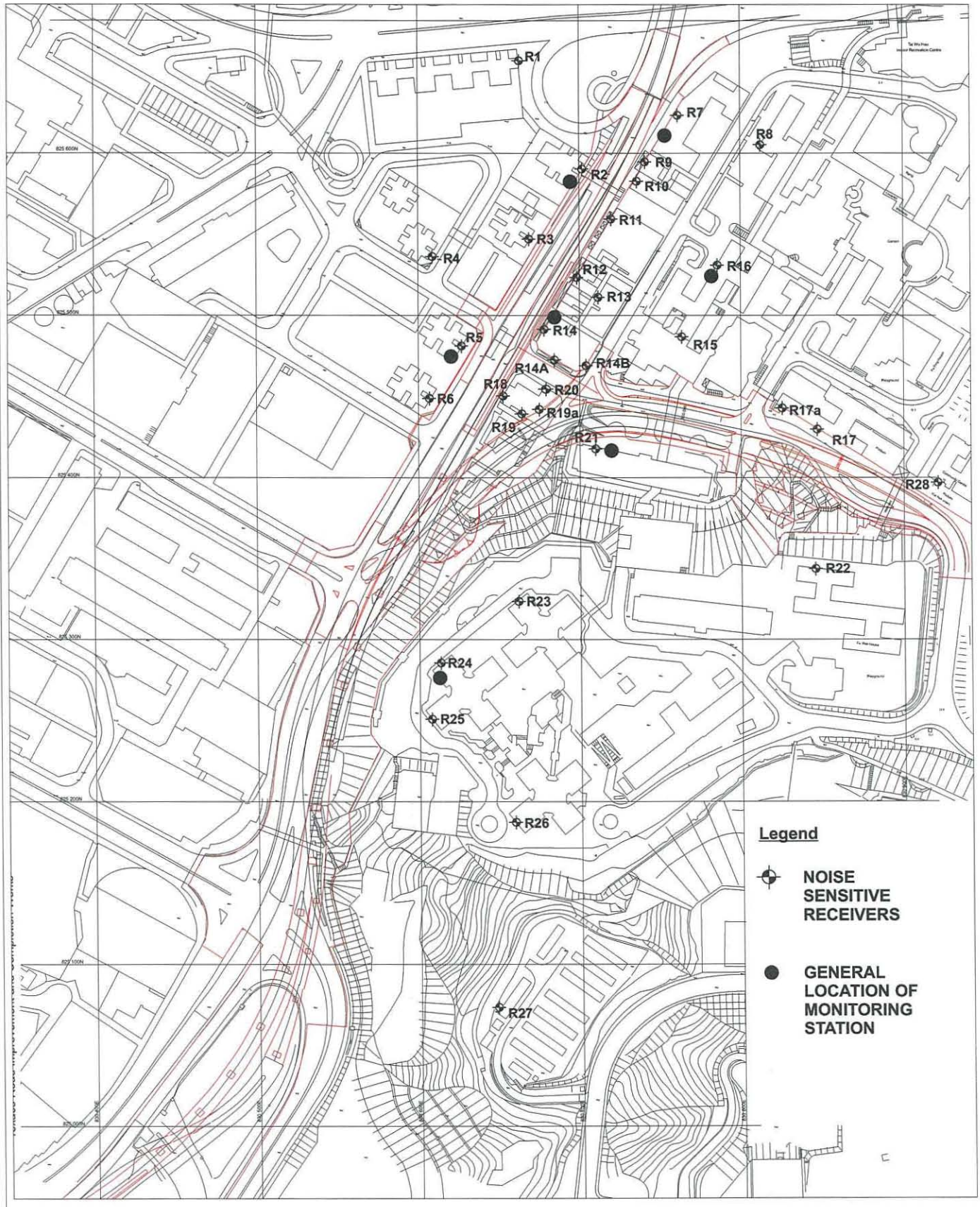
7.7.9 Interim Notifications of Environmental Quality Limit Exceedances

With reference to Event/Action Plans, when the environmental quality limits are exceeded, the Environmental Specialist shall immediately notify the Contractor, the Engineer's Representative and DEP, as appropriate. The notification shall be followed up with advice to each party on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in Drawing 7.7.

Drawing 7.1 Noise Monitoring Field Record Sheet

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

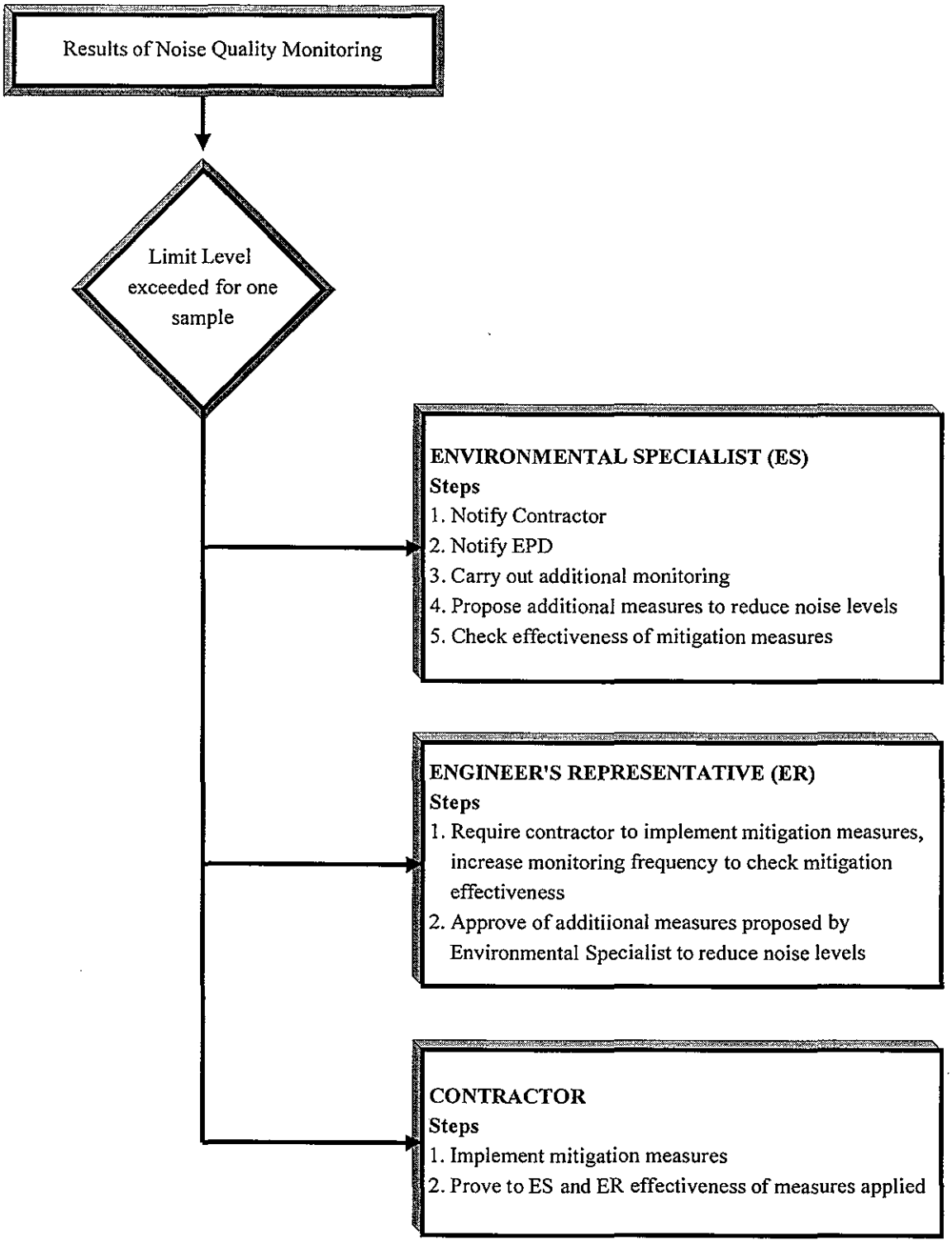
	Name & Designation	Signature	Date
Recorded By :	_____	_____	_____
Checked By :	_____	_____	_____



Noise Sensitive Receivers and Monitoring Locations

Mouchel

Drawing No. 7.2



Event and Action Plan for Noise Monitoring Limit Level Exceeded for One Sample.

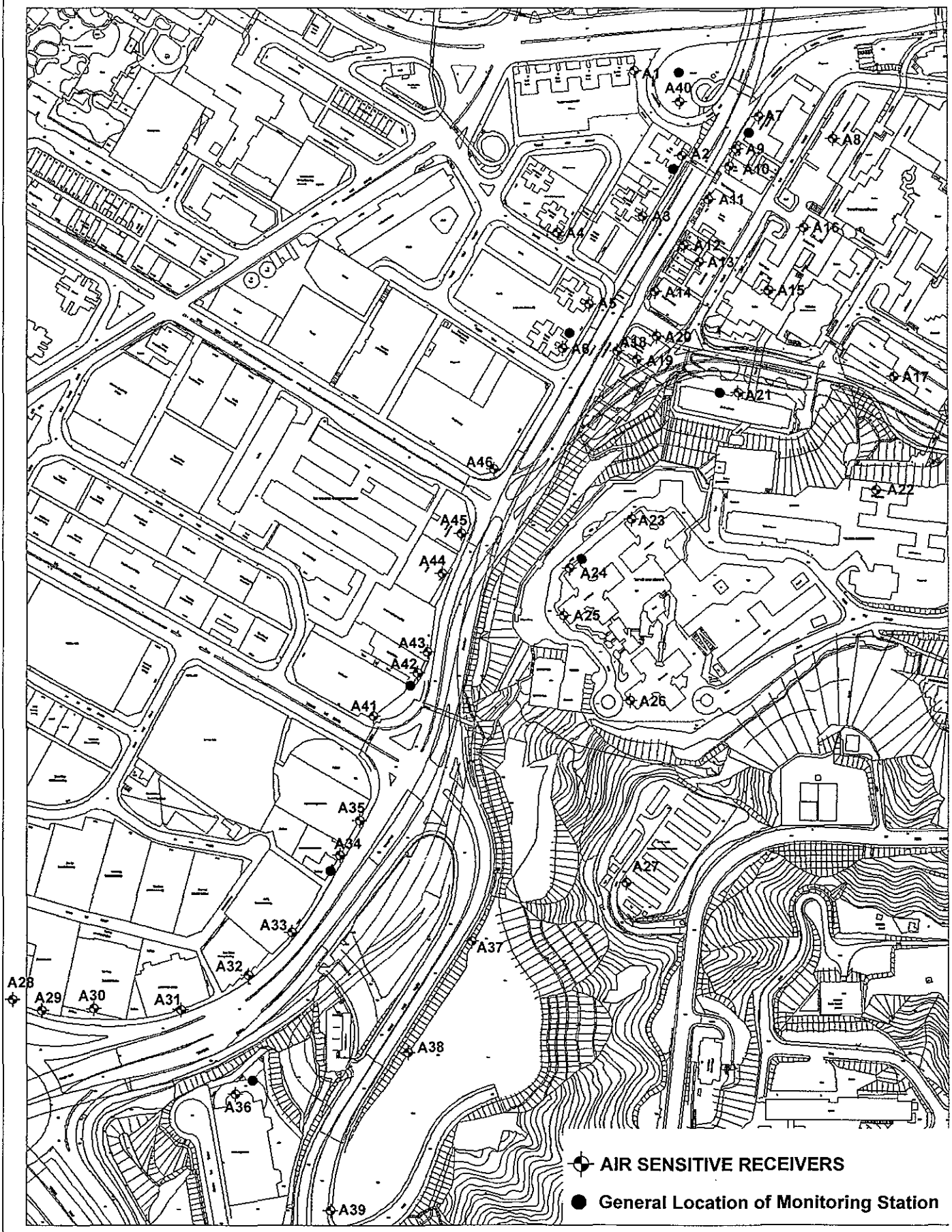
Mouchel

Drawing No. 7.3

Drawing 7.4 Data Sheet for TSP Monitoring

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

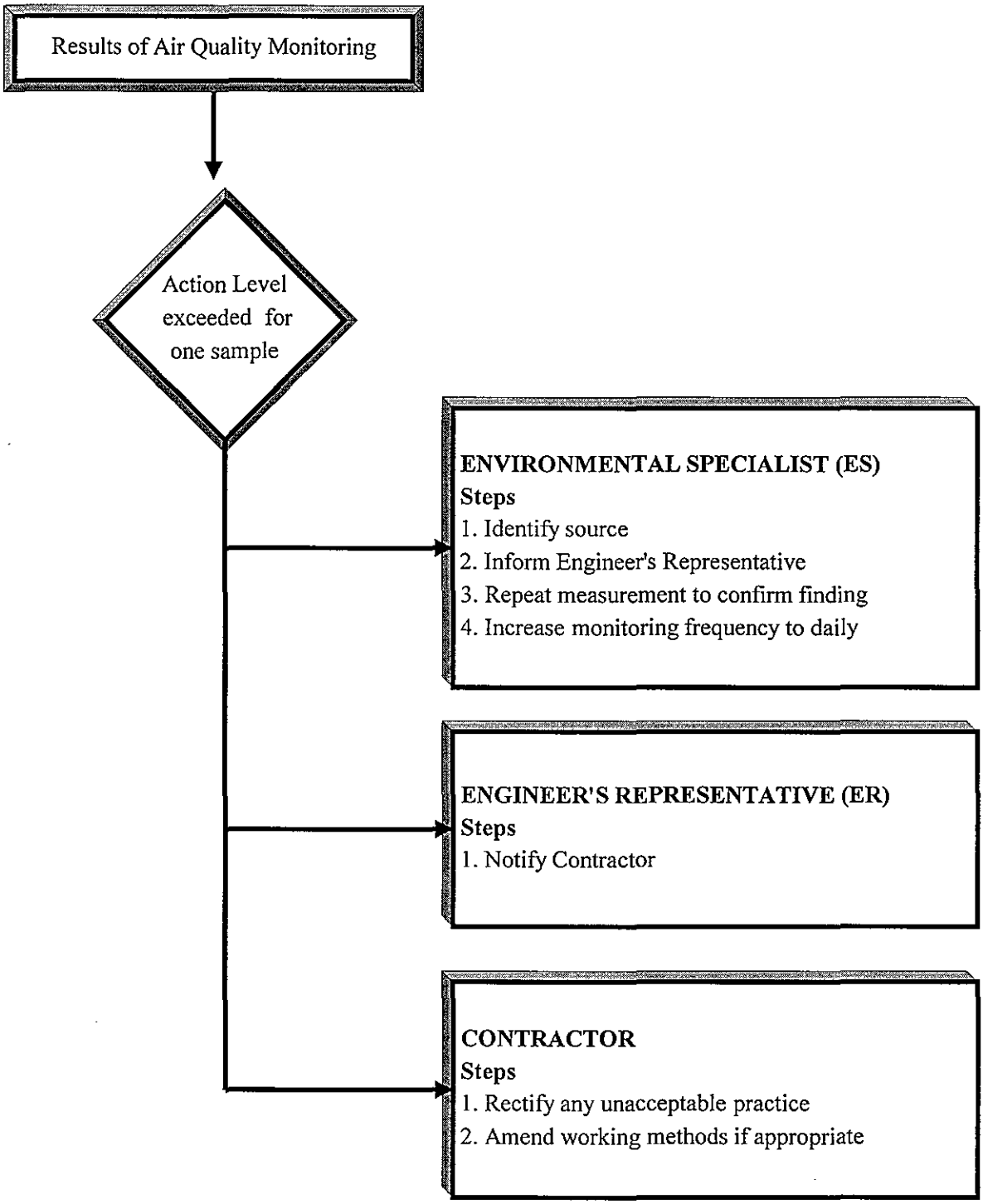
	Name & Designation	Signature	Date
Field Operator :	_____	_____	_____
Laboratory Staff :	_____	_____	_____
Checked by :	_____	_____	_____



Air Sensitive Receivers and Monitoring Locations

Mouchel

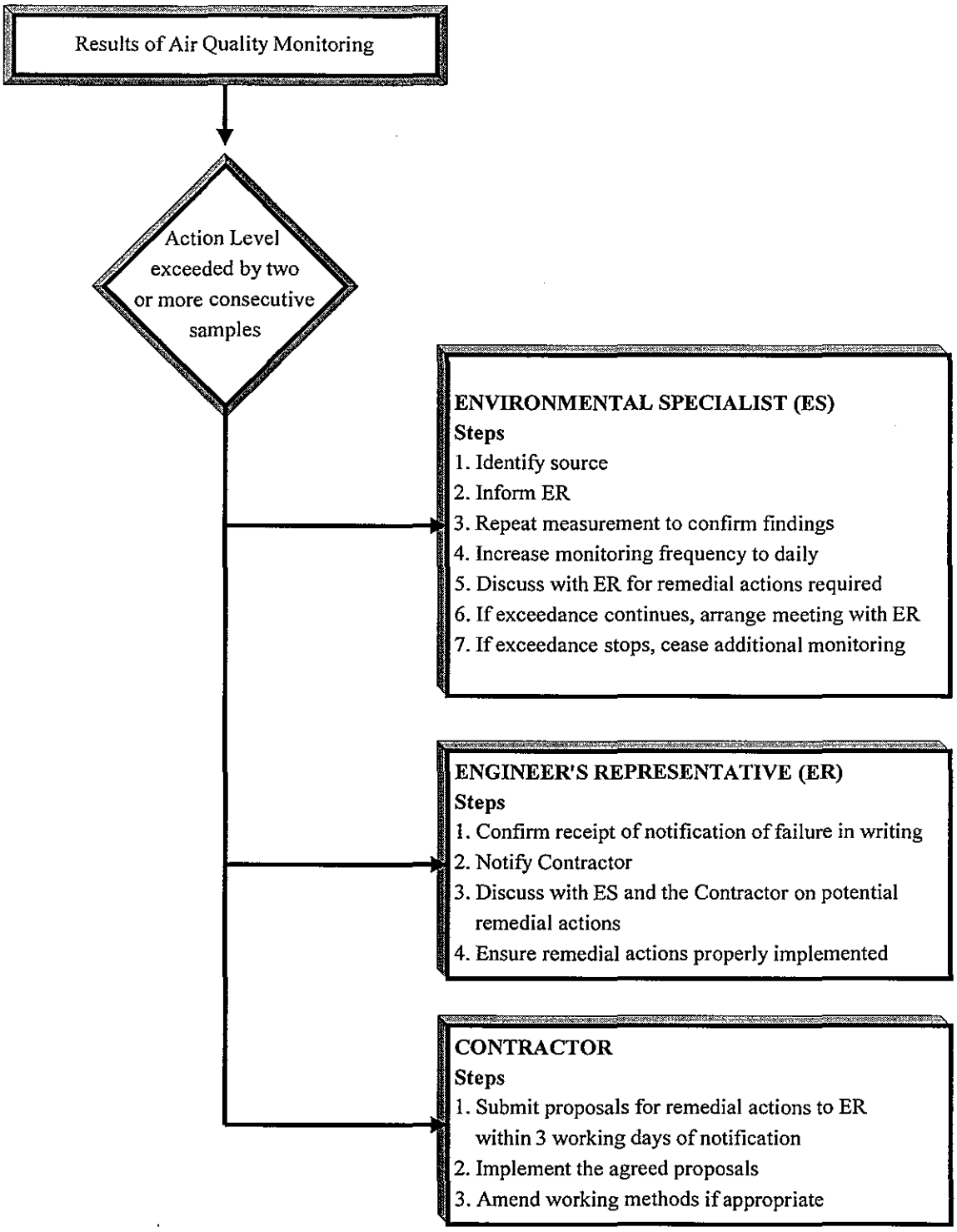
Drawing No. 7.5



Event and Action Plan for Air Monitoring Action Level Exceeded for One Sample.

Mouchel

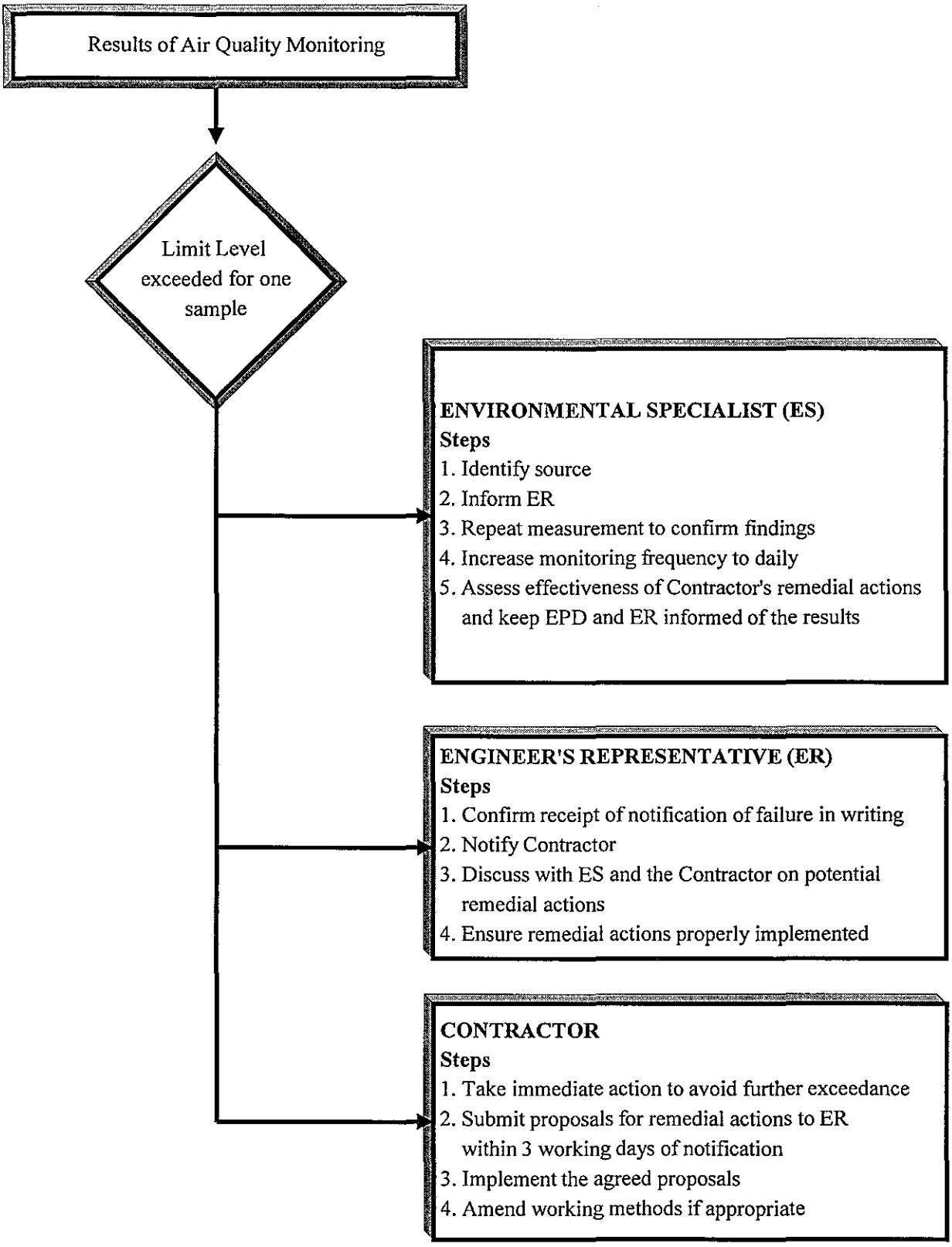
Drawing No. 7.6a



Event and Action Plan for Air Monitoring Action Level Exceeded for Two Samples.

Mouchel

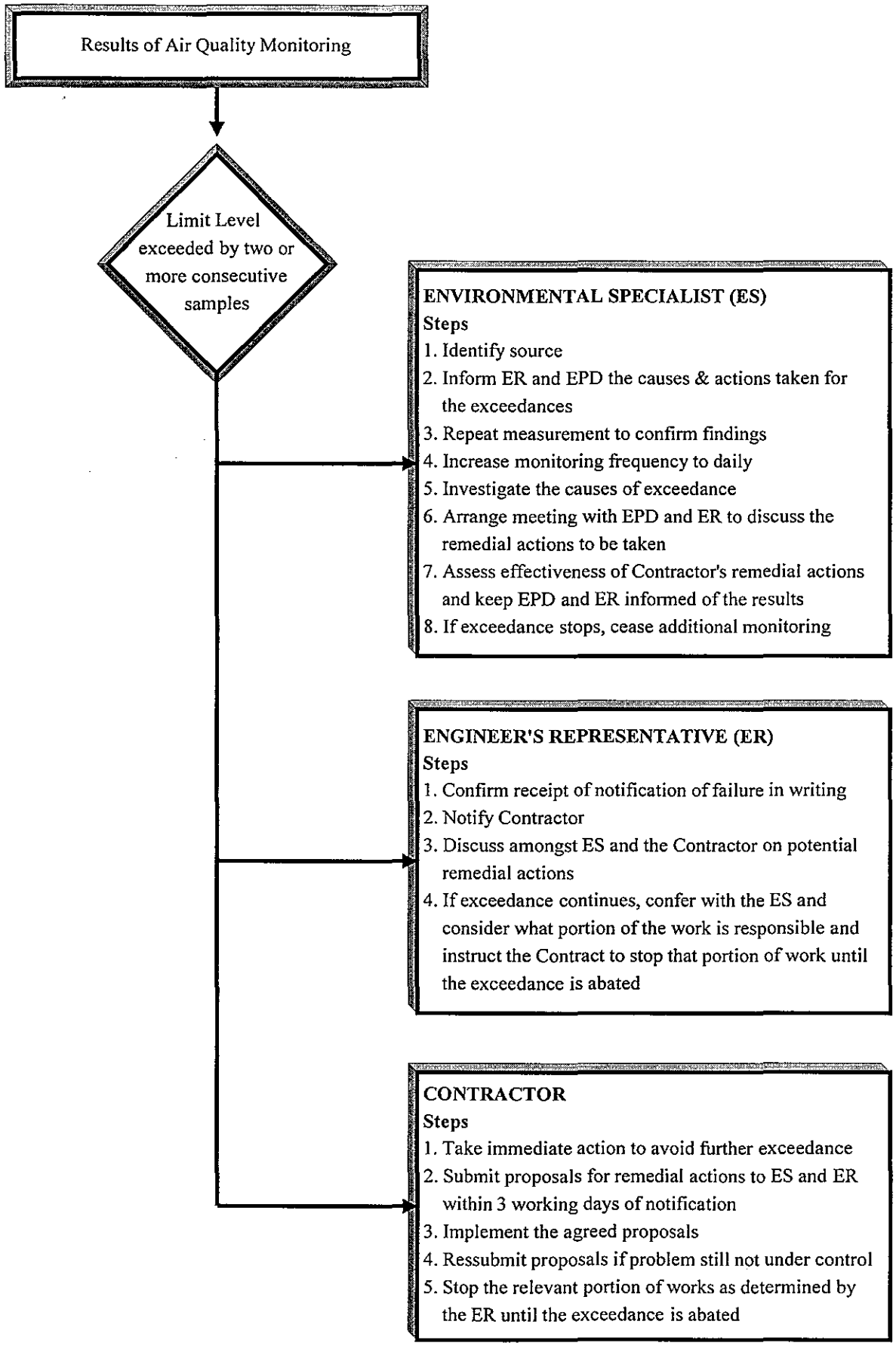
Drawing No. 7.6b



Event and Action Plan for Air Monitoring Limit Level Exceeded for One Sample.

Mouchel

Drawing No. 7.6c



Event and Action Plan for Air Monitoring Limit Level Exceeded for Two Samples.

Mouchel

Drawing No. 7.6d

Drawing 7.7 Sample Template for Interim Notifications of Environmental Quality Limits Exceedances

Incident Report on Action Level or Limit Level Non-compliance

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

Location Plan

Prepared by : _____

Designation : _____

Signature : _____

Date : _____

8.0 Landscape and Visual Impact Assessment

8.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

8.1 Study Process

The Technical Memorandum on the EIA process issued under Section 16 of the Environmental Impact Assessment Ordinance, included guidelines for Landscape and Visual Impact Assessment (LVIA). The Study Process for the LVIA, therefore, has been adapted slightly to conform with Annex 18 of the TM entitled "Guidelines for the Landscape and Visual Impact Assessment".

Details of the key elements of the study process are as follows:

- *Scope of Report*: the objectives and scope of the LVIA are to identify the baseline landscape and visual resources within the limit of works and surrounding area; review the relevant planning and control framework governing development activity within the limit of works; identify the unmitigated landscape and visual impacts on the existing resources and predict their magnitude and extent; and review the recommended mitigation and assess the residual landscape and visual impacts.

- *Limits of Study Area*: distant views into or out of the Study Area are limited because of the confined nature of the area. Therefore, the LVIA Study has been confined to the limit of works and immediately adjacent properties.

- *Baseline Study and Preliminary Landscape Mitigation Plans*: the baseline study presents an appraisal and evaluation of the existing landscape and visual resources of the Study Area, their sensitivity to change and the visually sensitive receivers likely to be affected by the Project. This aspect of the LVIA provides the benchmark against which the significance of the change to the landscape and visual resources can be assessed.

  The baseline study was prepared as part of the Initial Assessment. A number of preliminary landscape mitigation measures were formulated based on the information collected at that stage with the aim of introducing landscape design parameters into the engineering design process at the earliest possible opportunity. After further design development by the project team in consultation with Government and a comprehensive impact study, the landscape mitigation measures have been finalised and included in Section 8.6.

- *Review Planning and Development Control Framework*: this stage comprises the review of the layout plans and zoning designations with particular attention to the presence of landscape elements, local open spaces and amenity areas.

- *Impact Study*: the impact study involves the prediction of the potential changes to the baseline condition during construction and operation lifecycles of the Project. Impacts have been assessed in relation to visual compatibility with the surroundings and visual obstruction of views from visually sensitive receivers.

This stage also comprises the recommendation of mitigation measures.

- *Residual Impacts:* the significance of the residual landscape and visual impacts are evaluated assuming the recommended mitigation measures will be incorporated into the Project design. Mitigation measures are shown on the Landscape Mitigation Plans, which are intended to serve as Landscape Layout Plans as mentioned in Section 1.

8.2 Definition of Technical Terms

For the purpose of this VIA Study, the following technical terms used throughout the report are defined as follows:

(i) Landscape impact is a direct physical change to existing landscape features such as vegetation, topography, open space and recreation facilities as well as buildings and structures. By mapping the extent and location of these features, any loss or change can be objectively assessed and subsequently re-provisioned or compensatory mitigation measures incorporated into the Project.

(ii) Visual impact is a change to the appearance of the landscape and its subsequent effect on the views of people at particularly sensitive viewpoints. Visual impact can vary in significance from overall improvement to degradation. The assessment of visual impact relies on an understanding of aesthetic principles, the design and function of urban form and the characteristics of human perception. It should be noted that, unlike the more tangible environmental impacts, visual impact does not usually result in direct physical changes to the occupants of an area, as would damage to health from air, noise or water pollution. However, this is not to say that adverse levels of visual impact are harmless and can be ignored because they are not physical. The consequences of adverse levels of visual impact can lead to the blighting of urban and rural areas, resulting in a long-term decline in the quality of an existing environment and a subsequent loss in socio-economic vitality.

(iii) Sensitive viewpoints are considered to have varying degrees of "sensitivity" to changes in the view based on the land use at each viewpoint. The Environmental Guidelines for Planning in Hong Kong define sensitive users as "land uses which, by virtue of the nature of the activities thereon ---- are susceptible to the influence of residual or physical changes generated by polluting uses".

(iv) Highly sensitive viewpoints are locations where the views of people are considered highly sensitive because the users, usually residents in their own homes, would be particularly aware of any visual changes. Residents are likely to care about visual impact because it can affect the quality of residential amenity. In addition, residents are likely to have a financial interest in the property (either ownership or rental) and a change in the appearance of the surroundings could have a significant financial implication on property values. People affected by visual impact at highly sensitive viewpoints are referred to as visually sensitive receivers (VSRs) in this report.

(v) The significance of the landscape and visual impact is judged using the following criteria:-

- whether the impact is during construction or operation;
- the proximity of the sensitive viewpoint to the Project;
- the activity of the viewer (for example, leisure time, working etc.);
- the frequency and length of the view of the proposed development;
- the scale or visual obstruction of the proposed works in relation to the overall view (the impact would be less if part of a wide or panoramic view); and
- the level of change to the baseline condition.

8.3 Baseline Study

8.3.1 Northern Section

The landscape and visual resources existing within the northern section of the study area comprises the area between the Texaco Interchange and Sha Tsui Road and is visually dominated by the existing flyover. It is characterised by a mix of shops, residential estates, schools, churches and external amenity areas (as shown in Appendix E, Drawings 1 and 2 and Figures 1 to 4).

The streetscape at ground level tends to be busy and active with pedestrians during the day. The existing amenity planting along Texaco Road provides visual relief at ground level. Along Tai Wo Hau Road, an existing stand of trees provides a valuable screen between the street and adjacent housing estates and makes a substantial contribution to the streetscape (as seen in Appendix E, Figures 3 and 9). The quality of the landscape and visual resources in Texaco Road are considered to be of medium to low local value, while the quality of Tai Wo Hau Road is considered to be of high local value and very sensitive to change.

8.3.2 Southern Section

The southern section contrasts with the northern section's active streetscape. This section is dominated by the existing road viaduct, vehicular traffic, large shotcrete slopes and retaining walls and the presence of industrial buildings (as shown in Drawings 1, 7 and 8 and Figures 5 to 8 in Appendix E). While there are pockets of road-side planting (detailed in Appendix E, Figures 6 to 8) which make a valuable contribution to amenity, the quality of the streetscape is considered to be of medium to low local value and not sensitive to change.

8.3.3 Sensitive Receivers

The VSRs and associated land uses within the Study Area are shown in Drawing 1, Appendix E and listed below:

- VSR 1 - Buddhist B. Y. M. School;
- VSR 2 - Texaco Road Circle Park- passive recreation;

- VSR 3 - Jade Court - residential;
- VSR 4 - Cheong Kwai Court - residential;
- VSR 5 - Tak Tai and Wang Wah Buildings - commercial and residential;
- VSR 6 - Cheung Fai House - residential;
- VSR 7 - Tai Fat and Cheung Fat Houses - residential;
- VSR 8 - Crown of Thorns Church; and
- VSR 9 - Fu Keung House - residential.

8.4 Review of Planning and Development Framework

8.4.1 Background

A review of the Layout Plans and zoning designations paid particular attention to the presence of landscape open space (LOS) and amenity area (AA). LOSs affected by landscape and visual impact will need to be re-instated or re-provisioned while amenity areas should be re-instated where possible. A number of important areas were identified within the limit of works and are described in the following paragraphs.

8.4.2 Texaco Road Interchange Circle Park

This area is zoned as a LOS allocated to Regional Services Department (RSD). While no development is planned within this area, hoarding will be necessary along the boundary between the limit of works and the LOS which may affect existing planting to a slight extent. Where planting is affected it would be re-provisioned to an equivalent standard after construction is completed.

8.4.3 Crown of Thorns Church

The base assumption for the purposes of this report, is that the Crown of Thorns Church will be rebuilt at its existing location and that the piece of triangular land to the south of the church remaining after completion of the Tai Wo Hau Road realignment, formally the Housing Department Quarters site, will be zoned as LOS on the Layout Plan.

Thus, a LOS could be provided at this location under the jurisdiction of RSD. However, should the church be reprovisioned at an alternative location, this site may also be available for LOS provision. Both these options, together with the option that the church may be allocated the LOS to the south for construction are illustrated in Appendix E, Drawing 12. This matter will require further consultation with RSD during detailed design.

8.5 Impact Assessment

8.5.1 Background

This stage of the methodology predicts the potential changes to the baseline condition during both the construction and operational phases. A key aspect of the operational stage assessment is the visual nature of the flyover structures and noise mitigation measures. The overall design of these structures is summarised below.

(i) General Description of Structure Design

The geometry and arrangement of the remaining works will be generally as per the Texaco Road Improvements Final Report. The need for horizontal and vertical curvature along the proposed alignment would be obtained by insitu concrete construction and continuous construction would provide the required aesthetic finish omitting the joints usual with precast methods. The location of many columns, required to support the southbound flyover, is governed by topographical features of the highway scheme. The deck structures are generally of the order of 30-33m in length with some longer spans necessary over road junctions.

(ii) Superstructure

The deck structure will comprise a continuous prestressed insitu concrete spine beam of standard section, haunched at the supports where the maximum span is exceeded. Changes to the design and form of the parapet from the previous schemes are minor in nature and are not likely to be obvious to a pedestrian. Further, amendments to the standard construction of stormwater drainage are also minor and, visually, this form of construction will appear homogenous with the existing flyover.

(iii) Sub-structures

The deck support columns will be of reinforced concrete construction and similar to those constructed for the existing flyover. The northern abutment will be a voided box structure with the other retaining walls being conventional cantilever structures. It is unlikely that the form of the final column supports will appear different to the existing flyover.

(iv) Noise Mitigation Measures

Noise mitigation measures in the form of top-bent barriers with cantilevered roofs are proposed in five locations (as shown in Drawing 5.2 in Section 5.0 of this report). The walls of the barriers will be absorptive, while the roofs will be a non-absorptive material. The size of the structures will be 5.5m high but will vary in width from 1m to 8m. The noise structures will, therefore, be visually prominent within the Study Area.

8.5.2 Prediction of Landscape Impacts

(i) Construction Phase

The prediction of landscape impacts during the construction phase is divided into two main areas of the alignment, the northern and southern sections.

- Northern section of Texaco Road - the main landscape effects in this area are the impacts on roadside amenity areas (refer to Appendix E, Drawing 2 and Figure 4). The conversion of the existing elevated road to one-way northbound will require the demolition of a slip road from the Texaco Interchange to Tsuen Fu

Street and the re-construction of the flyover. This will affect slightly the Circle Park under the Interchange which will need to be partially closed to pedestrians during the construction period resulting in a temporary inconvenience in access for the local residents approaching from along Texaco Road.

The landscaped area at the side of Jade Court will have to be removed to provide emergency vehicular access (EVA) for the building, requiring the removal of a planter area and three mature trees present in the planter. This will result in the loss of residential amenity.

The existing amenity planting under the existing flyover will need to be removed in order to allow the construction of the new road which will be on fill retained by new walls. This will result in a permanent loss of roadside amenity.

- Northern section of Tai Wo Hau Road - realignment of the at-grade road connection between Tai Wo Hau Road and Sha Tsui Road will involve the felling of a large stand of mature trees and the demolition of the sitting out area outside Fu Keung House (refer to Appendix E, Drawings 2 and 4). The road alignment proposed is optimal within the engineering, land resumption and environmental constraints present in this area and thus, felling of the trees is unaviodable. The permanent loss of these trees is considered to be a substantial change to the baseline condition.

- Southern section of Texaco Road - the new flyover will affect existing amenity planting at the intersection of Texaco and Kwai Fuk Roads (refer to Appendix E, Drawing 6 and Figures 6 to 8) requiring the removal of the existing trees and resulting in the overshadowing of the existing shrubs. As this planting can be reprovisioned after construction and its removal is considered to be a temporary change to the baseline condition.

(ii) Operation Phase

No further landscape impacts are predicted for the operational phase of the project.

8.5.3 Prediction of Visual Impacts

(i) Construction Phase

The predicted visual impacts during the construction phase at the representative VSRs are summarised in Table 8.1 below. The level of visual impact is expressed as substantial, high, moderate or low depending on the level of change to the baseline condition. The level of change is assessed by examining:

- the proximity of the VSR to the proposed works;
- the activity of the viewer at the VSR (for example, residential, education, commercial, recreation);
- the frequency and length of the view of the proposed development; and

- the scale or visual obstruction of the proposed works in relation to the overall view (the impact would be less if part of a wide or panoramic view).

Table 8.1: Predicted Visual Impacts During Construction

VSR	Proximity to Project	Main Activity of VSR	Frequency and Duration of Views of Project	Scale of Visual Intrusion	Change toBaseline Condition
1 - Buddhist School	Adjacent	Education	School days	Substantial	Substantial
2 - Texaco Road Circle Park	Adjacent	Passive Recreation	Dependant upon use	High	High
3 - Jade Court	Overlooking	Residential	Permanent	Low	High
4 - Cheong Kwai Court	Overlooking Adjacent	Residential	Permanent	Low	High
5 - Tak Tai and Wang Wah Buildings	Adjacent	Commercial /Residential	Permanent	High	High
6 - Cheung Fat House	Overlooking Adjacent	Residential	Permanent	Low	Medium
7 - Tai Fat House	Overlooking Adjacent	Residential	Permanent	Low	Medium
8 - Crown of Thorns Church	Adjacent	Religious and Passive Recreational	Dependant upon use	High	Substantial - property will be demolished
9 - Fu Keung House	Adjacent	Residential	Permanent	Medium	High

The table shows that while some VSRs experience a low level of visual intrusion despite being adjacent to the works, the fact that the VSRs will be residents overlooking the site and will have clear views of the construction works means that the level of change to the base line condition will be high.

(ii) Operational Phase

The predicted visual impacts during the operational phase from the representative VSRs are summarised in Table 8.2 below. The level of visual impact is expressed as substantial, high, moderate or low depending on the level of change to the baseline condition. The level of change is assessed by examining:

- the proximity of the VSR to the proposed works;
- the activity of the viewer at the VSR (for example, residential, education, commercial, recreation);
- the frequency and length of the view of the proposed development; and

- the scale or visual obstruction of the proposed works in relation to the overall view (the impact would be less if part of a wide or panoramic view).

Table 8.2: Predicted Visual Impacts During Operation

VSR	Proximity to Project	Main Activity of VSR	Frequency and Duration of Views of Project	Scale of Visual Intrusion	Change toBaseline Condition
1 - Buddhist School	Adjacent	Education	School days	Substantial	Substantial
2 - Texaco Road Circle Park	Adjacent	Passive Recreation	Dependant upon use	Medium	Medium
3 - Jade Court	Overlooking Adjacent	Residential	Permanent	Medium	High
4 - Cheong Kwai Court	Overlooking Adjacent	Residential	Permanent	Medium	High
5 - Tak Tai and Wang Wah Buildings	Adjacent	Commercial /Residential	Business Hours / Permanent	High	High
6 - Chueng Fat House	Overlooking Adjacent	Residential	Permanent	Medium	High
7 - Tai Fat House	Overlooking Adjacent	Residential	Permanent	Medium	High
8 - Reprovisioned Crown of Thorns Church	Adjacent	Religious and Passive Recreational	Dependant upon use	High	High
9 - Fu Keung House	Adjacent Within	Residential	Permanent	Medium	High

It should be noted that VSR 8, the Crown of Thorns Church, is included in the above table based upon the assumption that the church will be rebuilt on its current site and not relocated to an alternative site.

8.5.4 Evaluation of Key Issues

(i) Northern Section

Construction between Tai Wo Hau Road and Texaco Interchange will occur between 'walls' of existing buildings. Many residential properties will overlook the construction site. The working area will be tightly constrained and pedestrian circulation, public amenity and views from the adjacent VSRs will be severely disrupted and the baseline condition will be substantially reduced.

On completion, the streetscape between the flyover structures and adjacent building facades on the east side of Texaco Road will be heavily shaded, narrow in width and dusty from the adjacent road. The quality of the new streetscape will be low, resulting in a reduction of the baseline condition.

The existing amenity planting in the central divider in Texaco Road provides visual relief at ground level for pedestrians and the loss of this planting is an important reduction of the baseline condition.

Construction of the at-grade road connection between Tai Wo Hau Road and Sha Tsui Road will involve the felling of a group of mature trees and the demolition of the sitting out area near the Crown of Thorns Church. The trees currently provide a valuable screen and green buffer between Fu Keung House and the existing road as well as providing amenity to the residents. The loss of this planting is considered to be a substantial loss to the baseline condition.

(ii) Southern Section

On the eastern side of the alignment there are substantial rock cut slopes, currently stabilised with spray concrete. It is proposed to support the new flyover on this rock slope by bedding the new structure onto the existing rock. This may lead to a visually unattractive junction between concrete structure, rock slopes and shotcrete.

