

PROJECT PROFILE

1.0 BASIC INFORMATION

1.1 Project Title

RPIS Minor Rural Improvement Works Package 5,
Improvement of Lung Mei Tsuen Road, Sai Kung
Project ID Code: SK-076

1.2 Purpose and nature of the project

The objective of the project is to widen the existing service road, to improve access to local villagers and meet the design standards specified in the Transport Planning & Design Manual (TPDM). The new access road will remain a service road after construction. The project will involve improvement to a 270m stretch of Lung Mei Tsuen Road which will be marginally re-aligned and widened to 5.5m with a 2m wide footpath on one side of the carriageway. A section approximately 400m long will be improved and widened to 3.5m with a 2m wide footpath on one side of the carriageway. The site area will be approximately 16000m² in size including approximately 9000m² of conservation area.

1.3 Name of Project Proponent

Highways Department, New Territories Region
2nd floor, Ho Man Tin Government Offices.
88 Chung Hau Street,
Ho Man Tin,
Kowloon, Hong Kong

1.4 Location and scale of project

The proposed route will provide access from the area of Lung Mei to Ngau Liu village. The location of the site and the details of the construction works are shown in Drawings 90600/D/SK076/CWD/01- 02 (Rev B) attached. The site is enclosed by vegetated hillside to the north and the residential areas to the south and, at both the eastern and western ends.

1.5 Number and Types of designated projects to be covered by the project profile

In accordance with category Q1, Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance, this project shall be regarded as a Designated Project as the proposed road works will fall into the boundary of the conservation area as outlined on the Outline Zoning Plan S/SK-PK/3 issued by Planning Department. Therefore, an Environmental Permit under the EIA Ordinance must be obtained prior to the commencement of construction.

1.6 Name and telephone number of contact person(s)

Mouchel Asia Limited

2.0 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 How will the project be planned and implemented

The Consultants (Mouchel Asia Limited) will design the project. The construction works will be planned and implemented by the Contractor.

2.2 What is the project time table

Construction is expected to commence in December 2000. The Construction period will be 1.5 year, ending in May 2002. There will then be a 1 year maintenance period. The exact timing of the construction events will be dependent upon the Contractor's programme. However, an estimate of the duration of the key construction activities that may cause environmental impact is given below:

Road Removal	20 weeks
Road Construction: Sub-base	7 weeks
Road Construction: Surfacing	5 weeks
Slope Works	25 weeks
Embankment Works	13 weeks
Retaining wall	16 weeks

An indicative works programme is presented in Appendix C.

2.3 Are there any interactions with broader programme requirements or other projects that shall be considered

No.

3.0 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Outline existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the proposed project

Background

The existing Lung Mei Tsuen Road is narrow in width with many bends and slopes. Several passing places are present, but they are sparsely spaced. There is no footpath along the existing road and some cracks are apparent on the pavement. Construction of the proposed road will largely follow the existing road alignment.

Noise

The existing Lung Mei Tsuen Road provides access to numerous residential properties located mainly at the eastern and western ends of the proposed road. There are 56 identified residential buildings (designated R1-R56) and one church (C1) located within 102m of the proposed road. Of these, 5 residential units (R4-8) of the Greenville Villa are within 10m. Located at the eastern end of the study area, these are the closest and most sensitive to construction operations. The locations of the key noise sensitive receivers are shown on Drawing 90600/D/SK076/NSR/01(RevC) and their distances from the works during each construction activity are provided in Table 1.

Table 1: Distance of each identified NSR from the Construction Works (in metres)

NSRs	Road removal	Slope work	Embankment	Road surfacing	Road subbase	Retaining wall
R1	28	35	>150	28	28	>78
R2	28	36	>150	28	28	>78
R3	28	37	>150	28	28	>78
R4	9	17	>150	9	9	>78
R5	8	21	>150	8	8	>78
R6	7	51	>150	7	7	>78
R7	4	42	>150	4	4	>78
R8	7	42	>150	7	7	>78
R9	37	63	>150	37	37	>78
R10	33	52	>150	33	33	>78
R11	15	33	>150	15	15	>78
R12	17	28	>150	17	17	>78
R13	30	38	>150	30	30	>78
R14	14	25	148	14	14	>78
R15	14	33	135	14	14	>78
R16	25	44	133	25	25	>78
R17	14	40	128	14	14	>78
R18	25	49	125	25	25	>78
R19	41	65	119	41	41	>78
R20	33	70	111	33	33	>78
R21	63	69	144	63	63	>78
R22	55	65	119	55	55	>78
R23	55	64	111	55	55	>78
R24	49	58	100	49	49	>78
R25	50	59	92	50	50	>78
R26	72	81	123	72	72	>78
R27	71	80	117	71	71	>78
R28	68	79	95	68	68	>78
R29	70	78	90	70	70	>78
R30	74	76	71	74	74	>78
R31	62	67	60	62	62	>78
R32	21	35	59	21	21	>78
R33	18	28	40	18	18	>78
R34	31	42	50	31	31	>78
R35	21	28	33	21	21	>78
R36	43	47	42	43	43	>78
R37	24	33	24	24	24	>78
R38	38	44	36	38	38	>78
R39	85	107	>150	85	85	>78
R40	93	112	>150	93	93	>78
R41	102	120	>150	102	102	>78
R42	45	76	109	45	45	56
R43	50	80	112	50	50	61
R44	66	85	116	66	66	68
R45	64	85	120	64	64	74
R46	46	85	140	46	46	54
R47	45	85	140	45	45	52
R48	43	82	138	43	43	49
R49	42	80	137	42	42	43
R50	59	>85	>150	59	59	70
R51	66	>85	>150	66	66	75
R52	70	>85	>150	70	70	78
R53	72	>85	>150	72	72	>78
R54	92	>85	>150	92	92	>78
R55	over 92	>85	>150	>78	>78	>78
R56	over 92	>85	>150	>78	>78	>78
C1	40	38	>150	40	40	>78

R1- Residence No. 1

C - Church

Air quality

Air sensitive receivers are the same as the noise sensitive receivers described above. Background air quality is good given the rural nature of the site area and there are no sources of air pollution in the area.

Stream Water Quality

The Hang Cho Shui stream is situated to the west end of the road. It has been observed to be of good water quality as there are no sources of pollution from the nearby area.

Ecology

The northern side of the proposed road will fall into the boundary of the planned "Conservation Area(CA)" as delineated on the Outline Zoning Plan No. S/SK-PK/3 dated 6 August, 1999 and shown in Drawing 90600/D/SK076/NSR/01(Rev.C). Habitats recorded include the stream, woodland, scrub, parkland and grassland as shown in Drawing 3. Of these, only the woodland and stream habitats are considered to be of ecological importance but the stream will not be affected by any proposed work. Therefore, only the woodland habitat will be discussed in detail in the following sections.

The designated Conservation Area within this study area is approximately 9000m² and there are scrub and woodland habitats present within the area. The woodland of the conservation area has a dense canopy with the presence of sparse saplings and a fair number of climbers. No rare fauna and flora was recorded and the list of species is presented in the Appendix D. This is a quite well-developed and undisturbed woodland and therefore is considered to be of medium ecological importance.

Besides the conservation area, some stretches of road having shotcreted slopes or grassland on one side and parkland or garden on the other are also present close to the Greenville Villa with planted species used for landscape purposes. No rare species were found in these habitats. These types of habitat are fairly common in Hong Kong and thus, are considered to have low ecological importance.

The Hang Cho Shui, located at the west end of the proposed route, is of very good water quality. This stream is natural in character and believed to be a permanent freshwater habitat. Both sides of the stream bank are lined with rich fringing vegetation. In addition, the stream supports a range of freshwater fauna including certain species of butterflies and dragonflies which were recorded. A hill stream frog was observed perched on a boulder, although a clear identification could not be made as the frog quickly moved off. Such an undisturbed stream habitat is becoming rare in Hong Kong and therefore, this habitat is considered to be of medium-high ecological importance.

Quite a number of mature trees were found within the site boundary. According to the tree survey report, 211 mature trees were recorded but these are typical woodland species. One individual of the protected tree species, *Litsea cubeba*, was observed on site.