The road works in this area will be overlooked from the Tai Wo Hau Estate which sits on an elevated platform above the road level. The views from residential properties overlooking the Project will be affected during construction and by the appearance of the new structures during operation.

(iii) Noise Mitigation Structures

The recommended noise mitigation structures will require absorptive walls in some locations, which will be opaque. These structures will be approximately 5.5m high and between 1 and 8 metres across and, therefore, are considered to be dominant visual elements. The walls will obstruct views across Tai Wo Hau Street, transforming it into a tunnel-like space devoid of planting or green space. Along Texaco Road, the structure will be on an elevated viaduct. The ground level streetscape will be defined on one side by the high podium walls of residential developments or existing buildings and on the other by the noise mitigation structure and viaduct. This will also transform the street into darker tunnel-like spaces dominated by the engineering structures above.

In addition, these noise mitigation structures will be overlooked by residents in the various properties adjacent to the Study Area and they will be particularly noticeable owing to their size, massing and location.

8.5.5 Impact on Existing Trees

A preliminary tree survey was conducted in accordance with WBTC 24/94 on the 27 March 1998 (see Tables 1-8 and Drawings 13 - 16 in Appendix E). A total of 155 existing trees

were surveyed, while another stand of trees which were inaccessible were examined from the closest possible location. The proposed works would require the felling of 108 trees plus the stand of trees which is inaccessible. A total of 42 trees could be retained and six trees could be transplanted. No rare or protected trees were found, and the predominant species of trees are *Acacia* and *Aleurites* spp.

It should be noted that the comments in this report on tree felling do not imply blanket approval for tree felling and more detailed examination should be carried out during the detailed design stage in order to determine whether further existing trees can be retained or transplanted. A tree felling application will be required during the detail design stage and this should consider each tree on its merits with the objective of saving or transplanting as many trees as possible. Felling of trees will only be acceptable as a last resort.

8.6 Recommendations for Mitigation Measures

8.6.1 Landscape Mitigation Measures

A number of preliminary landscape mitigation measures were formulated during the Initial Assessment with the aim of introducing landscape design parameters into the engineering design process at the earliest possible opportunity. After further design development by the project team in consultation with Government and a comprehensive impact study, the landscape mitigation measures have been finalised and shown on Drawings 2 to 12 in Appendix E.

The main recommendations for landscape mitigation measures are described below:

i) the design of the non-absorptive elements of the noise mitigation structures should utilise a steel frame and transparent material to appear as lightweight and transparent as possible. The frames should have an architectural colour scheme which unifies the variety of barriers, enclosures and semi-enclosures and identifies them as belonging to one family of structures (Drawing 11 in Appendix E and Drawings 5.3a, 5.3b and 5.3c show typical cross-sections of the noise barriers).

   The appearance of the absorptive walls will need to be sensitively designed in order to avoid an unattractive tunnel-like streetscape when viewed from ground-level. Texture, colour and patterns should be incorporated into the outside of the absorptive walls so that these elements look more architectural than industrial.

ii) the new at-grade roads should be framed with new tree and shrub planting to reduce the visual impact and improve the quality of the streetscape for pedestrians. RSD should be consulted about all aspects of implementing new landscape works including species and irrigation. The following species are recommended:

Trees and Palms:	*Cinnamomum camphora*
	Peltophorum pterocarpum
	Archontophoenix alexandrae

Shrubs:	*Cordyline terminalis rubra* *Codiaeum variegatum* *Ficus microcarpa 'Golden Leaf'* *Hibiscus rosa-sinensis* *Lagerstroemia indica* *Rhododendron spp*
Shade tolerant shrubs and palms:	*Schefflera arboricola* *Polyscias fruticosa* *Polyscias guilfoylei* *Rhaphis excelsa* *Cordyline terminalis marginata*
Groundcovers:	*Liriope spicata* *Wedelia trilobata* *Asparagus sprengeri* *Zephyranthes grandiflora* *Lantana montevidensis*

iii) Existing trees will be preserved as far as possible to ensure that no trees are felled unnecessarily. At detailed design stage, a tree survey will be carried out, which will include plotting of the exact location and level of existing trees. Such information will be used to check against the proposed road alignment, with the objective of preserving them within the road median, sidewalk or road side amenity area. Any mature trees proposed to be felled, with valid justifications, will be replaced by semi-mature trees of suitable species and their quantity will not be less than the number of mature trees that are proposed to be felled. All compensatory trees should be healthy, in good form, free of pest and disease and agreeable to the relevant Government Departments. The landscape proposals shown on Drawings 2 to 12 (see Appendix E) would result in the planting of at least 120 new street trees and extensive areas of new amenity planting.

iv) A new open space should be provided adjacent to Tau Wo Hau Street (refer to Drawing 12 for possible options) to compensate for the loss of the existing LOS next to the Crown of Thorns Church. The area between the Crown of Thorns Church and the Wang Wah Building is required for emergency vehicular access but can also serve the dual function as an amenity area for passive informal recreation with street trees and innovative hard works.

v) Under the new viaducts, sculptural hard landscape elements should be introduced to improve the quality of the streetscape and amenity for local residents (refer to Drawing 11 for examples). The sculptural hardworks should be constructed from durable material such as concrete or steel, have minimum maintenance requirements and be modern and visually-arresting in colour or appearance. Dead-end spaces and large areas of flat paving should be avoided for security reasons.

8.6.2 Landscape Mitigation Plans

The main landscape mitigation measures are summarised in Tables 8.3 to 8.6 below and presented in Drawings 2 to 12 of Appendix E.

Table 8.3: Recommended Landscape Mitigation Measures for Landscape Impacts during Construction

Landscape Impact	Recommended Mitigation
Hoarding at Texaco Interchange Circle Park adjacent to planting areas	Planting adjacent to the limit of the project to be protected during construction period by hoarding or temporary fencing. Hoarding to be designed with interesting patterns.
Loss of existing amenity planting under the new flyover structure	Transplant exemplary plant species prior to commencement of construction period.
Loss of mature trees near the Crown of Thorns Church sitting out area.	Transplant exemplary plant species prior to commencement of construction period.
Loss of landscape outside Jade Court	Provide new amenity areas nearby. Any mature trees felled will be replaced by semi-mature trees of suitable species and their quality and quantity will not be less than those felled.
Loss of mature trees in the sitting out area adjacent to Fu Keung house	Transplant exemplary plant species prior to commencement of construction period.
Loss of Mature Trees on slope outside Fu Wing House	No recommendations. Transplanting not possible owing to access difficulties.
Loss of amenity planting at the Yeung Uk / Texaco / Kwai Fu Roads intersection	Transplant exemplary plant species prior to commencement of construction period.

Table 8.4: Recommended Landscape Mitigation Measures for Landscape Impacts during Operation

Landscape Impact	Recommended Mitigation
Planting at Circle Park	Reinstate to an equivalent standards if necessary
Loss of existing amenity planting under the new flyover structure	Incorporate new planting and innovative hardworks into the under viaduct streetscape where possible.
Loss of mature trees near the Crown of Thorns Church sitting out area.	Any mature trees felled will be replaced by semi-mature trees of suitable species and their quality and quantity will not be less than those felled.
Loss of mature trees in the sitting out area adjacent to Fu Keung house	Provide new landscape buffer between Fu Keung House and Tai Wo Hau Road. Any mature trees felled will be replaced by semi-mature trees of suitable species and their quality and quantity will not be less than those felled.

Table 8.4 Cont'd...

Landscape Impact	Recommended Mitigation
Loss of Mature Trees on slope outside Fu Wing House	Incorporate new planting onto new slopeworks. Any mature trees felled will be replaced by semi-mature trees of suitable species and their quality and quantity will not be less than those felled.
Loss of amenity planting at the Yeung Uk / Texaco / Kwai Fu Roads intersection	Reinstate amenity area with species which can tolerate overshadowing. Provide new roadside amenity planting where possible.

Table 8.5: Recommended Landscape Mitigation Measures for Visual Impact during Construction

VSR	Main Activity of VSR	Recommended Mitigation
1 - Buddhist School	Education	Reduce construction period to the absolute minimum. Wherever possible, provide hoarding which will screen off views of construction. Hoarding to be designed as an attractive, but temporary urban feature.
2 - Texaco Road Circle Park	Passive Recreation	Reinstate planting to an equivalent standard where necessary.
3 - Jade Court	Residential	Reduce construction period to the absolute minimum. Provide hoarding which will screen off views of construction. Construction site to be maintained in a neat and orderly manner, avoiding the unnecessary build-up of litter, rubble and building waste.
4 - Cheong Kwai Court	Commercial / Residential	Reduce construction period to the absolute minimum. Provide hoarding which will screen off views of construction. Construction site to be maintained in a neat and orderly manner, avoiding the unnecessary build-up of litter, rubble and building waste.
5 - Tak Tai and Wang Wah Buildings	Residential	Reduce construction period to the absolute minimum. Provide hoarding which will screen off views of construction. Construction site to be maintained in a neat and orderly manner, avoiding the unnecessary build-up of litter, rubble and building waste.
6 - Cheung Fat House	Residential	Reduce construction period to the absolute minimum. Provide hoarding which will screen off views of construction. Construction site to be maintained in a neat and orderly manner, avoiding the unnecessary build-up of litter, rubble and building waste.

Table 8.5 Cont'd...

VSR	Main Activity of VSR	Recommended Mitigation
7 - Tai Fat House	Residential	Reduce construction period to the absolute minimum. Provide hoarding which will screen off views of construction. Construction site to be maintained in a neat and orderly manner, avoiding the unnecessary build-up of litter, rubble and building waste.
8 - Reprovisioned Crown of Thorns Church	Religious and Passive Recreational	New element. (assuming the church is rebuilt on the existing site)
9 - Fu Keung House	Residential	Reduce construction period to the absolute minimum. Provide hoarding which will screen off views of construction. Construction site to be maintained in a neat and orderly manner, avoiding the unnecessary build-up of litter, rubble and building waste.

Table 8.6: Recommended Landscape Mitigation Measures for Visual Impact during Operation

VSR	Main Activity of VSR	Recommended Mitigation
1 - Buddhist School	Education	Consider providing an architectural screen to boundary wall to block off views of new viaducts and noise mitigation structures for the northbound carriageway.
2 - Texaco Road Circle Park	Passive Recreation	Reinstated planting will contribute to the amenity of the area.
3 - Jade Court	Residential	Provide new amenity planting in place of the demolished slip road. Ensure that noise mitigation structures are designed to be as lightweight as possible and with a chromatic colour scheme appropriate to the setting. Ensure that the appearance of noise mitigation structures when viewed from above are interesting.
4 - Cheong Kwai Court	Commercial / Residential	Provide new amenity planting in place of the demolished slip road. Ensure that noise mitigation structures are designed to be as lightweight as possible and with a chromatic colour scheme appropriate to the setting. Ensure that the appearance of noise mitigation structures when viewed from above are interesting.

Table 8.6 Cont'd...

VSR	Main Activity of VSR	Recommended Mitigation
5 - Tak Tai and Wang Wah Buildings	Residential	Ensure that the design of new flyover and noise mitigation structures are integrated in order to minimise the visual impact of columns at ground level. Ensure that the appearance of noise mitigation structures when viewed from above are interesting. Incorporate innovative ground-level hardworks such as paving, lighting, and design of columns and parapets to mitigate against the effects of the new flyover on the streetscape.
6 - Cheung Fat House	Residential	Ensure that the design of new flyover and noise mitigation structures are integrated in order to minimise the visual impact of columns at ground level. Ensure that the appearance of noise mitigation structures when viewed from above are interesting.
7 - Tai Fat House	Residential	Ensure that the design of new flyover and noise mitigation structures are integrated in order to minimise the visual impact of columns at ground level. Ensure that the appearance of noise mitigation structures when viewed from above are interesting.
8 - Reprovisioned Crown of Thorns Church	Religious and Passive Recreational	Provide a new local open space in the vicinity of the Church. This recommendation depends upon the ultimate location of the church building. Alternative option are illustrated in Drawing 12 of Appendix E. Also the EVA area can serve the dual function as an amenity area for passive informal recreation.
9 - Fu Keung House	Residential	Provide new sitting out area and tree screening buffer between Tai Wo Hau Road and Fu Keung House. Housing Department will need to be consulted.

8.7 Conclusions

8.7.1 Residual Landscape and Visual Impacts during Construction

The residual landscape impacts of the project are not considered significant in the long term assuming the landscape mitigation measures are incorporated into the scheme. Immediately after the construction period, the residual change to the baseline condition following the loss of tree groups in Tai Wo Hau Street is considered to be high and adverse because the existing trees make a significant contribution to the environmental amenity. However, it is expected that during the operational period of the Project, this adverse impact will slowly diminish to a level where the new planting matures and attenuates the high change to the baseline condition.

The residual visual impacts on views from the Buddhist School, Jade Court, Cheong Kwai Court and the Tak Tai and Wang Wah Buildings will remain high to medium despite the

inclusion of mitigation measures.

8.7.2 Residual Landscape and Visual Impacts during Operation

The residual impacts during operation are summarised in Tables 8.7 and 8.8 below for landscape and visual impacts respectively.

Table 8.7: Summary of Residual Landscape Impacts during Operation

Landscape Impact	Level of Change to Baseline Condition Assuming Landscape Mitigation Measures are NOT Implemented	Level of Change to Baseline Condition Assuming Landscape Mitigation Measures are INCLUDED into the Project
Loss of planting at Texaco Interchange open Space	Low	No change, as planting affected will be re-instated.
Loss of existing amenity planting under new flyover structure	Medium	No change, as planting affected will be re-instated and innovative hardworks incorporated into streetscape.
Loss of mature trees near Crown of Thorns Church LOS Loss of mature trees in the LOS adjacent to Fu Keung House Loss of mature trees on slope outside Fu Wing House	High	Immediately after construction period, the residual change will remain high and adverse as the existing trees make a significant contribution to the environmental amenity. Over time, this level of change will attenuate as new trees mature.
Loss of amenity planting at the Yeung Uk/ Texaco / Kwai Fu Roads intersection	Low	Enhanced as the area of amenity planting will be increased.

Table 8.8: Summary of Residual Visual Impacts during Operation

VSR	Main Activity of VSR	Level of Change to Baseline Condition Assuming Landscape Mitigation Measures are NOT Implemented	Change to Baseline Condition Assuming Landscape Mitigation Measures are INCLUDED into the Project
1 - Buddhist School	Education	Substantial	Low
2 - Texaco Road Circle Park	Passive Recreation	Low	Medium
3 - Jade Court 4 - Cheong Kwai Court	Residential Commercial / Residential	Medium	Medium
5 - Tak Tai and Wang Wah Buildings	Residential	Medium	Medium

Table 8.8 Cont'd...

VSR	Main Activity of VSR	Level of Change to Baseline Condition Assuming Landscape Mitigation Measures are NOT Implemented	Change to Baseline Condition Assuming Landscape Mitigation Measures are INCLUDED into the Project
6 - Cheung Fat House	Residential	Low	Low
7 - Tai Fat House	Residential		
8 - Reprovisioned Crown of Thorns Church	Religious and Passive Recreational	Substantial	Low
9 - Fu Keung House	Residential	High	Low

9.0 Conclusions and Recommendations

9.0 CONCLUSIONS AND RECOMMENDATIONS

This Environmental Impact Assessment (EIA) Report has presented the potential environmental impacts associated with the construction and operation of the Texaco Road Improvements works ultimate scheme and comprised an appraisal of noise, air quality and visual and landscape effects. The key findings and recommendation of the impact assessment are summarised below:

Noise Impact Assessment

The construction noise assessment has concluded that maximum noise levels at some of the NSRs during the Texaco Road construction works will exceed the day time noise criteria of 75dB(A) or 70dB(A) for the school and nursery. The mitigation measures below have been recommended, therefore, to reduce the noise levels to within acceptable limits. With the application of these measures, the noise levels are predicted to meet the daytime construction noise limit of 75 dB(A).

- undertake construction activities between 07.00-19.00 only;
- silencers, mufflers or acoustic enclosures should be installed on mechanical equipment as appropriate;
- use of temporary noise barriers or enclosures;
- good site practice;
- avoidance of simultaneous noisy activities;
- selection of quiet plant and working methods; and
- reduction in the numbers of plant operating in critical areas close to NSRs.

The traffic noise modelling concluded that direct mitigation measures will be required. The recommended direct mitigation scenario for the Texaco Road improvement works are summarised below. .

- an absorptive top-bent barrier with 8.0m overhang between Jade Court and Cheung Fat House on the northbound carriageway of Texaco Road;
- an absorptive/non-absorptive top-bent barrier with 8.0m overhang between Wang Wah Building and Symphone Industrial Building on the southbound carriageway of Texaco Road; absorptive section between R14 and Tsuen Wing Street;
- a non-absorptive cantilevered barrier with a 1.0m overhang adjacent to the Crown of Thorns Church on Tai Wo Hau Road;
- an absorptive top-bent barrier with a 6.0m overhang in front of Fu Keung House on Tai Wo Hau Road; the effective overhang of this barrier is 3.0m as it is set to the back of the 3.0m footpath;
- an absorptive top-bent barrier with a 3.0m overhang in front of Fu Man House on Tai Wo Hau Road;
- an adsorptive top-bent barrier with a 3.0m overhang in front of Fu On House on Tai Wo Hau Road; and
- an adsorptive top-bent barrier with a 3.0m overhang opposite Fu On House on Tai Wo Hau Road.

These are the maximum practicable direct mitigation measures which can be applied within the constraints imposed by the need to provide emergency vehicular access to the properties adjacent to Texaco Road and engineering feasibility. A detailed submission will be made to ACABAS regarding these structures. The air quality impact assessment (Section 6.0) has determined that inclusion of these noise mitigation structures would not result in pollutant levels above the Air Quality Objectives.

The assessment has shown that, even with the application of direct mitigation measures, only R27 (the Kwai Lok Temporary Housing Area) R22 (Fu Wing House), some of the dwellings of R17 (Fu On House) and some of the lower floors of R15, R16, R23, R24 and R25 will experience noise within the 70 dB(A) standard. Thus, the majority of NSRs still exceed the HKPSG criteria.

It is concluded that approximately 1400 dwellings will be eligible for indirect noise mitigation remedies in the form of acoustic insulation and air conditioning systems subject to ExCo approval. The majority of NSRs are not eligible for indirect technical remedies due to the continuing influence of traffic from the existing roads as the dominant noise source.

Air Impact Assessment

The unmitigated TSP concentrations during the construction stage will exceed the standards at some of the sensitive receivers. Application of recommended mitigation measures listed below will reduce these levels to within acceptable limits:

- watering of unpaved roads and dusty activities twice daily;
- watering of exposed areas at every 1.5 hours;
- limit dropping heights for excavated materials during excavation and loading/unloading operations;
- do not load material to a level higher than the side and tail boards during transportation and cover or dampen the material; and
- all stockpiles of aggregate or spoil should be covered and watered.

The operational air assessment has considered three scenarios:

(i) the air pollution concentrations in the year 2011 with the new road in place but without the presence of the noise mitigation measures detailed in Section 5.0 of this report. For this scenario, the existing roads and the whole length of the new road as open sections has been modelled; and

(ii) the air pollution concentrations in the year 2011 with the new road in place and with the recommended direct noise mitigation measures. This scenario requires the modelling of vehicular air pollutants from the existing roads, open sections of the new road and side openings of semi-enclosures.

The vehicular emissions at each of the ASRs are superimposed on the background air quality data to predict the total air impacts. The results show that in both cases the

concentrations of all the air pollutants comply with the Air Quality Objectives.

Landscape and Visual Impact Assessment

Overall, the views from residential properties overlooking the Project will be affected during construction and the noise mitigation and flyover structures will lead to a reduction to the baseline condition during the operational phase because of their scale, massing and height above ground.

During the construction stage, landscape impacts in the form of loss of amenity planting, areas of trees, landscape open spaces and sitting out areas will produce the most significant effects. The effect of the construction works on visually sensitive receivers (VSRs) of the scheme will be greatest in the northern section where the sensitivity to change its high. Many residential properties will overlook the construction site and, because the working area will be tightly constrained, pedestrian circulation, public amenity and views from the adjacent VSRs will be severely disrupted.

Mitigation measures in the form of compensatory and transplant planting, reprovisioning of amenity areas and erection of hoarding will not completely mitigate the predicted impacts. However, the residual landscape impacts of the project are not considered significant in the long term.

Immediately after the construction period, the residual change to the baseline condition because of the loss of tree groups in Tai Wo Hau Street is considered to be high and adverse, because the existing trees make a significant contribution to the environmental amenity. However, it is expected that during the operational period of the Project, this adverse impact will slowly diminish to a level where the new planting matures and attenuates the high change to the baseline condition.

Appendix A

Construction Noise Modelling Results

Noise Level During Day-Time
At-grade - Excavation (07:00-19:00 hours)
(Scenario 1)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	81 dBA	67 dBA
R2	96 dBA	73 dBA
R3	93 dBA	70 dBA
R4	82 dBA	68 dBA
R5	91 dBA	68 dBA
R6	91 dBA	68 dBA
R7	95 dBA	71 dBA
R8	81 dBA	67 dBA
R9	98 dBA	74 dBA
R10	94 dBA	71 dBA
R11	95 dBA	72 dBA
R12	95 dBA	72 dBA
R13	89 dBA	66 dBA
R14	97 dBA	74 dBA
R15	82 dBA	68 dBA
R16	87 dBA	64 dBA
R17	73 dBA	69 dBA
R18	99 dBA	76 dBA

Noise Level During Day-Time
At-grade - Excavation (07:00-19:00 hours)
(Scenario 1)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	95 dBA	72 dBA
r20	92 dBA	69 dBA
r21	91 dBA	67 dBA
r22	80 dBA	65 dBA
r23	82 dBA	68 dBA
r24	85 dBA	70 dBA
r25	84 dBA	70 dBA
r26	78 dBA	63 dBA
r27	75 dBA	71 dBA
14a	92 dBA	69 dBA
14b	89 dBA	66 dBA
R19a	98 dBA	75 dBA
R28	91 dBA	67 dBA

Noise Level During Day-Time
At-grade - filling (07:00-19:00 hours)
(Scenario 2)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	75 dBA	73 dBA
R2	90 dBA	69 dBA
R3	87 dBA	74 dBA
R4	77 dBA	74 dBA
R5	86 dBA	73 dBA
R6	85 dBA	73 dBA
R7	89 dBA	67 dBA
R8	75 dBA	73 dBA
R9	92 dBA	70 dBA
R10	89 dBA	67 dBA
R11	89 dBA	68 dBA
R12	90 dBA	68 dBA
R13	83 dBA	61 dBA
R14	92 dBA	70 dBA
R15	77 dBA	74 dBA
R16	82 dBA	69 dBA
R17	68 dBA	65 dBA
R18	94 dBA	72 dBA

Noise Level During Day-Time
At-grade - filling (07:00-19:00 hours)
(Scenario 2)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	89 dBA	67 dBA
r20	86 dBA	73 dBA
r21	85 dBA	72 dBA
r22	74 dBA	71 dBA
r23	76 dBA	73 dBA
r24	79 dBA	66 dBA
r25	78 dBA	75 dBA
r26	72 dBA	69 dBA
r27	69 dBA	66 dBA
14a	86 dBA	65 dBA
14b	84 dBA	62 dBA
R19a	92 dBA	70 dBA
R28	85 dBA	70 dBA

Noise Level During Day-Time
At pavement - traffic (07:00-19:00 hours)
(Scenario 3)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	75 dBA	70 dBA
R2	90 dBA	75 dBA
R3	87 dBA	72 dBA
R4	76 dBA	71 dBA
R5	85 dBA	70 dBA
R6	85 dBA	70 dBA
R7	88 dBA	73 dBA
R8	75 dBA	70 dBA
R9	92 dBA	68 dBA
R10	88 dBA	73 dBA
R11	89 dBA	74 dBA
R12	89 dBA	74 dBA
R13	83 dBA	68 dBA
R14	91 dBA	67 dBA
R15	76 dBA	71 dBA
R16	81 dBA	66 dBA
R17	67 dBA	62 dBA
R18	93 dBA	69 dBA

Noise Level During Day-Time
At pavement - traffic (07:00-19:00 hours)
(Scenario 3)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	89 dBA	74 dBA
r20	86 dBA	71 dBA
r21	84 dBA	69 dBA
r22	73 dBA	68 dBA
r23	76 dBA	71 dBA
r24	79 dBA	74 dBA
r25	78 dBA	73 dBA
r26	71 dBA	66 dBA
r27	69 dBA	64 dBA
14a	86 dBA	62 dBA
14b	83 dBA	59 dBA
R19a	92 dBA	68 dBA
R28	84 dBA	69 dBA

Noise Level During Day-Time
At-grade - road pavement (07:00-19:00 hours)
(Scenario 4)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	74 dBA	55 dBA
R2	89 dBA	70 dBA
R3	85 dBA	66 dBA
R4	75 dBA	56 dBA
R5	84 dBA	65 dBA
R6	83 dBA	64 dBA
R7	87 dBA	68 dBA
R8	73 dBA	54 dBA
R9	90 dBA	71 dBA
R10	87 dBA	68 dBA
R11	87 dBA	68 dBA
R12	88 dBA	69 dBA
R13	81 dBA	62 dBA
R14	90 dBA	71 dBA
R15	75 dBA	56 dBA
R16	80 dBA	72 dBA
R17	74 dBA	58 dBA
R18	99 dBA	84 dBA

Noise Level During Day-Time
At-grade - Road pavement (07:00-19:00 hours)
(Scenario 4)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	87 dBA	68 dBA
r20	84 dBA	65 dBA
r21	83 dBA	64 dBA
r22	72 dBA	53 dBA
r23	74 dBA	55 dBA
r24	77 dBA	58 dBA
r25	76 dBA	57 dBA
r26	70 dBA	51 dBA
r27	57 dBA	38 dBA
14a	84 dBA	65 dBA
14b	82 dBA	63 dBA
R19a	90 dBA	71 dBA
R28	83 dBA	64 dBA

Noise Level During Day-Time
At-grade - Retaining structure (07:00-19:00 hours)
(Scenario 5)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	72 dBA	71 dBA
R2	87 dBA	67 dBA
R3	84 dBA	73 dBA
R4	74 dBA	72 dBA
R5	83 dBA	71 dBA
R6	82 dBA	71 dBA
R7	86 dBA	74 dBA
R8	72 dBA	61 dBA
R9	89 dBA	69 dBA
R10	86 dBA	74 dBA
R11	86 dBA	75 dBA
R12	87 dBA	75 dBA
R13	80 dBA	69 dBA
R14	89 dBA	68 dBA
R15	74 dBA	62 dBA
R16	79 dBA	67 dBA
R17	65 dBA	63 dBA
R18	91 dBA	70 dBA

Noise Level During Day-Time
At-grade - Retaining structure (07:00-19:00 hours)
(Scenario 5)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	86 dBA	66 dBA
r20	83 dBA	63 dBA
r21	82 dBA	70 dBA
r22	71 dBA	69 dBA
r23	73 dBA	72 dBA
r24	76 dBA	75 dBA
r25	75 dBA	74 dBA
r26	69 dBA	67 dBA
r27	66 dBA	65 dBA
14a	83 dBA	63 dBA
14b	81 dBA	60 dBA
R19a	89 dBA	69 dBA
R28	82 dBA	70 dBA

Noise Level During Day-Time
Viaduct Foundation ..... (07:00-19:00 hours)
(Scenario 6)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	81 dBA	67 dBA
R2	96 dBA	73 dBA
R3	93 dBA	70 dBA
R4	82 dBA	69 dBA
R5	91 dBA	68 dBA
R6	91 dBA	68 dBA
R7	94 dBA	72 dBA
R8	81 dBA	67 dBA
R9	98 dBA	75 dBA
R10	94 dBA	71 dBA
R11	95 dBA	72 dBA
R12	95 dBA	72 dBA
R13	89 dBA	66 dBA
R14	97 dBA	75 dBA
R15	82 dBA	68 dBA
R16	87 dBA	64 dBA
R17	73 dBA	70 dBA
R18	99 dBA	76 dBA

Noise Level During Day-Time
Viaduct Foundation ..... (07:00-19:00 hours)
(Scenario 6)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	95 dBA	71 dBA
r20	92 dBA	69 dBA
r21	90 dBA	67 dBA
r22	79 dBA	65 dBA
r23	82 dBA	68 dBA
r24	85 dBA	70 dBA
r25	84 dBA	69 dBA
r26	77 dBA	63 dBA
r27	75 dBA	70 dBA
14a	92 dBA	69 dBA
14b	89 dBA	66 dBA
R19a	98 dBA	74 dBA
R28	90 dBA	67 dBA

Noise Level During Day-Time
Road pavement (07:00-19:00 hours)
(Scenario 7)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
R1	74 dBA	55 dBA
R2	89 dBA	70 dBA
R3	85 dBA	66 dBA
R4	75 dBA	56 dBA
R5	84 dBA	65 dBA
R6	83 dBA	64 dBA
R7	87 dBA	68 dBA
R8	73 dBA	54 dBA
R9	90 dBA	71 dBA
R10	87 dBA	68 dBA
R11	87 dBA	68 dBA
R12	88 dBA	69 dBA
R13	81 dBA	62 dBA
R14	90 dBA	71 dBA
R15	75 dBA	56 dBA
R16	80 dBA	72 dBA
R17	74 dBA	58 dBA
R18	99 dBA	84 dBA

Noise Level During Day-Time
Road pavement (07:00-19:00 hours)
(Scenario 7)

Noise Sensitive Receiver	Predicted Noise Level Without Noise Mitigation	Corrected Noise Level With Noise Mitigation
r19	87 dBA	68 dBA
r20	84 dBA	65 dBA
r21	83 dBA	64 dBA
r22	72 dBA	53 dBA
r23	74 dBA	55 dBA
r24	77 dBA	58 dBA
r25	76 dBA	57 dBA
r26	70 dBA	51 dBA
r27	57 dBA	38 dBA
14a	84 dBA	65 dBA
14b	82 dBA	63 dBA
R19a	90 dBA	71 dBA
R28	83 dBA	64 dBA

Appendix B

Operational Noise Modelling Results

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Umitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R1	5	19.2	80.5	72.3	82.4	82.8
R1	6	21.7	80.3	72.6	82.2	82.6
R1	7	24.2	80.0	73.0	81.9	82.4
R1	8	26.7	79.9	73.3	81.8	82.3
R1	9	29.2	79.8	73.5	81.6	82.2
R1	10	31.7	79.6	74.0	81.4	82.1
R1	11	34.2	79.4	74.0	81.2	81.9
R1	12	36.7	79.2	74.1	81.0	81.7
R1	13	39.2	79.0	74.1	80.7	81.5
R1	14	41.7	78.8	74.2	80.5	81.3
R1	15	44.2	78.6	74.2	80.3	81.2
R1	16	46.7	78.4	74.2	80.1	81.0
R1	17	49.2	78.2	74.1	79.9	80.9
R1	18	51.7	78.1	74.1	79.8	80.7
R1	19	54.2	77.9	74.0	79.6	80.6
R2	5	18.6	82.9	86.5	73.0	86.4
R2	6	21.1	82.4	86.1	73.0	86.0
R2	7	23.6	81.9	85.7	73.1	85.6
R2	8	26.1	81.5	85.3	73.2	85.2
R2	9	28.6	81.1	84.9	73.3	84.8
R2	10	31.1	80.8	84.5	73.4	84.5
R2	11	33.6	80.5	84.2	73.5	84.2
R2	12	36.1	80.2	83.8	73.5	83.9
R2	13	38.6	79.9	83.5	73.4	83.6
R2	14	41.1	79.6	83.3	73.4	83.3
R2	15	43.6	79.4	83.0	73.3	83.1
R2	16	46.1	79.1	82.7	73.2	82.8
R2	17	48.6	78.9	82.5	73.1	82.6
R2	18	51.1	78.7	82.3	73.0	82.4
R3	6	22.2	81.7	84.4	67.6	84.1
R3	7	24.7	81.5	84.3	68.1	84.0
R3	8	27.2	81.3	84.1	68.3	83.9
R3	9	29.7	81.0	83.9	68.4	83.6
R3	10	32.2	80.7	83.6	68.5	83.4
R3	11	34.7	80.4	83.3	68.6	83.1
R3	12	37.2	80.1	83.1	68.7	82.9
R3	13	39.7	79.9	82.8	68.9	82.6
R3	14	42.2	79.7	82.6	69.0	82.4
R3	15	44.7	79.4	82.4	69.1	82.2
R3	16	47.2	79.2	82.2	69.3	82.0
R3	17	49.7	79.0	82.0	69.4	81.8
R3	18	52.2	78.8	81.8	69.4	81.6
R3	19	54.7	78.6	81.6	69.4	81.4
R3	20	57.2	78.5	81.4	69.4	81.3
R3	21	59.7	78.3	81.2	69.4	81.1
R3	22	62.2	78.1	81.0	69.4	80.9
R3	23	64.7	78.0	80.9	69.4	80.8
R3	24	67.2	77.8	80.7	69.4	80.6
R3	25	69.7	77.7	80.5	69.5	80.5
R3	26	72.2	77.5	80.4	69.6	80.4
R3	27	74.7	77.4	80.2	69.8	80.2
R3	28	77.2	77.3	80.1	70.0	80.1
R3	29	79.7	77.2	80.0	70.2	80.0
R4	5	19	76.2	69.2	74.0	75.1
R4	6	21.5	75.8	69.2	73.7	74.9
R4	7	24	75.4	69.2	73.3	74.6
R4	8	26.5	75.1	69.7	73.0	74.6
R4	9	29	74.9	70.5	72.8	74.7
R4	10	31.5	74.7	70.8	72.6	74.7
R4	11	34	74.6	71.2	72.5	74.7
R4	12	36.5	74.5	71.4	72.4	74.7
R4	13	39	74.4	71.6	72.2	74.7
R4	14	41.5	74.3	71.8	72.1	74.7
R4	15	44	74.1	71.9	72.0	74.7

Unmitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R4	16	46.5	74.0	72.1	71.8	74.7
R4	17	49	73.9	72.3	71.7	74.8
R4	18	51.5	73.9	72.5	71.6	74.8
R4	19	54	73.8	72.7	71.4	74.9
R4	20	56.5	73.7	72.8	71.4	74.9
R4	21	59	73.7	73.1	71.3	75.0
R4	22	61.5	73.7	73.3	71.2	75.1
R4	23	64	73.7	73.4	71.1	75.1
R4	24	66.5	73.6	73.6	71.0	75.2
R4	25	69	73.5	73.5	70.9	75.1
R4	26	71.5	73.5	73.6	70.8	75.1
R4	27	74	73.5	73.7	70.8	75.1
R4	28	76.5	73.5	73.7	70.7	75.2
R4	29	79	73.5	73.7	70.7	75.2
R5	5	18.5	82.0	84.1	74.6	84.3
R5	6	21	81.8	84.0	74.2	84.2
R5	7	23.5	81.5	83.8	73.9	83.9
R5	8	26	81.2	83.6	73.6	83.8
R5	9	28.5	80.9	83.4	73.4	83.6
R5	10	31	80.6	83.2	73.2	83.3
R5	11	33.5	80.4	83.0	73.0	83.1
R5	12	36	80.1	82.8	72.7	82.9
R5	13	38.5	79.8	82.5	72.5	82.7
R5	14	41	79.6	82.3	72.3	82.5
R5	15	43.5	79.3	82.1	72.1	82.2
R5	16	46	79.1	81.9	71.9	82.0
R5	17	48.5	78.9	81.7	71.7	81.8
R5	18	51	78.6	81.5	71.6	81.6
R5	19	53.5	78.4	81.3	71.4	81.5
R5	20	56	78.2	81.1	71.3	81.3
R5	21	58.5	78.1	81.0	71.2	81.1
R5	22	61	77.9	80.8	71.1	81.0
R5	23	63.5	77.7	80.6	71.0	80.8
R5	24	66	77.6	80.5	70.9	80.6
R5	25	68.5	77.4	80.3	70.8	80.5
R5	26	71	77.3	80.2	70.7	80.4
R5	27	73.5	77.1	80.0	70.7	80.2
R5	28	76	77.0	79.9	70.6	80.1
R5	29	78.5	76.8	79.8	70.5	80.0
R6	5	28.5	81.4	84.1	74.1	84.4
R6	6	31	81.2	83.9	73.7	84.2
R6	7	33.5	81.0	83.8	73.3	84.0
R6	8	36	80.7	83.6	72.9	83.8
R6	9	38.5	80.4	83.4	72.6	83.6
R6	10	41	80.1	83.1	72.2	83.4
R6	11	43.5	79.8	82.9	71.9	83.1
R6	12	46	79.6	82.7	71.6	82.9
R6	13	48.5	79.3	82.4	71.3	82.7
R6	14	51	79.0	82.2	71.1	82.4
R6	15	53.5	78.8	82.0	70.9	82.2
R6	16	56	78.5	81.8	70.6	82.0
R6	17	58.5	78.3	81.6	70.4	81.8
R6	18	61	78.1	81.4	70.3	81.6
R6	19	63.5	77.9	81.2	70.3	81.4
R6	20	66	77.7	81.0	70.2	81.2
R6	21	68.5	77.6	80.9	70.1	81.1
R6	22	71	77.4	80.7	69.9	80.9
R6	23	73.5	77.2	80.5	69.8	80.8
R6	24	76	77.1	80.4	69.7	80.6
R6	25	78.5	76.9	80.2	69.6	80.4
R6	26	81	76.8	80.1	69.6	80.3
R6	27	83.5	76.6	79.9	69.5	80.2
R6	28	86	76.5	79.8	69.4	80.0
R6	29	88.5	76.3	79.6	69.3	79.9

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Umitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R7	1	15.1	82.5	83.2	82.7	85.6
R7	2	17.6	82.6	83.8	82.9	86.1
R7	3	20.1	82.2	83.8	82.5	85.9
R7	4	22.6	81.9	83.5	82.2	85.6
R8	2	11.4	72.0	61.0	74.0	74.2
R8	3	13.9	72.2	61.4	74.1	74.4
R8	4	16.4	72.4	61.6	74.4	74.6
R8	5	18.9	72.5	61.8	74.5	74.7
R8	6	21.4	72.9	62.0	74.9	75.1
R8	7	23.9	74.7	64.2	76.7	76.9
R8	8	26.4	75.7	65.2	77.6	77.8
R8	9	28.9	76.1	66.4	78.0	78.3
R8	10	31.4	76.3	67.6	78.2	78.6
R8	11	33.9	76.4	68.7	78.3	78.7
R8	12	36.4	76.5	69.5	78.3	78.8
R8	13	38.9	76.5	70.2	78.3	78.9
R8	14	41.4	76.5	70.7	78.3	78.9
R8	15	43.9	76.5	71.1	78.2	78.9
R8	16	46.4	76.4	71.3	78.2	78.9
R8	17	48.9	76.4	71.4	78.1	78.9
R8	18	51.4	76.3	71.5	78.1	78.9
R8	19	53.9	76.3	71.6	78.0	78.8
R8	20	56.4	76.2	71.6	77.9	78.8
R8	21	58.9	76.2	71.6	77.9	78.7
R8	22	61.4	76.1	71.5	77.8	78.7
R8	23	63.9	76.1	71.5	77.8	78.6
R8	24	66.4	76.0	71.5	77.7	78.5
R8	25	68.9	75.9	71.4	77.6	78.5
R8	26	71.4	75.9	71.4	77.6	78.4
R8	27	73.9	75.8	71.3	77.5	78.4
R8	28	76.4	75.8	71.3	77.4	78.3
R8	29	78.9	75.7	71.3	77.4	78.2
R8	30	81.4	75.7	71.2	77.3	78.2
R8	31	83.9	75.6	71.2	77.2	78.1
R9	2	11.4	81.1	85.1	76.3	84.9
R9	3	13.9	81.4	85.1	77.8	85.2
R9	4	16.4	81.4	85.4	78.2	85.6
R9	5	18.9	81.1	85.3	78.1	85.5
R10	4	16.4	81.3	85.5	76.9	85.5
R10	5	18.9	81.1	85.3	76.9	85.4
R10	6	21.4	80.7	85.1	76.9	85.2
R10	7	23.9	80.4	84.7	76.8	84.9
R10	8	26.4	80.1	84.3	76.7	84.5
R10	9	28.9	79.8	84.0	76.6	84.3
R10	10	31.4	79.6	83.6	76.4	84.0
R10	11	33.9	79.3	83.3	76.3	83.7
R10	12	36.4	79.1	83.0	76.2	83.4
R10	13	38.9	78.8	82.7	76.2	83.1
R10	14	41.4	78.6	82.4	76.1	82.9
R10	15	43.9	78.4	82.1	76.0	82.7
R10	16	46.4	78.2	81.8	75.9	82.4
R10	17	48.9	78.0	81.6	75.8	82.2
R10	18	51.4	77.9	81.3	75.7	82.0
R10	19	53.9	77.7	81.1	75.6	81.9
R10	20	56.4	77.6	80.9	75.6	81.7
R10	23	58.9	77.4	80.7	75.5	81.5
R10	22	61.4	77.3	80.5	75.4	81.3
R10	23	63.9	77.1	80.3	75.3	81.2
R11	5	18.9	82.2	85.7	74.2	85.5
R11	6	21.4	81.8	85.3	74.1	85.1
R11	7	23.9	81.5	84.9	74.0	84.8
R11	8	26.4	81.1	84.5	74.0	84.4
R11	9	28.9	80.8	84.1	73.9	84.1
R11	10	31.4	80.5	83.8	73.8	83.7

Umitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R11	11	33.9	80.2	83.4	73.7	83.4
R11	12	36.4	80.0	83.1	73.6	83.1
R11	13	38.9	79.7	82.8	73.6	82.9
R11	14	41.4	79.5	82.5	73.5	82.6
R11	15	43.9	79.3	82.3	73.4	82.4
R11	16	46.4	79.0	82.0	73.3	82.2
R11	17	48.9	78.8	81.8	73.3	81.9
R11	18	51.4	78.6	81.5	73.2	81.7
R11	19	53.9	78.4	81.3	73.1	81.5
R11	20	56.4	78.3	81.1	73.1	81.3
R11	21	58.9	78.1	80.9	73.0	81.2
R11	22	61.4	77.9	80.7	72.9	81.0
R11	23	63.9	77.8	80.5	72.9	80.8
R11	24	66.4	77.6	80.3	72.8	80.7
R12	2	11.4	83.2	87.1	70.5	86.6
R12	3	13.9	83.1	86.8	71.1	86.3
R12	4	16.4	82.8	86.4	71.5	86.0
R12	5	18.9	82.5	85.9	71.5	85.5
R13	3	13.9	54.3	57.0	45.0	56.9
R13	4	16.4	57.3	59.7	45.9	59.5
R13	5	18.9	59.3	61.6	46.7	61.4
R13	6	21.4	59.5	61.5	48.3	61.4
R13	7	23.9	60.4	63.1	51.6	63.2
R13	8	26.4	70.1	71.1	56.5	71.2
R13	9	28.9	72.7	73.9	57.9	73.9
R13	10	31.4	73.9	75.4	58.3	75.4
R13	11	33.9	74.5	75.9	58.4	75.9
R13	12	36.4	74.8	76.3	58.4	76.2
R13	13	38.9	74.9	76.6	58.4	76.5
R13	14	41.4	75.0	77.0	58.5	76.8
R13	15	43.9	75.0	77.4	58.7	77.1
R13	16	46.4	75.0	77.6	58.8	77.3
R13	17	48.9	74.9	77.7	58.8	77.3
R13	18	51.4	74.8	77.8	60.1	77.4
R13	19	53.9	74.8	77.8	61.3	77.5
R13	20	56.4	74.7	77.8	62.1	77.5
R13	21	58.9	74.7	77.7	62.8	77.5
R13	22	61.4	74.6	77.7	63.2	77.4
R14	2	11.3	83.3	87.7	71.7	87.1
R14	3	13.8	83.1	87.2	71.7	86.7
R14	4	16.3	82.9	86.7	71.9	86.3
R14	5	18.8	82.5	86.1	72.1	85.8
R14	6	21.3	82.2	85.6	72.1	85.3
R14	7	23.8	81.9	85.2	72.0	84.9
R14	8	26.3	81.6	84.7	71.9	84.5
R14	9	28.8	81.2	84.3	71.9	84.1
R14	10	31.3	80.9	84.0	71.8	83.8
R14	11	33.8	80.6	83.6	71.8	83.4
R14	12	36.3	80.4	83.3	71.7	83.1
R14	13	38.8	80.1	83.0	71.6	82.8
R14	14	41.3	79.8	82.7	71.5	82.6
R14	15	43.8	79.6	82.4	71.4	82.3
R14	16	46.3	79.4	82.1	71.3	82.0
R15	2	11.4	65.2	60.4	63.8	65.5
R15	3	13.9	65.4	61.1	64.0	65.8
R15	4	16.4	66.0	62.2	64.2	66.3
R15	5	18.9	67.3	65.7	64.9	68.3
R15	6	21.4	68.9	68.1	66.7	70.4
R15	7	23.9	69.4	69.1	67.3	71.3
R15	8	26.4	69.8	69.4	67.8	71.7
R15	9	28.9	70.2	69.7	68.4	72.1
R15	10	31.4	70.7	70.0	69.0	72.5
R15	11	33.9	71.1	70.4	69.2	72.8
R15	12	36.4	71.1	70.7	69.2	73.0

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Unmitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R15	13	38.9	71.2	70.8	69.2	73.1
R15	14	41.4	71.3	70.9	69.2	73.1
R15	15	43.9	71.3	70.9	69.1	73.1
R15	16	46.4	71.3	70.9	69.0	73.1
R15	17	48.9	71.2	70.9	69.0	73.1
R15	18	51.4	71.2	70.9	68.9	73.0
R15	19	53.9	71.1	70.8	68.8	73.0
R15	20	56.4	71.1	70.8	68.7	72.9
R15	21	58.9	71.0	70.8	68.7	72.8
R15	22	61.4	71.0	70.7	68.6	72.8
R15	23	63.9	70.9	70.6	68.5	72.7
R15	24	66.4	70.8	70.6	68.5	72.7
R15	25	68.9	70.7	70.6	68.4	72.6
R15	26	71.4	70.7	70.5	68.3	72.6
R15	27	73.9	70.6	70.6	68.3	72.6
R15	28	76.4	70.6	70.6	68.3	72.6
R15	29	78.9	70.5	70.5	68.2	72.5
R15	30	81.4	70.5	70.6	68.2	72.5
R15	31	83.9	70.5	70.6	68.1	72.5
R16	2	11.4	65.4	66.0	65.1	66.0
R16	3	13.9	65.6	66.1	65.4	66.4
R16	4	16.4	65.8	66.1	65.7	66.8
R16	5	18.9	65.9	66.1	65.8	67.4
R16	6	21.4	66.3	66.2	66.6	68.6
R16	7	23.9	67.4	66.5	68.2	70.5
R16	8	26.4	68.1	66.7	69.0	71.2
R16	9	28.9	68.7	66.8	69.7	71.7
R16	10	31.4	69.2	67.0	70.3	72.2
R16	11	33.9	69.7	67.3	70.8	72.7
R16	12	36.4	70.0	67.2	71.2	72.9
R16	13	38.9	70.3	67.5	71.6	73.2
R16	14	41.4	70.6	67.7	71.9	73.5
R16	15	43.9	70.8	68.0	72.1	73.7
R16	16	46.4	71.0	68.2	72.3	73.9
R16	17	48.9	71.1	68.2	72.4	74.0
R16	18	51.4	71.3	68.3	72.6	74.1
R16	19	53.9	71.3	68.5	72.6	74.2
R16	20	56.4	71.4	68.6	72.7	74.2
R16	21	58.9	71.4	68.8	72.7	74.2
R16	22	61.4	71.4	69.1	72.7	74.2
R16	23	63.9	71.4	69.3	72.7	74.2
R16	24	66.4	71.4	69.3	72.6	74.2
R16	25	68.9	71.4	69.4	72.6	74.2
R16	26	71.4	71.4	69.4	72.6	74.2
R16	27	73.9	71.3	69.5	72.6	74.1
R16	28	76.4	71.3	69.5	72.5	74.1
R16	29	78.9	71.3	69.5	72.5	74.1
R16	30	81.4	71.4	69.5	72.6	74.1
R16	31	83.9	71.4	69.6	72.6	74.2
R17	5	27.7	77.5	65.0	77.4	77.7
R17	6	30.2	77.2	64.9	77.1	77.4
R17	7	32.7	76.9	64.9	76.8	77.1
R17	8	35.2	76.6	64.8	76.5	76.7
R17	9	37.7	76.2	64.8	76.1	76.4
R17	10	40.2	75.9	64.7	75.8	76.1
R17	11	42.7	75.6	64.7	75.5	75.9
R17	12	45.2	75.4	64.7	75.2	75.6
R17	13	47.7	75.1	64.7	75.0	75.4
R17	14	50.2	74.9	64.7	74.7	75.1
R17	15	52.7	74.6	64.6	74.5	74.9
R17	16	55.2	74.4	64.6	74.3	74.7
R18	1	8.7	84.2	87.9	72.9	87.3
R18	2	11.2	83.9	87.7	72.8	87.1
R18	3	13.7	83.5	87.4	72.8	87.0

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Umitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R18	4	16.2	83.1	86.8	72.7	86.4
R18	5	18.7	82.7	86.2	72.7	85.9
R19	1	8.7	77.1	82.0	69.0	82.0
R19	2	11.2	77.3	82.0	69.0	82.1
R19	3	13.7	77.4	82.0	68.9	82.1
R19	4	16.2	77.4	82.0	68.9	82.1
R19	5	18.7	77.3	81.9	68.8	82.0
R20	1	8.7	80.7	77.7	65.8	77.5
R20	2	11.2	80.3	77.9	65.7	77.6
R20	3	13.7	79.6	77.9	65.6	77.7
R20	4	16.2	78.9	77.9	65.4	77.6
R20	5	18.7	78.3	77.7	65.3	77.5
R21	1	11.6	73.2	76.2	72.4	78.7
R21	2	14.1	73.1	76.1	72.4	78.6
R21	3	16.6	73.1	76.0	72.4	78.3
R21	4	19.1	73.0	75.8	72.3	78.0
R21	5	21.6	72.9	75.7	72.1	77.7
R21	6	24.1	72.9	75.5	72.0	77.6
R21	7	26.6	72.9	75.2	71.8	77.3
R21	8	29.1	72.9	75.0	71.6	77.1
R21	9	31.6	73.0	74.8	71.4	76.9
R21	10	34.1	73.0	74.6	71.2	76.7
R21	11	36.6	73.0	74.4	71.0	76.6
R21	12	39.1	73.0	74.2	70.8	76.4
R21	13	41.6	72.9	74.1	70.6	76.3
R21	14	44.1	72.9	73.9	70.4	76.2
R21	15	46.6	72.8	73.8	70.2	76.1
R21	16	49.1	72.7	73.6	70.0	76.0
R21	17	51.6	72.7	73.4	69.8	75.9
R21	18	54.1	72.6	73.3	69.6	75.7
R21	19	56.6	72.5	73.2	69.5	75.6
R21	20	59.1	72.4	73.1	69.3	75.5
R21	21	61.6	72.4	73.0	69.2	75.4
R22	1	39	73.0	63.4	72.4	73.2
R22	2	41.5	72.9	63.4	72.4	73.1
R22	3	44	72.8	63.4	72.3	73.1
R22	4	46.5	72.8	63.4	72.2	73.0
R22	5	49	72.7	63.4	72.1	72.9
R22	6	51.5	72.6	63.4	72.1	72.8
R22	7	54	72.5	63.4	72.0	72.8
R22	8	56.5	72.4	63.4	71.9	72.7
R22	9	59	72.3	63.4	71.8	72.6
R22	10	61.5	72.3	63.4	71.7	72.5
R22	11	64	72.2	63.4	71.6	72.5
R22	12	66.5	72.1	63.4	71.5	72.4
R22	13	69	72.0	63.4	71.5	72.3
R22	14	71.5	72.0	63.4	71.4	72.3
R22	15	74	71.9	63.5	71.4	72.3
R22	16	76.5	71.9	63.5	71.5	72.3
R22	17	79	71.9	63.6	71.5	72.4
R22	18	81.5	71.9	63.6	71.5	72.4
R22	19	84	71.8	63.7	71.5	72.4
R22	20	86.5	71.8	63.8	71.5	72.4
R22	21	89	71.7	64.0	71.4	72.3
R22	22	91.5	71.6	64.1	71.4	72.3
R22	23	94	71.6	64.2	71.3	72.2
R22	24	96.5	71.5	64.3	71.2	72.2
R22	25	99	71.4	64.4	71.1	72.1
R22	26	101.5	71.4	64.6	71.1	72.1
R23	1	39	58.6	60.7	51.9	61.2
R23	2	41.5	60.8	62.2	53.1	62.7
R23	3	44	63.3	64.0	55.2	64.5
R23	4	46.5	65.9	66.0	56.6	66.5
R23	5	49	68.1	68.0	58.2	68.4

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Unmitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R23	6	51.5	70.4	70.3	59.8	70.6
R23	7	54	71.3	72.0	61.0	72.3
R23	8	56.5	71.9	73.2	62.1	73.5
R23	9	59	72.2	74.1	63.2	74.4
R23	10	61.5	72.5	74.9	64.2	75.2
R23	11	64	72.9	76.1	65.4	76.4
R23	12	66.5	73.1	76.4	65.9	76.8
R23	13	69	73.2	76.6	66.2	77.0
R23	14	71.5	73.4	76.7	66.4	77.1
R23	15	74	73.5	76.8	66.6	77.2
R23	16	76.5	73.6	76.8	66.8	77.2
R23	17	79	73.7	76.9	67.0	77.3
R23	18	81.5	73.7	76.9	67.2	77.3
R23	19	84	73.7	76.9	67.4	77.3
R23	20	86.5	73.7	76.9	67.5	77.3
R23	21	89	73.8	76.9	67.7	77.3
R23	22	91.5	73.7	76.8	67.8	77.3
R23	23	94	73.7	76.8	67.8	77.3
R23	24	96.5	73.7	76.8	67.9	77.3
R23	25	99	73.7	76.8	67.9	77.3
R23	26	101.5	73.6	76.7	68.0	77.2
R23	27	104	73.6	76.7	68.1	77.2
R23	28	106.5	73.5	76.6	68.1	77.2
R23	29	109	73.5	76.6	68.2	77.1
R23	30	111.5	73.5	76.5	68.3	77.1
R23	31	114	73.5	76.5	68.4	77.1
R23	32	116.5	73.4	76.4	68.4	77.0
R23	33	119	73.4	76.4	68.4	77.0
R23	34	121.5	73.3	76.3	68.5	76.9
R23	35	124	73.3	76.3	68.5	76.9
R23	36	126.5	73.2	76.2	68.5	76.8
R23	37	129	73.2	76.1	68.5	76.8
R23	38	131.5	73.2	76.1	68.4	76.8
R24	1	39	61.0	63.6	56.3	64.4
R24	2	41.5	63.4	65.6	58.2	66.3
R24	3	44	66.6	67.8	59.9	68.4
R24	4	46.5	69.6	70.6	61.7	71.1
R24	5	49	71.5	73.3	63.8	73.7
R24	6	51.5	73.3	75.9	65.9	76.3
R24	7	54	73.9	77.1	67.2	77.5
R24	8	56.5	74.4	77.8	68.0	78.2
R24	9	59	74.9	78.1	68.5	78.6
R24	10	61.5	75.2	78.3	68.9	78.8
R24	11	64	75.8	78.6	69.7	79.1
R24	12	66.5	75.8	78.7	69.9	79.2
R24	13	69	75.8	78.7	69.9	79.2
R24	14	71.5	75.8	78.7	69.9	79.2
R24	15	74	75.7	78.6	69.9	79.2
R24	16	76.5	75.7	78.6	69.9	79.1
R24	17	79	75.6	78.5	69.9	79.1
R24	18	81.5	75.5	78.4	69.8	79.0
R24	19	84	75.5	78.4	69.8	78.9
R24	20	86.5	75.4	78.3	69.8	78.8
R24	21	89	75.3	78.2	69.8	78.8
R24	22	91.5	75.2	78.1	69.8	78.7
R24	23	94	75.2	78.0	69.8	78.6
R24	24	96.5	75.1	77.9	69.9	78.6
R24	25	99	75.1	77.9	69.9	78.5
R24	26	101.5	75.0	77.8	70.0	78.4
R24	27	104	75.0	77.7	70.1	78.4
R24	28	106.5	74.9	77.6	70.1	78.3
R24	29	109	74.8	77.5	70.1	78.2
R24	30	111.5	74.8	77.5	70.1	78.2
R24	31	114	74.7	77.4	70.1	78.1

				Unmitigated 2018		
NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R24	32	116.5	74.7	77.3	70.1	78.0
R24	33	119	74.6	77.2	70.1	78.0
R24	34	121.5	74.5	77.1	70.0	77.9
R24	35	124	74.5	77.1	70.0	77.8
R24	36	126.5	74.4	77.0	69.9	77.8
R24	37	129	74.4	76.9	69.9	77.7
R24	38	131.5	74.3	76.9	69.9	77.6
R25	1	39	64.1	65.5	62.4	67.2
R25	2	41.5	67.8	68.9	66.1	70.8
R25	3	44	70.1	71.3	68.4	73.1
R25	4	46.5	71.1	72.6	69.2	74.2
R25	5	49	71.7	73.4	69.6	74.9
R25	6	51.5	72.5	74.1	70.1	75.5
R25	7	54	72.8	74.5	70.3	75.9
R25	8	56.5	73.1	74.8	70.4	76.2
R25	9	59	73.4	75.2	70.5	76.5
R25	10	61.5	73.7	75.5	70.7	76.7
R25	11	64	74.3	76.1	71.1	77.3
R25	12	66.5	74.5	76.2	71.3	77.4
R25	13	69	74.5	76.4	71.4	77.6
R25	14	71.5	74.5	76.5	71.4	77.7
R25	15	74	74.6	76.6	71.4	77.7
R25	16	76.5	74.6	76.8	71.4	77.9
R25	17	79	74.6	76.8	71.4	77.9
R25	18	81.5	74.6	76.7	71.4	77.8
R25	19	84	74.5	76.7	71.4	77.8
R25	20	86.5	74.5	76.6	71.4	77.7
R25	21	89	74.5	76.5	71.4	77.7
R25	22	91.5	74.4	76.4	71.4	77.6
R25	23	94	74.4	76.3	71.4	77.5
R25	24	96.5	74.3	76.3	71.4	77.5
R25	25	99	74.3	76.2	71.4	77.4
R25	26	101.5	74.2	76.1	71.4	77.4
R25	27	104	74.2	76.0	71.4	77.3
R25	28	106.5	74.1	75.9	71.3	77.2
R25	29	109	74.1	75.8	71.3	77.2
R25	30	111.5	74.0	75.8	71.3	77.1
R25	31	114	74.0	75.7	71.3	77.0
R25	32	116.5	73.9	75.6	71.3	77.0
R25	33	119	73.9	75.5	71.3	76.9
R25	34	121.5	73.9	75.5	71.3	76.9
R25	35	124	73.9	75.4	71.3	76.8
R25	36	126.5	73.8	75.3	71.3	76.8
R25	37	129	73.8	75.2	71.4	76.7
R25	38	131.5	73.8	75.2	71.4	76.7
R26	1	42.3	71.2	70.5	69.7	73.1
R26	2	44.8	71.8	71.3	70.1	73.8
R26	3	47.3	72.0	71.8	70.2	74.1
R26	4	49.8	72.0	72.1	70.2	74.2
R26	5	52.3	72.1	72.2	70.2	74.3
R26	6	54.8	72.3	72.6	70.3	74.6
R26	7	57.3	72.3	72.7	70.3	74.7
R26	8	59.8	72.3	72.8	70.3	74.7
R26	9	62.3	72.3	72.9	70.3	74.8
R26	10	64.8	72.3	72.9	70.3	74.8
R26	11	67.3	72.3	73.0	70.3	74.8
R26	12	69.8	72.3	73.0	70.3	74.9
R26	13	72.3	72.3	73.0	70.2	74.9
R26	14	74.8	72.3	73.0	70.2	74.8
R26	15	77.3	72.3	73.0	70.2	74.8
R26	16	79.8	72.3	73.1	70.2	74.9
R26	17	82.3	72.3	73.1	70.1	74.9
R26	18	84.8	72.2	73.1	70.1	74.8
R26	19	87.3	72.2	73.1	70.1	74.8

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Umitigated 2018

NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R26	20	89.8	72.2	73.1	70.1	74.8
R26	21	92.3	72.2	73.0	70.1	74.8
R26	22	94.8	72.2	73.1	70.1	74.8
R26	23	97.3	72.2	73.1	70.1	74.8
R26	24	99.8	72.2	73.1	70.1	74.8
R26	25	102.3	72.2	73.1	70.1	74.8
R26	26	104.8	72.2	73.1	70.0	74.9
R26	27	107.3	72.3	73.1	70.0	74.8
R26	28	109.8	72.3	73.1	70.1	74.9
R26	29	112.3	72.3	73.1	70.1	74.9
R26	30	114.8	72.3	73.1	70.2	74.9
R26	31	117.3	72.3	73.0	70.2	74.9
R26	32	119.8	72.4	73.0	70.3	74.9
R26	33	122.3	72.4	73.0	70.4	74.9
R26	34	124.8	72.4	73.0	70.5	74.9
R26	35	127.3	72.4	73.0	70.5	75.0
R26	36	129.8	72.4	73.0	70.6	75.0
R26	37	132.3	72.4	73.0	70.6	75.0
R26	38	134.8	72.4	73.0	70.6	75.0
R27	1	77.9	60.7	50.8	61.5	61.9
R27	2	80.4	60.9	52.2	61.7	62.1
R14A	2	11.3	80.4	78.8	66.5	78.6
R14A	3	13.8	79.6	78.8	66.4	78.6
R14A	4	16.3	79.0	78.7	66.3	78.6
R14A	5	18.8	78.5	78.8	66.2	78.6
R14A	6	21.3	78.4	79.2	67.0	79.1
R14A	7	23.8	78.3	79.3	67.2	79.2
R14A	8	26.3	78.1	79.4	67.6	79.3
R14A	9	28.8	77.9	79.3	67.9	79.3
R14A	10	31.3	77.7	79.2	67.8	79.2
R14A	11	33.8	77.4	79.1	67.7	79.1
R14A	12	36.3	77.3	79.0	67.7	79.0
R14A	13	38.8	77.0	78.9	67.6	78.9
R14A	14	41.3	76.8	78.8	67.4	78.8
R14A	15	43.8	76.6	78.7	67.3	78.7
R14A	16	46.3	76.4	78.5	67.2	78.6
R14B	2	11.3	75.1	73.2	66.6	74.0
R14B	3	13.8	74.8	73.1	66.6	74.0
R14B	4	16.3	74.3	73.0	66.6	73.9
R14B	5	18.8	73.8	72.8	66.4	73.7
R14B	6	21.3	73.3	72.6	66.3	73.5
R14B	7	23.8	73.1	72.5	66.2	73.4
R14B	8	26.3	72.6	72.3	66.0	73.2
R14B	9	28.8	72.2	72.0	65.7	73.0
R14B	10	31.3	71.8	71.8	65.5	72.7
R14B	11	33.8	71.4	71.5	65.3	72.5
R14B	12	36.3	71.2	71.4	65.2	72.4
R14B	13	38.8	70.8	71.2	64.9	72.1
R14B	14	41.3	70.5	70.9	64.7	71.9
R14B	15	43.8	70.2	70.7	64.5	71.6
R14B	16	46.3	69.9	70.5	64.3	71.4
R19a	1	8.7	72.7	79.8	67.2	80.0
R19a	2	11.2	72.9	79.7	67.4	79.9
R19a	3	13.7	72.9	79.4	67.4	79.6
R19a	4	16.2	72.9	78.9	67.4	79.2
R19a	5	18.7	72.7	78.5	67.3	78.8
R28	1	24.9	76.8	76.9	46.9	76.9
R28	2	27.4	76.8	76.8	47.2	76.8
R28	3	29.9	76.5	76.5	47.2	76.5
R28	4	32.4	76.2	76.2	47.1	76.2
R28	5	34.9	75.8	75.9	47.1	75.9
R17a	5	27.7	76.4	76.6	52.5	76.7
R17a	6	30.2	76.1	76.4	52.5	76.4

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

				Umitigated 2018		
NSR	Floor	Height (mPD)	Existing (1999)	"New"	"Old"	Total
R17a	7	32.7	75.9	76.2	52.6	76.2
R17a	8	35.2	75.6	75.9	52.7	76.0
R17a	9	37.7	75.4	75.7	52.8	75.7
R17a	10	40.2	75.1	75.5	52.9	75.5
R17a	11	42.7	74.9	75.2	52.9	75.3
R17a	12	45.2	74.7	75.0	53.0	75.0
R17a	13	47.7	74.4	74.8	53.0	74.8
R17a	14	50.2	74.2	74.6	53.1	74.6
R17a	15	52.7	74.0	74.4	53.2	74.5
R17a	16	55.2	73.8	74.2	53.3	74.3

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R1	5	19.2	65.6	82.4	82.7	80.5
R1	6	21.7	65.6	82.2	82.4	80.3
R1	7	24.2	65.6	81.9	82.2	80.0
R1	8	26.7	65.6	81.8	82.0	79.9
R1	9	29.2	65.6	81.6	81.9	79.8
R1	10	31.7	65.6	81.4	81.7	79.6
R1	11	34.2	65.6	81.2	81.5	79.4
R1	12	36.7	65.6	81.0	81.3	79.2
R1	13	39.2	65.6	80.7	81.1	79.0
R1	14	41.7	65.6	80.5	80.9	78.8
R1	15	44.2	65.5	80.3	80.7	78.6
R1	16	46.7	65.5	80.1	80.5	78.4
R1	17	49.2	65.5	79.9	80.3	78.2
R1	18	51.7	65.5	79.8	80.2	78.1
R1	19	54.2	65.5	79.6	80.0	77.9
R2	5	18.6	73.3	73.0	76.9	82.9
R2	6	21.1	73.4	73.0	76.9	82.4
R2	7	23.6	73.6	73.1	77.0	81.9
R2	8	26.1	74.0	73.2	77.1	81.5
R2	9	28.6	74.9	73.3	77.6	81.1
R2	10	31.1	76.6	73.5	78.6	80.8
R2	11	33.6	78.0	73.5	79.5	80.5
R2	12	36.1	78.4	73.5	79.8	80.2
R2	13	38.6	78.8	73.4	80.1	79.9
R2	14	41.1	78.6	73.4	79.9	79.6
R2	15	43.6	79.0	73.3	80.1	79.4
R2	16	46.1	78.7	73.2	79.9	79.1
R2	17	48.6	78.5	73.1	79.7	78.9
R2	18	51.1	78.3	73.0	79.6	78.7
R3	6	22.2	73.7	67.6	75.0	81.7
R3	7	24.7	74.9	68.1	75.9	81.5
R3	8	27.2	75.6	68.3	76.5	81.3
R3	9	29.7	75.8	68.4	76.7	81.0
R3	10	32.2	76.1	68.5	77.0	80.7
R3	11	34.7	78.5	68.7	79.0	80.4
R3	12	37.2	78.7	68.8	79.2	80.1
R3	13	39.7	78.7	69.0	79.2	79.9
R3	14	42.2	78.6	69.1	79.1	79.7
R3	15	44.7	78.4	69.2	79.0	79.4
R3	16	47.2	78.4	69.4	79.0	79.2
R3	17	49.7	78.2	69.5	78.8	79.0
R3	18	52.2	78.1	69.5	78.7	78.8
R3	19	54.7	77.9	69.5	78.6	78.6
R3	20	57.2	77.7	69.5	78.4	78.5
R3	21	59.7	77.6	69.5	78.3	78.3
R3	22	62.2	77.4	69.5	78.1	78.1
R3	23	64.7	77.3	69.5	78.0	78.0
R3	24	67.2	77.1	69.5	77.9	77.8
R3	25	69.7	77.0	69.6	77.8	77.7
R3	26	72.2	76.8	69.7	77.7	77.5
R3	27	74.7	76.7	69.9	77.6	77.4
R3	28	77.2	76.6	70.1	77.5	77.3
R3	29	79.7	76.4	70.3	77.4	77.2
R4	5	19.0	68.0	74.0	75.0	76.2
R4	6	21.5	68.0	73.7	74.7	75.8
R4	7	24.0	68.1	73.3	74.5	75.4
R4	8	26.5	68.4	73.0	74.3	75.1
R4	9	29.0	69.1	72.8	74.4	74.9
R4	10	31.5	69.4	72.6	74.3	74.7
R4	11	34.0	69.8	72.5	74.4	74.6
R4	12	36.5	69.9	72.4	74.3	74.5
R4	13	39.0	70.1	72.2	74.3	74.4
R4	14	41.5	70.1	72.1	74.2	74.3
R4	15	44.0	70.1	72.0	74.2	74.1

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R4	16	46.5	70.2	71.8	74.1	74.0
R4	17	49.0	70.2	71.7	74.0	73.9
R4	18	51.5	70.3	71.6	74.0	73.9
R4	19	54.0	70.4	71.5	74.0	73.8
R4	20	56.5	70.4	71.4	73.9	73.7
R4	21	59.0	70.6	71.3	73.9	73.7
R4	22	61.5	70.7	71.2	73.9	73.7
R4	23	64.0	70.7	71.1	73.9	73.7
R4	24	66.5	70.7	71.0	73.9	73.6
R4	25	69.0	70.7	70.9	73.8	73.5
R4	26	71.5	70.8	70.8	73.8	73.5
R4	27	74.0	70.8	70.8	73.8	73.5
R4	28	76.5	70.8	70.8	73.8	73.5
R4	29	79.0	70.8	70.8	73.8	73.5
R5	5	18.5	83.1	74.6	83.7	82.0
R5	6	21.0	83.0	74.2	83.5	81.8
R5	7	23.5	82.8	73.9	83.3	81.5
R5	8	26.0	82.7	73.6	83.2	81.2
R5	9	28.5	82.5	73.5	83.0	80.9
R5	10	31.0	82.2	73.3	82.8	80.6
R5	11	33.5	82.0	73.0	82.5	80.4
R5	12	36.0	81.8	72.8	82.3	80.1
R5	13	38.5	81.6	72.6	82.1	79.8
R5	14	41.0	81.5	72.3	82.0	79.6
R5	15	43.5	81.3	72.1	81.8	79.3
R5	16	46.0	81.1	72.0	81.6	79.1
R5	17	48.5	80.9	71.8	81.4	78.9
R5	18	51.0	80.7	71.6	81.2	78.6
R5	19	53.5	80.5	71.5	81.0	78.4
R5	20	56.0	80.3	71.4	80.8	78.2
R5	21	58.5	80.1	71.3	80.7	78.1
R5	22	61.0	80.0	71.2	80.5	77.9
R5	23	63.5	79.8	71.1	80.4	77.7
R5	24	66.0	79.6	71.0	80.2	77.6
R5	25	68.5	79.5	70.9	80.1	77.4
R5	26	71.0	79.3	70.9	79.9	77.3
R5	27	73.5	79.2	70.8	79.8	77.1
R5	28	76.0	79.0	70.7	79.6	77.0
R5	29	78.5	78.9	70.6	79.5	76.8
R6	5	28.5	83.5	74.1	84.0	81.4
R6	6	31.0	83.4	73.7	83.8	81.2
R6	7	33.5	83.2	73.3	83.6	81.0
R6	8	36.0	83.0	72.9	83.4	80.7
R6	9	38.5	82.8	72.6	83.2	80.4
R6	10	41.0	82.6	72.3	83.0	80.1
R6	11	43.5	82.4	72.0	82.8	79.8
R6	12	46.0	82.2	71.7	82.6	79.6
R6	13	48.5	82.0	71.4	82.3	79.3
R6	14	51.0	81.8	71.2	82.1	79.0
R6	15	53.5	81.6	70.9	81.9	78.8
R6	16	56.0	81.4	70.7	81.7	78.5
R6	17	58.5	81.2	70.5	81.5	78.3
R6	18	61.0	81.0	70.5	81.3	78.1
R6	19	63.5	80.8	70.4	81.2	77.9
R6	20	66.0	80.6	70.3	81.0	77.7
R6	21	68.5	80.4	70.2	80.8	77.6
R6	22	71.0	80.3	70.1	80.7	77.4
R6	23	73.5	80.1	70.0	80.5	77.2
R6	24	76.0	79.9	69.9	80.3	77.1
R6	25	78.5	79.8	69.8	80.2	76.9
R6	26	81.0	79.6	69.8	80.0	76.8
R6	27	83.5	79.5	69.7	79.9	76.6
R6	28	86.0	79.3	69.6	79.8	76.5
R6	29	88.5	79.2	69.5	79.6	76.3

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R7	1	15.1	82.3	82.7	85.9	82.5
R7	2	17.6	83.3	82.9	86.1	82.6
R7	3	20.1	83.1	82.5	85.8	82.2
R7	4	22.6	82.8	82.2	85.5	81.9
R8	2	11.4	58.8	74.0	74.1	72.0
R8	3	13.9	59.3	74.2	74.3	72.2
R8	4	16.4	59.8	74.4	74.5	72.4
R8	5	18.9	60.0	74.5	74.7	72.5
R8	6	21.4	60.2	74.9	75.1	72.9
R8	7	23.9	63.4	76.7	76.9	74.7
R8	8	26.4	64.7	77.6	77.9	75.7
R8	9	28.9	66.3	78.0	78.3	76.1
R8	10	31.4	67.7	78.2	78.6	76.3
R8	11	33.9	69.0	78.3	78.8	76.4
R8	12	36.4	69.7	78.3	78.9	76.5
R8	13	38.9	70.1	78.3	78.9	76.5
R8	14	41.4	70.5	78.3	78.9	76.5
R8	15	43.9	70.7	78.2	78.9	76.5
R8	16	46.4	70.8	78.2	78.9	76.4
R8	17	48.9	70.9	78.1	78.9	76.4
R8	18	51.4	71.0	78.1	78.8	76.3
R8	19	53.9	71.0	78.0	78.8	76.3
R8	20	56.4	71.0	77.9	78.7	76.2
R8	21	58.9	70.9	77.9	78.7	76.2
R8	22	61.4	70.9	77.8	78.6	76.1
R8	23	63.9	70.9	77.8	78.6	76.1
R8	24	66.4	70.8	77.7	78.5	76.0
R8	25	68.9	70.7	77.6	78.4	75.9
R8	26	71.4	70.7	77.6	78.4	75.9
R8	27	73.9	70.6	77.5	78.3	75.8
R8	28	76.4	70.6	77.4	78.3	75.8
R8	29	78.9	70.6	77.4	78.2	75.7
R8	30	81.4	70.6	77.3	78.1	75.7
R8	31	83.9	70.5	77.2	78.1	75.6
R9	2	11.4	79.0	76.3	81.6	81.1
R9	3	13.9	84.2	77.8	85.2	81.4
R9	4	16.4	84.9	78.2	85.6	81.4
R9	5	18.9	84.5	78.1	85.4	81.1
R10	4	16.4	85.2	76.9	85.4	81.3
R10	5	18.9	84.8	76.9	85.4	81.1
R10	6	21.4	84.4	76.9	85.1	80.7
R10	7	23.9	84.0	76.8	84.8	80.4
R10	8	26.4	83.6	76.7	84.4	80.1
R10	9	28.9	83.3	76.6	84.1	79.8
R10	10	31.4	82.9	76.4	83.8	79.6
R10	11	33.9	82.6	76.3	83.5	79.3
R10	12	36.4	82.3	76.3	83.3	79.1
R10	13	38.9	82.0	76.2	83.0	78.8
R10	14	41.4	81.7	76.1	82.8	78.6
R10	15	43.9	81.4	76.0	82.5	78.4
R10	16	46.4	81.2	75.9	82.3	78.2
R10	17	48.9	81.0	75.8	82.1	78.0
R10	18	51.4	80.7	75.7	81.9	77.9
R10	19	53.9	80.5	75.7	81.7	77.7
R10	20	56.4	80.3	75.6	81.6	77.6
R10	23	58.9	80.1	75.5	81.4	77.4
R10	22	61.4	79.9	75.4	81.2	77.3
R10	23	63.9	79.7	75.3	81.1	77.1
R11	5	18.9	84.8	74.2	85.2	82.2
R11	6	21.4	84.4	74.1	84.8	81.8
R11	7	23.9	84.0	74.0	84.4	81.5
R11	8	26.4	83.6	74.0	84.1	81.1
R11	9	28.9	83.3	73.9	83.8	80.8
R11	10	31.4	83.0	73.8	83.5	80.5

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R11	11	33.9	82.6	73.7	83.2	80.2
R11	12	36.4	82.3	73.6	82.9	80.0
R11	13	38.9	82.1	73.6	82.6	79.7
R11	14	41.4	81.8	73.5	82.4	79.5
R11	15	43.9	81.5	73.4	82.2	79.3
R11	16	46.4	81.3	73.3	81.9	79.0
R11	17	48.9	81.1	73.3	81.7	78.8
R11	18	51.4	80.8	73.2	81.5	78.6
R11	19	53.9	80.6	73.1	81.3	78.4
R11	20	56.4	80.4	73.1	81.2	78.3
R11	21	58.9	80.2	73.0	81.0	78.1
R11	22	61.4	80.0	73.0	80.8	77.9
R11	23	63.9	79.9	72.9	80.7	77.8
R11	24	66.4	79.7	72.8	80.5	77.6
R12	2	11.4	85.9	70.5	86.0	83.2
R12	3	13.9	85.7	71.1	85.8	83.1
R12	4	16.4	85.3	71.5	85.5	82.8
R12	5	18.9	84.9	71.5	85.1	82.5
R13	3	13.9	57.4	45.1	56.9	54.3
R13	4	16.4	59.7	45.9	59.4	57.3
R13	5	18.9	61.4	46.8	61.4	59.3
R13	6	21.4	61.4	48.3	61.4	59.5
R13	7	23.9	61.7	51.6	62.1	60.4
R13	8	26.4	70.4	56.5	70.6	70.1
R13	9	28.9	73.5	57.9	73.6	72.7
R13	10	31.4	75.2	58.3	75.3	73.9
R13	11	33.9	75.8	58.4	75.9	74.5
R13	12	36.4	76.0	58.4	76.1	74.8
R13	13	38.9	76.3	58.5	76.4	74.9
R13	14	41.4	76.5	58.6	76.6	75.0
R13	15	43.9	76.8	58.7	76.9	75.0
R13	16	46.4	76.9	58.9	77.0	75.0
R13	17	48.9	76.9	58.9	77.0	74.9
R13	18	51.4	76.9	60.5	77.0	74.8
R13	19	53.9	76.9	61.6	77.0	74.8
R13	20	56.4	76.9	62.4	77.0	74.7
R13	21	58.9	76.8	63.0	77.0	74.7
R13	22	61.4	76.7	63.4	76.9	74.6
R14	2	11.3	86.0	71.7	86.1	83.3
R14	3	13.8	85.9	71.7	86.1	83.1
R14	4	16.3	85.4	71.9	85.6	82.9
R14	5	18.8	85.0	72.1	85.2	82.5
R14	6	21.3	84.5	72.1	84.7	82.2
R14	7	23.8	84.2	72.0	84.4	81.9
R14	8	26.3	83.8	71.9	84.0	81.6
R14	9	28.8	83.4	71.9	83.7	81.2
R14	10	31.3	83.0	71.8	83.4	80.9
R14	11	33.8	82.7	71.8	83.0	80.6
R14	12	36.3	82.4	71.7	82.7	80.4
R14	13	38.8	82.1	71.6	82.5	80.1
R14	14	41.3	81.8	71.5	82.2	79.8
R14	15	43.8	81.5	71.4	81.9	79.6
R14	16	46.3	81.3	71.3	81.7	79.4
R15	2	11.4	54.8	63.8	64.3	65.2
R15	3	13.9	56.6	64.0	64.6	65.4
R15	4	16.4	59.3	64.2	65.2	66.0
R15	5	18.9	61.9	65.2	66.4	67.3
R15	6	21.4	64.5	66.8	68.4	68.9
R15	7	23.9	65.5	67.3	69.4	69.4
R15	8	26.4	66.0	67.8	69.9	69.8
R15	9	28.9	66.3	68.4	70.4	70.2
R15	10	31.4	66.5	69.0	70.8	70.7
R15	11	33.9	66.6	69.2	71.1	71.1
R15	12	36.4	66.7	69.2	71.1	71.1

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R15	13	38.9	66.8	69.2	71.2	71.2
R15	14	41.4	66.9	69.2	71.2	71.3
R15	15	43.9	66.9	69.1	71.1	71.3
R15	16	46.4	66.8	69.0	71.1	71.3
R15	17	48.9	66.8	69.0	71.0	71.2
R15	18	51.4	66.8	68.9	71.0	71.2
R15	19	53.9	66.7	68.8	70.9	71.1
R15	20	56.4	66.7	68.7	70.8	71.1
R15	21	58.9	66.6	68.7	70.8	71.0
R15	22	61.4	66.6	68.6	70.7	71.0
R15	23	63.9	66.6	68.6	70.7	70.9
R15	24	66.4	66.6	68.5	70.6	70.8
R15	25	68.9	66.5	68.4	70.6	70.7
R15	26	71.4	66.5	68.4	70.6	70.7
R15	27	73.9	66.5	68.4	70.6	70.6
R15	28	76.4	66.5	68.4	70.6	70.6
R15	29	78.9	66.5	68.4	70.6	70.5
R15	30	81.4	66.6	68.4	70.6	70.5
R15	31	83.9	66.7	68.3	70.6	70.5
R16	2	11.4	59.0	65.1	66.0	65.4
R16	3	13.9	59.7	65.4	66.4	65.6
R16	4	16.4	60.4	65.7	66.8	65.8
R16	5	18.9	62.1	65.8	67.4	65.9
R16	6	21.4	64.4	66.6	68.6	66.3
R16	7	23.9	66.7	68.2	70.5	67.4
R16	8	26.4	67.1	69.0	71.2	68.1
R16	9	28.9	67.4	69.7	71.7	68.7
R16	10	31.4	67.8	70.3	72.2	69.2
R16	11	33.9	68.1	70.8	72.7	69.7
R16	12	36.4	68.1	71.2	73.0	70.0
R16	13	38.9	68.3	71.6	73.3	70.3
R16	14	41.4	68.5	71.9	73.5	70.6
R16	15	43.9	68.6	72.1	73.7	70.8
R16	16	46.4	68.7	72.3	73.9	71.0
R16	17	48.9	68.7	72.4	74.0	71.1
R16	18	51.4	68.8	72.6	74.1	71.3
R16	19	53.9	68.9	72.6	74.2	71.3
R16	20	56.4	69.0	72.7	74.2	71.4
R16	21	58.9	68.9	72.7	74.2	71.4
R16	22	61.4	69.0	72.7	74.2	71.4
R16	23	63.9	69.0	72.7	74.2	71.4
R16	24	66.4	69.0	72.6	74.2	71.4
R16	25	68.9	69.0	72.6	74.2	71.4
R16	26	71.4	69.0	72.6	74.2	71.4
R16	27	73.9	68.9	72.6	74.1	71.3
R16	28	76.4	68.9	72.5	74.1	71.3
R16	29	78.9	68.9	72.5	74.1	71.3
R16	30	81.4	68.9	72.6	74.1	71.4
R16	31	83.9	68.9	72.7	74.2	71.4
R17	5	27.7	69.8	51.5	69.9	77.5
R17	6	30.2	69.6	51.5	69.7	77.2
R17	7	32.7	69.5	51.6	69.5	76.9
R17	8	35.2	69.3	51.6	69.4	76.6
R17	9	37.7	69.2	51.6	69.3	76.2
R17	10	40.2	69.1	51.6	69.1	75.9
R17	11	42.7	69.0	51.6	69.0	75.6
R17	12	45.2	68.9	51.7	69.0	75.4
R17	13	47.7	68.8	51.7	68.9	75.1
R17	14	50.2	68.7	51.7	68.8	74.9
R17	15	52.7	68.7	51.8	68.8	74.6
R17	16	55.2	68.6	51.8	68.7	74.4
R18	1	8.7	76.2	72.9	77.9	84.2
R18	2	11.2	76.9	72.8	78.4	83.9
R18	3	13.7	80.5	72.8	81.2	83.5

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R18	4	16.2	82.1	72.7	82.5	83.1
R18	5	18.7	81.9	72.7	82.4	82.7
R19	1	8.7	70.2	69.1	72.7	77.1
R19	2	11.2	72.2	69.1	73.9	77.3
R19	3	13.7	74.5	69.0	75.6	77.4
R19	4	16.2	75.8	69.0	76.6	77.4
R19	5	18.7	76.0	68.9	76.8	77.3
R20	1	8.7	74.4	65.8	74.9	80.7
R20	2	11.2	74.5	65.7	75.0	80.3
R20	3	13.7	75.1	65.6	75.5	79.6
R20	4	16.2	76.0	65.4	76.4	78.9
R20	5	18.7	75.9	65.3	76.3	78.3
R21	1	11.6	70.1	68.2	73.1	73.2
R21	2	14.1	70.7	68.2	73.1	73.1
R21	3	16.6	71.0	68.2	73.1	73.1
R21	4	19.1	71.1	68.1	73.1	73.0
R21	5	21.6	71.1	68.0	73.1	72.9
R21	6	24.1	71.4	67.9	73.0	72.9
R21	7	26.6	71.5	67.8	72.9	72.9
R21	8	29.1	71.6	67.7	72.9	72.9
R21	9	31.6	71.8	67.6	72.7	73.0
R21	10	34.1	71.9	67.6	72.6	73.0
R21	11	36.6	71.8	67.5	72.5	73.0
R21	12	39.1	72.0	67.4	72.4	73.0
R21	13	41.6	72.0	67.2	72.2	72.9
R21	14	44.1	72.2	67.1	72.1	72.9
R21	15	46.6	72.3	67.0	72.0	72.8
R21	16	49.1	72.2	67.0	71.9	72.7
R21	17	51.6	72.2	66.9	71.8	72.7
R21	18	54.1	72.2	66.9	71.8	72.6
R21	19	56.6	72.2	66.8	71.7	72.5
R21	20	59.1	72.1	66.8	71.7	72.4
R21	21	61.6	72.1	66.7	71.6	72.4
R22	1	39.0	68.0	51.1	68.1	73.0
R22	2	41.5	67.9	51.2	68.0	72.9
R22	3	44.0	68.0	51.3	68.0	72.8
R22	4	46.5	67.9	51.5	68.0	72.8
R22	5	49.0	67.9	51.6	68.0	72.7
R22	6	51.5	67.9	51.8	68.0	72.6
R22	7	54.0	67.8	52.1	67.9	72.5
R22	8	56.5	67.8	52.1	67.9	72.4
R22	9	59.0	67.7	52.1	67.8	72.3
R22	10	61.5	67.7	52.1	67.8	72.3
R22	11	64.0	67.7	54.1	67.9	72.2
R22	12	66.5	67.6	54.9	67.9	72.1
R22	13	69.0	67.6	55.9	67.9	72.0
R22	14	71.5	67.5	57.3	67.9	72.0
R22	15	74.0	67.5	59.0	68.1	71.9
R22	16	76.5	67.5	60.9	68.4	71.9
R22	17	79.0	67.5	62.3	68.6	71.9
R22	18	81.5	67.5	63.1	68.8	71.9
R22	19	84.0	67.4	63.6	68.9	71.8
R22	20	86.5	67.4	63.8	69.0	71.8
R22	21	89.0	67.5	63.9	69.1	71.7
R22	22	91.5	67.4	64.0	69.1	71.6
R22	23	94.0	67.4	64.0	69.0	71.6
R22	24	96.5	67.4	64.0	69.0	71.5
R22	25	99.0	67.4	64.0	69.0	71.4
R22	26	101.5	67.4	64.1	69.0	71.4
R23	1	39.0	58.8	52.6	59.7	58.6
R23	2	41.5	60.2	53.9	61.1	60.8
R23	3	44.0	61.9	55.9	62.9	63.3
R23	4	46.5	63.9	57.2	64.8	65.9
R23	5	49.0	66.1	58.7	66.9	68.1