Landscape and visual

The predominant character of local plantings is that of remnant native oak woodland, with *Lithocarpus glaber* as the climax species and almost exclusively so on the wooded hill slopes. This is supplemented by a variety of typical mixed woodland species including, *Aquilaria*, *Bridelia*, *Cinnamomum*, *Ficus*, *Schefflera*, *Sterculia* and *Viburnum*. Some excellent roadside trees have been retained which give strong character to the site. The road link is frequently shaded by overhanging canopies and fine stands of mature trees exist including *Celtis sinensis*, *Engelhardtia craspedioides* and *Ficus variegata*. Surrounding the village areas and the periphery of Lung Mei Tsuen, more exotic species have been introduced and a variety of fruit and decorative trees can be found including *Araucaria heterophylla*, *Bauhinia purpurea*, *Cunninghamia lanceolata*, *Euphoria longan*, *Mangifera indica*, and *Livistonia chinensis*

4.0 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Outline any processes involved, including process flow diagrams, site plans, storage requirements and information on emissions and discharges

A typical construction sequence will include road removal followed by construction works comprising laying of the sub-base and surfacing. Construction of embankments, retaining walls together with slope works will also be required.

The construction details are shown on Drawings 90600/D/SK076/CWD/01-02 (Rev.B) and an indicative works programme is presented in Appendix C.

4.2 Describe the environmental impacts or issues that arise during the construction, operation or decommissioning of the project where applicable

4.2.1 Construction Phase

Noise

Noise during the construction phase will be generated from powered mechanical equipment (PME) being used during various construction activities. Operations that may generate adverse noise impacts can be broadly divided into the following key processes:

- removal of existing road;
- slope works;
- embankment works;
- road construction; and
- construction of retaining wall.

The equipment required for each construction operation is listed below:

<u>Construction Operation</u>	<u>Powered Mechanical Equipment Required</u>
Road Removal	Excavator, air compressor, hand-held breaker and dump truck.
Slope Works	Excavator and dump truck.
Embankment	Excavator, dump truck and roller.
Road Construction	
(i) sub-base	Excavator, dump truck and roller.
(ii) surfacing	Asphalt paver, dump truck and roller.
Retaining Wall	Mobile crane

All the above equipment will not operate simultaneously and, based upon the types of equipment which will be used at any one time, 18 working scenarios have been determined. The Sound Power Level (SWL) generated by each piece of equipment from each of these scenarios are summarized in Table 2 below. These SWL are obtained from the Technical Memorandum on Noise from Construction Work Other than Percussive Piling and NS5228: Part 1:1997 Vibration Control on Construction and Open Sites.

Table 2 : Predicted Sound Power Levels for Main Construction Activities.

Main Activity	Working Scenarios	Equipment	CNP Equipment Code	Sound Power Level (SWL) in dB(A)
Road Removal	Scenario 1	Compressor	CNP001	100
		Hand-held breaker	CNP023	108
	Scenario 2	Excavator	CNP081	112
	Scenario 3	Dump Truck	BS5228, Table C9, Ref29 *	109
Slope Work	Scenario 1	Excavator	CNP081	112
	Scenario 2	Dump Truck	BS5228, Table C9, Ref29 *	109

Table 2: Cont'd....

Main Activity	Working Scenarios	Equipment	CNP Equipment Code	Sound Power Level (SWL) in dB(A)
Slope Work	Scenario 3	Excavator	CNP081	112
		Dump Truck	BS5228,Table C9,Ref29 *	109
Embankment	Scenario 1	Excavator	CNP081	112
	Scenario 2	Dump Truck	BS5228,Table C9,Ref29 *	109
	Scenario 3	Excavator	CNP081	112
		Dump Truck	BS5228,Table C9,Ref29 *	109
	Scenario 4	Road roller	CNP185	108
Road construction - sub-base	Scenario 1	Excavator	CNP081	112
	Scenario 2	Dump Truck	BS5228,Table C9,Ref29 *	109
	Scenario 3	Excavator	CNP081	112
		Dump Truck	BS5228,Table C9,Ref29 *	109
	Scenario 4	Road roller	CNP185	108
Road construction - surfacing	Scenario 1	Dump Truck	BS5228,Table C9,Ref29 *	109
	Scenario 2	Asphalt paver	CNP004	109
	Scenario 3	Road roller	CNP185	108
Retaining wall	Scenario 1	Mobile crane	CNP048	112

* Recommended silenced powered mechanical equipment. (Noise and vibration control on construction and open sites, BS5228:Part 1:1997,p15-16)

Appendices A1&A2 contain details of the predicted unmitigated noise levels at NSRs during each working scenario in the construction phase. 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*. Noise calculations have been based on the assumption that all the identified NSRs are 1 storey in height. The results indicate that maximum noise levels at 33 of the NSRs will exceed the daytime noise criteria of 75dB(A) during the Lung Mei Tsuen Road construction works. A summary of unmitigated noise levels in excess of the criteria is provided in

Table 3 below. Based upon these results, noise mitigation measures are necessary to reduce the noise to acceptable levels.

Table 3: Summary of Unmitigated Noise Levels in Excess of the Criteria

Main Activity	Working Scenarios	Excessive noise levels will be resulted if any NSR is located over the following distances (m)	Number of residences which may subject to excessive noise
Road Removal	Scenario 1	27	13
	Scenario 2	34	23
	Scenario 3	24	16
Slope Work	Scenario 1	42	13
	Scenario 2	27	3
	Scenario 3	48	22
Embankment	Scenario 1	42	3
	Scenario 2	24	1
	Scenario 3	53	5
	Scenario 4	24	0
Road construction - sub-base	Scenario 1	38	23
	Scenario 2	27	16
	Scenario 3	48	33
	Scenario 4	24	13
Road construction - surfacing	Scenario 1	27	16
	Scenario 2	27	16
	Scenario 3	24	13
Retaining wall	Scenario 1	over 78m	0
Total No of NSRs affected : 33			

Air Quality

Site formation works could generate dust, especially during the dry season. In addition, stockpiling of fill or excavated material could act as a source of dust. However, the Contractor will be required to comply with the Air Pollution Control (Construction Dust) Regulation in order to ensure that no adverse dust impact on the air sensitive receivers will result.

Stream Water Quality

Sediments, bituminous oils and diesel oil are contaminants which may accidentally wash off from the construction site into the Hang Cho Shui and other nearby streams and drainage channels. However, the risk of this accidental spillage is very small if works are done with care. In addition, the Contractor will be required to follow the EPD ProPECC PN 1/94 "Construction Site Drainage" in order to ensure that no adverse water impacts will result.

Waste Management

Due to the close proximity of residences to the construction site, improper waste management on site could cause visual and dust impacts on nearby sensitive receivers. Thus, placement of waste materials and all the waste management practices should follow the relevant pollution control clauses in Attachment 1.

Ecology

Potential ecological impacts could arise from construction activities such as land clearance, new road construction and slope work. Loss of grassland, scrub and woodland habitats will result from these proposed works. The main concern is the loss of trees and some understorey vegetation, especially on the edge of the conservation area. A summary of the estimated area loss for each habitat is shown in Table 4. The designated conservation area is considered to be of medium-high ecological importance due to its undisturbed nature and flora diversity. The impacts are reversible over the long term. The overall habitat loss will be relatively small in comparison with the conservation area available to the north. Moderate ecological impacts are predicted.

Table 4: Summary of the Estimated Habitat Loss

Habitat Types	Estimated Habitat Loss (m²)
Woodland	9260.2
Scrub	790.4
Grassland	1572.0

Tree removal is another concern because approximately 75 out of 211 trees identified within the site boundary will be felled. There exists a single stand of *Litsea cubeba*, protected under law, which is immediately adjacent to the existing road and will need to be retained and protected during and following the works and thus, the construction work will not result in the loss of any rare mature trees. A tree survey has been carried out to quantify the impact of tree felling and details are provided in the landscape and visual impact section.

The stream habitat will not be impacted by any construction works and no other

ecological impact are expected.

Landscape and Visual Impact

Some significant slope cutting works will result in the loss of some of the woodland margin on the north slope. The short term visual impacts will be to expose the slopes above the road but this will have no adverse visual impact other than to exhibit the regularity of slope profile imposed, which will be lost quickly as the vegetation develops. A single stand of protected species, *Litsea cubeba*, was observed and effort should be made to protect it from adverse impact.

The retention of the majority of significant trees on the southern road edge, particularly at the village margin, result in little or no visual impacts in these key areas. A tree survey report including the Landscape Proposal has been prepared as part of the tree felling application to be submitted to the relevant authorities for approval in accordance with WBTC No.24/94 and the landscape proposal is presented in SK-076/LP/001-2 .

4.2.2 Operational Phase

No adverse impacts are expected in this phase.