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R23	6	51.5	68.6	60.2	69.2	70.4
R23	7	54.0	70.2	61.3	70.7	71.3
R23	8	56.5	71.3	62.4	71.8	71.9
R23	9	59.0	71.9	63.4	72.5	72.2
R23	10	61.5	72.3	64.3	72.9	72.5
R23	11	64.0	73.2	65.5	73.8	72.9
R23	12	66.5	73.3	66.0	74.1	73.1
R23	13	69.0	73.4	66.3	74.2	73.2
R23	14	71.5	73.5	66.5	74.3	73.4
R23	15	74.0	73.6	66.7	74.4	73.5
R23	16	76.5	73.7	66.9	74.5	73.6
R23	17	79.0	73.8	67.1	74.6	73.7
R23	18	81.5	73.9	67.2	74.7	73.7
R23	19	84.0	73.9	67.4	74.8	73.7
R23	20	86.5	73.9	67.6	74.8	73.7
R23	21	89.0	74.0	67.8	74.9	73.8
R23	22	91.5	74.0	67.8	74.9	73.7
R23	23	94.0	74.0	67.9	74.9	73.7
R23	24	96.5	73.9	67.9	74.9	73.7
R23	25	99.0	73.9	68.0	74.9	73.7
R23	26	101.5	73.9	68.0	74.9	73.6
R23	27	104.0	73.8	68.1	74.8	73.6
R23	28	106.5	73.8	68.1	74.8	73.5
R23	29	109.0	73.7	68.3	74.8	73.5
R23	30	111.5	73.7	68.4	74.8	73.5
R23	31	114.0	73.6	68.4	74.8	73.5
R23	32	116.5	73.6	68.5	74.7	73.4
R23	33	119.0	73.5	68.5	74.7	73.4
R23	34	121.5	73.5	68.5	74.7	73.3
R23	35	124.0	73.4	68.5	74.6	73.3
R23	36	126.5	73.3	68.5	74.6	73.2
R23	37	129.0	73.3	68.5	74.5	73.2
R23	38	131.5	73.2	68.5	74.5	73.2
R24	1	39.0	61.4	57.5	62.9	61.0
R24	2	41.5	63.3	59.6	64.9	63.4
R24	3	44.0	65.7	61.1	67.0	66.6
R24	4	46.5	68.8	62.6	69.8	69.6
R24	5	49.0	71.6	64.4	72.4	71.5
R24	6	51.5	73.8	66.3	74.5	73.3
R24	7	54.0	74.4	67.5	75.2	73.9
R24	8	56.5	74.8	68.2	75.7	74.4
R24	9	59.0	75.1	68.7	76.0	74.9
R24	10	61.5	75.2	69.1	76.1	75.2
R24	11	64.0	75.4	69.8	76.5	75.8
R24	12	66.5	75.4	70.0	76.5	75.8
R24	13	69.0	75.4	70.1	76.5	75.8
R24	14	71.5	75.4	70.1	76.5	75.8
R24	15	74.0	75.3	70.0	76.5	75.7
R24	16	76.5	75.3	70.0	76.4	75.7
R24	17	79.0	75.2	70.0	76.4	75.6
R24	18	81.5	75.2	70.0	76.3	75.5
R24	19	84.0	75.1	70.0	76.3	75.5
R24	20	86.5	75.0	70.0	76.2	75.4
R24	21	89.0	75.0	69.9	76.2	75.3
R24	22	91.5	74.9	70.0	76.1	75.2
R24	23	94.0	74.8	70.0	76.0	75.2
R24	24	96.5	74.7	70.0	76.0	75.1
R24	25	99.0	74.7	70.0	75.9	75.1
R24	26	101.5	74.6	70.2	75.9	75.0
R24	27	104.0	74.5	70.2	75.9	75.0
R24	28	106.5	74.4	70.3	75.8	74.9
R24	29	109.0	74.4	70.3	75.8	74.8
R24	30	111.5	74.3	70.3	75.7	74.8
R24	31	114.0	74.2	70.2	75.7	74.7

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R24	32	116.5	74.1	70.2	75.6	74.7
R24	33	119.0	74.1	70.2	75.6	74.6
R24	34	121.5	74.0	70.1	75.5	74.5
R24	35	124.0	73.9	70.1	75.4	74.5
R24	36	126.5	73.9	70.1	75.4	74.4
R24	37	129.0	73.8	70.0	75.3	74.4
R24	38	131.5	73.7	70.0	75.3	74.3
R25	1	39.0	63.7	63.9	66.8	64.1
R25	2	41.5	66.9	67.5	70.2	67.8
R25	3	44.0	70.0	69.4	72.7	70.1
R25	4	46.5	71.7	70.1	74.0	71.1
R25	5	49.0	72.4	70.4	74.5	71.7
R25	6	51.5	73.1	70.8	75.1	72.5
R25	7	54.0	73.3	70.9	75.3	72.8
R25	8	56.5	73.6	71.0	75.5	73.1
R25	9	59.0	74.0	71.1	75.8	73.4
R25	10	61.5	74.2	71.3	76.0	73.7
R25	11	64.0	74.7	71.7	76.4	74.3
R25	12	66.5	74.7	71.8	76.5	74.5
R25	13	69.0	74.6	71.9	76.5	74.5
R25	14	71.5	74.6	71.9	76.4	74.5
R25	15	74.0	74.5	71.9	76.4	74.6
R25	16	76.5	74.4	71.9	76.3	74.6
R25	17	79.0	74.3	71.9	76.3	74.6
R25	18	81.5	74.3	71.8	76.2	74.6
R25	19	84.0	74.2	71.8	76.2	74.5
R25	20	86.5	74.1	71.8	76.1	74.5
R25	21	89.0	74.0	71.8	76.0	74.5
R25	22	91.5	73.9	71.8	76.0	74.4
R25	23	94.0	73.8	71.8	75.9	74.4
R25	24	96.5	73.7	71.8	75.9	74.3
R25	25	99.0	73.7	71.8	75.8	74.3
R25	26	101.5	73.6	71.8	75.8	74.2
R25	27	104.0	73.5	71.8	75.7	74.2
R25	28	106.5	73.4	71.7	75.7	74.1
R25	29	109.0	73.3	71.7	75.6	74.1
R25	30	111.5	73.3	71.7	75.6	74.0
R25	31	114.0	73.2	71.7	75.5	74.0
R25	32	116.5	73.1	71.7	75.5	73.9
R25	33	119.0	73.0	71.7	75.4	73.9
R25	34	121.5	72.9	71.7	75.4	73.9
R25	35	124.0	72.9	71.7	75.4	73.9
R25	36	126.5	72.8	71.8	75.3	73.8
R25	37	129.0	72.7	71.8	75.3	73.8
R25	38	131.5	72.7	71.8	75.3	73.8
R26	1	42.3	66.6	70.9	72.3	71.2
R26	2	44.8	67.6	71.3	72.8	71.8
R26	3	47.3	68.4	71.4	73.1	72.0
R26	4	49.8	68.7	71.3	73.2	72.0
R26	5	52.3	69.0	71.3	73.3	72.1
R26	6	54.8	69.5	71.5	73.6	72.3
R26	7	57.3	69.7	71.5	73.7	72.3
R26	8	59.8	70.1	71.5	73.8	72.3
R26	9	62.3	70.6	71.4	74.0	72.3
R26	10	64.8	70.9	71.4	74.2	72.3
R26	11	67.3	71.2	71.4	74.3	72.3
R26	12	69.8	71.4	71.3	74.4	72.3
R26	13	72.3	71.5	71.3	74.4	72.3
R26	14	74.8	71.5	71.3	74.4	72.3
R26	15	77.3	71.5	71.2	74.4	72.3
R26	16	79.8	71.6	71.2	74.4	72.3
R26	17	82.3	71.6	71.2	74.4	72.3
R26	18	84.8	71.6	71.2	74.4	72.2
R26	19	87.3	71.6	71.1	74.4	72.2

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R26	20	89.8	71.6	71.1	74.4	72.2
R26	21	92.3	71.6	71.1	74.4	72.2
R26	22	94.8	71.6	71.1	74.4	72.2
R26	23	97.3	71.6	71.1	74.4	72.2
R26	24	99.8	71.6	71.1	74.4	72.2
R26	25	102.3	71.6	71.0	74.4	72.2
R26	26	104.8	71.7	71.0	74.4	72.2
R26	27	107.3	71.6	71.0	74.4	72.3
R26	28	109.8	71.6	71.0	74.4	72.3
R26	29	112.3	71.6	71.0	74.3	72.3
R26	30	114.8	71.6	71.1	74.4	72.3
R26	31	117.3	71.6	71.2	74.4	72.3
R26	32	119.8	71.5	71.2	74.4	72.4
R26	33	122.3	71.5	71.3	74.4	72.4
R26	34	124.8	71.4	71.3	74.4	72.4
R26	35	127.3	71.4	71.4	74.4	72.4
R26	36	129.8	71.3	71.4	74.4	72.4
R26	37	132.3	71.3	71.4	74.4	72.4
R26	38	134.8	71.3	71.5	74.4	72.4
R27	1	77.9	50.1	61.6	61.9	60.7
R27	2	80.4	51.1	61.8	62.2	60.9
R14A	2	11.3	74.2	66.5	74.9	80.4
R14A	3	13.8	75.9	66.4	76.3	79.6
R14A	4	16.3	76.0	66.3	76.4	79.0
R14A	5	18.8	76.0	66.2	76.5	78.5
R14A	6	21.3	76.4	67.1	76.9	78.4
R14A	7	23.8	76.9	67.3	77.3	78.3
R14A	8	26.3	77.1	67.7	77.5	78.1
R14A	9	28.8	77.0	68.0	77.5	77.9
R14A	10	31.3	76.9	68.0	77.4	77.7
R14A	11	33.8	76.8	67.9	77.3	77.4
R14A	12	36.3	76.7	67.8	77.2	77.3
R14A	13	38.8	76.5	67.7	77.0	77.0
R14A	14	41.3	76.3	67.6	76.8	76.8
R14A	15	43.8	76.1	67.5	76.7	76.6
R14A	16	46.3	76.0	67.4	76.5	76.4
R14B	2	11.3	70.9	66.6	72.2	75.1
R14B	3	13.8	70.9	66.6	72.3	74.8
R14B	4	16.3	70.8	66.6	72.2	74.3
R14B	5	18.8	70.8	66.4	72.1	73.8
R14B	6	21.3	70.7	66.3	72.0	73.3
R14B	7	23.8	70.6	66.2	72.0	73.1
R14B	8	26.3	70.4	66.0	71.7	72.6
R14B	9	28.8	70.2	65.7	71.6	72.2
R14B	10	31.3	70.1	65.5	71.4	71.8
R14B	11	33.8	69.9	65.3	71.2	71.4
R14B	12	36.3	69.8	65.2	71.1	71.2
R14B	13	38.8	69.5	64.9	70.8	70.8
R14B	14	41.3	69.4	64.7	70.6	70.5
R14B	15	43.8	69.2	64.5	70.5	70.2
R14B	16	46.3	69.0	64.3	70.2	69.9
R19a	1	8.7	67.4	67.4	70.4	72.7
R19a	2	11.2	67.6	67.5	70.6	72.9
R19a	3	13.7	68.0	67.6	70.8	72.9
R19a	4	16.2	68.5	67.5	71.1	72.9
R19a	5	18.7	69.2	67.5	71.4	72.7
R28	1	24.9	70.1	47.0	70.1	76.8
R28	2	27.4	69.7	47.3	69.7	76.8
R28	3	29.9	69.1	47.2	69.2	76.5
R28	4	32.4	68.7	47.2	68.7	76.2
R28	5	34.9	68.3	47.2	68.3	75.8
R17a	5	27.7	73.3	52.5	73.4	76.4
R17a	6	30.2	73.2	52.6	73.2	76.1

Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Mitigated 2018

NSR	Floor	Height (mPD)	"New"	"Old"	Total	Existing (1999)
R17a	7	32.7	73.0	52.7	73.0	75.9
R17a	8	35.2	72.8	52.8	72.8	75.6
R17a	9	37.7	72.6	52.8	72.6	75.4
R17a	10	40.2	72.4	52.9	72.4	75.1
R17a	11	42.7	72.2	53.0	72.2	74.9
R17a	12	45.2	72.0	53.0	72.1	74.7
R17a	13	47.7	71.8	53.1	71.9	74.4
R17a	14	50.2	71.7	53.1	71.7	74.2
R17a	15	52.7	71.5	53.2	71.6	74.0
R17a	16	55.2	71.4	53.4	71.4	73.8

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
1	2018 FSD Requirement						
2	OPT5; KD PB RT5 SPS ASP1;						
3	S1 S2 S3 S4 S5 S6S S7 S9 S14 S15 S18 S19 S23 S27 S28						
4	S29 S30 S31 S22 S21 S17 S32 S62						
5	S63 S10 S16 S11 S12 S26 S13						
6	Project : OPT5			Date : 20.03.98			
7	Run file : 014			Time : 10:34			
8	\RL Standard : "16.BImSchV"						
9	\F Results in dB(A)						
10	Build38 R1 5-9	830662.40	825654.23	19.200	82.675	0.000	81.681
11	Build38 R1 5-9	830662.40	825654.23	21.700	82.419	0.000	81.398
12	Build38 R1 5-9	830662.40	825654.23	24.200	82.163	0.000	81.112
13	Build38 R1 5-9	830662.40	825654.23	26.700	82.039	0.000	80.823
14	Build38 R1 5-9	830662.40	825654.23	29.200	81.917	0.000	80.540
15	R1 10-14	830662.40	825654.23	31.700	81.703	0.000	80.266
16	R1 10-14	830662.40	825654.23	34.200	81.490	0.000	80.003
17	R1 10-14	830662.40	825654.23	36.700	81.285	0.000	79.751
18	R1 10-14	830662.40	825654.23	39.200	81.082	0.000	79.512
19	R1 10-14	830662.40	825654.23	41.700	80.882	0.000	79.282
20	R1 15-19	830662.40	825654.23	44.200	80.696	0.000	79.064
21	R1 15-19	830662.40	825654.23	46.700	80.515	0.000	78.856
22	R1 15-19	830662.40	825654.23	49.200	80.340	0.000	78.655
23	R1 15-19	830662.40	825654.23	51.700	80.172	0.000	78.462
24	R1 15-19	830662.40	825654.23	54.200	80.012	0.000	78.277
25	Build25 R2 5-9	830699.10	825583.84	18.600	76.947	0.000	72.132
26	Build25 R2 5-9	830699.10	825583.84	21.100	76.911	0.000	72.278
27	Build25 R2 5-9	830699.10	825583.84	23.600	76.962	0.000	72.579
28	Build25 R2 5-9	830699.10	825583.84	26.100	77.120	0.000	73.023
29	Build25 R2 5-9	830699.10	825583.84	28.600	77.611	0.000	74.127
30	R2 10-14	830699.10	825583.84	31.100	78.599	0.000	76.036
31	R2 10-14	830699.10	825583.84	33.600	79.497	0.000	77.432
32	R2 10-14	830699.10	825583.84	36.100	79.825	0.000	77.929
33	R2 10-14	830699.10	825583.84	38.600	80.071	0.000	78.303
34	R2 10-14	830699.10	825583.84	41.100	79.866	0.000	78.063
35	R2 15-19	830699.10	825583.84	43.600	80.130	0.000	77.831
36	R2 15-19	830699.10	825583.84	46.100	79.935	0.000	77.607
37	R2 15-19	830699.10	825583.84	48.600	79.745	0.000	77.390
38	R2 15-19	830699.10	825583.84	51.100	79.563	0.000	77.182
39	Build24 R3 6-10	830668.41	825543.19	22.200	74.996	0.000	72.112
40	Build24 R3 6-10	830668.41	825543.19	24.700	75.949	0.000	72.372
41	Build24 R3 6-10	830668.41	825543.19	27.200	76.527	0.000	72.674
42	Build24 R3 6-10	830668.41	825543.19	29.700	76.725	0.000	73.036
43	Build24 R3 6-10	830668.41	825543.19	32.200	76.950	0.000	73.532
44	R3 11-15	830668.41	825543.19	34.700	79.046	0.000	76.721
45	R3 11-15	830668.41	825543.19	37.200	79.191	0.000	76.957
46	R3 11-15	830668.41	825543.19	39.700	79.198	0.000	76.996
47	R3 11-15	830668.41	825543.19	42.200	79.128	0.000	76.925
48	R3 11-15	830668.41	825543.19	44.700	79.006	0.000	76.781
49	R3 16-20	830668.41	825543.19	47.200	78.979	0.000	76.594
50	R3 16-20	830668.41	825543.19	49.700	78.848	0.000	76.432
51	R3 16-20	830668.41	825543.19	52.200	78.713	0.000	76.261
52	R3 16-20	830668.41	825543.19	54.700	78.558	0.000	76.085

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
53	R3 16-20	830668.41	825543.19	57.200	78.409	0.000	75.914
54	R3 21-25	830668.41	825543.19	59.700	78.263	0.000	75.747
55	R3 21-25	830668.41	825543.19	62.200	78.125	0.000	75.585
56	R3 21-25	830668.41	825543.19	64.700	77.991	0.000	75.427
57	R3 21-25	830668.41	825543.19	67.200	77.870	0.000	75.274
58	R3 21-25	830668.41	825543.19	69.700	77.751	0.000	75.125
59	R3 26-29	830668.41	825543.19	72.200	77.665	0.000	75.537
60	R3 26-29	830668.41	825543.19	74.700	77.579	0.000	75.395
61	R3 26-29	830668.41	825543.19	77.200	77.510	0.000	75.257
62	R3 26-29	830668.41	825543.19	79.700	77.442	0.000	75.123
63	Build39 R4 5-9	830608.14	825536.14	19.000	74.973	0.000	73.276
64	Build39 R4 5-9	830608.14	825536.14	21.500	74.702	0.000	72.934
65	Build39 R4 5-9	830608.14	825536.14	24.000	74.473	0.000	72.642
66	Build39 R4 5-9	830608.14	825536.14	26.500	74.320	0.000	72.411
67	Build39 R4 5-9	830608.14	825536.14	29.000	74.363	0.000	72.367
68	R4 10-14	830608.14	825536.14	31.500	74.303	0.000	72.419
69	R4 10-14	830608.14	825536.14	34.000	74.360	0.000	72.388
70	R4 10-14	830608.14	825536.14	36.500	74.341	0.000	72.296
71	R4 10-14	830608.14	825536.14	39.000	74.300	0.000	72.214
72	R4 10-14	830608.14	825536.14	41.500	74.222	0.000	72.096
73	R4 15-19	830608.14	825536.14	44.000	74.157	0.000	72.019
74	R4 15-19	830608.14	825536.14	46.500	74.083	0.000	71.917
75	R4 15-19	830608.14	825536.14	49.000	74.020	0.000	71.830
76	R4 15-19	830608.14	825536.14	51.500	73.994	0.000	71.792
77	R4 15-19	830608.14	825536.14	54.000	73.954	0.000	71.748
78	R4 20-24	830608.14	825536.14	56.500	73.923	0.000	71.773
79	R4 20-24	830608.14	825536.14	59.000	73.936	0.000	71.796
80	R4 20-24	830608.14	825536.14	61.500	73.946	0.000	71.814
81	R4 20-24	830608.14	825536.14	64.000	73.919	0.000	71.780
82	R4 20-24	830608.14	825536.14	66.500	73.882	0.000	71.733
83	R4 25	830608.14	825536.14	69.000	73.844	0.000	71.675
84	R4 25	830608.14	825536.14	71.500	73.818	0.000	71.639
85	R4 25	830608.14	825536.14	74.000	73.803	0.000	71.605
86	R4 25	830608.14	825536.14	76.500	73.779	0.000	71.542
87	R4 25	830608.14	825536.14	79.000	73.805	0.000	71.512
88	Build22 R5 5-9	830626.41	825476.59	18.500	83.691	0.000	82.851
89	Build22 R5 5-9	830626.41	825476.59	21.000	83.539	0.000	82.684
90	Build22 R5 5-9	830626.41	825476.59	23.500	83.345	0.000	82.486
91	Build22 R5 5-9	830626.41	825476.59	26.000	83.174	0.000	82.294
92	Build22 R5 5-9	830626.41	825476.59	28.500	82.980	0.000	82.070
93	R5 10-14	830626.41	825476.59	31.000	82.754	0.000	81.854
94	R5 10-14	830626.41	825476.59	33.500	82.537	0.000	81.627
95	R5 10-14	830626.41	825476.59	36.000	82.323	0.000	81.405
96	R5 10-14	830626.41	825476.59	38.500	82.134	0.000	81.203
97	R5 10-14	830626.41	825476.59	41.000	82.000	0.000	81.061
98	R5 15-19	830626.41	825476.59	43.500	81.797	0.000	80.840
99	R5 15-19	830626.41	825476.59	46.000	81.591	0.000	80.627
100	R5 15-19	830626.41	825476.59	48.500	81.395	0.000	80.419
101	R5 15-19	830626.41	825476.59	51.000	81.211	0.000	80.228
102	R5 15-19	830626.41	825476.59	53.500	81.024	0.000	80.034
103	R5 20-24	830626.41	825476.59	56.000	80.846	0.000	79.847
104	R5 20-24	830626.41	825476.59	58.500	80.676	0.000	79.667

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
105	R5 20-24	830626.41	825476.59	61.000	80.516	0.000	79.497
106	R5 20-24	830626.41	825476.59	63.500	80.357	0.000	79.327
107	R5 20-24	830626.41	825476.59	66.000	80.203	0.000	79.163
108	R5 25	830626.41	825476.59	68.500	80.057	0.000	79.004
109	R5 25	830626.41	825476.59	71.000	79.917	0.000	78.850
110	R5 25	830626.41	825476.59	73.500	79.779	0.000	78.700
111	R5 25	830626.41	825476.59	76.000	79.644	0.000	78.555
112	R5 25	830626.41	825476.59	78.500	79.517	0.000	78.416
113	Build21 R6 5-9	830606.91	825444.33	18.500	83.966	0.000	83.204
114	Build21 R6 5-9	830606.91	825444.33	21.000	83.813	0.000	83.048
115	Build21 R6 5-9	830606.91	825444.33	23.500	83.643	0.000	82.869
116	Build21 R6 5-9	830606.91	825444.33	26.000	83.442	0.000	82.664
117	Build21 R6 5-9	830606.91	825444.33	28.500	83.229	0.000	82.446
118	R6 10-14	830606.91	825444.33	31.000	83.007	0.000	82.221
119	R6 10-14	830606.91	825444.33	33.500	82.788	0.000	81.993
120	R6 10-14	830606.91	825444.33	36.000	82.564	0.000	81.765
121	R6 10-14	830606.91	825444.33	38.500	82.343	0.000	81.541
122	R6 10-14	830606.91	825444.33	41.000	82.139	0.000	81.331
123	R6 15-19	830606.91	825444.33	43.500	81.927	0.000	81.113
124	R6 15-19	830606.91	825444.33	46.000	81.720	0.000	80.900
125	R6 15-19	830606.91	825444.33	48.500	81.518	0.000	80.693
126	R6 15-19	830606.91	825444.33	51.000	81.331	0.000	80.492
127	R6 15-19	830606.91	825444.33	53.500	81.154	0.000	80.304
128	R6 20-24	830606.91	825444.33	56.000	80.988	0.000	80.126
129	R6 20-24	830606.91	825444.33	58.500	80.818	0.000	79.949
130	R6 20-24	830606.91	825444.33	61.000	80.653	0.000	79.776
131	R6 20-24	830606.91	825444.33	63.500	80.494	0.000	79.608
132	R6 20-24	830606.91	825444.33	66.000	80.337	0.000	79.443
133	R6 25	830606.91	825444.33	68.500	80.190	0.000	79.284
134	R6 25	830606.91	825444.33	71.000	80.048	0.000	79.128
135	R6 25	830606.91	825444.33	73.500	79.903	0.000	78.977
136	R6 25	830606.91	825444.33	76.000	79.766	0.000	78.831
137	R6 25	830606.91	825444.33	78.500	79.632	0.000	78.689
138	Build32 R7 1-4	830756.97	825621.63	15.100	85.921	0.000	82.396
139	Build32 R7 1-4	830756.97	825621.63	17.600	86.125	0.000	82.377
140	Build32 R7 1-4	830756.97	825621.63	20.100	85.818	0.000	82.120
141	Build32 R7 1-4	830756.97	825621.63	22.600	85.487	0.000	81.826
142	Build37 R8 2-6	830813.94	825607.48	11.400	74.114	0.000	0.000
143	Build37 R8 2-6	830813.94	825607.48	13.900	74.291	0.000	0.000
144	Build37 R8 2-6	830813.94	825607.48	16.400	74.512	0.000	0.000
145	Build37 R8 2-6	830813.94	825607.48	18.900	74.654	0.000	0.000
146	Build37 R8 2-6	830813.94	825607.48	21.400	75.056	0.000	0.000
147	R8 7-11	830813.94	825607.48	23.900	76.920	0.000	0.000
148	R8 7-11	830813.94	825607.48	26.400	77.850	0.000	0.000
149	R8 7-11	830813.94	825607.48	28.900	78.319	0.000	0.000
150	R8 7-11	830813.94	825607.48	31.400	78.607	0.000	0.000
151	R8 7-11	830813.94	825607.48	33.900	78.776	0.000	0.000
152	R8 12-16	830813.94	825607.48	36.400	78.865	0.000	0.000
153	R8 12-16	830813.94	825607.48	38.900	78.907	0.000	0.000
154	R8 12-16	830813.94	825607.48	41.400	78.927	0.000	0.000
155	R8 12-16	830813.94	825607.48	43.900	78.922	0.000	0.000
156	R8 12-16	830813.94	825607.48	46.400	78.903	0.000	0.000

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
157	R8 17-21	830813.94	825607.48	48.900	78.875	0.000	0.000
158	R8 17-21	830813.94	825607.48	51.400	78.838	0.000	0.000
159	R8 17-21	830813.94	825607.48	53.900	78.793	0.000	0.000
160	R8 17-21	830813.94	825607.48	56.400	78.742	0.000	0.000
161	R8 17-21	830813.94	825607.48	58.900	78.687	0.000	0.000
162	R8 22-26	830813.94	825607.48	61.400	78.629	0.000	0.000
163	R8 22-26	830813.94	825607.48	63.900	78.569	0.000	0.000
164	R8 22-26	830813.94	825607.48	66.400	78.505	0.000	0.000
165	R8 22-26	830813.94	825607.48	68.900	78.440	0.000	0.000
166	R8 22-26	830813.94	825607.48	71.400	78.375	0.000	0.000
167	R8 27	830813.94	825607.48	73.900	78.316	0.000	0.000
168	R8 27	830813.94	825607.48	76.400	78.256	0.000	0.000
169	R8 27	830813.94	825607.48	78.900	78.197	0.000	0.000
170	R8 27	830813.94	825607.48	81.400	78.138	0.000	0.000
171	R8 27	830813.94	825607.48	83.900	78.082	0.000	0.000
172	Build31 R9 2-5	830740.78	825594.59	11.400	81.590	0.000	74.823
173	Build31 R9 2-5	830740.78	825594.59	13.900	85.305	0.000	74.833
174	Build31 R9 2-5	830740.78	825594.59	16.400	85.721	0.000	74.803
175	Build31 R9 2-5	830740.78	825594.59	18.900	85.397	0.000	74.746
176	Build30 R10 4-8	830735.55	825585.34	16.400	85.814	0.000	85.134
177	Build30 R10 4-8	830735.55	825585.34	18.900	85.482	0.000	84.781
178	Build30 R10 4-8	830735.55	825585.34	21.400	85.132	0.000	84.407
179	Build30 R10 4-8	830735.55	825585.34	23.900	84.780	0.000	84.037
180	Build30 R10 4-8	830735.55	825585.34	26.400	84.438	0.000	83.682
181	R10 9-13	830735.55	825585.34	28.900	84.115	0.000	83.347
182	R10 9-13	830735.55	825585.34	31.400	83.811	0.000	83.031
183	R10 9-13	830735.55	825585.34	33.900	83.525	0.000	82.732
184	R10 9-13	830735.55	825585.34	36.400	83.256	0.000	82.452
185	R10 9-13	830735.55	825585.34	38.900	83.001	0.000	82.185
186	R10 14-18	830735.55	825585.34	41.400	82.759	0.000	81.933
187	R10 14-18	830735.55	825585.34	43.900	82.531	0.000	81.695
188	R10 14-18	830735.55	825585.34	46.400	82.315	0.000	81.469
189	R10 14-18	830735.55	825585.34	48.900	82.111	0.000	81.256
190	R10 14-18	830735.55	825585.34	51.400	81.916	0.000	81.051
191	R10 19-23	830735.55	825585.34	53.900	81.729	0.000	80.856
192	R10 19-23	830735.55	825585.34	56.400	81.551	0.000	80.669
193	R10 19-23	830735.55	825585.34	58.900	81.380	0.000	80.491
194	R10 19-23	830735.55	825585.34	61.400	81.217	0.000	80.320
195	R10 19-23	830735.55	825585.34	63.900	81.060	0.000	80.156
196	Build29 R11 5-9	830717.58	825556.50	18.900	85.166	0.000	84.523
197	Build29 R11 5-9	830717.58	825556.50	21.400	84.782	0.000	84.136
198	Build29 R11 5-9	830717.58	825556.50	23.900	84.420	0.000	83.766
199	Build29 R11 5-9	830717.58	825556.50	26.400	84.077	0.000	83.416
200	Build29 R11 5-9	830717.58	825556.50	28.900	83.756	0.000	83.087
201	R11 10-14	830717.58	825556.50	31.400	83.453	0.000	82.780
202	R11 10-14	830717.58	825556.50	33.900	83.163	0.000	82.486
203	R11 10-14	830717.58	825556.50	36.400	82.890	0.000	82.207
204	R11 10-14	830717.58	825556.50	38.900	82.634	0.000	81.946
205	R11 10-14	830717.58	825556.50	41.400	82.391	0.000	81.697
206	R11 15-19	830717.58	825556.50	43.900	82.164	0.000	81.462
207	R11 15-19	830717.58	825556.50	46.400	81.944	0.000	81.236
208	R11 15-19	830717.58	825556.50	48.900	81.734	0.000	81.020

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
209	R11 15-19	830717.58	825556.50	51.400	81.537	0.000	80.818
210	R11 15-19	830717.58	825556.50	53.900	81.345	0.000	80.621
211	R11 20-24	830717.58	825556.50	56.400	81.166	0.000	80.433
212	R11 20-24	830717.58	825556.50	58.900	80.990	0.000	80.252
213	R11 20-24	830717.58	825556.50	61.400	80.822	0.000	80.079
214	R11 20-24	830717.58	825556.50	63.900	80.661	0.000	79.913
215	R11 20-24	830717.58	825556.50	66.400	80.506	0.000	79.754
216	Build28 R12 2-5	830696.14	825521.80	11.400	85.985	0.000	85.240
217	Build28 R12 2-5	830696.14	825521.80	13.900	85.837	0.000	85.069
218	Build28 R12 2-5	830696.14	825521.80	16.400	85.502	0.000	84.708
219	Build28 R12 2-5	830696.14	825521.80	18.900	85.111	0.000	84.300
220	Build33 R13 3-7	830711.41	825512.13	13.900	56.941	0.000	0.000
221	Build33 R13 3-7	830711.41	825512.13	16.400	59.529	0.000	0.000
222	Build33 R13 3-7	830711.41	825512.13	18.900	61.358	0.000	0.000
223	Build33 R13 3-7	830711.41	825512.13	21.400	61.385	0.000	0.000
224	Build33 R13 3-7	830711.41	825512.13	23.900	62.090	0.000	0.000
225	R13 8-12	830711.41	825512.13	26.400	70.589	0.000	0.000
226	R13 8-12	830711.41	825512.13	28.900	73.570	0.000	0.000
227	R13 8-12	830711.41	825512.13	31.400	75.299	0.000	0.000
228	R13 8-12	830711.41	825512.13	33.900	75.850	0.000	0.000
229	R13 8-12	830711.41	825512.13	36.400	76.112	0.000	0.000
230	R13 13-17	830711.41	825512.13	38.900	76.369	0.000	0.000
231	R13 13-17	830711.41	825512.13	41.400	76.598	0.000	0.000
232	R13 13-17	830711.41	825512.13	43.900	76.854	0.000	0.000
233	R13 13-17	830711.41	825512.13	46.400	76.973	0.000	0.000
234	R13 13-17	830711.41	825512.13	48.900	77.005	0.000	0.000
235	R13 18-22	830711.41	825512.13	51.400	77.038	0.000	0.000
236	R13 18-22	830711.41	825512.13	53.900	77.040	0.000	0.000
237	R13 18-22	830711.41	825512.13	56.400	77.012	0.000	0.000
238	R13 18-22	830711.41	825512.13	58.900	76.983	0.000	0.000
239	R13 18-22	830711.41	825512.13	61.400	76.925	0.000	0.000
240	Build27 R14 2-6	830678.25	825492.36	11.300	86.139	0.000	85.362
241	Build27 R14 2-6	830678.25	825492.36	13.800	86.052	0.000	85.286
242	Build27 R14 2-6	830678.25	825492.36	16.300	85.606	0.000	84.829
243	Build27 R14 2-6	830678.25	825492.36	18.800	85.172	0.000	84.382
244	Build27 R14 2-6	830678.25	825492.36	21.300	84.743	0.000	83.943
245	R14 7-11	830678.25	825492.36	23.800	84.420	0.000	83.519
246	R14 7-11	830678.25	825492.36	26.300	84.043	0.000	83.130
247	R14 7-11	830678.25	825492.36	28.800	83.688	0.000	82.766
248	R14 7-11	830678.25	825492.36	31.300	83.350	0.000	82.415
249	R14 7-11	830678.25	825492.36	33.800	83.039	0.000	82.094
250	R14 12-16	830678.25	825492.36	36.300	82.738	0.000	81.782
251	R14 12-16	830678.25	825492.36	38.800	82.453	0.000	81.487
252	R14 12-16	830678.25	825492.36	41.300	82.191	0.000	81.217
253	R14 12-16	830678.25	825492.36	43.800	81.936	0.000	80.954
254	R14 12-16	830678.25	825492.36	46.300	81.693	0.000	80.703
255	Build34 R15 2-6	830762.97	825486.48	11.400	64.344	0.000	62.698
256	Build34 R15 2-6	830762.97	825486.48	13.900	64.631	0.000	62.793
257	Build34 R15 2-6	830762.97	825486.48	16.400	65.172	0.000	62.988
258	Build34 R15 2-6	830762.97	825486.48	18.900	66.417	0.000	63.722
259	Build34 R15 2-6	830762.97	825486.48	21.400	68.437	0.000	65.138
260	R15 7-11	830762.97	825486.48	23.900	69.376	0.000	66.275

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
261	R15 7-11	830762.97	825486.48	26.400	69.909	0.000	66.866
262	R15 7-11	830762.97	825486.48	28.900	70.354	0.000	67.462
263	R15 7-11	830762.97	825486.48	31.400	70.834	0.000	68.131
264	R15 7-11	830762.97	825486.48	33.900	71.084	0.000	68.423
265	R15 12-16	830762.97	825486.48	36.400	71.148	0.000	68.495
266	R15 12-16	830762.97	825486.48	38.900	71.169	0.000	68.468
267	R15 12-16	830762.97	825486.48	41.400	71.175	0.000	68.392
268	R15 12-16	830762.97	825486.48	43.900	71.136	0.000	68.290
269	R15 12-16	830762.97	825486.48	46.400	71.082	0.000	68.176
270	R15 17-21	830762.97	825486.48	48.900	71.028	0.000	68.056
271	R15 17-21	830762.97	825486.48	51.400	70.964	0.000	67.932
272	R15 17-21	830762.97	825486.48	53.900	70.905	0.000	67.807
273	R15 17-21	830762.97	825486.48	56.400	70.839	0.000	67.683
274	R15 17-21	830762.97	825486.48	58.900	70.788	0.000	67.561
275	R15 22-26	830762.97	825486.48	61.400	70.736	0.000	67.442
276	R15 22-26	830762.97	825486.48	63.900	70.707	0.000	67.324
277	R15 22-26	830762.97	825486.48	66.400	70.648	0.000	67.209
278	R15 22-26	830762.97	825486.48	68.900	70.590	0.000	67.096
279	R15 22-26	830762.97	825486.48	71.400	70.564	0.000	66.986
280	R15 27-28	830762.97	825486.48	73.900	70.590	0.000	66.881
281	R15 27-28	830762.97	825486.48	76.400	70.587	0.000	66.776
282	R15 27-28	830762.97	825486.48	78.900	70.580	0.000	66.676
283	R15 27-28	830762.97	825486.48	81.400	70.579	0.000	66.581
284	R15 27-28	830762.97	825486.48	83.900	70.586	0.000	66.486
285	Build34 R16 2-6	830789.06	825535.82	11.400	66.025	0.000	0.000
286	Build34 R16 2-6	830789.06	825535.82	13.900	66.426	0.000	0.000
287	Build34 R16 2-6	830789.06	825535.82	16.400	66.792	0.000	0.000
288	Build34 R16 2-6	830789.06	825535.82	18.900	67.357	0.000	0.000
289	Build34 R16 2-6	830789.06	825535.82	21.400	68.615	0.000	0.000
290	R16 7-11	830789.06	825535.82	23.900	70.510	0.000	65.530
291	R16 7-11	830789.06	825535.82	26.400	71.161	0.000	65.993
292	R16 7-11	830789.06	825535.82	28.900	71.715	0.000	66.294
293	R16 7-11	830789.06	825535.82	31.400	72.242	0.000	66.697
294	R16 7-11	830789.06	825535.82	33.900	72.676	0.000	67.000
295	R16 12-16	830789.06	825535.82	36.400	72.957	0.000	67.202
296	R16 12-16	830789.06	825535.82	38.900	73.250	0.000	67.419
297	R16 12-16	830789.06	825535.82	41.400	73.512	0.000	67.597
298	R16 12-16	830789.06	825535.82	43.900	73.721	0.000	67.731
299	R16 12-16	830789.06	825535.82	46.400	73.870	0.000	67.815
300	R16 17-21	830789.06	825535.82	48.900	73.976	0.000	67.868
301	R16 17-21	830789.06	825535.82	51.400	74.070	0.000	67.897
302	R16 17-21	830789.06	825535.82	53.900	74.159	0.000	68.035
303	R16 17-21	830789.06	825535.82	56.400	74.208	0.000	68.107
304	R16 17-21	830789.06	825535.82	58.900	74.214	0.000	68.081
305	R16 22-26	830789.06	825535.82	61.400	74.233	0.000	68.061
306	R16 22-26	830789.06	825535.82	63.900	74.218	0.000	68.035
307	R16 22-26	830789.06	825535.82	66.400	74.200	0.000	68.026
308	R16 22-26	830789.06	825535.82	68.900	74.180	0.000	68.020
309	R16 22-26	830789.06	825535.82	71.400	74.156	0.000	68.009
310	R16 27-28	830789.06	825535.82	73.900	74.126	0.000	68.001
311	R16 27-28	830789.06	825535.82	76.400	74.106	0.000	67.990
312	R16 27-28	830789.06	825535.82	78.900	74.090	0.000	67.972

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
313	R16 27-28	830789.06	825535.82	81.400	74.140	0.000	67.944
314	R16 27-28	830789.06	825535.82	83.900	74.183	0.000	67.914
327	Build26 R18 1-5	830653.35	825453.34	8.700	77.859	0.000	75.457
328	Build26 R18 1-5	830653.35	825453.34	11.200	78.351	0.000	75.089
329	Build26 R18 1-5	830653.35	825453.34	13.700	81.200	0.000	74.711
330	Build26 R18 1-5	830653.35	825453.34	16.200	82.544	0.000	74.501
331	Build26 R18 1-5	830653.35	825453.34	18.700	82.360	0.000	74.235
332	Build26 R19 1-5	830661.28	825438.37	8.700	72.686	0.000	70.982
333	Build26 R19 1-5	830661.28	825438.37	11.200	73.928	0.000	72.762
334	Build26 R19 1-5	830661.28	825438.37	13.700	75.615	0.000	74.887
335	Build26 R19 1-5	830661.28	825438.37	16.200	76.631	0.000	76.086
336	Build26 R19 1-5	830661.28	825438.37	18.700	76.792	0.000	76.295
337	Build26 R20 1-5	830679.83	825456.15	8.700	74.934	0.000	72.329
338	Build26 R20 1-5	830679.83	825456.15	11.200	75.047	0.000	72.258
339	Build26 R20 1-5	830679.83	825456.15	13.700	75.528	0.000	72.164
340	Build26 R20 1-5	830679.83	825456.15	16.200	76.394	0.000	72.042
341	Build26 R20 1-5	830679.83	825456.15	18.700	76.283	0.000	71.897
342	Build19 R21 1-5	830740.89	825414.53	11.600	73.089	0.000	72.088
343	Build19 R21 1-5	830740.89	825414.53	14.100	73.118	0.000	72.115
344	Build19 R21 1-5	830740.89	825414.53	16.600	73.104	0.000	72.098
345	Build19 R21 1-5	830740.89	825414.53	19.100	73.053	0.000	72.044
346	Build19 R21 1-5	830740.89	825414.53	21.600	73.060	0.000	72.053
347	R21 6-10	830740.89	825414.53	24.100	73.046	0.000	72.045
348	R21 6-10	830740.89	825414.53	26.600	72.946	0.000	71.907
349	R21 6-10	830740.89	825414.53	29.100	72.873	0.000	71.800
350	R21 6-10	830740.89	825414.53	31.600	72.747	0.000	71.654
351	R21 6-10	830740.89	825414.53	34.100	72.615	0.000	71.512
352	R21 11-15	830740.89	825414.53	36.600	72.481	0.000	71.376
353	R21 11-15	830740.89	825414.53	39.100	72.353	0.000	71.245
354	R21 11-15	830740.89	825414.53	41.600	72.231	0.000	71.122
355	R21 11-15	830740.89	825414.53	44.100	72.137	0.000	71.030
356	R21 11-15	830740.89	825414.53	46.600	72.036	0.000	70.930
357	R21 16-20	830740.89	825414.53	49.100	71.919	0.000	70.847
358	R21 16-20	830740.89	825414.53	51.600	71.833	0.000	70.764
359	R21 16-20	830740.89	825414.53	54.100	71.763	0.000	70.699
360	R21 16-20	830740.89	825414.53	56.600	71.720	0.000	70.665
361	R21 16-20	830740.89	825414.53	59.100	71.681	0.000	70.632
362	R21 21	830740.89	825414.53	61.600	71.623	0.000	70.591