5.0 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED

5.1 Describe measures to minimise environmental impacts

Noise

The results in Appendices A1& A2 have highlighted 33 NSRs which may experience adverse noise impacts during certain construction scenarios and will require mitigation measures. With the adoption of the mitigation measures detailed in Table 5, together with the use of a temporary barrier which can provide a 15dB(A) attenuation, the maximum noise exceedance will be reduced to an acceptable level with an exception of one NSR, R7.

Table 5: Recommended Mitigation Measures for each Type of Noisy Equipment

Plant	Mitigation Measures	Maximum Reduction in dB(A)	Alternative Plant
Excavator Crane Dump truck	<ul style="list-style-type: none"> i) Fit more efficient exhaust sound reduction equipment. ii) Manufacturers' enclosure panels should be kept closed. 	10	Alternative super silenced plant may be available.
Compressor	<ul style="list-style-type: none"> i) Fit more efficient sound reduction equipment ii) Acoustically dampen metal casing. iii) Manufacturers' enclosure panels should be kept closed. 	10	<ul style="list-style-type: none"> i) Super silenced plant is available. ii) Electric-powered compressors are available as opposed to diesel or petrol. iii) Sound-reduced compressor or generator can be used to supply several pieces of plant. Use centralized generator system.

Reference: Noise and vibration control on construction and open sites, BS5228:Part 1:1997,p15-16

A complete set of mitigated noise results is shown in Appendices B1& B2 with the maximum attenuation calculation being based on "Noise and vibration control on construction and open sites" BSI 1997. Notwithstanding the mitigation measures assumed, 1 property, R7, will still be adversely affected by a noise exceedance of 2 dB(A) during road surfacing work and thus further mitigation will be necessary.

Table 6: Summary of Noise Levels after Further Mitigation Measure

Affected NSRs	Scenario No.	After Initial Mitigation:	Further Mitigation measure	After Further Mitigation:
R7	Road surfacing, Scenario 2	77dB(A)	Restriction of the Asphalt paver operation to 20 minutes in any 30minutes (-3dB(A))	74dB(A)

Noise level can be further controlled by the above mitigation measure shown in Table 6 above. After restricting the operation times of the asphalt paver during Scenario 2 of the road surfacing activity, the property will not be subject to noise levels over 75dB(A). As a result, with the application of the recommended measures, no NSR will experience unacceptable noise levels during the construction phase and no residual impacts will occur.

Air Quality

With the adoption of the relevant pollution control clauses in the construction Contract as detailed in Attachment 1, environmental nuisance can be kept to a minimum.

Water Quality

Relevant pollution control clauses (Attachment 1) will be included in the construction Contract in order to minimize any adverse water quality impacts on the sensitive stream habitat. With the implementation of the mitigation measures, no adverse impacts will be encountered.

Waste Management

Relevant pollution control clauses as detailed in Attachment 1 will be included in the construction Contract in order to minimize the environmental nuisance to the nearby sensitive receivers.

Ecology

Care should be taken to avoid damage to areas that do not require any work. Any works storage areas should be located on land of low ecological value such as the grassland where practicable and storage of material subject to run-off and exposed areas of soil should be kept to a minimum especially during the wet season. It shall be specified in the Contract that unnecessary land take, particularly the woodland habitats and the conservation area, during construction should be restricted in order to protect these areas from disturbance. The Contractor will only be permitted to use grassland and bareground within the site boundary for any works.

An area of woodland felled shall be replaced by replanting of suitable native species

identified in the baseline survey as shown in Table 7 below. Long term impacts from woodland loss will therefore be limited. Short term losses will exist and the impact from woodland loss is therefore judged to be “minor” but acceptable.

Landscape and Visual

The boundary of the works area has been defined by the detailed design layout and has been subject to minor amendments to avoid the felling of mature trees. Every effort has been taken to avoid the works impacting mature trees within the works area during the detailed design process and to ensure that the protected species, *Litsea cubeba*, will not be affected. In order to quantify the tree loss, a tree survey report including the Landscape Proposal has been prepared as part of the tree felling application to be submitted to the relevant authorities for approval in the detailed design stage. Approximate locations for tree replanting is shown in SK-076/LP/001-2.

The new soil nail wall will replace an existing shotcrete wall. The landscape proposal has proposed to compensate the tree loss by the provision of a planter at the foot of the slope which allows the incorporation of trees and climbers to provide a green face where one did not previously exist. This could be deemed a landscape benefit in the longer term.