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
389	Build16 R23 1-5	830659.80	825322.91	39.000	59.697	0.000	0.000
390	Build16 R23 1-5	830659.80	825322.91	41.500	61.092	0.000	0.000
391	Build16 R23 1-5	830659.80	825322.91	44.000	62.903	0.000	0.000
392	Build16 R23 1-5	830659.80	825322.91	46.500	64.751	0.000	0.000
393	Build16 R23 1-5	830659.80	825322.91	49.000	66.856	0.000	0.000
394	R23 6-10	830659.80	825322.91	51.500	69.208	0.000	68.451
395	R23 6-10	830659.80	825322.91	54.000	70.721	0.000	70.032
396	R23 6-10	830659.80	825322.91	56.500	71.835	0.000	71.168
397	R23 6-10	830659.80	825322.91	59.000	72.495	0.000	71.790
398	R23 6-10	830659.80	825322.91	61.500	72.923	0.000	72.134
399	R23 11-15	830659.80	825322.91	64.000	73.845	0.000	72.749
400	R23 11-15	830659.80	825322.91	66.500	74.050	0.000	72.958
401	R23 11-15	830659.80	825322.91	69.000	74.197	0.000	73.106
402	R23 11-15	830659.80	825322.91	71.500	74.313	0.000	73.222
403	R23 11-15	830659.80	825322.91	74.000	74.410	0.000	73.311
404	R23 16-20	830659.80	825322.91	76.500	74.543	0.000	73.403
405	R23 16-20	830659.80	825322.91	79.000	74.632	0.000	73.486
406	R23 16-20	830659.80	825322.91	81.500	74.711	0.000	73.550
407	R23 16-20	830659.80	825322.91	84.000	74.778	0.000	73.600
408	R23 16-20	830659.80	825322.91	86.500	74.821	0.000	73.628
409	R23 21-25	830659.80	825322.91	89.000	74.923	0.000	73.641
410	R23 21-25	830659.80	825322.91	91.500	74.930	0.000	73.635
411	R23 21-25	830659.80	825322.91	94.000	74.922	0.000	73.614
412	R23 21-25	830659.80	825322.91	96.500	74.906	0.000	73.583
413	R23 21-25	830659.80	825322.91	99.000	74.884	0.000	73.544
414	R23 26-30	830659.80	825322.91	101.500	74.863	0.000	73.500
415	R23 26-30	830659.80	825322.91	104.000	74.846	0.000	73.452
416	R23 26-30	830659.80	825322.91	106.500	74.818	0.000	73.400

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
417	R23 26-30	830659.80	825322.91	109.000	74.803	0.000	73.345
418	R23 26-30	830659.80	825322.91	111.500	74.784	0.000	73.288
419	R23 31-35	830659.80	825322.91	114.000	74.758	0.000	73.231
420	R23 31-35	830659.80	825322.91	116.500	74.727	0.000	73.172
421	R23 31-35	830659.80	825322.91	119.000	74.691	0.000	73.113
422	R23 31-35	830659.80	825322.91	121.500	74.654	0.000	73.055
423	R23 31-35	830659.80	825322.91	124.000	74.615	0.000	72.996
424	R23 36-38	830659.80	825322.91	126.500	74.575	0.000	72.937
425	R23 36-38	830659.80	825322.91	129.000	74.535	0.000	72.878
426	R23 36-38	830659.80	825322.91	131.500	74.492	0.000	72.820
427	Build15 R24 1-5	830612.41	825285.18	39.000	62.895	0.000	0.000
428	Build15 R24 1-5	830612.41	825285.18	41.500	64.866	0.000	0.000
429	Build15 R24 1-5	830612.41	825285.18	44.000	67.019	0.000	0.000
430	Build15 R24 1-5	830612.41	825285.18	46.500	69.772	0.000	0.000
431	Build15 R24 1-5	830612.41	825285.18	49.000	72.382	0.000	0.000
432	R24 6-10	830612.41	825285.18	51.500	74.516	0.000	73.257
433	R24 6-10	830612.41	825285.18	54.000	75.240	0.000	74.016
434	R24 6-10	830612.41	825285.18	56.500	75.700	0.000	74.473
435	R24 6-10	830612.41	825285.18	59.000	75.976	0.000	74.714
436	R24 6-10	830612.41	825285.18	61.500	76.142	0.000	74.807
437	R24 11-15	830612.41	825285.18	64.000	76.486	0.000	75.222
438	R24 11-15	830612.41	825285.18	66.500	76.525	0.000	75.261
439	R24 11-15	830612.41	825285.18	69.000	76.523	0.000	75.258
440	R24 11-15	830612.41	825285.18	71.500	76.495	0.000	75.226
441	R24 11-15	830612.41	825285.18	74.000	76.456	0.000	75.181
442	R24 16-20	830612.41	825285.18	76.500	76.409	0.000	75.130
443	R24 16-20	830612.41	825285.18	79.000	76.361	0.000	75.074
444	R24 16-20	830612.41	825285.18	81.500	76.312	0.000	75.013
445	R24 16-20	830612.41	825285.18	84.000	76.264	0.000	74.947
446	R24 16-20	830612.41	825285.18	86.500	76.206	0.000	74.875
447	R24 21-25	830612.41	825285.18	89.000	76.153	0.000	74.800
448	R24 21-25	830612.41	825285.18	91.500	76.096	0.000	74.725
449	R24 21-25	830612.41	825285.18	94.000	76.041	0.000	74.649
450	R24 21-25	830612.41	825285.18	96.500	75.999	0.000	74.572
451	R24 21-25	830612.41	825285.18	99.000	75.949	0.000	74.497
452	R24 26-30	830612.41	825285.18	101.500	75.923	0.000	74.421
453	R24 26-30	830612.41	825285.18	104.000	75.886	0.000	74.346
454	R24 26-30	830612.41	825285.18	106.500	75.843	0.000	74.270
455	R24 26-30	830612.41	825285.18	109.000	75.792	0.000	74.196
456	R24 26-30	830612.41	825285.18	111.500	75.738	0.000	74.122
457	R24 31-35	830612.41	825285.18	114.000	75.681	0.000	74.048
458	R24 31-35	830612.41	825285.18	116.500	75.622	0.000	73.976
459	R24 31-35	830612.41	825285.18	119.000	75.563	0.000	73.904
460	R24 31-35	830612.41	825285.18	121.500	75.503	0.000	73.832
461	R24 31-35	830612.41	825285.18	124.000	75.442	0.000	73.760
462	R24 36-38	830612.41	825285.18	126.500	75.382	0.000	73.689
463	R24 36-38	830612.41	825285.18	129.000	75.322	0.000	73.618
464	R24 36-38	830612.41	825285.18	131.500	75.263	0.000	73.548
465	Build15 R25 1-5	830606.91	825248.94	39.000	66.774	0.000	0.000
466	Build15 R25 1-5	830606.91	825248.94	41.500	70.206	0.000	0.000
467	Build15 R25 1-5	830606.91	825248.94	44.000	72.703	0.000	0.000
468	Build15 R25 1-5	830606.91	825248.94	46.500	73.991	0.000	0.000

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
469	Build15 R25 1-5	830606.91	825248.94	49.000	74.542	0.000	0.000
470	R25 6-10	830606.91	825248.94	51.500	75.112	0.000	71.744
471	R25 6-10	830606.91	825248.94	54.000	75.318	0.000	72.180
472	R25 6-10	830606.91	825248.94	56.500	75.542	0.000	72.627
473	R25 6-10	830606.91	825248.94	59.000	75.823	0.000	73.153
474	R25 6-10	830606.91	825248.94	61.500	76.007	0.000	73.497
475	R25 11-15	830606.91	825248.94	64.000	76.438	0.000	73.722
476	R25 11-15	830606.91	825248.94	66.500	76.487	0.000	73.821
477	R25 11-15	830606.91	825248.94	69.000	76.480	0.000	73.841
478	R25 11-15	830606.91	825248.94	71.500	76.446	0.000	73.823
479	R25 11-15	830606.91	825248.94	74.000	76.396	0.000	73.783
480	R25 16-20	830606.91	825248.94	76.500	76.348	0.000	73.731
481	R25 16-20	830606.91	825248.94	79.000	76.285	0.000	73.672
482	R25 16-20	830606.91	825248.94	81.500	76.220	0.000	73.608
483	R25 16-20	830606.91	825248.94	84.000	76.158	0.000	73.541
484	R25 16-20	830606.91	825248.94	86.500	76.091	0.000	73.471
485	R25 21-25	830606.91	825248.94	89.000	76.037	0.000	73.398
486	R25 21-25	830606.91	825248.94	91.500	75.993	0.000	73.324
487	R25 21-25	830606.91	825248.94	94.000	75.931	0.000	73.250
488	R25 21-25	830606.91	825248.94	96.500	75.883	0.000	73.177
489	R25 21-25	830606.91	825248.94	99.000	75.833	0.000	73.103
490	R25 26-30	830606.91	825248.94	101.500	75.777	0.000	73.030
491	R25 26-30	830606.91	825248.94	104.000	75.719	0.000	72.958
492	R25 26-30	830606.91	825248.94	106.500	75.661	0.000	72.887
493	R25 26-30	830606.91	825248.94	109.000	75.604	0.000	72.817
494	R25 26-30	830606.91	825248.94	111.500	75.554	0.000	72.748
495	R25 31-35	830606.91	825248.94	114.000	75.502	0.000	72.679
496	R25 31-35	830606.91	825248.94	116.500	75.454	0.000	72.611
497	R25 31-35	830606.91	825248.94	119.000	75.418	0.000	72.544
498	R25 31-35	830606.91	825248.94	121.500	75.380	0.000	72.478
499	R25 31-35	830606.91	825248.94	124.000	75.353	0.000	72.413
500	R25 36-38	830606.91	825248.94	126.500	75.329	0.000	72.348
501	R25 36-38	830606.91	825248.94	129.000	75.296	0.000	72.284
502	R25 36-38	830606.91	825248.94	131.500	75.261	0.000	72.220
503	Build14 R26 1-5	830658.31	825185.35	42.300	72.255	0.000	71.289
504	Build14 R26 1-5	830658.31	825185.35	44.800	72.845	0.000	71.897
505	Build14 R26 1-5	830658.31	825185.35	47.300	73.130	0.000	72.174
506	Build14 R26 1-5	830658.31	825185.35	49.800	73.241	0.000	72.264
507	Build14 R26 1-5	830658.31	825185.35	52.300	73.340	0.000	72.340
508	R26 6-10	830658.31	825185.35	54.800	73.580	0.000	72.537
509	R26 6-10	830658.31	825185.35	57.300	73.697	0.000	72.623
510	R26 6-10	830658.31	825185.35	59.800	73.839	0.000	72.648
511	R26 6-10	830658.31	825185.35	62.300	74.029	0.000	72.713
512	R26 6-10	830658.31	825185.35	64.800	74.154	0.000	72.740
513	R26 11-15	830658.31	825185.35	67.300	74.314	0.000	73.496
514	R26 11-15	830658.31	825185.35	69.800	74.383	0.000	73.567
515	R26 11-15	830658.31	825185.35	72.300	74.417	0.000	73.600
516	R26 11-15	830658.31	825185.35	74.800	74.400	0.000	73.576
517	R26 11-15	830658.31	825185.35	77.300	74.375	0.000	73.545
518	R26 16-20	830658.31	825185.35	79.800	74.417	0.000	73.550
519	R26 16-20	830658.31	825185.35	82.300	74.394	0.000	73.523
520	R26 16-20	830658.31	825185.35	84.800	74.375	0.000	73.497

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
521	R26 16-20	830658.31	825185.35	87.300	74.384	0.000	73.491
522	R26 16-20	830658.31	825185.35	89.800	74.363	0.000	73.466
523	R26 21-25	830658.31	825185.35	92.300	74.352	0.000	73.449
524	R26 21-25	830658.31	825185.35	94.800	74.364	0.000	73.447
525	R26 21-25	830658.31	825185.35	97.300	74.359	0.000	73.432
526	R26 21-25	830658.31	825185.35	99.800	74.360	0.000	73.418
527	R26 21-25	830658.31	825185.35	102.300	74.350	0.000	73.400
528	R26 26-30	830658.31	825185.35	104.800	74.368	0.000	73.378
529	R26 26-30	830658.31	825185.35	107.300	74.356	0.000	73.353
530	R26 26-30	830658.31	825185.35	109.800	74.356	0.000	73.337
531	R26 26-30	830658.31	825185.35	112.300	74.346	0.000	73.309
532	R26 26-30	830658.31	825185.35	114.800	74.351	0.000	73.280
533	R26 31-35	830658.31	825185.35	117.300	74.374	0.000	73.249
534	R26 31-35	830658.31	825185.35	119.800	74.379	0.000	73.214
535	R26 31-35	830658.31	825185.35	122.300	74.384	0.000	73.177
536	R26 31-35	830658.31	825185.35	124.800	74.398	0.000	73.139
537	R26 31-35	830658.31	825185.35	127.300	74.398	0.000	73.099
538	R26 36-38	830658.31	825185.35	129.800	74.399	0.000	73.058
539	R26 36-38	830658.31	825185.35	132.300	74.386	0.000	73.017
540	R26 36-38	830658.31	825185.35	134.800	74.368	0.000	72.975
541	THA R27	830655.00	825053.30	77.900	61.917	0.000	0.000
542	THA R27	830655.00	825053.30	80.400	62.160	0.000	0.000
543	14a 2-6	830684.92	825472.00	11.300	74.890	0.000	74.169
544	14a 2-6	830684.92	825472.00	14.100	76.330	0.000	75.819
545	14a 2-6	830684.92	825472.00	16.900	76.431	0.000	75.933
546	14a 2-6	830684.92	825472.00	19.700	76.450	0.000	75.957
547	14a 2-6	830684.92	825472.00	22.500	76.907	0.000	76.360
548	14a 7-11	830684.85	825472.04	23.800	77.347	0.000	76.577
549	14a 7-11	830684.85	825472.04	26.600	77.548	0.000	76.773
550	14a 7-11	830684.85	825472.04	29.400	77.541	0.000	76.763
551	14a 7-11	830684.85	825472.04	32.200	77.446	0.000	76.665
552	14a 7-11	830684.85	825472.04	35.000	77.285	0.000	76.498
553	14a 12-16	830684.85	825472.04	36.300	77.197	0.000	76.416
554	14a 12-16	830684.85	825472.04	39.100	77.022	0.000	76.234
555	14a 12-16	830684.85	825472.04	41.900	76.849	0.000	76.052
556	14a 12-16	830684.85	825472.04	44.700	76.687	0.000	75.880
557	14a 12-16	830684.85	825472.04	47.500	76.527	0.000	75.713
558	r21 1-5/F	830706.24	825419.37	11.600	72.257	0.000	71.034
559	r21 1-5/F	830706.24	825419.37	14.400	72.647	0.000	71.452
560	r21 1-5/F	830706.24	825419.37	17.200	72.853	0.000	71.671
561	r21 1-5/F	830706.24	825419.37	20.000	72.894	0.000	71.718
562	r21 1-5/F	830706.24	825419.37	22.800	72.853	0.000	71.678
563	6-10/F	830706.17	825419.38	24.100	72.968	0.000	71.783
564	6-10/F	830706.17	825419.38	26.900	73.025	0.000	71.847
565	6-10/F	830706.17	825419.38	29.700	73.104	0.000	71.935
566	6-10/F	830706.17	825419.38	32.500	73.204	0.000	72.043
567	6-10/F	830706.17	825419.38	35.300	73.291	0.000	72.137
568	11-15/F	830706.17	825419.38	36.600	73.183	0.000	72.165
569	11-15/F	830706.17	825419.38	39.400	73.256	0.000	72.258
570	11-15/F	830706.17	825419.38	42.200	73.287	0.000	72.304
571	11-15/F	830706.17	825419.38	45.000	73.369	0.000	72.405
572	11-15/F	830706.17	825419.38	47.800	73.398	0.000	72.448

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
573	16-20/F	830706.17	825419.38	49.100	73.366	0.000	72.454
574	16-20/F	830706.17	825419.38	51.900	73.368	0.000	72.461
575	16-20/F	830706.17	825419.38	54.700	73.341	0.000	72.435
576	16-20/F	830706.17	825419.38	57.500	73.280	0.000	72.371
577	16-20/F	830706.17	825419.38	60.300	73.210	0.000	72.294
578	21/F	830706.17	825419.38	61.600	73.206	0.000	72.271
579	R14B 2-6/F	830704.97	825468.54	11.300	72.225	0.000	69.744
580	R14B 2-6/F	830704.97	825468.54	14.100	72.252	0.000	69.760
581	R14B 2-6/F	830704.97	825468.54	16.900	72.215	0.000	69.725
582	R14B 2-6/F	830704.97	825468.54	19.700	72.127	0.000	69.649
583	R14B 2-6/F	830704.97	825468.54	22.500	72.038	0.000	69.585
584	R14B 7-11/F	830704.97	825468.54	23.800	71.952	0.000	69.494
585	R14B 7-11/F	830704.97	825468.54	26.600	71.744	0.000	69.292
586	R14B 7-11/F	830704.97	825468.54	29.400	71.557	0.000	69.128
587	R14B 7-11/F	830704.97	825468.54	32.200	71.375	0.000	68.952
588	R14B 7-11/F	830704.97	825468.54	35.000	71.195	0.000	68.771
589	R14B 12-16/F	830704.97	825468.54	36.300	71.070	0.000	68.663
590	R14B 12-16/F	830704.97	825468.54	39.100	70.828	0.000	68.437
591	R14B 12-16/F	830704.97	825468.54	41.900	70.635	0.000	68.265
592	R14B 12-16/F	830704.97	825468.54	44.700	70.453	0.000	68.090
593	R14B 12-16/F	830704.97	825468.54	47.500	70.247	0.000	67.873
594	R19a	830677.30	825443.62	8.700	71.183	0.000	65.444
595	R19a	830677.30	825443.62	11.200	71.966	0.000	65.725
596	R19a	830677.30	825443.62	13.700	72.680	0.000	66.389
597	R19a	830677.30	825443.62	16.200	73.184	0.000	67.615
598	R19a	830677.30	825443.62	18.700	73.185	0.000	68.582

No.	_Receiver_name_	____X____	____Y____	____H____	1h_level_	18h_level	Level(s)_
1	2018 FSD Requirement						
2	OPT5; KD PB RT5 SPS ASP1;						
3	S1 S2 S3 S4 S5 S6S S7 S9 S14 S15 S18 S19 S23 S27 S28						
4	S29 S30 S31 S22 S21 S17 S62						
5	S63 S10 S16 S11 S12 S26 S13						
6	Project : OPT5			Date : 26.03.98			
7	Run file : 014			Time : 11:16			
8	\RL Standard : "16.BImSchV"						
9	\F Results in dB(A)						
10	Build36 R17 5-9	830847.12	825428.81	27.700	69.854	0.000	69.708
11	Build36 R17 5-9	830847.12	825428.81	30.200	69.683	0.000	69.533
12	Build36 R17 5-9	830847.12	825428.81	32.700	69.524	0.000	69.370
13	Build36 R17 5-9	830847.12	825428.81	35.200	69.381	0.000	69.224
14	Build36 R17 5-9	830847.12	825428.81	37.700	69.255	0.000	69.095
15	R17 10-14	830847.12	825428.81	40.200	69.147	0.000	68.977
16	R17 10-14	830847.12	825428.81	42.700	69.048	0.000	68.874
17	R17 10-14	830847.12	825428.81	45.200	68.964	0.000	68.786
18	R17 10-14	830847.12	825428.81	47.700	68.886	0.000	68.704
19	R17 10-14	830847.12	825428.81	50.200	68.817	0.000	68.633
20	R17 15-16	830847.12	825428.81	52.700	68.754	0.000	68.570
21	R17 15-16	830847.12	825428.81	55.200	68.701	0.000	68.513
22	Build18 R22 1-5	830849.70	825343.99	39.000	68.069	0.000	67.691
23	Build18 R22 1-5	830849.70	825343.99	41.500	68.034	0.000	67.654
24	Build18 R22 1-5	830849.70	825343.99	44.000	68.048	0.000	67.665
25	Build18 R22 1-5	830849.70	825343.99	46.500	68.012	0.000	67.625
26	Build18 R22 1-5	830849.70	825343.99	49.000	67.974	0.000	67.581
27	R22 6-10	830849.70	825343.99	51.500	67.975	0.000	67.583
28	R22 6-10	830849.70	825343.99	54.000	67.934	0.000	67.534
29	R22 6-10	830849.70	825343.99	56.500	67.888	0.000	67.486
30	R22 6-10	830849.70	825343.99	59.000	67.841	0.000	67.436
31	R22 6-10	830849.70	825343.99	61.500	67.836	0.000	67.431
32	R22 11-15	830849.70	825343.99	64.000	67.871	0.000	67.379
33	R22 11-15	830849.70	825343.99	66.500	67.861	0.000	67.329
34	R22 11-15	830849.70	825343.99	69.000	67.876	0.000	67.281
35	R22 11-15	830849.70	825343.99	71.500	67.941	0.000	67.233
36	R22 11-15	830849.70	825343.99	74.000	68.116	0.000	67.233
37	R22 16-20	830849.70	825343.99	76.500	68.380	0.000	67.192
38	R22 16-20	830849.70	825343.99	79.000	68.630	0.000	67.157
39	R22 16-20	830849.70	825343.99	81.500	68.823	0.000	67.124
40	R22 16-20	830849.70	825343.99	84.000	68.930	0.000	67.094
41	R22 16-20	830849.70	825343.99	86.500	69.006	0.000	67.103
42	R22 21-25	830849.70	825343.99	89.000	69.059	0.000	67.073
43	R22 21-25	830849.70	825343.99	91.500	69.059	0.000	67.045
44	R22 21-25	830849.70	825343.99	94.000	69.048	0.000	67.015
45	R22 21-25	830849.70	825343.99	96.500	69.033	0.000	66.986
46	R22 21-25	830849.70	825343.99	99.000	69.043	0.000	66.998
47	R22 26	830849.70	825343.99	101.500	69.033	0.000	66.980
48	R28	830920.31	825396.53	24.900	70.102	0.000	0.000
49	R28	830920.31	825396.53	27.400	69.745	0.000	0.000
50	R28	830920.31	825396.53	29.900	69.170	0.000	0.000
51	R28	830920.31	825396.53	32.400	68.697	0.000	0.000
52	R28	830920.31	825396.53	34.900	68.307	0.000	0.000

No.	Receiver_name	X	Y	H	1h_level	18h_level	Level(s)
53	R17a 5-9	830823.99	825442.58	27.700	73.380	0.000	73.140
54	R17a 5-9	830823.99	825442.58	30.200	73.204	0.000	72.961
55	R17a 5-9	830823.99	825442.58	32.700	73.001	0.000	72.753
56	R17a 5-9	830823.99	825442.58	35.200	72.798	0.000	72.546
57	R17a 5-9	830823.99	825442.58	37.700	72.601	0.000	72.344
58	R17a 10-14	830823.96	825442.59	40.200	72.405	0.000	72.154
59	R17a 10-14	830823.96	825442.59	42.700	72.224	0.000	71.968
60	R17a 10-14	830823.96	825442.59	45.200	72.050	0.000	71.790
61	R17a 10-14	830823.96	825442.59	47.700	71.887	0.000	71.621
62	R17a 10-14	830823.96	825442.59	50.200	71.733	0.000	71.463
63	R17a 15-16	830823.96	825442.59	52.700	71.582	0.000	71.311
64	R17a 15-16	830823.96	825442.59	55.200	71.442	0.000	71.166

Appendix C

Indirect Mitigation
Eligibility Test Results

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevailing traffic level	Conditon 1	Condition 2	Condition 3	Indirect Mitigation Required (Yes / No)
R1	5	19.2	82.8	82.4	65.6	82.7	80.5	Yes	Yes	No	No
R1	6	21.7	82.6	82.2	65.6	82.4	80.3	Yes	Yes	No	No
R1	7	24.2	82.4	81.9	65.6	82.2	80.0	Yes	Yes	No	No
R1	8	26.7	82.3	81.8	65.6	82.0	79.9	Yes	Yes	No	No
R1	9	29.2	82.2	81.6	65.6	81.9	79.8	Yes	Yes	No	No
R1	10	31.7	82.1	81.4	65.6	81.7	79.6	Yes	Yes	No	No
R1	11	34.2	81.9	81.2	65.6	81.5	79.4	Yes	Yes	No	No
R1	12	36.7	81.7	81.0	65.6	81.3	79.2	Yes	Yes	No	No
R1	13	39.2	81.5	80.7	65.6	81.1	79.0	Yes	Yes	No	No
R1	14	41.7	81.3	80.5	65.6	80.9	78.8	Yes	Yes	No	No
R1	15	44.2	81.2	80.3	65.5	80.7	78.6	Yes	Yes	No	No
R1	16	46.7	81.0	80.1	65.5	80.5	78.4	Yes	Yes	No	No
R1	17	49.2	80.9	79.9	65.5	80.3	78.2	Yes	Yes	No	No
R1	18	51.7	80.7	79.8	65.5	80.2	78.1	Yes	Yes	No	No
R1	19	54.2	80.6	79.6	65.5	80.0	77.9	Yes	Yes	No	No
R2	5	18.6	86.4	73.0	73.3	76.9	82.9	Yes	No	Yes	No
R2	6	21.1	86.0	73.0	73.4	76.9	82.4	Yes	No	Yes	No
R2	7	23.6	85.6	73.1	73.6	77.0	81.9	Yes	No	Yes	No
R2	8	26.1	85.2	73.2	74.0	77.1	81.5	Yes	No	Yes	No
R2	9	28.6	84.8	73.3	74.9	77.6	81.1	Yes	No	Yes	No
R2	10	31.1	84.5	73.5	76.6	78.6	80.8	Yes	No	Yes	No
R2	11	33.6	84.2	73.5	78.0	79.5	80.5	Yes	No	Yes	No
R2	12	36.1	83.9	73.5	78.4	79.8	80.2	Yes	No	Yes	No
R2	13	38.6	83.6	73.4	78.8	80.1	79.9	Yes	No	Yes	No
R2	14	41.1	83.3	73.4	78.6	79.9	79.6	Yes	No	Yes	No
R2	15	43.6	83.1	73.3	79.0	80.1	79.4	Yes	No	Yes	No
R2	16	46.1	82.8	73.2	78.7	79.9	79.1	Yes	No	Yes	No
R2	17	48.6	82.6	73.1	78.5	79.7	78.9	Yes	No	Yes	No
R2	18	51.1	82.4	73.0	78.3	79.6	78.7	Yes	No	Yes	No
R3	6	22.2	84.1	67.6	73.7	75.0	81.7	Yes	No	Yes	No
R3	7	24.7	84.0	68.1	74.9	75.9	81.5	Yes	No	Yes	No
R3	8	27.2	83.9	68.3	75.6	76.5	81.3	Yes	No	Yes	No
R3	9	29.7	83.6	68.4	75.8	76.7	81.0	Yes	No	Yes	No
R3	10	32.2	83.4	68.5	76.1	77.0	80.7	Yes	No	Yes	No
R3	11	34.7	83.1	68.7	78.5	79.0	80.4	Yes	No	Yes	No
R3	12	37.2	82.9	68.8	78.7	79.2	80.1	Yes	No	Yes	No
R3	13	39.7	82.6	69.0	78.7	79.2	79.9	Yes	No	Yes	No
R3	14	42.2	82.4	69.1	78.6	79.1	79.7	Yes	No	Yes	No
R3	15	44.7	82.2	69.2	78.4	79.0	79.4	Yes	No	Yes	No
R3	16	47.2	82.0	69.4	78.4	79.0	79.2	Yes	No	Yes	No
R3	17	49.7	81.8	69.5	78.2	78.8	79.0	Yes	No	Yes	No
R3	18	52.2	81.6	69.5	78.1	78.7	78.8	Yes	No	Yes	No
R3	19	54.7	81.4	69.5	77.9	78.6	78.6	Yes	No	Yes	No
R3	20	57.2	81.3	69.5	77.7	78.4	78.5	Yes	No	Yes	No
R3	21	59.7	81.1	69.5	77.6	78.3	78.3	Yes	No	Yes	No
R3	22	62.2	80.9	69.5	77.4	78.1	78.1	Yes	No	Yes	No
R3	23	64.7	80.8	69.5	77.3	78.0	78.0	Yes	No	Yes	No
R3	24	67.2	80.6	69.5	77.1	77.9	77.8	Yes	No	Yes	No
R3	25	69.7	80.5	69.6	77.0	77.8	77.7	Yes	No	Yes	No
R3	26	72.2	80.4	69.7	76.8	77.7	77.5	Yes	No	Yes	No
R3	27	74.7	80.2	69.9	76.7	77.6	77.4	Yes	No	Yes	No
R3	28	77.2	80.1	70.1	76.6	77.5	77.3	Yes	No	Yes	No
R3	29	79.7	80.0	70.3	76.4	77.4	77.2	Yes	No	Yes	No
R4	5	19	75.1	74.0	68.0	75.0	76.2	Yes	No	No	No
R4	6	21.5	74.9	73.7	68.0	74.7	75.8	Yes	No	Yes	No
R4	7	24	74.6	73.3	68.1	74.5	75.4	Yes	No	Yes	No
R4	8	26.5	74.6	73.0	68.4	74.3	75.1	Yes	No	Yes	No
R4	9	29	74.7	72.8	69.1	74.4	74.9	Yes	No	Yes	No
R4	10	31.5	74.7	72.6	69.4	74.3	74.7	Yes	No	Yes	No
R4	11	34	74.7	72.5	69.8	74.4	74.6	Yes	No	Yes	No
R4	12	36.5	74.7	72.4	69.9	74.3	74.5	Yes	No	Yes	No
R4	13	39	74.7	72.2	70.1	74.3	74.4	Yes	No	Yes	No
R4	14	41.5	74.7	72.1	70.1	74.2	74.3	Yes	No	Yes	No
R4	15	44	74.7	72.0	70.1	74.2	74.1	Yes	No	Yes	No
R4	16	46.5	74.7	71.8	70.2	74.1	74.0	Yes	No	Yes	No
R4	17	49	74.8	71.7	70.2	74.0	73.9	Yes	No	Yes	No
R4	18	51.5	74.8	71.6	70.3	74.0	73.9	Yes	No	Yes	No
R4	19	54	74.9	71.5	70.4	74.0	73.8	Yes	No	Yes	No

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevalling traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R4	20	56.5	74.9	71.4	70.4	73.9	73.7	Yes	No	Yes	No
R4	21	59	75.0	71.3	70.6	73.9	73.7	Yes	No	Yes	No
R4	22	61.5	75.1	71.2	70.7	73.9	73.7	Yes	No	Yes	No
R4	23	64	75.1	71.1	70.7	73.9	73.7	Yes	No	Yes	No
R4	24	66.5	75.2	71.0	70.7	73.9	73.6	Yes	No	Yes	No
R4	25	69	75.1	70.9	70.7	73.8	73.5	Yes	No	Yes	No
R4	26	71.5	75.1	70.8	70.8	73.8	73.5	Yes	No	Yes	No
R4	27	74	75.1	70.8	70.8	73.8	73.5	Yes	No	Yes	No
R4	28	76.5	75.2	70.8	70.8	73.8	73.5	Yes	No	Yes	No
R4	29	79	75.2	70.8	70.8	73.8	73.5	Yes	No	Yes	No
R5	5	18.5	84.3	74.6	83.1	83.7	82.0	Yes	Yes	Yes	Yes
R5	6	21	84.2	74.2	83.0	83.5	81.8	Yes	Yes	Yes	Yes
R5	7	23.5	83.9	73.9	82.8	83.3	81.5	Yes	Yes	Yes	Yes
R5	8	26	83.8	73.6	82.7	83.2	81.2	Yes	Yes	Yes	Yes
R5	9	28.5	83.6	73.5	82.5	83.0	80.9	Yes	Yes	Yes	Yes
R5	10	31	83.3	73.3	82.2	82.8	80.6	Yes	Yes	Yes	Yes
R5	11	33.5	83.1	73.0	82.0	82.5	80.4	Yes	Yes	Yes	Yes
R5	12	36	82.9	72.8	81.8	82.3	80.1	Yes	Yes	Yes	Yes
R5	13	38.5	82.7	72.6	81.6	82.1	79.8	Yes	Yes	Yes	Yes
R5	14	41	82.5	72.3	81.5	82.0	79.6	Yes	Yes	Yes	Yes
R5	15	43.5	82.2	72.1	81.3	81.8	79.3	Yes	Yes	Yes	Yes
R5	16	46	82.0	72.0	81.1	81.6	79.1	Yes	Yes	Yes	Yes
R5	17	48.5	81.8	71.8	80.9	81.4	78.9	Yes	Yes	Yes	Yes
R5	18	51	81.6	71.6	80.7	81.2	78.6	Yes	Yes	Yes	Yes
R5	19	53.5	81.5	71.5	80.5	81.0	78.4	Yes	Yes	Yes	Yes
R5	20	56	81.3	71.4	80.3	80.8	78.2	Yes	Yes	Yes	Yes
R5	21	58.5	81.1	71.3	80.1	80.7	78.1	Yes	Yes	Yes	Yes
R5	22	61	81.0	71.2	80.0	80.5	77.9	Yes	Yes	Yes	Yes
R5	23	63.5	80.8	71.1	79.8	80.4	77.7	Yes	Yes	Yes	Yes
R5	24	66	80.6	71.0	79.6	80.2	77.6	Yes	Yes	Yes	Yes
R5	25	68.5	80.5	70.9	79.5	80.1	77.4	Yes	Yes	Yes	Yes
R5	26	71	80.4	70.9	79.3	79.9	77.3	Yes	Yes	Yes	Yes
R5	27	73.5	80.2	70.8	79.2	79.8	77.1	Yes	Yes	Yes	Yes
R5	28	76	80.1	70.7	79.0	79.6	77.0	Yes	Yes	Yes	Yes
R5	29	78.5	80.0	70.6	78.9	79.5	76.8	Yes	Yes	Yes	Yes
R6	5	28.5	84.4	74.1	83.5	84.0	81.4	Yes	Yes	Yes	Yes
R6	6	31	84.2	73.7	83.4	83.8	81.2	Yes	Yes	Yes	Yes
R6	7	33.5	84.0	73.3	83.2	83.6	81.0	Yes	Yes	Yes	Yes
R6	8	36	83.8	72.9	83.0	83.4	80.7	Yes	Yes	Yes	Yes
R6	9	38.5	83.6	72.6	82.8	83.2	80.4	Yes	Yes	Yes	Yes
R6	10	41	83.4	72.3	82.6	83.0	80.1	Yes	Yes	Yes	Yes
R6	11	43.5	83.1	72.0	82.4	82.8	79.8	Yes	Yes	Yes	Yes
R6	12	46	82.9	71.7	82.2	82.6	79.6	Yes	Yes	Yes	Yes
R6	13	48.5	82.7	71.4	82.0	82.3	79.3	Yes	Yes	Yes	Yes
R6	14	51	82.4	71.2	81.8	82.1	79.0	Yes	Yes	Yes	Yes
R6	15	53.5	82.2	70.9	81.6	81.9	78.8	Yes	Yes	Yes	Yes
R6	16	56	82.0	70.7	81.4	81.7	78.5	Yes	Yes	Yes	Yes
R6	17	58.5	81.8	70.5	81.2	81.5	78.3	Yes	Yes	Yes	Yes
R6	18	61	81.6	70.5	81.0	81.3	78.1	Yes	Yes	Yes	Yes
R6	19	63.5	81.4	70.4	80.8	81.2	77.9	Yes	Yes	Yes	Yes
R6	20	66	81.2	70.3	80.6	81.0	77.7	Yes	Yes	Yes	Yes
R6	21	68.5	81.1	70.2	80.4	80.8	77.6	Yes	Yes	Yes	Yes
R6	22	71	80.9	70.1	80.3	80.7	77.4	Yes	Yes	Yes	Yes
R6	23	73.5	80.8	70.0	80.1	80.5	77.2	Yes	Yes	Yes	Yes
R6	24	76	80.6	69.9	79.9	80.3	77.1	Yes	Yes	Yes	Yes
R6	25	78.5	80.4	69.8	79.8	80.2	76.9	Yes	Yes	Yes	Yes
R6	26	81	80.3	69.8	79.6	80.0	76.8	Yes	Yes	Yes	Yes
R6	27	83.5	80.2	69.7	79.5	79.9	76.6	Yes	Yes	Yes	Yes
R6	28	86	80.0	69.6	79.3	79.8	76.5	Yes	Yes	Yes	Yes
R6	29	88.5	79.9	69.5	79.2	79.6	76.3	Yes	Yes	Yes	Yes
R7	1	15.1	85.6	82.7	82.3	85.9	82.5	Yes	Yes	Yes	Yes
R7	2	17.6	86.1	82.9	83.3	86.1	82.6	Yes	Yes	Yes	Yes
R7	3	20.1	85.9	82.5	83.1	85.8	82.2	Yes	Yes	Yes	Yes
R7	4	22.6	85.6	82.2	82.8	85.5	81.9	Yes	Yes	Yes	Yes
R8	2	11.4	74.2	74.0	58.8	74.1	72.0	Yes	Yes	No	No
R8	3	13.9	74.4	74.2	59.3	74.3	72.2	Yes	Yes	No	No
R8	4	16.4	74.6	74.4	59.8	74.5	72.4	Yes	Yes	No	No
R8	5	18.9	74.7	74.5	60.0	74.7	72.5	Yes	Yes	No	No

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevailing traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R8	6	21.4	75.1	74.9	60.2	75.1	72.9	Yes	Yes	No	No
R8	7	23.9	76.9	76.7	63.4	76.9	74.7	Yes	Yes	No	No
R8	8	26.4	77.8	77.6	64.7	77.9	75.7	Yes	Yes	No	No
R8	9	28.9	78.3	78.0	66.3	78.3	76.1	Yes	Yes	No	No
R8	10	31.4	78.6	78.2	67.7	78.6	76.3	Yes	Yes	No	No
R8	11	33.9	78.7	78.3	69.0	78.8	76.4	Yes	Yes	No	No
R8	12	36.4	78.8	78.3	69.7	78.9	76.5	Yes	Yes	No	No
R8	13	38.9	78.9	78.3	70.1	78.9	76.5	Yes	Yes	No	No
R8	14	41.4	78.9	78.3	70.5	78.9	76.5	Yes	Yes	No	No
R8	15	43.9	78.9	78.2	70.7	78.9	76.5	Yes	Yes	No	No
R8	16	46.4	78.9	78.2	70.8	78.9	76.4	Yes	Yes	No	No
R8	17	48.9	78.9	78.1	70.9	78.9	76.4	Yes	Yes	No	No
R8	18	51.4	78.9	78.1	71.0	78.8	76.3	Yes	Yes	No	No
R8	19	53.9	78.8	78.0	71.0	78.8	76.3	Yes	Yes	No	No
R8	20	56.4	78.8	77.9	71.0	78.7	76.2	Yes	Yes	No	No
R8	21	58.9	78.7	77.9	70.9	78.7	76.2	Yes	Yes	No	No
R8	22	61.4	78.7	77.8	70.9	78.6	76.1	Yes	Yes	No	No
R8	23	63.9	78.6	77.8	70.9	78.6	76.1	Yes	Yes	No	No
R8	24	66.4	78.5	77.7	70.8	78.5	76.0	Yes	Yes	No	No
R8	25	68.9	78.5	77.6	70.7	78.4	75.9	Yes	Yes	No	No
R8	26	71.4	78.4	77.6	70.7	78.4	75.9	Yes	Yes	No	No
R8	27	73.9	78.4	77.5	70.6	78.3	75.8	Yes	Yes	No	No
R8	28	76.4	78.3	77.4	70.6	78.3	75.8	Yes	Yes	No	No
R8	29	78.9	78.2	77.4	70.6	78.2	75.7	Yes	Yes	No	No
R8	30	81.4	78.2	77.3	70.6	78.1	75.7	Yes	Yes	No	No
R8	31	83.9	78.1	77.2	70.5	78.1	75.6	Yes	Yes	No	No
R9	2	11.4	84.9	76.3	79.0	81.6	81.1	Yes	No	Yes	No
R9	3	13.9	85.2	77.8	84.2	85.2	81.4	Yes	Yes	Yes	Yes
R9	4	16.4	85.6	78.2	84.9	85.6	81.4	Yes	Yes	Yes	Yes
R9	5	18.9	85.5	78.1	84.5	85.4	81.1	Yes	Yes	Yes	Yes
R10	4	16.4	85.5	76.9	85.2	85.4	81.3	Yes	Yes	Yes	Yes
R10	5	18.9	85.4	76.9	84.8	85.4	81.1	Yes	Yes	Yes	Yes
R10	6	21.4	85.2	76.9	84.4	85.1	80.7	Yes	Yes	Yes	Yes
R10	7	23.9	84.9	76.8	84.0	84.8	80.4	Yes	Yes	Yes	Yes
R10	8	26.4	84.5	76.7	83.6	84.4	80.1	Yes	Yes	Yes	Yes
R10	9	28.9	84.3	76.6	83.3	84.1	79.8	Yes	Yes	Yes	Yes
R10	10	31.4	84.0	76.4	82.9	83.8	79.6	Yes	Yes	Yes	Yes
R10	11	33.9	83.7	76.3	82.6	83.5	79.3	Yes	Yes	Yes	Yes
R10	12	36.4	83.4	76.3	82.3	83.3	79.1	Yes	Yes	Yes	Yes
R10	13	38.9	83.1	76.2	82.0	83.0	78.8	Yes	Yes	Yes	Yes
R10	14	41.4	82.9	76.1	81.7	82.8	78.6	Yes	Yes	Yes	Yes
R10	15	43.9	82.7	76.0	81.4	82.5	78.4	Yes	Yes	Yes	Yes
R10	16	46.4	82.4	75.9	81.2	82.3	78.2	Yes	Yes	Yes	Yes
R10	17	48.9	82.2	75.8	81.0	82.1	78.0	Yes	Yes	Yes	Yes
R10	18	51.4	82.0	75.7	80.7	81.9	77.9	Yes	Yes	Yes	Yes
R10	19	53.9	81.9	75.7	80.5	81.7	77.7	Yes	Yes	Yes	Yes
R10	20	56.4	81.7	75.6	80.3	81.6	77.6	Yes	Yes	Yes	Yes
R10	23	58.9	81.5	75.5	80.1	81.4	77.4	Yes	Yes	Yes	Yes
R10	22	61.4	81.3	75.4	79.9	81.2	77.3	Yes	Yes	Yes	Yes
R10	23	63.9	81.2	75.3	79.7	81.1	77.1	Yes	Yes	Yes	Yes
R11	5	18.9	85.5	74.2	84.8	85.2	82.2	Yes	Yes	Yes	Yes
R11	6	21.4	85.1	74.1	84.4	84.8	81.8	Yes	Yes	Yes	Yes
R11	7	23.9	84.8	74.0	84.0	84.4	81.5	Yes	Yes	Yes	Yes
R11	8	26.4	84.4	74.0	83.6	84.1	81.1	Yes	Yes	Yes	Yes
R11	9	28.9	84.1	73.9	83.3	83.8	80.8	Yes	Yes	Yes	Yes
R11	10	31.4	83.7	73.8	83.0	83.5	80.5	Yes	Yes	Yes	Yes
R11	11	33.9	83.4	73.7	82.6	83.2	80.2	Yes	Yes	Yes	Yes
R11	12	36.4	83.1	73.6	82.3	82.9	80.0	Yes	Yes	Yes	Yes
R11	13	38.9	82.9	73.6	82.1	82.6	79.7	Yes	Yes	Yes	Yes
R11	14	41.4	82.6	73.5	81.8	82.4	79.5	Yes	Yes	Yes	Yes
R11	15	43.9	82.4	73.4	81.5	82.2	79.3	Yes	Yes	Yes	Yes
R11	16	46.4	82.2	73.3	81.3	81.9	79.0	Yes	Yes	Yes	Yes
R11	17	48.9	81.9	73.3	81.1	81.7	78.8	Yes	Yes	Yes	Yes
R11	18	51.4	81.7	73.2	80.8	81.5	78.6	Yes	Yes	Yes	Yes
R11	19	53.9	81.5	73.1	80.6	81.3	78.4	Yes	Yes	Yes	Yes
R11	20	56.4	81.3	73.1	80.4	81.2	78.3	Yes	Yes	Yes	Yes
R11	21	58.9	81.2	73.0	80.2	81.0	78.1	Yes	Yes	Yes	Yes
R11	22	61.4	81.0	73.0	80.0	80.8	77.9	Yes	Yes	Yes	Yes

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevalling traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R11	23	63.9	80.8	72.9	79.9	80.7	77.8	Yes	Yes	Yes	Yes
R11	24	66.4	80.7	72.8	79.7	80.5	77.6	Yes	Yes	Yes	Yes
R12	2	11.4	86.6	70.5	85.9	86.0	83.2	Yes	Yes	Yes	Yes
R12	3	13.9	86.3	71.1	85.7	85.8	83.1	Yes	Yes	Yes	Yes
R12	4	16.4	86.0	71.5	85.3	85.5	82.8	Yes	Yes	Yes	Yes
R12	5	18.9	85.5	71.5	84.9	85.1	82.5	Yes	Yes	Yes	Yes
R13	3	13.9	56.9	45.1	57.4	56.9	54.3	No	Yes	Yes	No
R13	4	16.4	59.5	45.9	59.7	59.4	57.3	No	Yes	Yes	No
R13	5	18.9	61.4	46.8	61.4	61.4	59.3	No	Yes	Yes	No
R13	6	21.4	61.4	48.3	61.4	61.4	59.5	No	Yes	Yes	No
R13	7	23.9	63.2	51.6	61.7	62.1	60.4	No	Yes	Yes	No
R13	8	26.4	71.2	56.5	70.4	70.6	70.1	Yes	No	Yes	No
R13	9	28.9	73.9	57.9	73.5	73.6	72.7	Yes	No	Yes	No
R13	10	31.4	75.4	58.3	75.2	75.3	73.9	Yes	Yes	Yes	Yes
R13	11	33.9	75.9	58.4	75.8	75.9	74.5	Yes	Yes	Yes	Yes
R13	12	36.4	76.2	58.4	76.0	76.1	74.8	Yes	Yes	Yes	Yes
R13	13	38.9	76.5	58.5	76.3	76.4	74.9	Yes	Yes	Yes	Yes
R13	14	41.4	76.8	58.6	76.5	76.6	75.0	Yes	Yes	Yes	Yes
R13	15	43.9	77.1	58.7	76.8	76.9	75.0	Yes	Yes	Yes	Yes
R13	16	46.4	77.3	58.9	76.9	77.0	75.0	Yes	Yes	Yes	Yes
R13	17	48.9	77.3	58.9	76.9	77.0	74.9	Yes	Yes	Yes	Yes
R13	18	51.4	77.4	60.5	76.9	77.0	74.8	Yes	Yes	Yes	Yes
R13	19	53.9	77.5	61.6	76.9	77.0	74.8	Yes	Yes	Yes	Yes
R13	20	56.4	77.5	62.4	76.9	77.0	74.7	Yes	Yes	Yes	Yes
R13	21	58.9	77.5	63.0	76.8	77.0	74.7	Yes	Yes	Yes	Yes
R13	22	61.4	77.4	63.4	76.7	76.9	74.6	Yes	Yes	Yes	Yes
R14	2	11.3	87.1	71.7	86.0	86.1	83.3	Yes	Yes	Yes	Yes
R14	3	13.8	86.7	71.7	85.9	86.1	83.1	Yes	Yes	Yes	Yes
R14	4	16.3	86.3	71.9	85.4	85.6	82.9	Yes	Yes	Yes	Yes
R14	5	18.8	85.8	72.1	85.0	85.2	82.5	Yes	Yes	Yes	Yes
R14	6	21.3	85.3	72.1	84.5	84.7	82.2	Yes	Yes	Yes	Yes
R14	7	23.8	84.9	72.0	84.2	84.4	81.9	Yes	Yes	Yes	Yes
R14	8	26.3	84.5	71.9	83.8	84.0	81.6	Yes	Yes	Yes	Yes
R14	9	28.8	84.1	71.9	83.4	83.7	81.2	Yes	Yes	Yes	Yes
R14	10	31.3	83.8	71.8	83.0	83.4	80.9	Yes	Yes	Yes	Yes
R14	11	33.8	83.4	71.8	82.7	83.0	80.6	Yes	Yes	Yes	Yes
R14	12	36.3	83.1	71.7	82.4	82.7	80.4	Yes	Yes	Yes	Yes
R14	13	38.8	82.8	71.6	82.1	82.5	80.1	Yes	Yes	Yes	Yes
R14	14	41.3	82.6	71.5	81.8	82.2	79.8	Yes	Yes	Yes	Yes
R14	15	43.8	82.3	71.4	81.5	81.9	79.6	Yes	Yes	Yes	Yes
R14	16	46.3	82.0	71.3	81.3	81.7	79.4	Yes	Yes	Yes	Yes
R15	2	11.4	65.5	63.8	54.8	64.3	65.2	No	No	No	No
R15	3	13.9	65.8	64.0	56.6	64.6	65.4	No	No	No	No
R15	4	16.4	66.3	64.2	59.3	65.2	66.0	No	No	No	No
R15	5	18.9	68.3	65.2	61.9	66.4	67.3	No	No	Yes	No
R15	6	21.4	70.4	66.8	64.5	68.4	68.9	No	No	Yes	No
R15	7	23.9	71.3	67.3	65.5	69.4	69.4	No	No	Yes	No
R15	8	26.4	71.7	67.8	66.0	69.9	69.8	No	No	Yes	No
R15	9	28.9	72.1	68.4	66.3	70.4	70.2	No	No	Yes	No
R15	10	31.4	72.5	69.0	66.5	70.8	70.7	Yes	No	Yes	No
R15	11	33.9	72.8	69.2	66.6	71.1	71.1	Yes	No	Yes	No
R15	12	36.4	73.0	69.2	66.7	71.1	71.1	Yes	No	Yes	No
R15	13	38.9	73.1	69.2	66.8	71.2	71.2	Yes	No	Yes	No
R15	14	41.4	73.1	69.2	66.9	71.2	71.3	Yes	No	Yes	No
R15	15	43.9	73.1	69.1	66.9	71.1	71.3	Yes	No	Yes	No
R15	16	46.4	73.1	69.0	66.8	71.1	71.3	Yes	No	Yes	No
R15	17	48.9	73.1	69.0	66.8	71.0	71.2	Yes	No	Yes	No
R15	18	51.4	73.0	68.9	66.8	71.0	71.2	Yes	No	Yes	No
R15	19	53.9	73.0	68.8	66.7	70.9	71.1	Yes	No	Yes	No
R15	20	56.4	72.9	68.7	66.7	70.8	71.1	Yes	No	Yes	No
R15	21	58.9	72.8	68.7	66.6	70.8	71.0	Yes	No	Yes	No
R15	22	61.4	72.8	68.6	66.6	70.7	71.0	Yes	No	Yes	No
R15	23	63.9	72.7	68.6	66.6	70.7	70.9	Yes	No	Yes	No
R15	24	66.4	72.7	68.5	66.6	70.6	70.8	Yes	No	Yes	No
R15	25	68.9	72.6	68.4	66.5	70.6	70.7	Yes	No	Yes	No
R15	26	71.4	72.6	68.4	66.5	70.6	70.7	Yes	No	Yes	No
R15	27	73.9	72.6	68.4	66.5	70.6	70.6	Yes	No	Yes	No
R15	28	76.4	72.6	68.4	66.5	70.6	70.6	Yes	No	Yes	No

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevailing traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R15	29	78.9	72.5	68.4	66.5	70.6	70.5	Yes	No	Yes	No
R15	30	81.4	72.5	68.4	66.6	70.6	70.5	Yes	No	Yes	No
R15	31	83.9	72.5	68.3	66.7	70.6	70.5	Yes	No	Yes	No
R16	2	11.4	66.0	65.1	59.0	66.0	65.4	No	No	No	No
R16	3	13.9	66.4	65.4	59.7	66.4	65.6	No	No	Yes	No
R16	4	16.4	66.8	65.7	60.4	66.8	65.8	No	Yes	Yes	No
R16	5	18.9	67.4	65.8	62.1	67.4	65.9	No	Yes	Yes	No
R16	6	21.4	68.6	66.6	64.4	68.6	66.3	No	Yes	Yes	No
R16	7	23.9	70.5	68.2	66.7	70.5	67.4	Yes	Yes	Yes	Yes
R16	8	26.4	71.2	69.0	67.1	71.2	68.1	Yes	Yes	Yes	Yes
R16	9	28.9	71.7	69.7	67.4	71.7	68.7	Yes	Yes	Yes	Yes
R16	10	31.4	72.2	70.3	67.8	72.2	69.2	Yes	Yes	Yes	Yes
R16	11	33.9	72.7	70.8	68.1	72.7	69.7	Yes	Yes	Yes	Yes
R16	12	36.4	72.9	71.2	68.1	73.0	70.0	Yes	Yes	Yes	Yes
R16	13	38.9	73.2	71.6	68.3	73.3	70.3	Yes	Yes	Yes	Yes
R16	14	41.4	73.5	71.9	68.5	73.5	70.6	Yes	Yes	Yes	Yes
R16	15	43.9	73.7	72.1	68.6	73.7	70.8	Yes	Yes	Yes	Yes
R16	16	46.4	73.9	72.3	68.7	73.9	71.0	Yes	Yes	Yes	Yes
R16	17	48.9	74.0	72.4	68.7	74.0	71.1	Yes	Yes	Yes	Yes
R16	18	51.4	74.1	72.6	68.8	74.1	71.3	Yes	Yes	Yes	Yes
R16	19	53.9	74.2	72.6	68.9	74.2	71.3	Yes	Yes	Yes	Yes
R16	20	56.4	74.2	72.7	69.0	74.2	71.4	Yes	Yes	Yes	Yes
R16	21	58.9	74.2	72.7	68.9	74.2	71.4	Yes	Yes	Yes	Yes
R16	22	61.4	74.2	72.7	69.0	74.2	71.4	Yes	Yes	Yes	Yes
R16	23	63.9	74.2	72.7	69.0	74.2	71.4	Yes	Yes	Yes	Yes
R16	24	66.4	74.2	72.6	69.0	74.2	71.4	Yes	Yes	Yes	Yes
R16	25	68.9	74.2	72.6	69.0	74.2	71.4	Yes	Yes	Yes	Yes
R16	26	71.4	74.2	72.6	69.0	74.2	71.4	Yes	Yes	Yes	Yes
R16	27	73.9	74.1	72.6	68.9	74.1	71.3	Yes	Yes	Yes	Yes
R16	28	76.4	74.1	72.5	68.9	74.1	71.3	Yes	Yes	Yes	Yes
R16	29	78.9	74.1	72.5	68.9	74.1	71.3	Yes	Yes	Yes	Yes
R16	30	81.4	74.1	72.6	68.9	74.1	71.4	Yes	Yes	Yes	Yes
R16	31	83.9	74.2	72.7	68.9	74.2	71.4	Yes	Yes	Yes	Yes
R17	5	27.7	77.7	51.5	69.8	69.9	77.5	No	No	Yes	No
R17	6	30.2	77.4	51.5	69.6	69.7	77.2	No	No	Yes	No
R17	7	32.7	77.1	51.6	69.5	69.5	76.9	No	No	Yes	No
R17	8	35.2	76.7	51.6	69.3	69.4	76.6	No	No	Yes	No
R17	9	37.7	76.4	51.6	69.2	69.3	76.2	No	No	Yes	No
R17	10	40.2	76.1	51.6	69.1	69.1	75.9	No	No	Yes	No
R17	11	42.7	75.9	51.6	69.0	69.0	75.6	No	No	Yes	No
R17	12	45.2	75.6	51.7	68.9	69.0	75.4	No	No	Yes	No
R17	13	47.7	75.4	51.7	68.8	68.9	75.1	No	No	Yes	No
R17	14	50.2	75.1	51.7	68.7	68.8	74.9	No	No	Yes	No
R17	15	52.7	74.9	51.8	68.7	68.8	74.6	No	No	Yes	No
R17	16	55.2	74.7	51.8	68.6	68.7	74.4	No	No	Yes	No
R18	1	8.7	87.3	72.9	76.2	77.9	84.2	Yes	No	Yes	No
R18	2	11.2	87.1	72.8	76.9	78.4	83.9	Yes	No	Yes	No
R18	3	13.7	87.0	72.8	80.5	81.2	83.5	Yes	No	Yes	No
R18	4	16.2	86.4	72.7	82.1	82.5	83.1	Yes	No	Yes	No
R18	5	18.7	85.9	72.7	81.9	82.4	82.7	Yes	No	Yes	No
R19	1	8.7	82.0	69.1	70.2	72.7	77.1	Yes	No	Yes	No
R19	2	11.2	82.1	69.1	72.2	73.9	77.3	Yes	No	Yes	No
R19	3	13.7	82.1	69.0	74.5	75.6	77.4	Yes	No	Yes	No
R19	4	16.2	82.1	69.0	75.8	76.6	77.4	Yes	No	Yes	No
R19	5	18.7	82.0	68.9	76.0	76.8	77.3	Yes	No	Yes	No
R20	1	8.7	77.5	65.8	74.4	74.9	80.7	Yes	No	Yes	No
R20	2	11.2	77.6	65.7	74.5	75.0	80.3	Yes	No	Yes	No
R20	3	13.7	77.7	65.6	75.1	75.5	79.6	Yes	No	Yes	No
R20	4	16.2	77.6	65.4	76.0	76.4	78.9	Yes	No	Yes	No
R20	5	18.7	77.5	65.3	75.9	76.3	78.3	Yes	No	Yes	No
R21	1	11.6	78.7	68.2	70.1	73.1	73.2	Yes	No	Yes	No
R21	2	14.1	78.6	68.2	70.7	73.1	73.1	Yes	No	Yes	No
R21	3	16.6	78.3	68.2	71.0	73.1	73.1	Yes	No	Yes	No
R21	4	19.1	78.0	68.1	71.1	73.1	73.0	Yes	No	Yes	No
R21	5	21.6	77.7	68.0	71.1	73.1	72.9	Yes	No	Yes	No
R21	6	24.1	77.6	67.9	71.4	73.0	72.9	Yes	No	Yes	No
R21	7	26.6	77.3	67.8	71.5	72.9	72.9	Yes	No	Yes	No
R21	8	29.1	77.1	67.7	71.6	72.9	72.9	Yes	No	Yes	No

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevailing traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R21	9	31.6	76.9	67.6	71.8	72.7	73.0	Yes	No	Yes	No
R21	10	34.1	76.7	67.6	71.9	72.6	73.0	Yes	No	Yes	No
R21	11	36.6	76.6	67.5	71.8	72.5	73.0	Yes	No	Yes	No
R21	12	39.1	76.4	67.4	72.0	72.4	73.0	Yes	No	Yes	No
R21	13	41.6	76.3	67.2	72.0	72.2	72.9	Yes	No	Yes	No
R21	14	44.1	76.2	67.1	72.2	72.1	72.9	Yes	No	Yes	No
R21	15	46.6	76.1	67.0	72.3	72.0	72.8	Yes	No	Yes	No
R21	16	49.1	76.0	67.0	72.2	71.9	72.7	Yes	No	Yes	No
R21	17	51.6	75.9	66.9	72.2	71.8	72.7	Yes	No	Yes	No
R21	18	54.1	75.7	66.9	72.2	71.8	72.6	Yes	No	Yes	No
R21	19	56.6	75.6	66.8	72.2	71.7	72.5	Yes	No	Yes	No
R21	20	59.1	75.5	66.8	72.1	71.7	72.4	Yes	No	Yes	No
R21	21	61.6	75.4	66.7	72.1	71.6	72.4	Yes	No	Yes	No
R22	1	39	73.2	51.1	68.0	68.1	73.0	No	No	Yes	No
R22	2	41.5	73.1	51.2	67.9	68.0	72.9	No	No	Yes	No
R22	3	44	73.1	51.3	68.0	68.0	72.8	No	No	Yes	No
R22	4	46.5	73.0	51.5	67.9	68.0	72.8	No	No	Yes	No
R22	5	49	72.9	51.6	67.9	68.0	72.7	No	No	Yes	No
R22	6	51.5	72.8	51.8	67.9	68.0	72.6	No	No	Yes	No
R22	7	54	72.8	52.1	67.8	67.9	72.5	No	No	Yes	No
R22	8	56.5	72.7	52.1	67.8	67.9	72.4	No	No	Yes	No
R22	9	59	72.6	52.1	67.7	67.8	72.3	No	No	Yes	No
R22	10	61.5	72.5	52.1	67.7	67.8	72.3	No	No	Yes	No
R22	11	64	72.5	54.1	67.7	67.9	72.2	No	No	Yes	No
R22	12	66.5	72.4	54.9	67.6	67.9	72.1	No	No	Yes	No
R22	13	69	72.3	55.9	67.6	67.9	72.0	No	No	Yes	No
R22	14	71.5	72.3	57.3	67.5	67.9	72.0	No	No	Yes	No
R22	15	74	72.3	59.0	67.5	68.1	71.9	No	No	Yes	No
R22	16	76.5	72.3	60.9	67.5	68.4	71.9	No	No	Yes	No
R22	17	79	72.4	62.3	67.5	68.6	71.9	No	No	Yes	No
R22	18	81.5	72.4	63.1	67.5	68.8	71.9	No	No	Yes	No
R22	19	84	72.4	63.6	67.4	68.9	71.8	No	No	Yes	No
R22	20	86.5	72.4	63.8	67.4	69.0	71.8	No	No	Yes	No
R22	21	89	72.3	63.9	67.5	69.1	71.7	No	No	Yes	No
R22	22	91.5	72.3	64.0	67.4	69.1	71.6	No	No	Yes	No
R22	23	94	72.2	64.0	67.4	69.0	71.6	No	No	Yes	No
R22	24	96.5	72.2	64.0	67.4	69.0	71.5	No	No	Yes	No
R22	25	99	72.1	64.0	67.4	69.0	71.4	No	No	Yes	No
R22	26	101.5	72.1	64.1	67.4	69.0	71.4	No	No	Yes	No
R23	1	39	61.2	52.6	58.8	59.7	58.6	No	Yes	Yes	No
R23	2	41.5	62.7	53.9	60.2	61.1	60.8	No	No	Yes	No
R23	3	44	64.5	55.9	61.9	62.9	63.3	No	No	Yes	No
R23	4	46.5	66.5	57.2	63.9	64.8	65.9	No	No	Yes	No
R23	5	49	68.4	58.7	66.1	66.9	68.1	No	No	Yes	No
R23	6	51.5	70.6	60.2	68.6	69.2	70.4	No	No	Yes	No
R23	7	54	72.3	61.3	70.2	70.7	71.3	Yes	No	Yes	No
R23	8	56.5	73.5	62.4	71.3	71.8	71.9	Yes	No	Yes	No
R23	9	59	74.4	63.4	71.9	72.5	72.2	Yes	No	Yes	No
R23	10	61.5	75.2	64.3	72.3	72.9	72.5	Yes	No	Yes	No
R23	11	64	76.4	65.5	73.2	73.8	72.9	Yes	No	Yes	No
R23	12	66.5	76.8	66.0	73.3	74.1	73.1	Yes	No	Yes	No
R23	13	69	77.0	66.3	73.4	74.2	73.2	Yes	No	Yes	No
R23	14	71.5	77.1	66.5	73.5	74.3	73.4	Yes	No	Yes	No
R23	15	74	77.2	66.7	73.6	74.4	73.5	Yes	No	Yes	No
R23	16	76.5	77.2	66.9	73.7	74.5	73.6	Yes	No	Yes	No
R23	17	79	77.3	67.1	73.8	74.6	73.7	Yes	No	Yes	No
R23	18	81.5	77.3	67.2	73.9	74.7	73.7	Yes	No	Yes	No
R23	19	84	77.3	67.4	73.9	74.8	73.7	Yes	Yes	Yes	Yes
R23	20	86.5	77.3	67.6	73.9	74.8	73.7	Yes	Yes	Yes	Yes
R23	21	89	77.3	67.8	74.0	74.9	73.8	Yes	Yes	Yes	Yes
R23	22	91.5	77.3	67.8	74.0	74.9	73.7	Yes	Yes	Yes	Yes
R23	23	94	77.3	67.9	74.0	74.9	73.7	Yes	Yes	Yes	Yes
R23	24	96.5	77.3	67.9	73.9	74.9	73.7	Yes	Yes	Yes	Yes
R23	25	99	77.3	68.0	73.9	74.9	73.7	Yes	Yes	Yes	Yes
R23	26	101.5	77.2	68.0	73.9	74.9	73.6	Yes	Yes	Yes	Yes
R23	27	104	77.2	68.1	73.8	74.8	73.6	Yes	Yes	Yes	Yes
R23	28	106.5	77.2	68.1	73.8	74.8	73.5	Yes	Yes	Yes	Yes
R23	29	109	77.1	68.3	73.7	74.8	73.5	Yes	Yes	Yes	Yes

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevailing traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R23	30	111.5	77.1	68.4	73.7	74.8	73.5	Yes	Yes	Yes	Yes
R23	31	114	77.1	68.4	73.6	74.8	73.5	Yes	Yes	Yes	Yes
R23	32	116.5	77.0	68.5	73.6	74.7	73.4	Yes	Yes	Yes	Yes
R23	33	119	77.0	68.5	73.5	74.7	73.4	Yes	Yes	Yes	Yes
R23	34	121.5	76.9	68.5	73.5	74.7	73.3	Yes	Yes	Yes	Yes
R23	35	124	76.9	68.5	73.4	74.6	73.3	Yes	Yes	Yes	Yes
R23	36	126.5	76.8	68.5	73.3	74.6	73.2	Yes	Yes	Yes	Yes
R23	37	129	76.8	68.5	73.3	74.5	73.2	Yes	Yes	Yes	Yes
R23	38	131.5	76.8	68.5	73.2	74.5	73.2	Yes	Yes	Yes	Yes
R24	1	39	64.4	57.5	61.4	62.9	61.0	No	Yes	Yes	No
R24	2	41.5	66.3	59.6	63.3	64.9	63.4	No	Yes	Yes	No
R24	3	44	68.4	61.1	65.7	67.0	66.6	No	No	Yes	No
R24	4	46.5	71.1	62.6	68.8	69.8	69.6	No	No	Yes	No
R24	5	49	73.7	64.4	71.6	72.4	71.5	Yes	No	Yes	No
R24	6	51.5	76.3	66.3	73.8	74.5	73.3	Yes	Yes	Yes	Yes
R24	7	54	77.5	67.5	74.4	75.2	73.9	Yes	Yes	Yes	Yes
R24	8	56.5	78.2	68.2	74.8	75.7	74.4	Yes	Yes	Yes	Yes
R24	9	59	78.6	68.7	75.1	76.0	74.9	Yes	Yes	Yes	Yes
R24	10	61.5	78.8	69.1	75.2	76.1	75.2	Yes	No	Yes	No
R24	11	64	79.1	69.8	75.4	76.5	75.8	Yes	No	Yes	No
R24	12	66.5	79.2	70.0	75.4	76.5	75.8	Yes	No	Yes	No
R24	13	69	79.2	70.1	75.4	76.5	75.8	Yes	No	Yes	No
R24	14	71.5	79.2	70.1	75.4	76.5	75.8	Yes	No	Yes	No
R24	15	74	79.2	70.0	75.3	76.5	75.7	Yes	No	Yes	No
R24	16	76.5	79.1	70.0	75.3	76.4	75.7	Yes	No	Yes	No
R24	17	79	79.1	70.0	75.2	76.4	75.6	Yes	No	Yes	No
R24	18	81.5	79.0	70.0	75.2	76.3	75.5	Yes	No	Yes	No
R24	19	84	78.9	70.0	75.1	76.3	75.5	Yes	No	Yes	No
R24	20	86.5	78.8	70.0	75.0	76.2	75.4	Yes	No	Yes	No
R24	21	89	78.8	69.9	75.0	76.2	75.3	Yes	No	Yes	No
R24	22	91.5	78.7	70.0	74.9	76.1	75.2	Yes	No	Yes	No
R24	23	94	78.6	70.0	74.8	76.0	75.2	Yes	No	Yes	No
R24	24	96.5	78.6	70.0	74.7	76.0	75.1	Yes	No	Yes	No
R24	25	99	78.5	70.0	74.7	75.9	75.1	Yes	No	Yes	No
R24	26	101.5	78.4	70.2	74.6	75.9	75.0	Yes	No	Yes	No
R24	27	104	78.4	70.2	74.5	75.9	75.0	Yes	No	Yes	No
R24	28	106.5	78.3	70.3	74.4	75.8	74.9	Yes	No	Yes	No
R24	29	109	78.2	70.3	74.4	75.8	74.8	Yes	No	Yes	No
R24	30	111.5	78.2	70.3	74.3	75.7	74.8	Yes	No	Yes	No
R24	31	114	78.1	70.2	74.2	75.7	74.7	Yes	No	Yes	No
R24	32	116.5	78.0	70.2	74.1	75.6	74.7	Yes	No	Yes	No
R24	33	119	78.0	70.2	74.1	75.6	74.6	Yes	No	Yes	No
R24	34	121.5	77.9	70.1	74.0	75.5	74.5	Yes	No	Yes	No
R24	35	124	77.8	70.1	73.9	75.4	74.5	Yes	No	Yes	No
R24	36	126.5	77.8	70.1	73.9	75.4	74.4	Yes	No	Yes	No
R24	37	129	77.7	70.0	73.8	75.3	74.4	Yes	No	Yes	No
R24	38	131.5	77.6	70.0	73.7	75.3	74.3	Yes	No	Yes	No
R25	1	39	67.2	63.9	63.7	66.8	64.1	No	Yes	Yes	No
R25	2	41.5	70.8	67.5	66.9	70.2	67.8	No	Yes	Yes	No
R25	3	44	73.1	69.4	70.0	72.7	70.1	Yes	Yes	Yes	Yes
R25	4	46.5	74.2	70.1	71.7	74.0	71.1	Yes	Yes	Yes	Yes
R25	5	49	74.9	70.4	72.4	74.5	71.7	Yes	Yes	Yes	Yes
R25	6	51.5	75.5	70.8	73.1	75.1	72.5	Yes	Yes	Yes	Yes
R25	7	54	75.9	70.9	73.3	75.3	72.8	Yes	Yes	Yes	Yes
R25	8	56.5	76.2	71.0	73.6	75.5	73.1	Yes	Yes	Yes	Yes
R25	9	59	76.5	71.1	74.0	75.8	73.4	Yes	Yes	Yes	Yes
R25	10	61.5	76.7	71.3	74.2	76.0	73.7	Yes	Yes	Yes	Yes
R25	11	64	77.3	71.7	74.7	76.4	74.3	Yes	Yes	Yes	Yes
R25	12	66.5	77.4	71.8	74.7	76.5	74.5	Yes	Yes	Yes	Yes
R25	13	69	77.6	71.9	74.6	76.5	74.5	Yes	Yes	Yes	Yes
R25	14	71.5	77.7	71.9	74.6	76.4	74.5	Yes	Yes	Yes	Yes
R25	15	74	77.7	71.9	74.5	76.4	74.6	Yes	Yes	Yes	Yes
R25	16	76.5	77.9	71.9	74.4	76.3	74.6	Yes	Yes	Yes	Yes
R25	17	79	77.9	71.9	74.3	76.3	74.6	Yes	Yes	Yes	Yes
R25	18	81.5	77.8	71.8	74.3	76.2	74.6	Yes	Yes	Yes	Yes
R25	19	84	77.8	71.8	74.2	76.2	74.5	Yes	Yes	Yes	Yes
R25	20	86.5	77.7	71.8	74.1	76.1	74.5	Yes	Yes	Yes	Yes
R25	21	89	77.7	71.8	74.0	76.0	74.5	Yes	Yes	Yes	Yes

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevalling traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R25	22	91.5	77.6	71.8	73.9	76.0	74.4	Yes	Yes	Yes	Yes
R25	23	94	77.5	71.8	73.8	75.9	74.4	Yes	Yes	Yes	Yes
R25	24	96.5	77.5	71.8	73.7	75.9	74.3	Yes	Yes	Yes	Yes
R25	25	99	77.4	71.8	73.7	75.8	74.3	Yes	Yes	Yes	Yes
R25	26	101.5	77.4	71.8	73.6	75.8	74.2	Yes	Yes	Yes	Yes
R25	27	104	77.3	71.8	73.5	75.7	74.2	Yes	Yes	Yes	Yes
R25	28	106.5	77.2	71.7	73.4	75.7	74.1	Yes	Yes	Yes	Yes
R25	29	109	77.2	71.7	73.3	75.6	74.1	Yes	Yes	Yes	Yes
R25	30	111.5	77.1	71.7	73.3	75.6	74.0	Yes	Yes	Yes	Yes
R25	31	114	77.0	71.7	73.2	75.5	74.0	Yes	Yes	Yes	Yes
R25	32	116.5	77.0	71.7	73.1	75.5	73.9	Yes	Yes	Yes	Yes
R25	33	119	76.9	71.7	73.0	75.4	73.9	Yes	Yes	Yes	Yes
R25	34	121.5	76.9	71.7	72.9	75.4	73.9	Yes	Yes	Yes	Yes
R25	35	124	76.8	71.7	72.9	75.4	73.9	Yes	Yes	Yes	Yes
R25	36	126.5	76.8	71.8	72.8	75.3	73.8	Yes	Yes	Yes	Yes
R25	37	129	76.7	71.8	72.7	75.3	73.8	Yes	Yes	Yes	Yes
R25	38	131.5	76.7	71.8	72.7	75.3	73.8	Yes	Yes	Yes	Yes
R26	1	42.3	73.1	70.9	66.6	72.3	71.2	Yes	Yes	Yes	Yes
R26	2	44.8	73.8	71.3	67.6	72.8	71.8	Yes	Yes	Yes	Yes
R26	3	47.3	74.1	71.4	68.4	73.1	72.0	Yes	Yes	Yes	Yes
R26	4	49.8	74.2	71.3	68.7	73.2	72.0	Yes	Yes	Yes	Yes
R26	5	52.3	74.3	71.3	69.0	73.3	72.1	Yes	Yes	Yes	Yes
R26	6	54.8	74.6	71.5	69.5	73.6	72.3	Yes	Yes	Yes	Yes
R26	7	57.3	74.7	71.5	69.7	73.7	72.3	Yes	Yes	Yes	Yes
R26	8	59.8	74.7	71.5	70.1	73.8	72.3	Yes	Yes	Yes	Yes
R26	9	62.3	74.8	71.4	70.6	74.0	72.3	Yes	Yes	Yes	Yes
R26	10	64.8	74.8	71.4	70.9	74.2	72.3	Yes	Yes	Yes	Yes
R26	11	67.3	74.8	71.4	71.2	74.3	72.3	Yes	Yes	Yes	Yes
R26	12	69.8	74.9	71.3	71.4	74.4	72.3	Yes	Yes	Yes	Yes
R26	13	72.3	74.9	71.3	71.5	74.4	72.3	Yes	Yes	Yes	Yes
R26	14	74.8	74.8	71.3	71.5	74.4	72.3	Yes	Yes	Yes	Yes
R26	15	77.3	74.8	71.2	71.5	74.4	72.3	Yes	Yes	Yes	Yes
R26	16	79.8	74.9	71.2	71.6	74.4	72.3	Yes	Yes	Yes	Yes
R26	17	82.3	74.9	71.2	71.6	74.4	72.3	Yes	Yes	Yes	Yes
R26	18	84.8	74.8	71.2	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	19	87.3	74.8	71.1	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	20	89.8	74.8	71.1	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	21	92.3	74.8	71.1	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	22	94.8	74.8	71.1	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	23	97.3	74.8	71.1	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	24	99.8	74.8	71.1	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	25	102.3	74.8	71.0	71.6	74.4	72.2	Yes	Yes	Yes	Yes
R26	26	104.8	74.9	71.0	71.7	74.4	72.2	Yes	Yes	Yes	Yes
R26	27	107.3	74.8	71.0	71.6	74.4	72.3	Yes	Yes	Yes	Yes
R26	28	109.8	74.9	71.0	71.6	74.4	72.3	Yes	Yes	Yes	Yes
R26	29	112.3	74.9	71.0	71.6	74.3	72.3	Yes	Yes	Yes	Yes
R26	30	114.8	74.9	71.1	71.6	74.4	72.3	Yes	Yes	Yes	Yes
R26	31	117.3	74.9	71.2	71.6	74.4	72.3	Yes	Yes	Yes	Yes
R26	32	119.8	74.9	71.2	71.5	74.4	72.4	Yes	Yes	Yes	Yes
R26	33	122.3	74.9	71.3	71.5	74.4	72.4	Yes	Yes	Yes	Yes
R26	34	124.8	74.9	71.3	71.4	74.4	72.4	Yes	Yes	Yes	Yes
R26	35	127.3	75.0	71.4	71.4	74.4	72.4	Yes	Yes	Yes	Yes
R26	36	129.8	75.0	71.4	71.3	74.4	72.4	Yes	Yes	Yes	Yes
R26	37	132.3	75.0	71.4	71.3	74.4	72.4	Yes	Yes	Yes	Yes
R26	38	134.8	75.0	71.5	71.3	74.4	72.4	Yes	Yes	Yes	Yes
R27	1	77.9	61.9	61.6	50.1	61.9	60.7	No	Yes	No	No
R27	2	80.4	62.1	61.8	51.1	62.2	60.9	No	Yes	No	No
R14A	2	11.3	78.6	66.5	74.2	74.9	80.4	Yes	No	Yes	No
R14A	3	13.8	78.6	66.4	75.9	76.3	79.6	Yes	No	Yes	No
R14A	4	16.3	78.6	66.3	76.0	76.4	79.0	Yes	No	Yes	No
R14A	5	18.8	78.6	66.2	76.0	76.5	78.5	Yes	No	Yes	No
R14A	6	21.3	79.1	67.1	76.4	76.9	78.4	Yes	No	Yes	No
R14A	7	23.8	79.2	67.3	76.9	77.3	78.3	Yes	No	Yes	No
R14A	8	26.3	79.3	67.7	77.1	77.5	78.1	Yes	No	Yes	No
R14A	9	28.8	79.3	68.0	77.0	77.5	77.9	Yes	No	Yes	No
R14A	10	31.3	79.2	68.0	76.9	77.4	77.7	Yes	No	Yes	No
R14A	11	33.8	79.1	67.9	76.8	77.3	77.4	Yes	No	Yes	No
R14A	12	36.3	79.0	67.8	76.7	77.2	77.3	Yes	No	Yes	No

Appendix D

Environmental Mitigation Implementation Schedules

			1	2	4	5	6	Column 5 > Environmental Standard	Column 5 - 6 > at least 1.0dB(A)	Column 5 - 2 > at least 1.0dB(A)	
NSR	Floor	Height (mPD)	Year 2018 all road without mitigation	Year 2018 all road without the new road scheme	Year 2018 only new roads with proposed mitigation	Year 2018 all roads with proposed mitigation	Year 1999 prevalling traffic level	Conditon 1	Condtion 2	Condition 3	Indirect Mitigation Required (Yes / No)
R14A	13	38.8	78.9	67.7	76.5	77.0	77.0	Yes	No	Yes	No
R14A	14	41.3	78.8	67.6	76.3	76.8	76.8	Yes	No	Yes	No
R14A	15	43.8	78.7	67.5	76.1	76.7	76.6	Yes	No	Yes	No
R14A	16	46.3	78.6	67.4	76.0	76.5	76.4	Yes	No	Yes	No
R14B	2	11.3	74.0	66.6	70.9	72.2	75.1	Yes	No	Yes	No
R14B	3	13.8	74.0	66.6	70.9	72.3	74.8	Yes	No	Yes	No
R14B	4	16.3	73.9	66.6	70.8	72.2	74.3	Yes	No	Yes	No
R14B	5	18.8	73.7	66.4	70.8	72.1	73.8	Yes	No	Yes	No
R14B	6	21.3	73.5	66.3	70.7	72.0	73.3	Yes	No	Yes	No
R14B	7	23.8	73.4	66.2	70.6	72.0	73.1	Yes	No	Yes	No
R14B	8	26.3	73.2	66.0	70.4	71.7	72.6	Yes	No	Yes	No
R14B	9	28.8	73.0	65.7	70.2	71.6	72.2	Yes	No	Yes	No
R14B	10	31.3	72.7	65.5	70.1	71.4	71.8	Yes	No	Yes	No
R14B	11	33.8	72.5	65.3	69.9	71.2	71.4	Yes	No	Yes	No
R14B	12	36.3	72.4	65.2	69.8	71.1	71.2	Yes	No	Yes	No
R14B	13	38.8	72.1	64.9	69.5	70.8	70.8	Yes	No	Yes	No
R14B	14	41.3	71.9	64.7	69.4	70.6	70.5	Yes	No	Yes	No
R14B	15	43.8	71.6	64.5	69.2	70.5	70.2	No	No	Yes	No
R14B	16	46.3	71.4	64.3	69.0	70.2	69.9	No	No	Yes	No
R19a	1	8.7	80.0	67.4	67.4	70.4	72.7	No	No	No	No
R19a	2	11.2	79.9	67.5	67.6	70.6	72.9	Yes	No	No	No
R19a	3	13.7	79.6	67.6	68.0	70.8	72.9	Yes	No	No	No
R19a	4	16.2	79.2	67.5	68.5	71.1	72.9	Yes	No	No	No
R19a	5	18.7	78.8	67.5	69.2	71.4	72.7	Yes	No	No	No
R28	1	24.9	76.9	47.0	70.1	70.1	76.8	Yes	No	No	No
R28	2	27.4	76.8	47.3	69.7	69.7	76.8	Yes	No	No	No
R28	3	29.9	76.5	47.2	69.1	69.2	76.5	Yes	No	No	No
R28	4	32.4	76.2	47.2	68.7	68.7	76.2	Yes	No	No	No
R28	5	34.9	75.9	47.2	68.3	68.3	75.8	Yes	No	No	No
R17a	5	27.7	76.7	52.5	73.3	73.4	76.4	Yes	No	No	No
R17a	6	30.2	76.4	52.6	73.2	73.2	76.1	Yes	No	No	No
R17a	7	32.7	76.2	52.7	73.0	73.0	75.9	Yes	No	No	No
R17a	8	35.2	76.0	52.8	72.8	72.8	75.6	Yes	No	No	No
R17a	9	37.7	75.7	52.8	72.6	72.6	75.4	Yes	No	No	No
R17a	10	40.2	75.5	52.9	72.4	72.4	75.1	Yes	No	No	No
R17a	11	42.7	75.3	53.0	72.2	72.2	74.9	Yes	No	No	No
R17a	12	45.2	75.0	53.0	72.0	72.1	74.7	Yes	No	No	No
R17a	13	47.7	74.8	53.1	71.8	71.9	74.4	Yes	No	No	No
R17a	14	50.2	74.6	53.1	71.7	71.7	74.2	Yes	No	No	No
R17a	15	52.7	74.5	53.2	71.5	71.6	74.0	Yes	No	No	No
R17a	16	55.2	74.3	53.4	71.4	71.4	73.8	Yes	No	No	No

Appendix D

Environmental Mitigation Implementation Schedules

Agreement No. CE 71/95
TEXACO ROAD IMPROVEMENT BETWEEN TEXACO ROAD INTERCHANGE AND TSUEN TSING INTERCHANGE

ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

Construction Noise

EIA Report Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			
						Design	Construction	Operation	Decommission
5.4	3.7	Restrict activities to the daytime period	All areas	Contractor	NCO		✔		
5.4	3.7	Install silencers on exhaust pipes	All areas where truck, excavators and loaders are operating	Contractor	NCO		✔		
5.4	3.7	Install mufflers on rock drills and pneumatic breakers	All areas	Contractor	NCO		✔		
5.4	3.7	Install acoustic enclosures for concrete pumps and generators	All areas	Contractor	NCO		✔		
5.4	3.7	Use temporary barriers or enclosures	Site boundary	Contractor	NCO		✔		
5.4	3.7	Instigate good site practice	All areas	Contractor	NCO		✔		
5.4	3.7	Avoid simultaneous noisy activities	All areas	Contractor	NCO		✔		
5.4	3.7	Select quiet plant and working methods	All areas	Contractor	NCO		✔		
5.4	3.7	Reduce numbers of plant operating in critical areas	Close to NSRs	Contractor	NCO		✔		
5.4	3.7	Include contract clauses for environemntal protection	All areas	Contractor	NCO		✔		

Agreement No. CE 71/95
TEXACO ROAD IMPROVEMENT BETWEEN TEXACO ROAD INTERCHANGE AND TSUEN TSING INTERCHANGE

ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

Operational Noise

EIA Report Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			
						Design	Construction	Operation	Decommision
5.6.2		157m long absorptive 5.5m high top-bent barrier with 8.0m overhang on the northbound carriageway of Texaco Road On elevated road	Between Jade Court and Cheung Fat House	TDD	HKPSG			✔	
5.6.2		313m long combined absorptive and non-absorptive 5.5m high top-bent barrier with 8.0m overhang on the southbound carriageway of Texaco Road Absorptive between Wang Wah Building and Tsuen Wing Street On elevated road	Between Wang Wah Building and Symphone Industrial Building	TDD	HKPSG			✔	
5.6.2		42m long non-absorptive 5.5m high cantilevered barrier with a 1.0m overhang. On at-grade road	Adjacent to the Crown of Thorns Church site on Tai Wo Hau Road	TDD				✔	
5.6.2		92m long absorptive 5.5m high top-bent barrier with a 6.0m overhang, set to the back of the footpath On at-grade road	In front of Fu Keung House on Tai Wo Hau Road	TDD	HKPSG			✔	

Agreement No. CE 71/95
TEXACO ROAD IMPROVEMENT BETWEEN TEXACO ROAD INTERCHANGE AND TSUEN TSING INTERCHANGE

ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

Operational Noise

EIA Report Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			
						Design	Construction	Operation	Decommision
5.6.2		65m long absorptive 5.5m high top-bent barrier with a 3.0m overhang On at-grade road	In front of Fu Man House on Tai Wo Hau Road.	TDD	HKPSG			✓	
5.6.2		110m long absorptive 5.5m high top bent barrier with a 3.0m overhang	In front of Fu On House on Tai Wo Hau Road	TDD	HKSPG			✓	
5.6.2		67m long absorptive 5.5m high top bent barrier with a 3.0m overhang	Opposite Fu On House on Tai Wo Hau Road	TDD	HKSPG			✓	
5.7		Indirect mitigation measures for approximately 1400 dwellings (subject to ExCo approval)	Texaco Road	TDD	HKPSG			✓	

Agreement No. CE 71/95
TEXACO ROAD IMPROVEMENT BETWEEN TEXACO ROAD INTERCHANGE AND TSUEN TSING INTERCHANGE

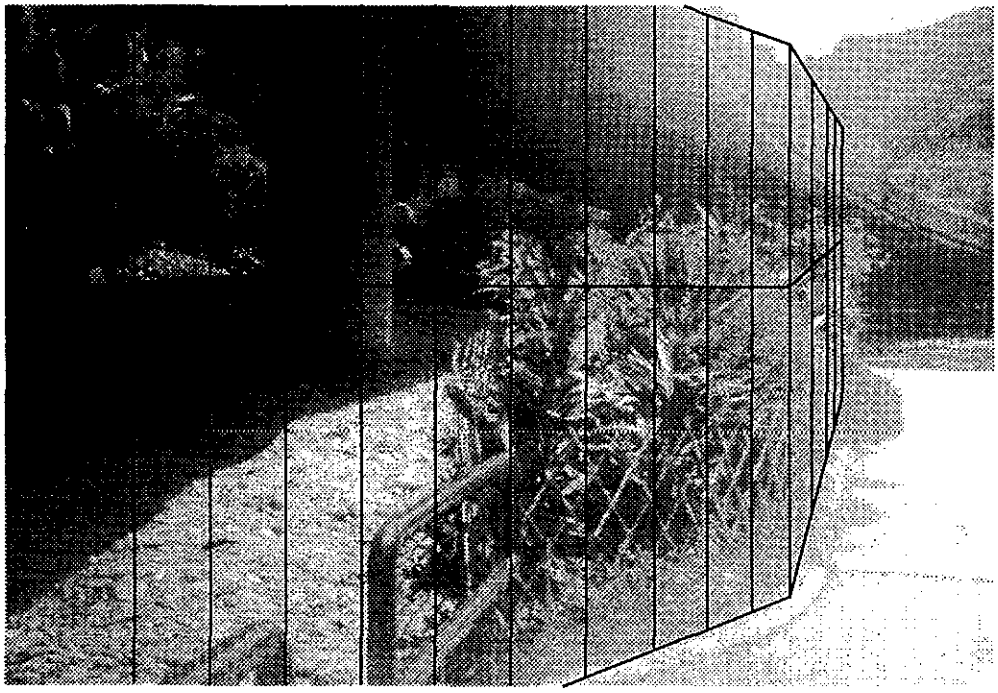
ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