New embankments will be replanted with a woodland tree mix in order to regenerate the woodland edge and reinstate the existing landscape character. The tree survey report contains the details of those trees to be felled and replanted. The species for replanting are provided in Table 7.

Table 7 Tree Species for Woodland Replanting

TREES SPECIES	SHRUBS SPECIES
<i>Castanopsis fissa</i>	<i>Gordonia axillaris</i>
<i>Celtis sinensis</i>	<i>Ilex pubescens</i>
<i>Cinnamomum spp.</i>	<i>Ligustrum sinensis</i>
<i>Ficus spp.</i>	<i>Melastoma candidum</i>
<i>Litsea spp.</i>	<i>Microcos paniculata</i>
<i>Machilus thunbergii</i>	<i>Rhaphiolepis indica</i>
<i>Murraya paniculata</i>	<i>Phyllanthus emblica</i>
<i>Sapium sebiferum</i>	<i>Rhodomyrtus tormentosa</i>
<i>Schefflera octophylla</i>	<i>Rhus chinensis</i>
<i>Schima superba</i>	
<i>Sterculia lanceolata</i>	

The roadside margin planting shall consist of easily maintainable hillside margin trees. They are intended to be sympathetic to the existing woodland character and species diversity yet reinforcing a new roadside development of strong seasonal flowering characteristics. The species for roadside planting are shown in Table 8.

Table 8: Species for Roadside Planting

TREE SPECIES
<i>Bischofia trifoliata</i>
<i>Camellia hongkongensis</i>
<i>Celtis sinensis</i>
<i>Cinnamomum spp.</i>
<i>Ficus spp.</i>
<i>Litsea spp.</i>
<i>Magnolia spp.</i>

5.2 Comment on the possible severity, distribution and duration of environmental effects

The unmitigated loss of the woodland is a “moderate” impact over the short term. It will only be experienced locally within the site boundary. The proposed replanting of native woodland will compensate the woodland losses over the long term and overall residual ecological impacts are judged to be “minor”.

Adverse noise impacts will not result after the application of the full set of recommended mitigation measures. With the pollution control clauses and the above mitigation measures, no residual air and water quality impacts will occur. The visual and landscape impact is minimized by the application of the landscape proposal.

5.3 Comment on any further implications

None

5.4 Use of previous approved EIA

None

ATTACHMENT 1

RECOMMENDED POLLUTION CONTROL CLAUSES FOR CONSTRUCTION CONTRACTS

AVOIDANCE OF NUISANCE

- (i) All works are to be carried out in such a manner as to cause as little inconvenience as possible to nearby residents, property and to the public in general, and the Contractor shall be held responsible for any claims which may arise from such inconvenience.
- (ii) The Contractor shall be responsible for the adequate maintenance and clearance of channels, gullies etc. and shall also provide and maintain such pedestrian and vehicular access as shall be directed within the works site.
- (iii) Water shall be used to prevent dust rising and the Contractor shall take every precaution to prevent the excavated materials from entering into the public drainage system.
- (iv) The Contractor shall carry out the Works in such a manner as to minimize adverse impacts on the environment during execution of the Works.

NOISE POLLUTION CONTROL

General Requirements

- (i) The Contractor shall comply with and observe the Noise Control Ordinance and its subsidiary regulations in force in Hong Kong.
- (ii) The Contractor shall consider noise as an environmental constraint in his planning and execution of the Works.
- (iii) The Contractor shall take all necessary measures to ensure that the operation of mechanical equipment and construction processes on or off the works areas will not cause any unnecessary and excessive noise which may disturb any occupant or any nearby dwellings, school, hospitals, or premises with similar sensitivity to noise. The Contractor shall submit to the Engineer for his consent details of the Contractor's equipment including methods of use and construction operations together with proposed measures for limiting noise therefrom which shall include, inter alia, the use of silencers, mufflers, acoustic linings or shields, or acoustic sheds or screens and shall be based upon the best reasonable practice. Information on the types and models of silenced equipment and acoustic treatment for unsilenced equipment shall be included. The Contractor shall use such measures and shall maintain plant and silencing equipment in good condition so as to minimise the noise emission during construction works.
- (iv) Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing measures intended to be used on the Site to be

made available for inspection and approval to ensure that they are suitable for the project.