Construction Air Quality

EIA Report Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			
						Design	Construction	Operation	Decommission
6.4	2.8	Twice daily watering	Unpaved roads	Contractor	APCO		✔		
6.4	2.8	Watering of excavation/material handling	All areas subject to excavation	Contractor	APCO		✔		
6.4	2.8	Watering every 1.5 hours	Opens/exposed areas	Contractor	APCO		✔		
6.4	2.8	Reduction in dropping heights	Unloading/loading areas	Contractor	APCO		✔		
6.4	2.8	Dampen or cover transported material and ensure trucks not over filled	Unloading/loading areas	Contractor	APCO		✔		
6.4	2.8	Enclose or cover stockpiled areas	Storage areas	Contractor	APCO		✔		
6.4	2.8	Water stockpiled areas in dry or windy conditions	Storage areas	Contractor	APCO		✔		
6.4	2.8	Include contract clauses for environmental protection	All areas	Contractor	APCO		✔		

Appendix E

Landscape and Visual Impact Assessment Drawings

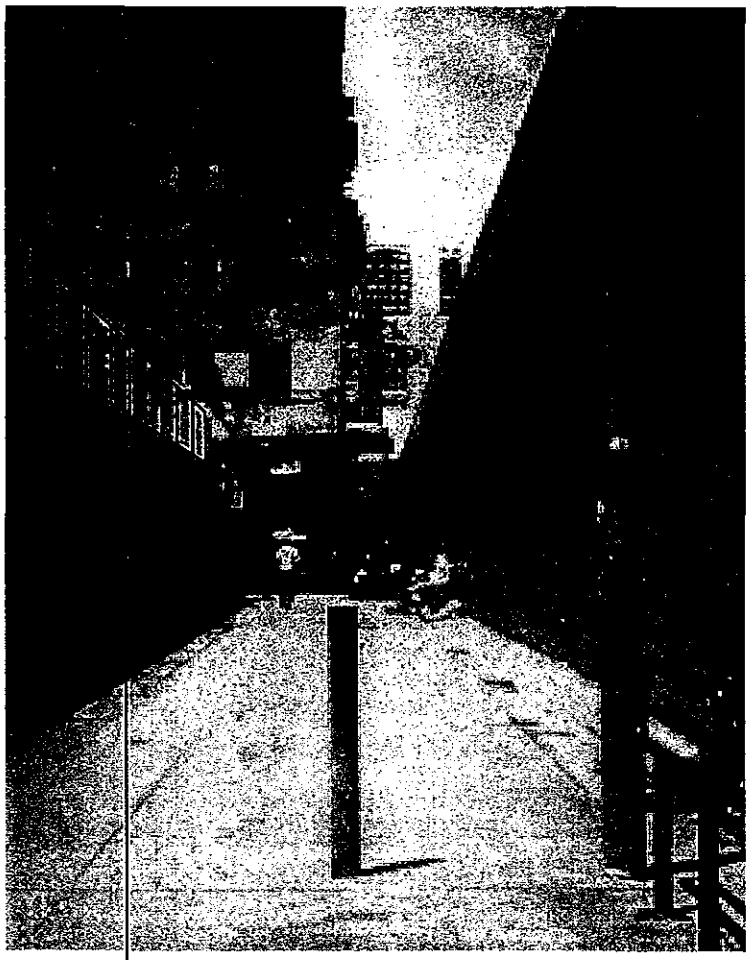


EXISTING OPEN SPACE BELOW ELEVATED ROAD WILL BE AFFECTED DURING CONSTRUCTION BY HOARDING

LANDSCAPE & VISUAL IMPACT
FIGURE 1

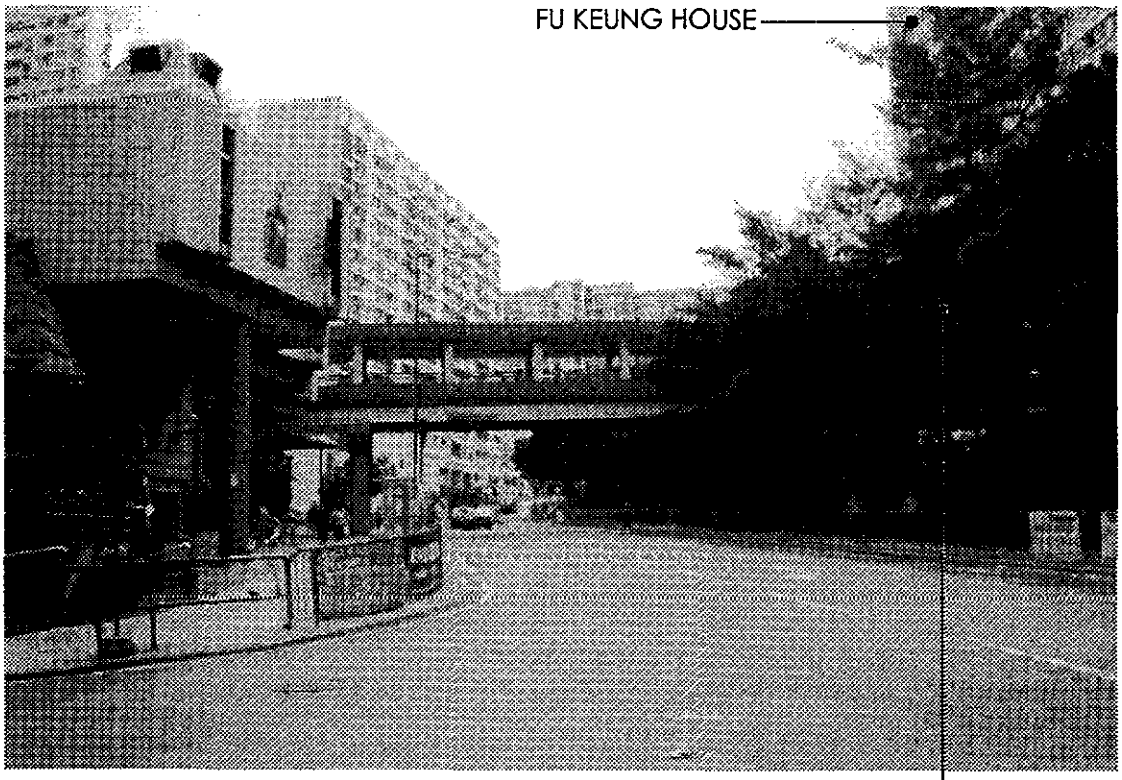
Texaco Road Improvement and Completion Works

← BUDDHIST SCHOOL

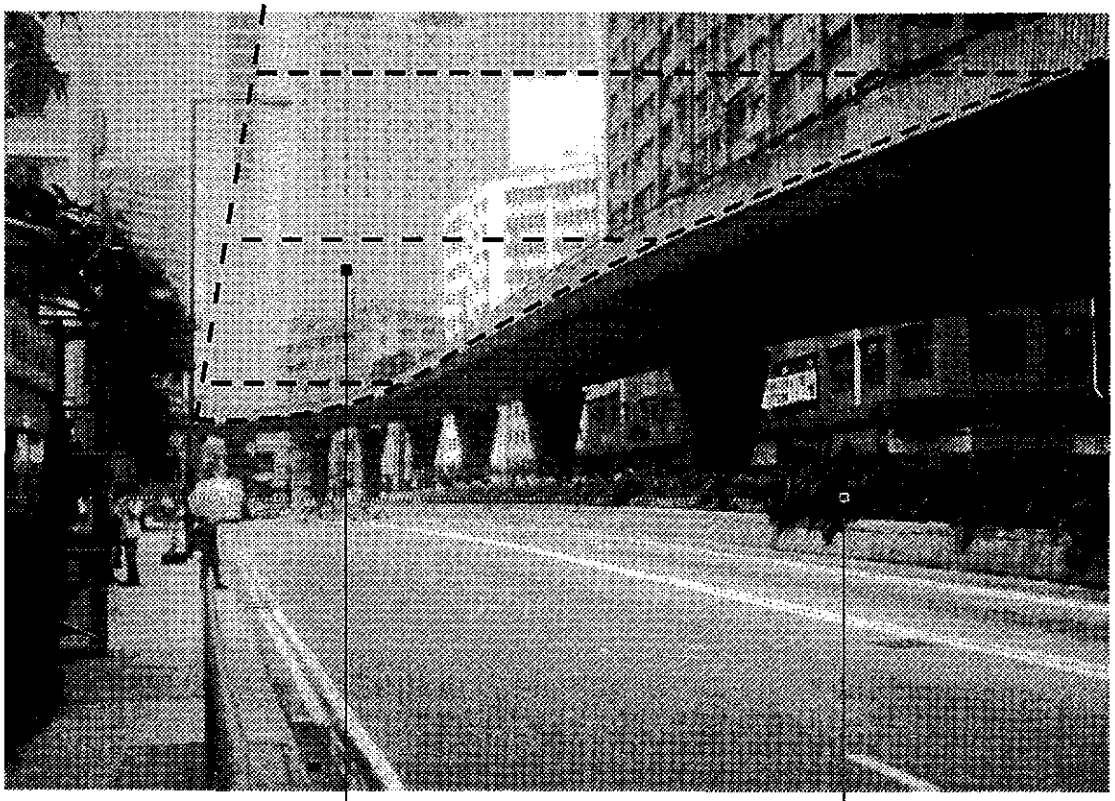


CONSIDER ARCHITECTURAL SCREEN TO BLOCK OFF VIEWS
OF NEW VIADUCTS AND NOISE MITIGATION STRUCTURES

LANDSCAPE & VISUAL IMPACT
FIGURE 2



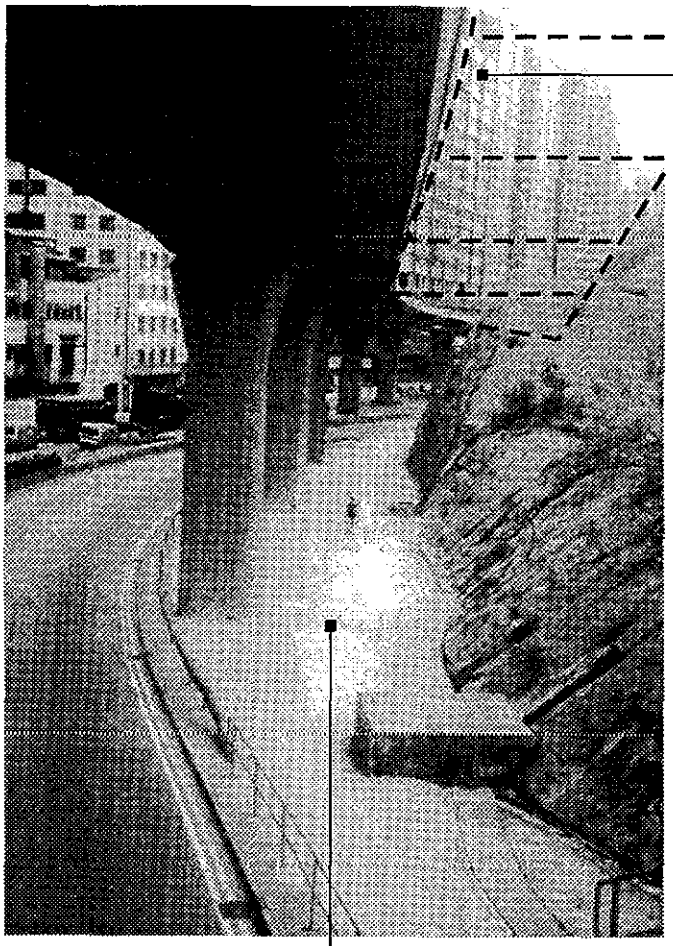
LANDSCAPE & VISUAL IMPACT
FIGURE 3



APPROXIMATE LOCATION OF
NEW FLYOVER STRUCTURE
OVER TEXACO ROAD

EXISTING AMENITY PLANTING UNDER
EXISTING VIADUCT WILL BE OVERSHADOWED
AND SHOULD BE TRANSPLANTED

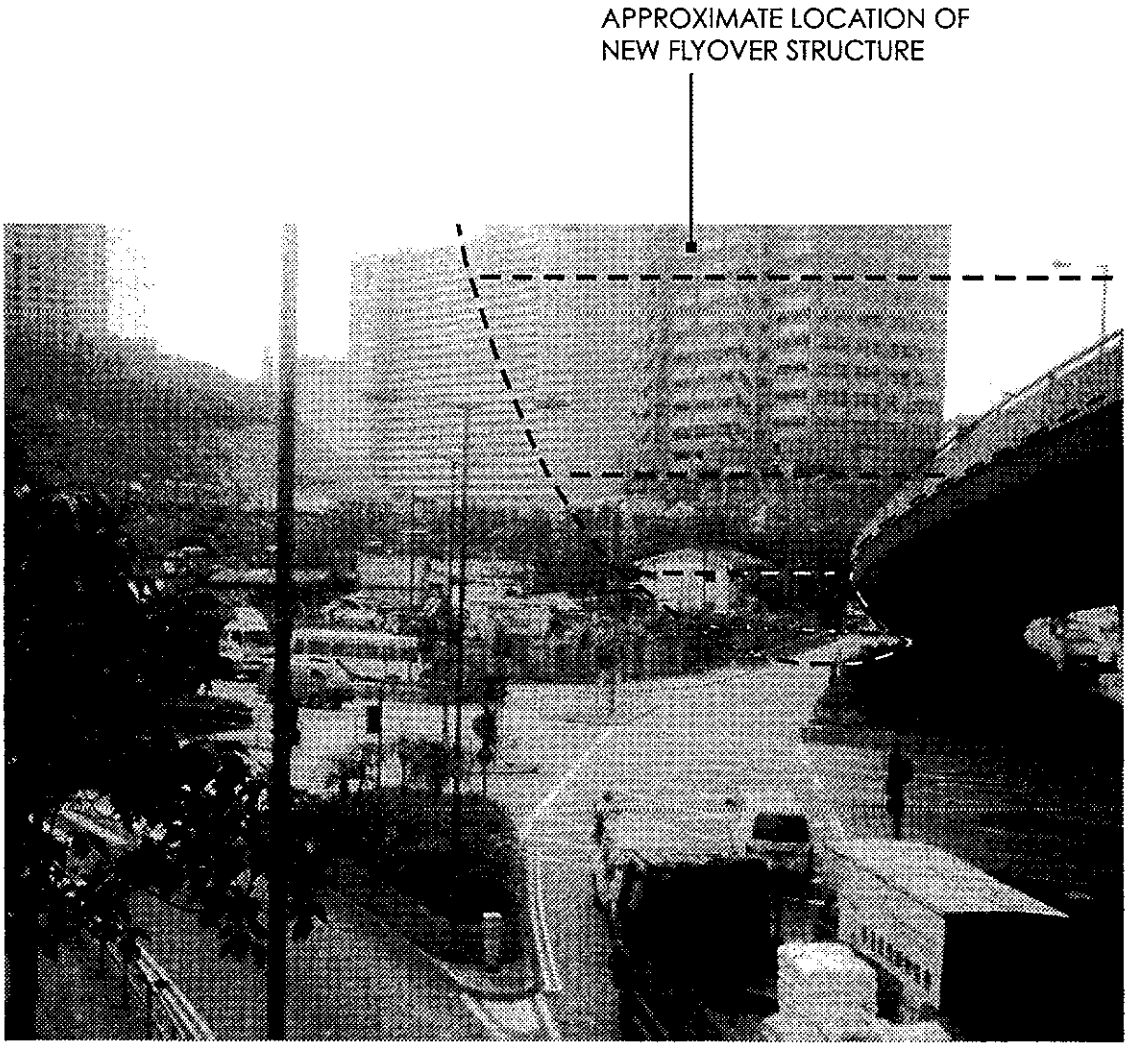
LANDSCAPE & VISUAL IMPACT
FIGURE 4



APPROXIMATE LOCATION NEW FLYOVER STRUCTURE ADJACENT TO EXISTING STRUCTURE

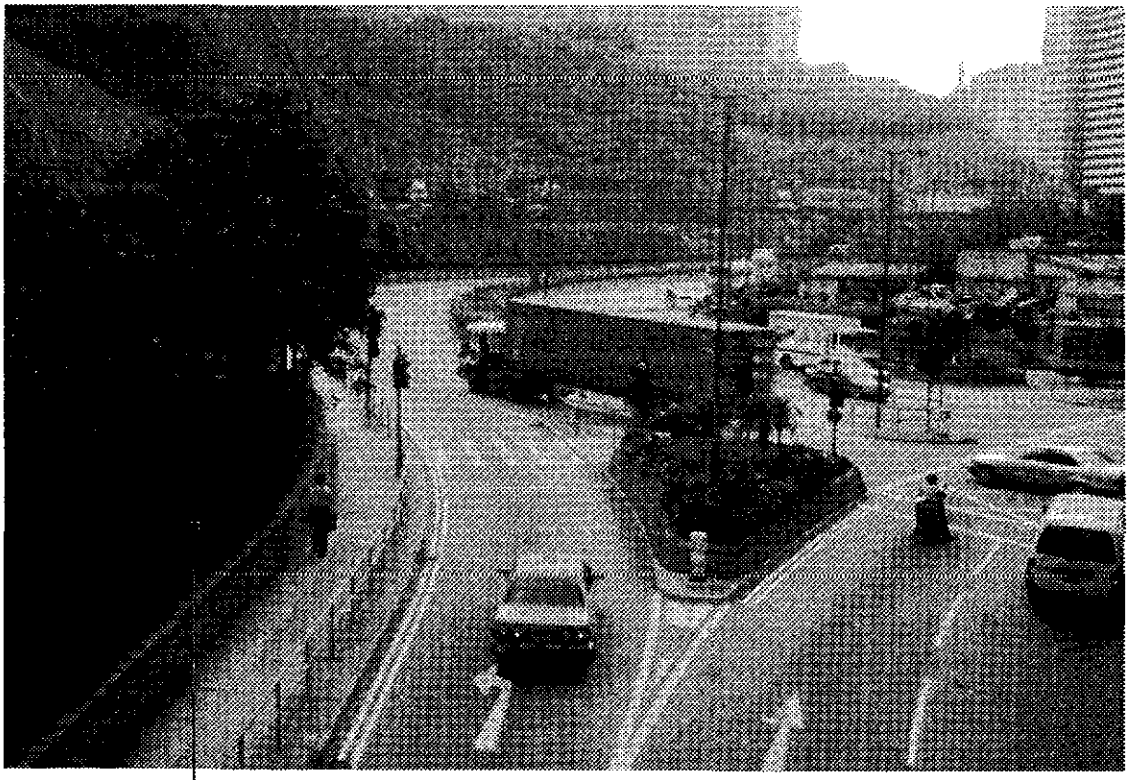
CUMULATIVE EFFECT OF EXISTING STRUCTURE, NEW STRUCTURE ANDEXISTING SLOPE WILL LEAD TO A LOW - QUALITY STREETSCAPE

LANDSCAPE & VISUAL IMPACT
FIGURE 5



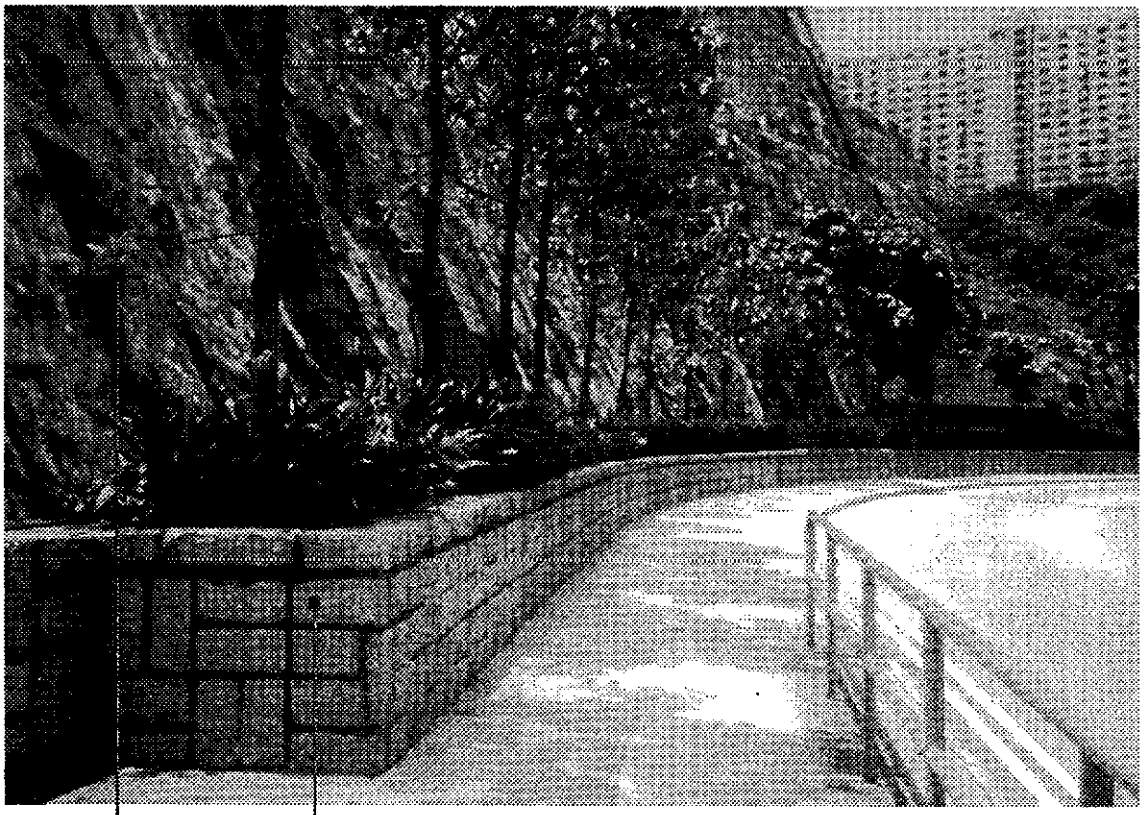
EXISTING ROADSIDE AMENITY PLANTING UNDER EXISTING FLYOVER TO BE RETAINED AND PROTECTED DURING CONSTRUCTION.

LANDSCAPE & VISUAL IMPACT
FIGURE 6



PLANTING TO BE RE-INSTATED WITH SHADE TOLERANT SPECIES AFTER CONSTRUCTION.

LANDSCAPE & VISUAL IMPACT
FIGURE 7

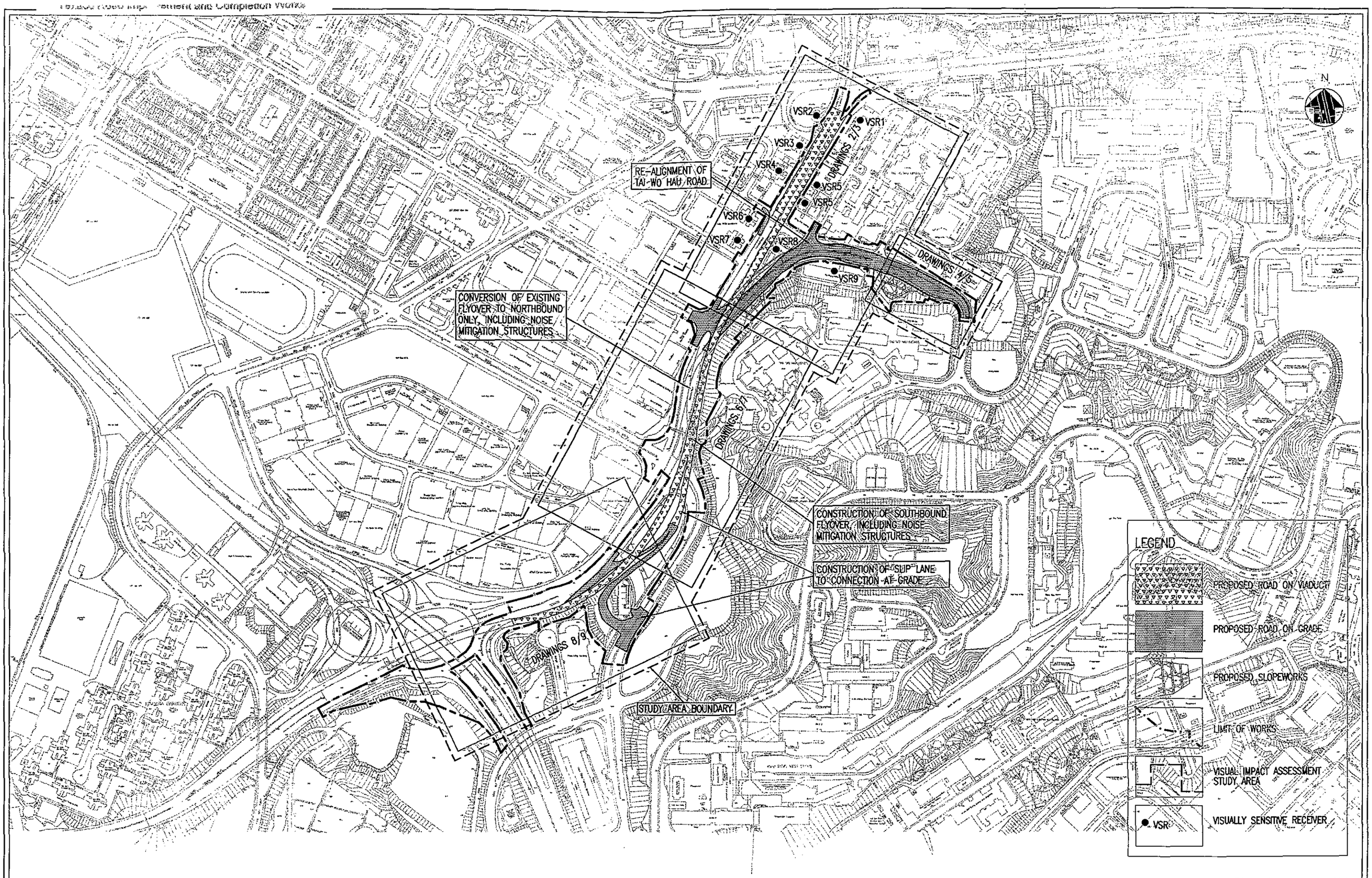


EXISTING SHRUBS TO BE RE-INSTATED WITH SHADE TOLERANT SPECIES AFTER CONSTRUCTION. STONE WALL TO BE RETAINED AND PROTECTED DURING CONSTRUCTION PERIOD

LANDSCAPE & VISUAL IMPACT
FIGURE 8

REMOVAL OF MATURE TREES IN TA WO HAU STREET WILL HAVE A SUBSTANTIAL IMPACT ON ENVIRONMENTAL QUALITY.

LANDSCAPE & VISUAL IMPACT
FIGURE 9



LANDSCAPE MITIGATION PLAN – KEY PLAN

Mouchel

Drawing No. 1.0

CAD FILE NAME: LGM103A/WORKING/001.dwg

SEE SHEETS 6 AND 7

FIGURE 4
EXISTING PLANTING UNDER PROPOSED FLYOVER WILL BE REMOVED TO ALLOW CONSTRUSTION OF NEW ROAD.

NEW AT-GRADE ROAD CREATES AN OPPORTUNITY TO PROVIDE AN INTERESTING OPEN SPACE AREA.

FIGURE 1
EXISTING OPEN SPACE BELOW ELEVATED ROAD. ACCESS WILL BE LIMITED BY HOARDINGS DURING CONSTRUCTION.

REFER TO PHOTOGRAPH IN FIGURE 1

REFER TO PHOTOGRAPH IN FIGURE 2

REFER TO PHOTOGRAPH IN FIGURE 3

REFER TO PHOTOGRAPH IN FIGURE 4

REFER FIGURE 2
VISUAL IMPACT ON A VSR – BUDDHIST B.Y.M. SCHOOL DURING CONSTRUCTION AND OPERATION. EFFECTIVE MITIGATION DIFFICULT TO ACHIEVE OWING TO PROXIMITY OF NEW STRUCTURES. NOISE MITIGATION MEASURES SHOULD BE DESIGNED SO AS NOT TO OBSTRUCT LIGHT INTO ADJACENT BUILDING.

RETAINING WALL AND ABUTMENT

TAI TAK PATH IS CURRENTLY IN POOR CONDITION AND HARDLY USED.

NEW FLYOVER AND ASSOCIATED ABUTMENT WILL IMPACT ON QUALITY OF STREET LEVEL LANDSCAPE. PARAPET AND FACE OF WALL SHOULD BE DESIGNED WITH AN INTERESTING FINISH. EXTRA STREET LIGHTING MAY BE NECCESSARY.

NEW SLOPEWORKS REQUIRED FOR AT-GRADE ROAD. TREATMENT OF SLOPE FACE SHOULD BE UNOBTRUSIVE AND INCORPORATE SOFT LANDSCAPE WORKS IF POSSIBLE TO REDUCE VISUAL IMPACT.

REFER FIGURE 3
CONSTRUCTION OF AT-GRADE ROAD WILL REQUIRE THE REMOVAL OF A NUMBER OF MATURE TREES, EXPOSING FU KEUNG HOUSE TO VIEWS OF THE NEW ROAD.
LOSS OF TREES WILL BE A SIGNIFICANT IMPACT ON VISUAL AMENITY. TRANSPLANTING MAY BE POSSIBLE OF SOME SIGNIFICANT TREES.
FURTHER CHECKING AT DETAILED DESIGN MAY ENABLE PRESERVATION OF SOME OF THESE TREES WITHIN THE ROAD MEDIAN, SIDEWALK OR ROADSIDE AMENITY AREA

EXISTING PLAY AREA (HKHA) WILL BE AFFECTED BY WORKS. CONSIDER OPTIONS FOR REPROVISIONING ON SITE.

LEGEND
- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS
- EXISTING PLANTING

SEE SHEETS 4 AND 5

0 5 10 20m

LANDSCAPE & VISUAL IMPACT PLAN – SHEET 2 OF 12

Mouchel

Drawing No. 2.0

CAD FILE NAME: LGM103A/WORKING/102.dwg

SEE SHEET 6 AND 7

OPPORTUNITY TO PROVIDE NEW AMENITY PLANTING IN REDUNDANT ROAD SPACE

NOISE MITIGATION MEASURES TO BE DESIGNED AS LIGHTWEIGHT STRUCTURES WITH A CHROMATIC COLOUR SCHEME APPROPRIATE TO ITS SETTING.

AFTER HOARDINGS REMOVED RE-INSTATE EDGE OF OPEN SPACE IF NECESSARY.

OPTIONS FOR AMENITY AREA SEE DRAWING 12

NEW RETAINING WALL TO HAVE A COLOURED EXTERNAL TREATMENT.

INCORPORATE NEW LANDSCAPE WORKS ALONG NEW AT-GRADE ROAD AND ON ADJACENT SLOPE FACE.

CONSIDER UPGRADING WHOLE OF AREA IN FRONT OF FU KEUNG HOUSE. SEE FIGURE 10

LEGEND

- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS
- PROPOSED TREES
- PROPOSED PLANTING, INCLUDING TREES, SHRUBS & GROUNDCOVER

SEE SHEETS 4 AND 5

0 5 10 20m.

LANDSCAPE MITIGATION PLAN – SHEET 3 OF 12

Mouchel

Drawing No. 3.0

CAD FILE NAME: LGM03A/WORKING/003.dwg

Texaco Road Improvement and Completion Works

OPPORTUNITY TO INTRODUCE NEW AMENITY PLANTING TO MITIGATE VISUAL IMPACT OF ROAD ON VIEWS FROM FU ON HOUSE AND TAI WO HAU ESTATE COMMUNITY CENTRE.

SEE SHEET 2 AND 3

REFER TO PHOTOGRAPH IN FIGURE 9

PROPOSED RETAINING WALL

NEW SLOPEWORKS WILL REQUIRE SOFT LANDSCAPE TREATMENT.

NEW SLOPEWORKS WILL REQUIRE THE LOSS OF A LARGE NUMBER OF SIGNIFICANT EXISTING TREES. SUBSTANTIAL REDUCTION IN ENVIRONMENT AMENITY.

LEGEND

- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS
- EXISTING VEGETATION

0 5 10 20m

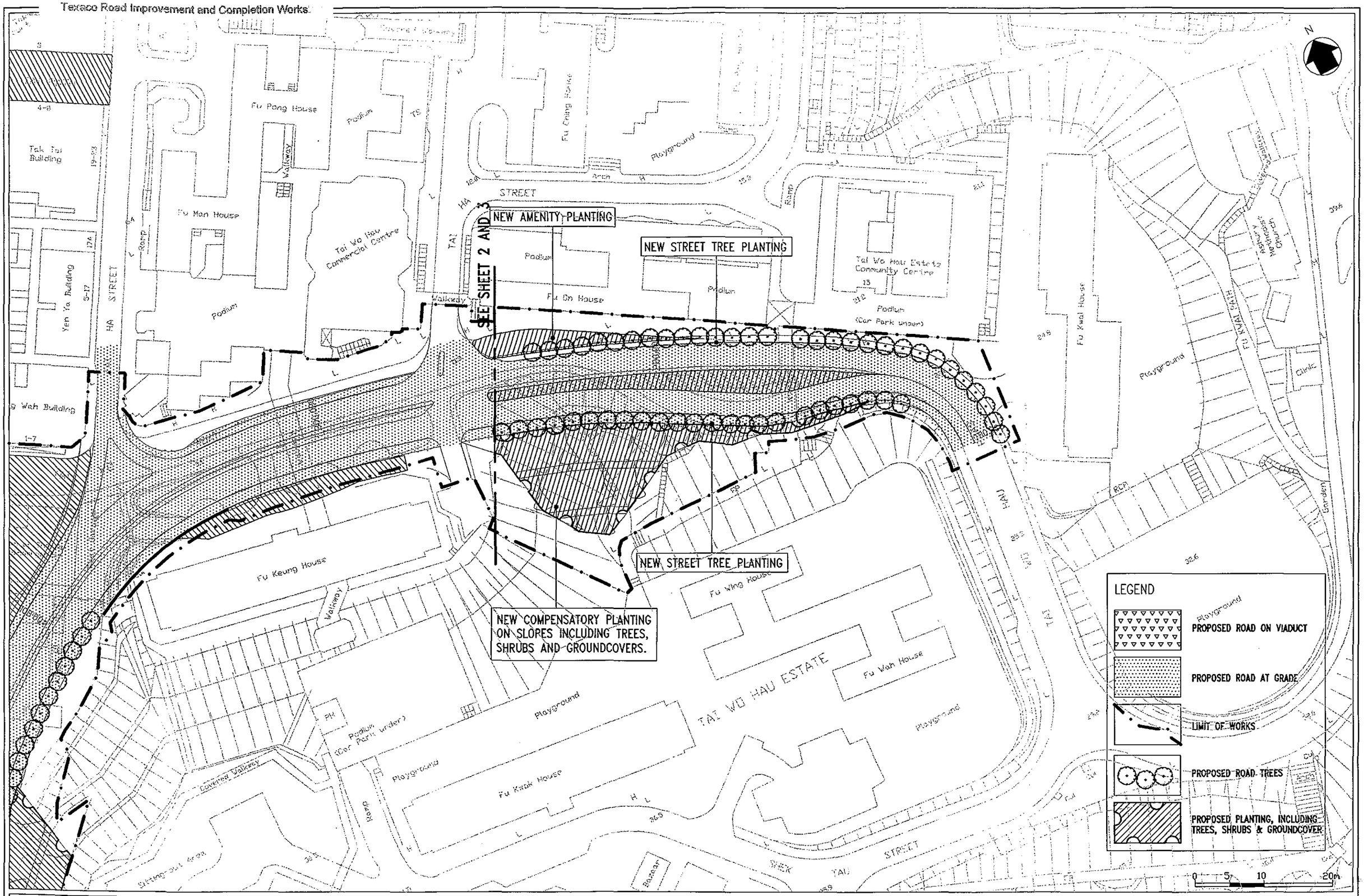
LANDSCAPE & VISUAL IMPACT PLAN – SHEET 4 OF 12

Mouchel

Drawing No. 4.0

CAD FILE NAME: LGH03A/WORKING/004.dwg

Texaco Road Improvement and Completion Works



LANDSCAPE MITIGATION PLAN – SHEET 5 OF 12

Mouchel

Drawing No. 5.0

CAD FILE NAME: LGM103A/WORKING/005.dwg

Texaco Road Improvement and Completion Works

LEGEND

- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS
- EXISTING VEGETATION

SEE SHEETS 8 AND 9

SEE SHEETS 2 AND 3

SEE SHEETS 2 AND 3

YELING UK ROAD

Dynamic Cargo Centre

E.W. International Tower

Podium

Walkway

Elevated Road

Factory

Ming Yip Factory Building

Fo-Tai Building

Symphonic Industrial Building

Pro Yip Building

Covered Walkway

Fu Yik House

Fu Tak House

TAI WO HAU ESTATE

Pond

ROAD

RCP

FIGURE 6
EXISTING ROADSIDE AMENITY PLANTING TO BE PROTECTED DURING CONSTRUCTION PERIOD.

APPEARANCE OF ROCK FACE/FLYOVER CONSTRUCTION INTERFACE.

REFER TO FIGURE 7 FOR PHOTOGRAPH

REFER TO FIGURE 5 FOR PHOTOGRAPH

REFER TO FIGURE 8 FOR PHOTOGRAPH

REFER TO FIGURE 6 FOR PHOTOGRAPH

FIGURE 5
NEW FLYOVER WILL OVERSHADOW FOOTPATH. CUMULATIVE EFFECT OF NEW STRUCTURE, NOISE MITIGATION MEASURES AND EXISTING SHOTCRETE SLOPE WILL GENERATE A LOW QUALITY STREETSCAPE.

FIGURE 7
EXISTING ROADSIDE AMENITY PLANTING EFFECTED BY WORKS TO BE TRANSPLANTED PRIOR TO COMMENCEMENT OF CONSTRUCTION AND RE-INSTATED TO AN EQUIVALENT STANDARD AFTER COMPLETION OF NEW STRUCTURE.

0 5 10 20m

LANDSCAPE & VISUAL IMPACT PLAN – SHEET 6 OF 12

Mouchel

Drawing No. 6.0

CAD FILE NAME: LGH1030A/WORKING/006.dwg

LEGEND

- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS
- PROPOSED ROAD TREES
- PROPOSED PLANTING, INCLUDING TREES, SHRUBS & GROUNDCOVER

FIGURE 6
EXISTING ROADSIDE AMENITY PLANTING TO BE PROTECTED DURING CONSTRUCTION PERIOD.

CONSIDER IMPROVE QUALITY OF STREETSCAPE BY INCORPORATING INNOVATIVE DESIGN FEATURES INTO PAVEMENT AND COLUMNS OF NEW VIADUCTS. CONSIDER NEW LIGHTING

SEE SHEETS 8 AND 9

SEE SHEETS 2 AND 3

NEW AMENITY PLANTING ADJACENT TO AT-GRADE ROAD AND NEW FLY-OVER ABUTMENT.

AMENITY PLANTING IN TRAFFIC ISLAND TO BE RE-INSTATED

EXISTING TREES UNDER PROPOSED FLYOVER RE-INSTATED WITH TALL SHRUBS

EXISTING AMENITY PLANTING TRANSPLANTED

0 5 10 20m

LANDSCAPE MITIGATION PLAN – SHEET 7 OF 12

Mouchel

Drawing No. 7.0

CAD FILE NAME: LGM103A/WORKING/007.dwg

QUALITY OF STREETSCAPE REDUCED BY NEW FLYOVER AND AT-GRADE ROAD. HARD LANDSCAPE SOLUTIONS NEEDED TO IMPROVE APPEARANCE OF AREA.

SEE SHEET 6 AND 7

NEW AT-GRADE ROAD WILL REQUIRE SLOPES AND EMBANKMENTS. OPPORTUNITY FOR THE PROVISION OF NEW PLANTING AREAS.

LEGEND

- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS

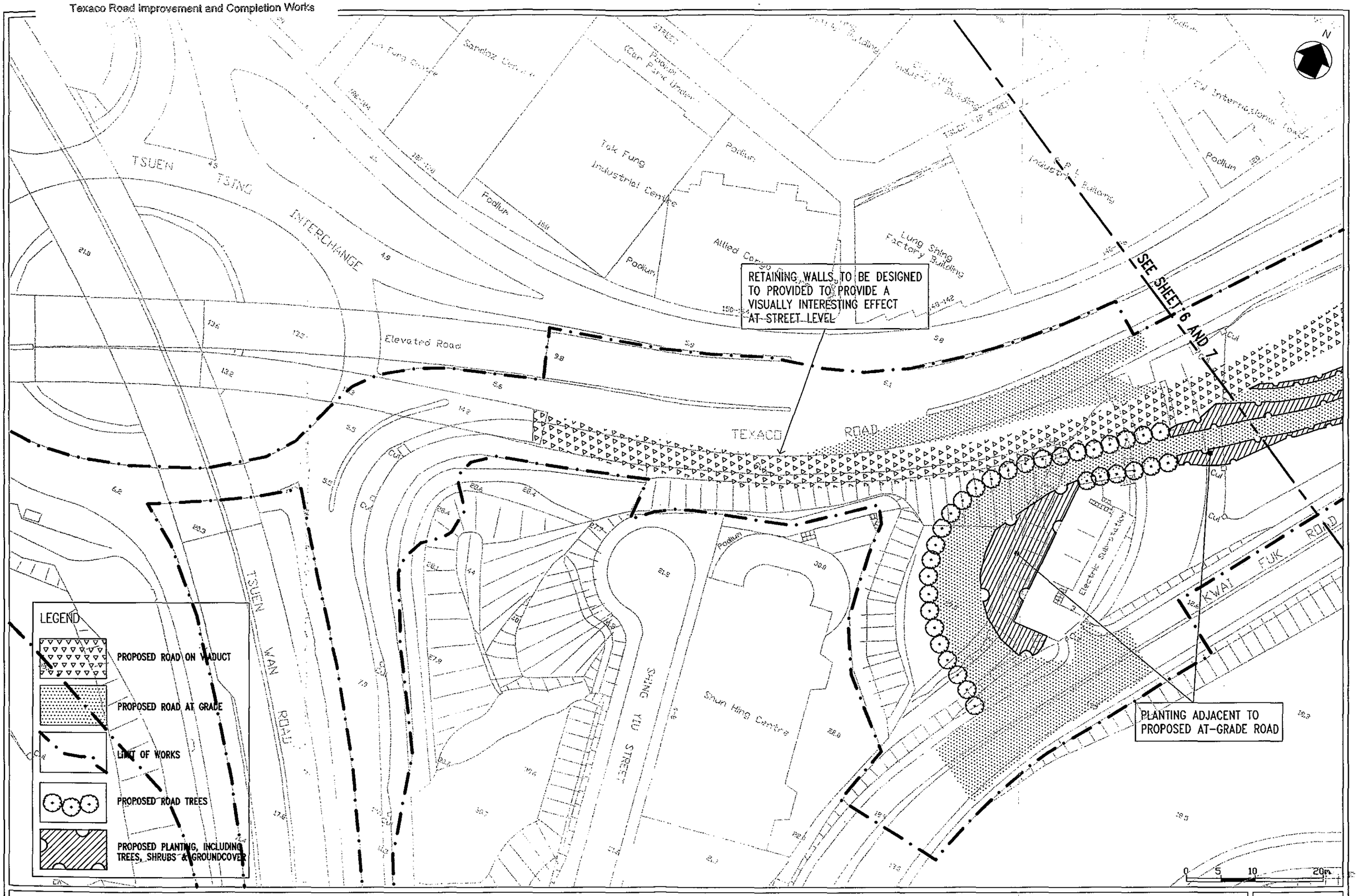
0 5 10 20m

LANDSCAPE & VISUAL IMPACT PLAN – SHEET 8 OF 12

Mouchel

Drawing No. 8.0

CAD FILE NAME: LGM103A/WORKING/009.dwg



LANDSCAPE MITIGATION PLAN – SHEET 9 OF 12

Mouchel

Drawing No. 9.0

CAD FILE NAME: LGH103A/WORKING/009.dwg

SEE DRAWING 12 FOR MITIGATION OPTIONS IN THIS LOCATION

UNDER VIADUCT AREAS WILL REQUIRE INNOVATIVE LANDSCAPE HARDWORKS. SEE DRAWING 12 FOR EXAMPLES

Fu Nun House
Tai Wo Hau Commercial Centre
Fu On House
Fu Keung House
Fu Wing House
Fu Wah House
Fu Kwok House
Fu Tak House
Wang Wah Building
Wealthy Shopping Arcade
Cheung Fat House
Tai Fat House
Elevated Road
Subway
Covered Walkway
Sitting-out Area
Ramp
Playground
Podium
(Car Park under)
TAI WO HAU ESTATE
TAI WO HAU ESTATE ROAD
SHEK

LEGEND

- PROPOSED ROAD ON VIADUCT
- PROPOSED ROAD AT GRADE
- LIMIT OF WORKS
- PROPOSED ROAD TREES
- PROPOSED PLANTING, INCLUDING TREES, SHRUBS & GROUNDCOVER

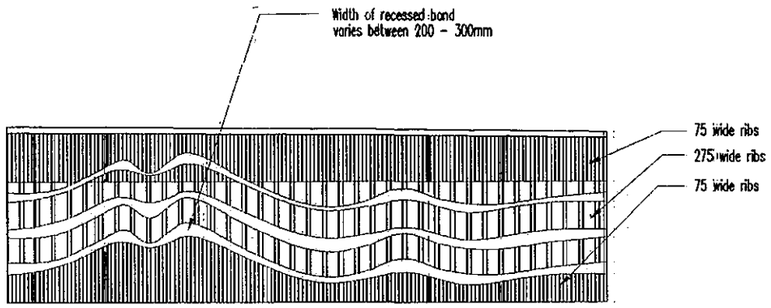
0 5 10 20m

LANDSCAPE MITIGATION PLAN – SHEET 10 OF 12

Mouchel

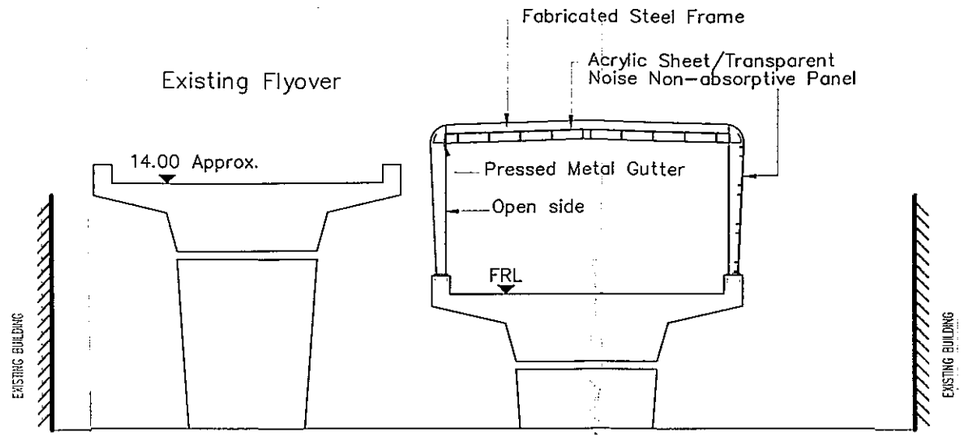
Drawing No. 10.0

CAD FILE NAME: LGH169A/WORKING/100.dwg



A. INDICATIVE CONCRETE RETAINING WALL ELEVATION

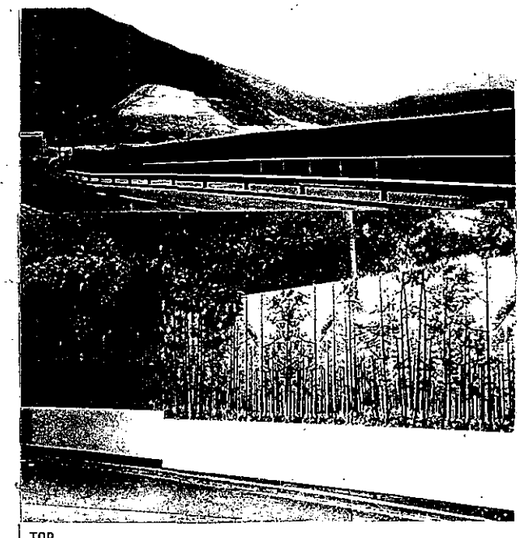
Not to Scale



B. INDICATIVE NOISE MITIGATION STRUCTURES

Not to Scale

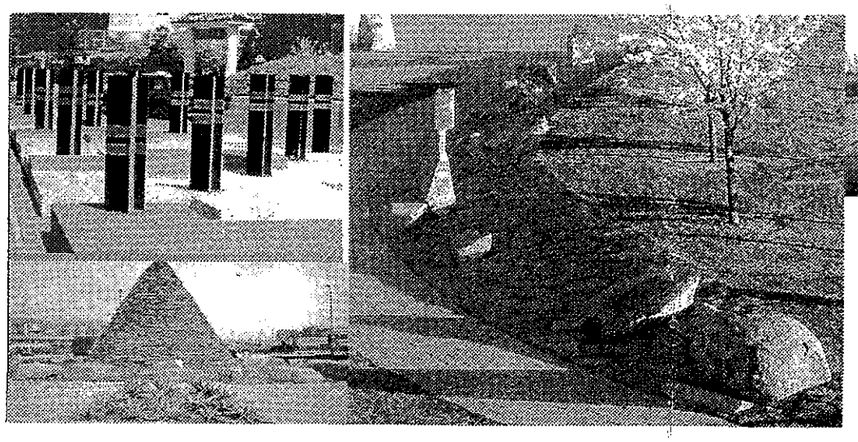
ABOVE
The visual impact of untidy construction sites on views from overlooking residences



TOP
The visual impact of unattractive hoarding on views at street level.

BELOW
The mitigating effects of a well-designed hoarding screening a construction site.

C. MITIGATION DURING CONSTRUCTION



TOP
Colourful bollards and granite block sculptures.

BELOW
Environmental art - stone sculpture pyramid.

ABOVE
Standard concrete block paving and granite faced retaining walls with sculptural boulders.

ABOVE
Innovative use of concrete under a road viaduct..

D. INNOVATIVE HARD LANDSCAPE SOLUTIONS

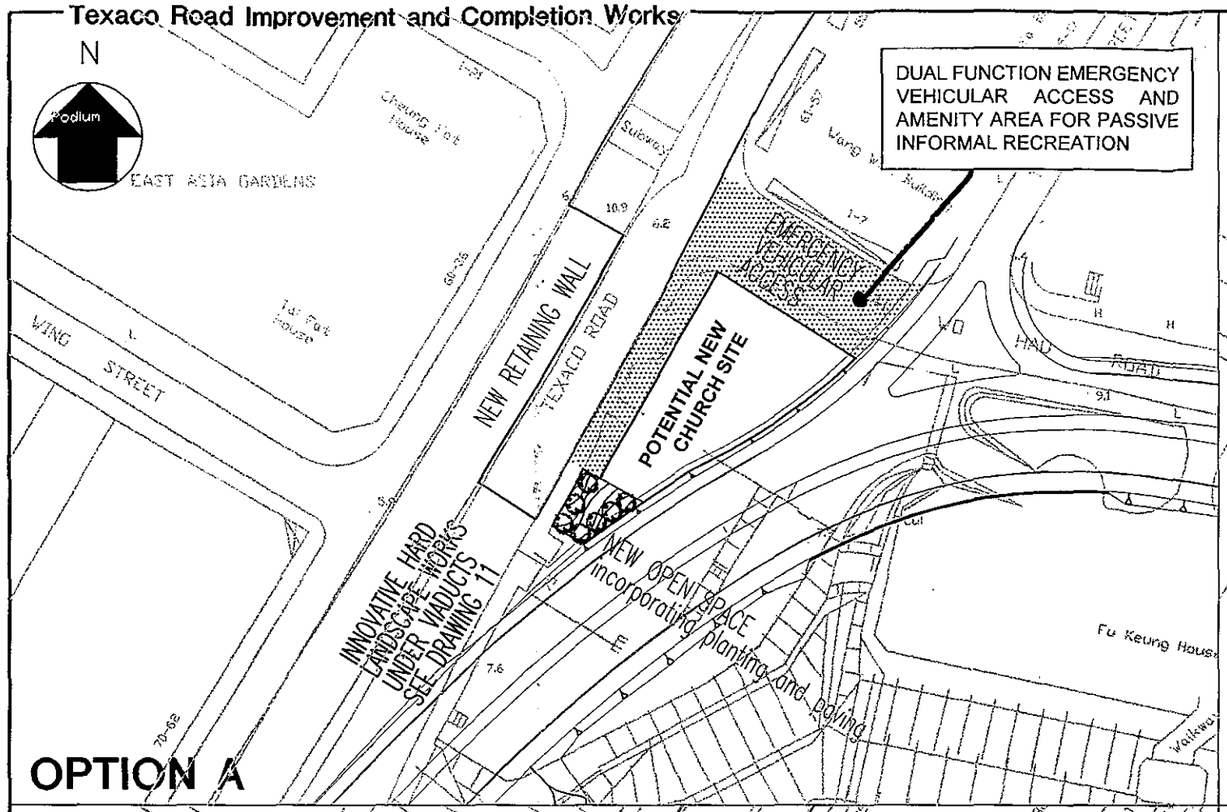
LANDSCAPE MITIGATION PLANS - INNOVATIVE LANDSCAPE SOLUTIONS

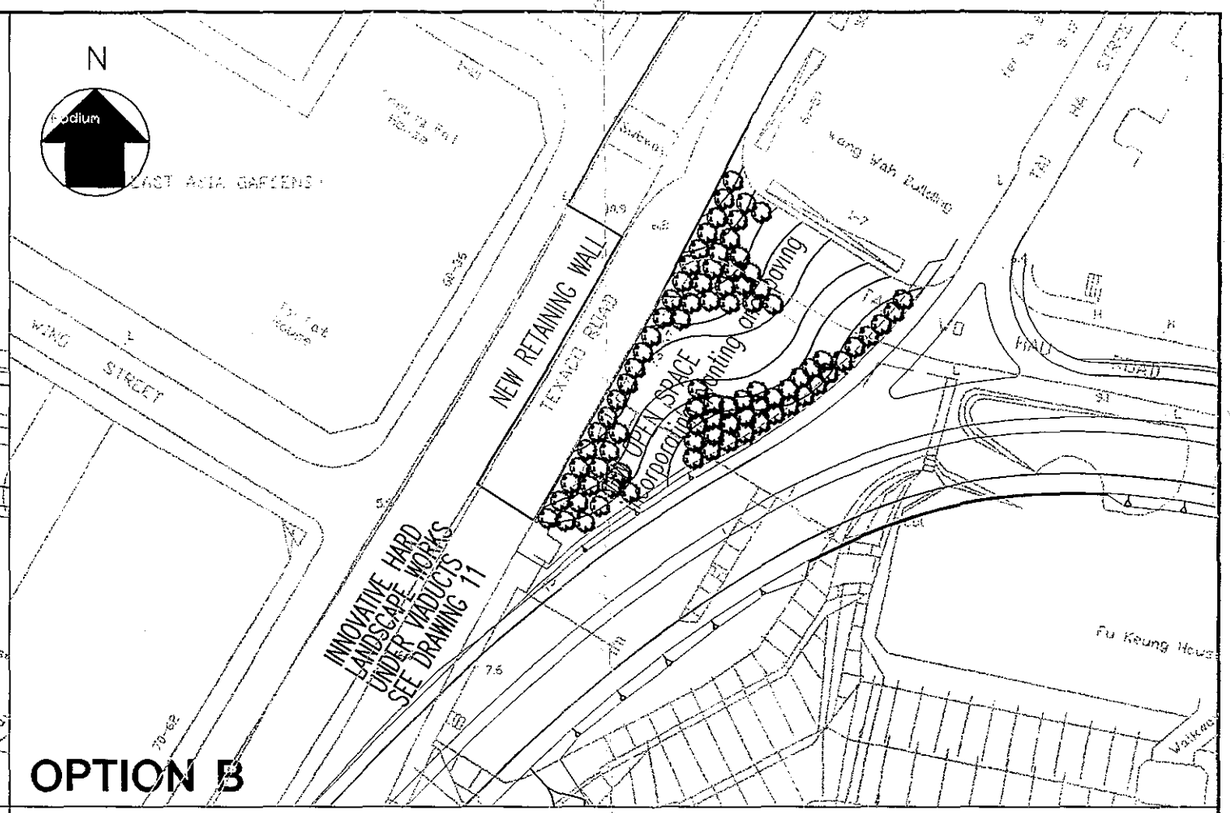
Mouchel

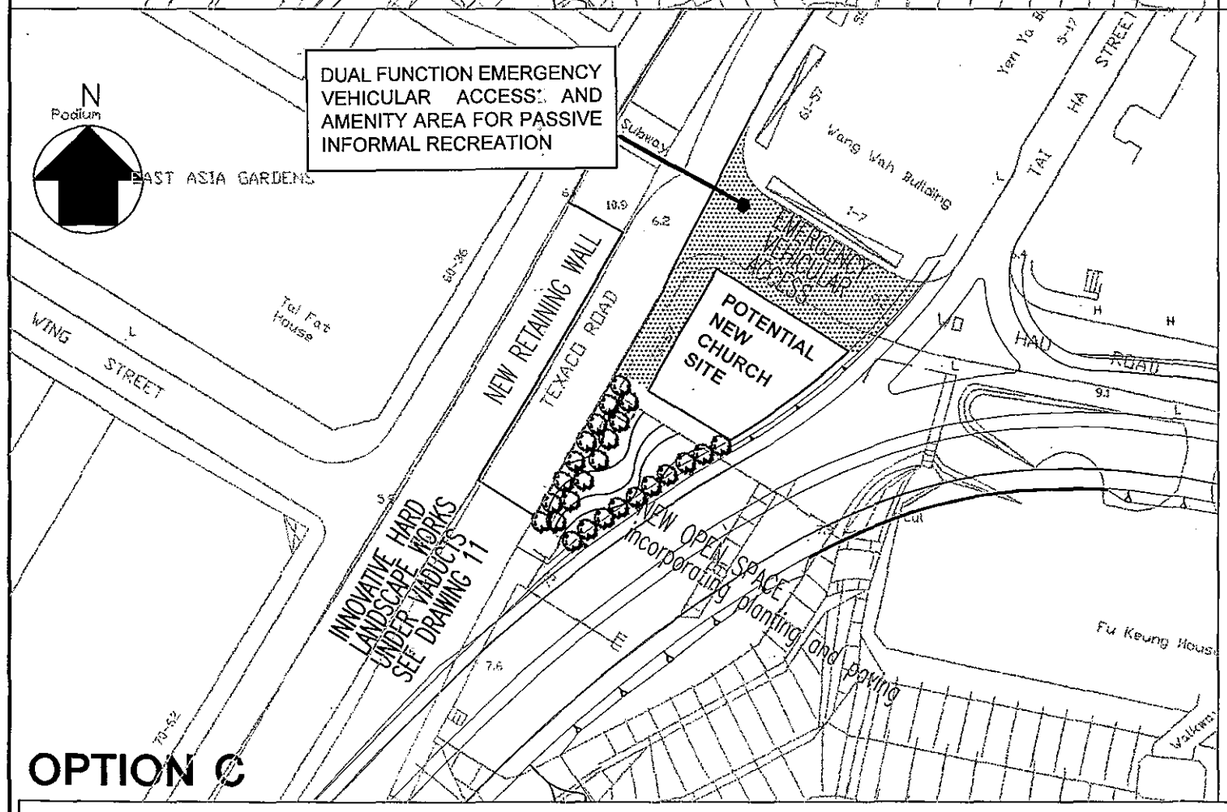
Drawing No. 11

CAD FILE NAME : LGM103A/011.DWG

Texaco Road Improvement and Completion Works







Proposed Local Open Space comprising new tree planting and interesting paving patterns and innovative hard landscape solutions

OPTION A – CHURCH SITE REPROVISIONED WITH AN EVA ALLOWING A SMALL OPEN SPACE AREA

OPTION B – CHURCH SITE NOT REPROVISIONED ALLOWING A LARGE OPEN SPACE AREA

OPTION C – CHURCH SITE REPROVISIONED WITH AN EVA WITH A SMALLER AREA THAN OPTION A, ALLOWING A MEDIUM-SIZED OPEN SPACE AREA

LANDSCAPE MITIGATION PLANS - CROWN OF THORNS CHURCH

Mouchel

Drawing No. 12

CAD FILE NAME : LGM103A\WORKING\D12.DWG

Tree Inspection Report

TABLE 1

Tree No.	Species	POTENTIAL TREATMENT	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
T1	Delonix regia	F	12	770	200	8	Good(G)	Good(G)	Possible(P)	High (H)	
T2	Delonix regia	F	12	880	270	8	G	G	P	H	
T3	Delonix regia	R	12	620	190	8	G	G	P	H	
T4	Bambusa ventricosa	R	3	180	50	3	G	G	Yes (Y)	H	11 Trunks of Bambusa.v
T5	Erythrina spp.	R	10	1600	550	12	G	G	P	Very high	Used to offering
T6	Bauhinia purpurea	R	7	470	160	8	G	G	Y	H	Two Trunks
T7	Bombax malabaricum	R	10	760	250	6	G	G	Y	H	
T8	Bauhinia purpurea	R	4	430	150	5	G	G	Y	H	Two Trunks
T9	Bauhinia purpurea	R	5	730	230	7	G	G	Y	H	Two Trunks
T10	Bauhinia purpurea	R	5	—	—	6	G	G	Y	M	Difficult to access (DA)
T11	Bauhinia purpurea	R	7	—	—	5	G	G	Y	M	DA
T12	Bauhinia purpurea	R	8	—	—	6	G	G	Y	M	DA
T13	Bauhinia purpurea	R	5	690	290	4	Medium(M)	Poor(P)	Y	Low (L)	
T14	Bauhinia purpurea	R	5	580	200	4	Poor(P)	P	Y	L	
T15	Aleurites moluccana	F	12	800	260	7	G	G	P	VH	
T16	Aleurites moluccana	F	12	1100	380	7	G	G	P	VH	
T17	Bauhinia purpurea	F	8	800	270	5	G	G	P	H	
T18	Aleurites moluccana	F	10	600		5	G	G	P	H	
T19	Bauhinia purpurea	F	8	560	190	5	G	G	P	H	
T20	Bauhinia purpurea	F	7	560	220	4	M	P	P	L	

Project : Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Tree Inspection Report

TABLE 2

27 March 1998

Tree No.	Species	Potential Treatment	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
T21	Aleurites moluccana	F	15	300	100	5	G	G	P	H	
T22	Aleurites moluccana	F	15	380	90	5	G	G	P	H	
T23	Aleurites moluccana	F	20	390	110	5	G	G	P	H	
T24	Aleurites moluccana	F	20	680	200	4	G	G	P	H	
T25	Aleurites moluccana	F	20	1100	380	5	G	G	P	H	
T26	Erythrina spp	F	5	850	310	5	G	G	Y	H	
T27	Bauhinia purpurea	F	7	800	310	5	M	M	Y	H	
T28	Ficus virens	F	4	—	—	4	M	M	Y	M	DA
T29	Bauhinia purpurea	F	5	200	70	2	M	M	Y	M	DA
T30	Bauhinia purpurea	F	7	490	170	4	M	M	Y	M	Two Trunks
T31	Bauhinia purpurea	F	5	200	70	2	M	M	Y	M	DA
T32	Acacia confusa	F	12	530	290	6	G	G	Y	H	Two Trunks.
T33	Bauhinia purpurea	F	4	490	180	3	M	M	Y	M	
T34	Bauhinia purpurea	F	4	40	140	3	M	M	Y	M	Two Trunks
T35	Bauhinia purpurea	F	7	950	30	4	G	G	Y	H	
T36	Bauhinia purpurea	F	7	670	260	5	G	G	Y	H	
T37	Macaranga tanarius	F	5	510	170	6	G	G	Y	H	
T38	Bauhinia purpurea	F	3	230	80	2	P	P	Y	L	
T39	Acacia spp.	F	10	560	170	5	G	G	P	H	
T40	Acacia spp	F	9	450	150	4	G	G	Y	H	

Tree Inspection Report

TABLE 3

Tree No.	Species	POTENTIAL TREATMENT	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
T41	Bauhinia purpurea	F	5	117	50	2	P	P	Y	L	
T42	Bauhinia purpurea	F	5	480	160	3	P	P	Y	L	
T43	—		—	—	—	—	—	—	—	—	—
T44	Bauhinia purpurea	F	5	320	100	3	P	P	Y	L	
T45	Bauhinia purpurea	F	5	280	90	3	P	P	Y	L	
T46	Bombax malabaricum	F	10	730	260	7	G	G	Y	H	
T47	Bauhinia purpurea	F	6	480	280	4	M	M	Y	M	
T48	Bauhinia purpurea	F	7	400	170	5	G	M	Y	M	
T49	Acacia spp.	R	10	1260	410	15	G	G	N	VH	
T50	Bauhinia purpurea	R	2	110	50	1	P	P	Y	VL	
T51	Acacia spp	R	7			10	G	G	Y	H	
T52	Bauhinia purpurea	F	8	250	120	7	M	M	Y	M	
T53	Bauhinia purpurea	F	8			6	M	M	Y	M	
T54	Ficus microcarpus	F	3	560	200	2	L	L	Y	L	
T55	Terminalia catappa	F	10	660	221	5	H	H	P	H	
T56	Terminalia catappa	F	10	771	220	5	H	H	P	H	
T57	Terminalia catappa	F	10	700	223	5	H	H	P	H	
T58	Terminalia catappa	F	7	600	180	5	H	H	P	H	
T59	Aleurites moluccana	F	12	760	260	6	H	H	P	H	
T60	Unknown spp	F	10	570	190	5	H	H	P	H	

Project : Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Tree Inspection Report

TABLE 4

27 March 1998

Tree No.	Species	POTENTIAL TREATMENT	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (HIgh/Medium/ Low)	Other Comment
T61	Unknown spp.	F	10	760	270	6	H	H	P	H	
T62	Acacia spp	F	10	400	140	4	H	H	P	H	
T63	Unknown spp.	F	8	480	160	4	H	H	P	H	
T64	Acacia spp.	F	7	440	120	3	H	M	P	M	
T65	Acacia spp.	F	10	710	240	8	H	H	P	VH	
T66	Acacia spp.	F	10	530	170	6	H	H	P	VH	
T67	Acacia spp	F	10	840	250	8	H	H	P	VH	
T68	Acacia spp	F	7	660	223	6	H	H	P	VH	
T69	Acacia spp.	F	10	560	170	5	H	H	P	H	
T70	Acacia spp.	F	10	550	180	3	H	H	P	H	
T71	Aleurites moluccana	F	12	940	220	6	H	H	P	VH	
T72	Acacia spp.	F	10	630	210	6	H	H	P	H	
T73	Acacia spp.	F	8	680	250	6	H	H	P	H	
T74	Aleurites moluccana	F	12	1080	320	7	H	H	P	H	
T75	Aleurites moluccana	F	12	820	240	6	H	H	P	H	
T76	Aleurites moluccana	F	12	590	220	6	H	H	P	H	
T77	Aleurites moluccana	R	8	820	250	6	H	H	P	H	
T78	Acacia spp	F	10	630	210	7	H	H	P	H	
T79	Delonix regia	F	12	980	300	12	H	H	P	H	
T80	Erythrina spp	T	8	870	180	6	H	H	P	H	

Project : Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Tree Inspection Report

TABLE 5

27 March 1998

Tree No.	Species	POTENTIAL TREATMENT	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
T81	Macaranga tanarius	R	5	530	190	3	G	G	Y	H	
T82	Macaranga tanarius	R	5	560	170	3	G	G	Y	H	
T83	Macaranga tanarius	F	6	660	230	4	G	G	Y	H	
T84	Unknown spp.	T	7	570	190	5	G	G	P	H	
T85	Unknown spp.	T	3	380	120	6	G	G	P	M	
T86	Delonix regia	R	12	980	290	10	G	G	P	H	
T87	Delonix regia	F	8	280	80	5	G	M	P	M	
T88	Delonix regia	F	12	1270	400	10	G	G	P	VVH.	
T89	Acacia spp.	F	7	390	120	5	G	G	P	M	
T90	Acacia spp	F	7	540	170	5	G	G	P	M	
T91	Acacia spp	F	6	430	130	4	G	G	P	M	
T92	Acacia spp.	F	4	350	80	2	G	G	P	M	
T93	Acacia spp.	F	4	260	100	2	G	G	P	M	
T94	Terminalia catappa	F	6	550	180	5	G	L	P	M	
T95	Acacia spp.	F	3	320	110	2	G	M	P	L	
T96	Unknown spp.	F	7	360	160	3	G	G	P	M	
T97	Terminalia catappa	F	4	590	200	3	G	L	P	L	
T98	Acacia spp.	F	7	320	90	3	G	M	P	M	
T99	Acacia spp	F	6	290	90	3	G	M	P	M	
T100	Acacia spp.	F	6	390	140	4	G	M	P	M	

Project : Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Tree Inspection Report

TABLE 6

27 March 1998

Tree No.	Species	Potential Treatment	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
T101	Acacia spp.	F	3	350	110	3	G	M	P	M	
T102	Acacia spp.	F	8	520	200	5	G	H	P	H	
T103	Acacia spp.	F	10	580	150	5	G	H	P	H	
T104	Acacia spp.	F	10	560	170	6	G	H	P	H	
T105	Acacia spp.	F	10	550	170	5	G	H	P	H	
T106	Acacia spp.	F	4	320	110	2	G	L	P	L	
T107	Casuarina equisetifolia	T	7	440	180	4	G	H	P	H	
T108	Bauhinia purpurea	F	8	790	240	10	G	H	P	H	
T109	Casuarina equisetifolia	F	12	850	290	7	G	H	P	H	
T110	Unknown spp.	F	7	360	130	10	G	M	P	M	
T111	Acacia spp.	F	7	420	150	4	G	H	P	H	
T112	Acacia spp.	F	8	530	160	4	G	H	P	H	
T113	Aleurites moluccana	F	12	830	300	6	G	H	P	H	
T114	Unknown spp.	F	10	320	200	6	G	H	P	H	
T115	Aleurites moluccana	F	12	840	230	6	G	H	P	H	
T116	Aleurites moluccana	F	12	112	330	6	G	H	P	H	
T117	Aleurites moluccana	F	12	890	270	6	G	H	P	H	
T118	Macaranga tanarius	F	—	—	—	—	—	—	—	—	Dead
T119	Macaranga tanarius	F	6	760	240	6	—	—	—	—	Dead
T120	Macaranga tanarius.	F	4	580	200	1	L	L	P	L	

Project : Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Tree Inspection Report

TABLE 7

27 March 1998

Tree No.	Species	POTENTIAL TREATMENT	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
AT1	Aleurites moluccana	F	10	1250	460	8	G	G	N	VVH	
AT2	Aleurites moluccana	F	10	1030	360	8	G	G	N	VVH	
AT3	Ficus elastica	F	8	1650	520	12	G	G	N	VVH	MANY ARIAL ROOT
AT4	Ficus elastica	F	8	3800	900	12	G	G	N	VVH	MANY ARIAL ROOTS
AT5	Ficus virens	R	3	/	/	3	G	P	Y	L	BAD ACCESS
AT6	Ficus virens	R	3	/	/	3	G	P	Y	L	"
AT7	unknown spp.	R	3	/	/	2	G	P	Y	L	"
AT8	Bauhinia purpurea	R	4	330	120	3	G	P	Y	M	
AT9	Aleurites moluccana	T	6	420	130	3	G	G	P	H	
AT10	Aleurites moluccana	T	6	448	130	4	G	G	P	H	
AT11	Aleurites moluccana	R	6	530	180	5	G	G	P	H	
AT12	Aleurites moluccana	R	6	610	190	6	G	G	P	H	
AT13	Aleurites moluccana	R	6	590	180	5	G	G	P	H	
AT14	Aleurites moluccana	R	6	480	150	4	G	G	P	H	
AT15	Aleurites moluccana	R	6	500	180	4	G	G	P	H	
AT16	Aleurites moluccana	R	6	440	150	3	G	G	P	H	
AT17	Erythrina sp.	R	12	2310	660	10	G	G	P	VVVH	BIRDS NEST IN TREE
AT18	Delonix regia	R	7	400-200	160-80	3	G	M	Y	M	49 SINGLE TREES ALL APPROX THE SAME
AT19	Delonix regia	R	7	750		4	G	M	Y	M	
AT20	Bambusa ventricosa	R	8	\	\	7	G	M	Y	H	PATCH $3m^2$

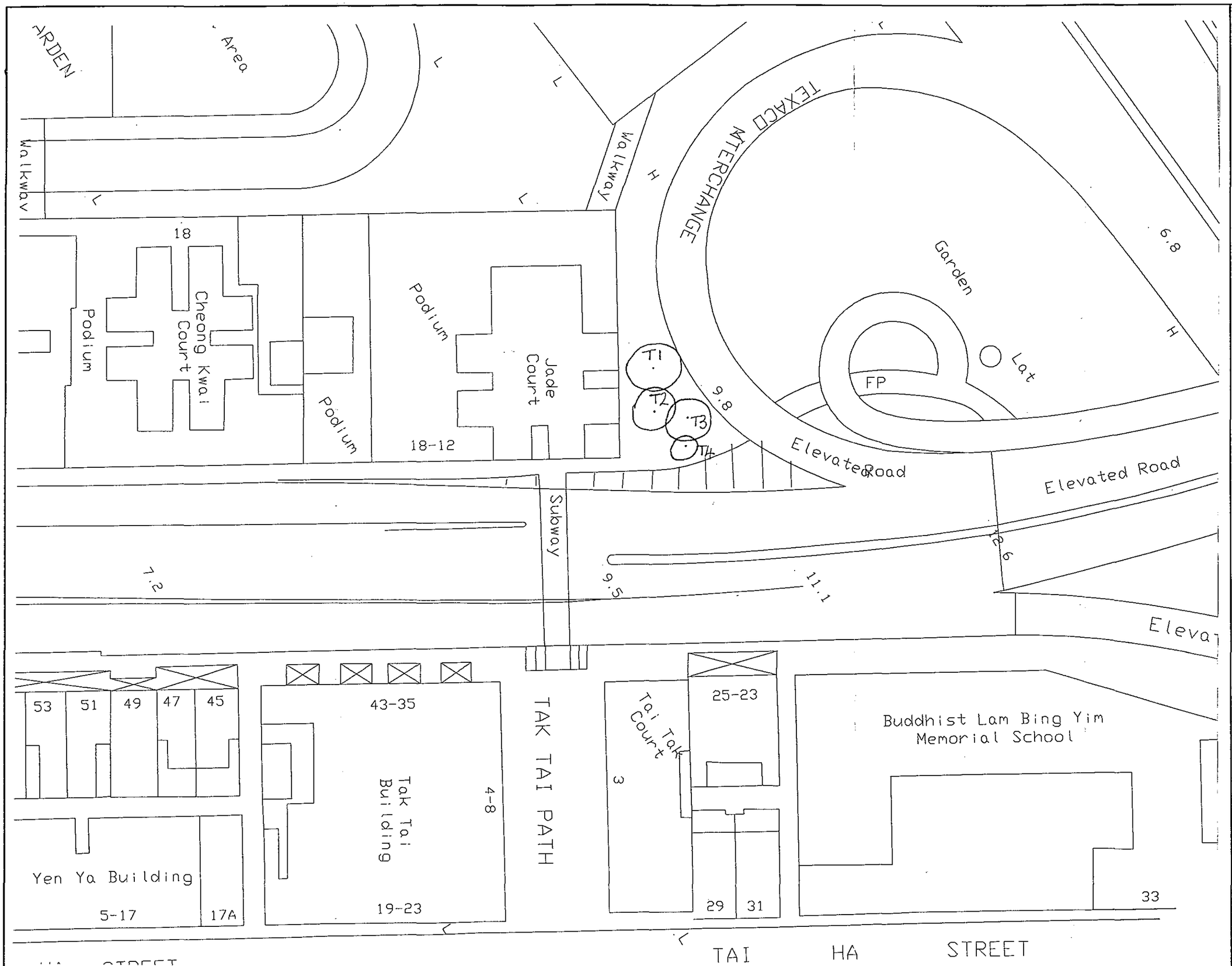
Project : Texaco Road Improvement between Texaco Road Interchange and Tsuen Tsing Interchange

Tree Inspection Report

TABLE 8

27 March 1998

Tree No.	Species	POTENTIAL TREATMENT	Overall Height (Metres)	Girth (mm)	Trunk Diameter (mm)	Average Crown Spread (Metres)	Health (Good/ Poor)	Form (Good/ Poor)	Trans-plantable (Yes/No)	Amenity Value (High/Medium/ Low)	Other Comment
AT21	Unknown spp.	R	10	1420	520	8	G	G	P	H	
AT22	Aleurites moluccana	R	12	1370	390	7	G	G	P	H	
AT23	Aleurites moluccana	R	12	1250	390	7	G	G	P	H	
AT24	Aleurites moluccana	R	7	780	260	5	G	M	P	M	
AT25	Aleurites moluccana	R	10	1580	510	7	G	M	P	M	
AT26	Erythrina spp.	F	8	2260	571	7	G	G	P	H	
AT27	Erythrina spp.	F	8	1610	480	8	G	G	P	H	
AT28	Delonix regia	F	8	1700	580	6	G	G	P	H	
AT29	Macaranga tanarius	F	4	640	210	5	G	P	P	L	
AT30	Bambusa ventricosa	F	4	260	96	4	G	P	P	M	29 stalks.
AT31	Delonix regia	F	8	900	300	6	G	P	P	M	
AT32	Macaranga tanarius	F	7	400	150	6	G	P	P	M	
AT33	Macaranga tanarius	R	7	300	100	5	G	M	P	M	
AT34	M. tanarius	R	6	320	120	5	G	M	P	M	
AT35	M. tanarius	R	7	310	110	5	G	M	P	M	
AT36	M. tanarius	R	6	350	100	5	G	M	P	M	6 Trees in group.



Rev	Issue Stat	Amendment	By	App.	Date

Client

TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG
NEW TERRITORIES WEST DEVELOPMENT OFFICE

Mouchel Asia Limited
Sub-Consultants
MVA Asia Ltd. Aspinwall Clouston.

Project

Completion of Texaco Road/Tsuen Wan By-Pass Interchange and Improvements at Texaco Road, Remaining Works

Title

Plan of Trees Located within the Site boundary (27/3/98)
(Sheet 2 of 4)

Drawn	Checked	Approved
DW		
Scale	CAD File No.	Date
1:500	-	28.3.98
First Issued	Drawing No.	Rev.
28.3.98	13	

Rev	Issue Stat	Amendment	By	App	Date

Client

TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG
NEW TERRITORIES WEST DEVELOPMENT OFFICE

Mouchel Asia Limited
Sub-Consultants
MVA Asia Ltd. Aspinwall Clouston.

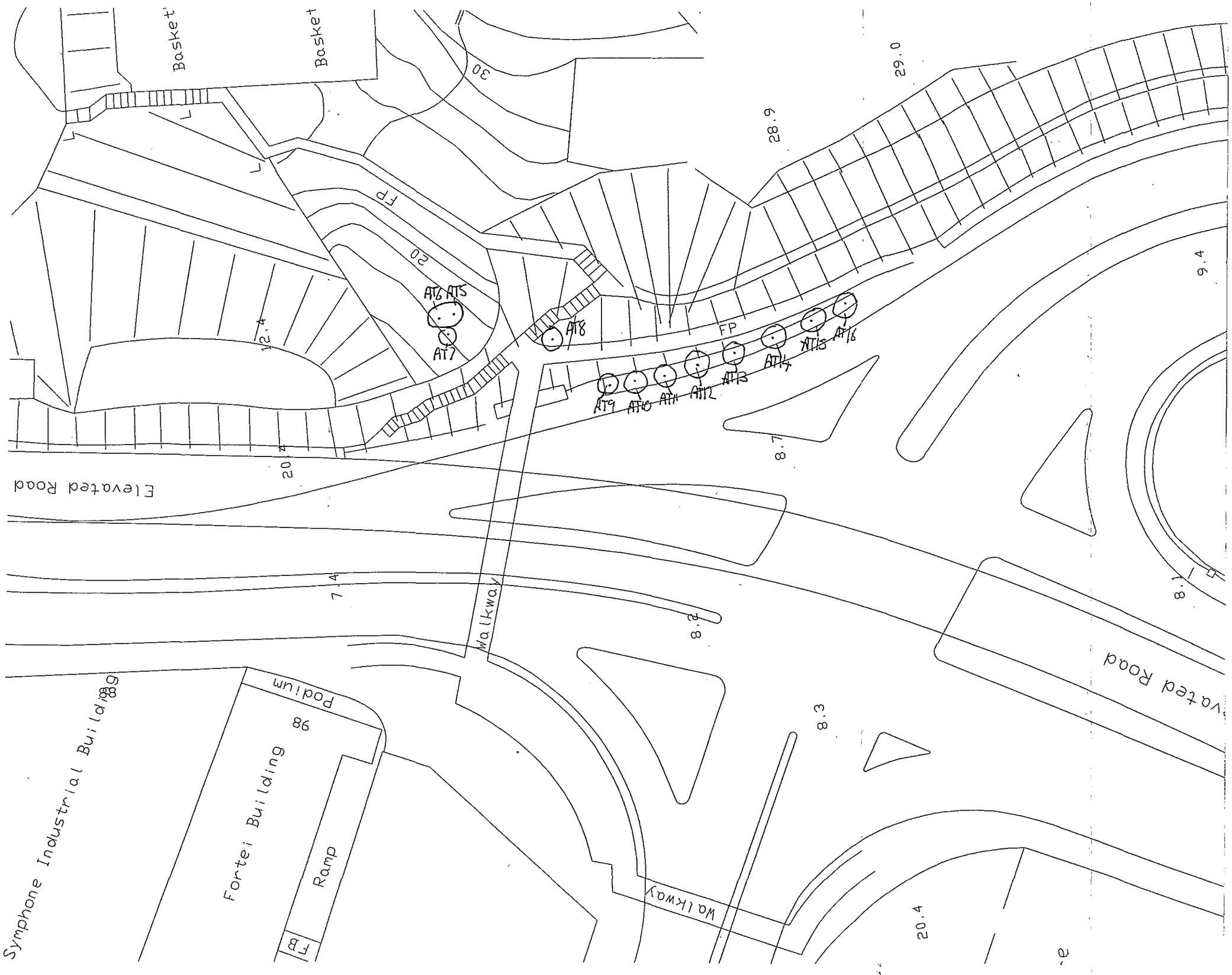
Project

Completion of Texaco Road/Tsuen Wan By-Pass Interchange and Improvements at Texaco Road, Remaining Works

Title

Plan of Trees Located within the Site boundary (27/3/98)
(Sheet 3 of 4)

Drawn	Checked	Approved
DW		
Scale	CAD File No.	Date
1:500	–	28.3.98
First Issued	Drawing No.	Rev.
28.3.98	14	



Rev	Issue Stat	Amendment	By	App	Date

Client

TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG
NEW TERRITORIES WEST DEVELOPMENT OFFICE

Mouchel Asia Limited
Sub-Consultants
MVA Asia Ltd, Aspinwall Clouston.

Project

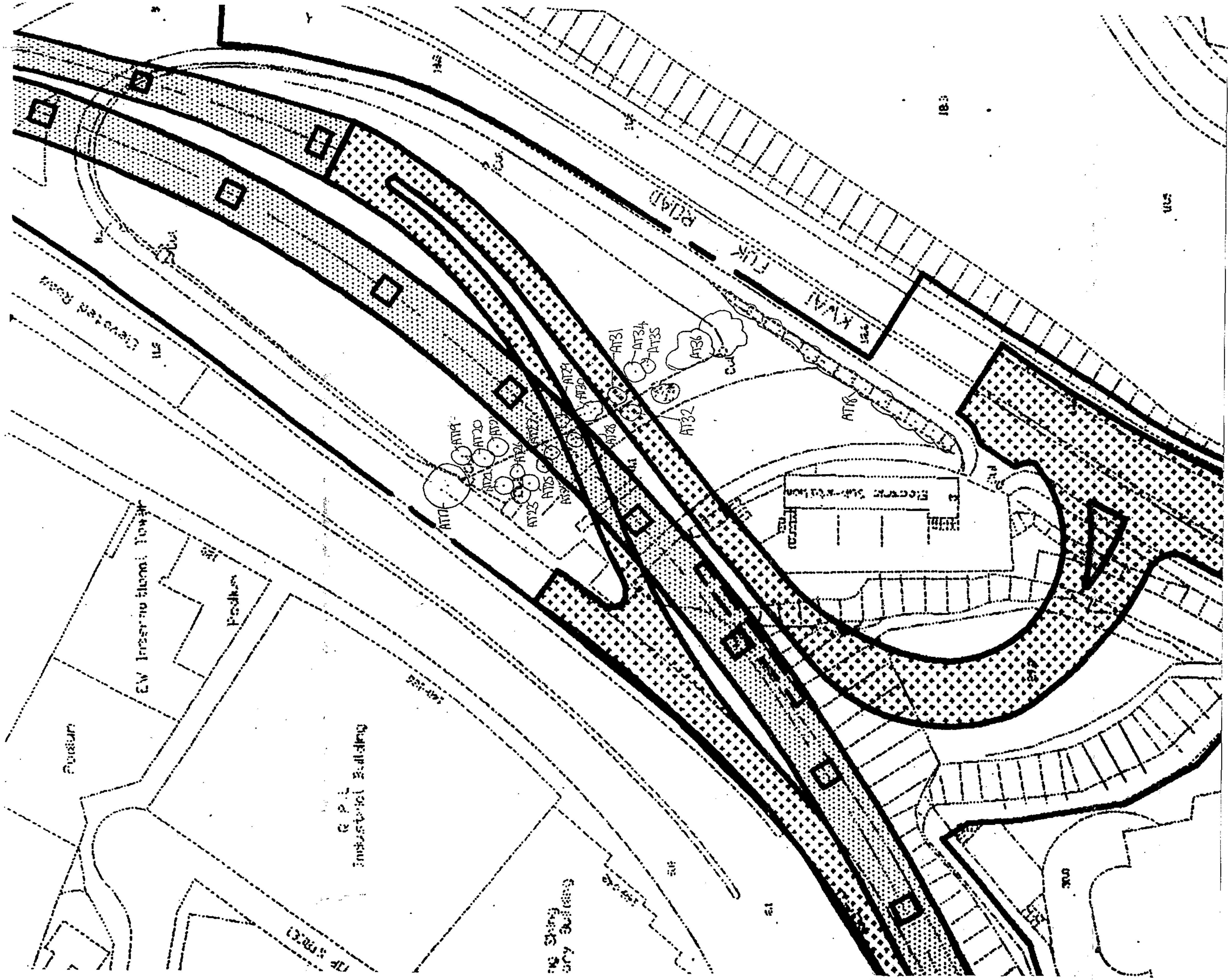
Completion of Texaco Road/Tsuen Wan By-Pass Interchange and Improvements at Texaco Road, Remaining Works

Title

Plan of Trees Located within the Site boundary (27/3/98)

(Sheet 1 of 4)

Drawn	Checked	Approved
DW		
Scale	CAD File No.	Date
1:500	-	28.3.98
First Issued	Drawing No.	Rev.
28.3.98	15	



Rev	Issue Stat	Amendment	By	App	Date

Client
TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG
NEW TERRITORIES WEST DEVELOPMENT OFFICE

Mouchel Asia Limited
Sub-Consultants
MVA Asia Ltd. Aspinwall Clouston.

Project
Completion of Texaco Road/Tsuen Wan By-Pass Interchange and Improvements at Texaco Road, Remaining Works

Title
Plan of Trees Located within the Site boundary (27/3/98)
(Sheet 4 of 4)

Drawn	Checked	Approved
DW		
Scale 1:600	CAD File No. –	Date 28.3.98
First Issued 28.3.98	Drawing No. 16	Rev.