- (v) The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented. The noise reduction methods include scheduling of works, siting of facilities, selection of quiet equipment and the use of purpose-built acoustic panels and enclosures.
- (vi) After commencement of the Works if the equipment or work methods are believed by the Engineer to be causing serious noise pollution impacts, the equipment or work methods shall be inspected and remedial proposals drawn up by the Contractor and once approved by the Engineer, implemented. In developing these remedial measures, the Contractor shall review all construction noise sources that may be contributing to the pollution impacts and propose changes to scheduling of activities, installation of plant soundproofing, provision of alternative plant, erection of sound barriers around part of the works areas or the location of construction noise sources or any other measures that may be effective in reducing noise. Where such remedial measures include the use of additional or alternative equipment, such equipment shall not be used on the Works until approved by the Engineer. Where remedial measures include maintenance or modification of previously approved equipment such equipment shall not be used on the Works until such maintenance or modification is completed and the adequacy of the maintenance or modification is demonstrated to the satisfaction of the Engineer.
- (vii) If the Engineer finds that approved remedial measures are not being implemented and that serious impacts persist, he may direct the Contractor to cease related parts of the Works until the measures are implemented. No claims by the Contractor shall be entertained in connection with such a direction.
- (viii) In addition to the requirements imposed by the Noise Control Ordinance, to control noise generated from equipment and activities for the purpose of carrying out any construction work other than percussive piling during the time period from 0700 to 1900 hours on any day not being a general holiday (including Sundays), the following requirements shall also be complied with:
 - (a) The noise level measured at 1m from the most affected external facade of the nearby noise sensitive receivers from the construction work along during any 30 minute period shall not exceed an equivalent sound level (L_{eq}) of 75 dB(A).
- (ix) Should the limits stated in the above sub-clauses (a) and (b) be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented. Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or to any additional costs whatsoever.
- (x) Notwithstanding the requirements and limitations set out in clause (vii) above and subject to compliance with clauses (iii) and (iv) above, the Engineer may upon application in

writing by the Contractor, allow the use of any equipment and the carrying out of any construction activities for any duration provided that he is satisfied with the application which, in his opinion, to be absolute necessary and adequate attention has been provided to the sensitive receivers to be affected, or of emergency nature, and not in contravention with the Noise Control Ordinance in any respect.

- (xi) Hand-held breakers used by the Contractor shall comply with the standards specified in EEC Technical Directive 84/537, and portable compressors shall comply with the standards specified in EEC Technical Directive 84/533.
- (xii) For the purposes of the above clauses, any domestic premises, hotels, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing arts centre or office building shall be considered a noise sensitive receiver.

Noise Monitoring and Compliance Audit Reporting

- (i) Monitoring equipment and methodology shall comply with the Technical Memorandum on Noise from Construction work other than Percussive Piling, issued under section 9 of the Noise Control Ordinance. Monitoring will be carried out by the Contractor to the specification of the Engineer. The data will be provided to the Engineer on a regular basis, or as requested.
- (ii) A monthly summary of monitoring data will be prepared by the Engineer. This will include an interpretation of the significance of the monitoring results. The monthly summary shall also identify any additional mitigation measures taken by the Contractor as a result. A copy of the summary report shall be made available for inspection by the Director of Environmental Protection at his request and by the Contractor.
- (iii) The Contractor shall provide within one week of the commencement of the Contract at least one portable sound level meter complying with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) (Bruel & Kjaer Type 2221 or similar approved) complete with tripods. These meters will be used by the Contractor or Engineer for noise monitoring, and should be regularly calibrated to ensure accuracy and consistency.
- (iv) The Engineer will, prior to commencement of construction works, carry out baseline monitoring to determine baseline noise levels. The baseline monitoring will be carried out for a period of at least one week, with measurements to be taken every day at locations and to a schedule determined by the Engineer. From these measurements baseline noise level (L_{eq} (5 min)) will be calculated. The target level for maximum construction noise levels will be 5dB(A) above the measured background.

Permitted Noise Levels

- (i) In the event that the Contractor intends to carry out works of a type and during periods ("the Restricted Periods") to which Section 6 of the Noise Control Ordinance applies, the

Contractor shall apply for and obtain a Construction Noise Permit and thereafter shall comply with the conditions which may be imposed in relation thereto.

- (ii) Work will be permitted during “the Restricted Periods” subject to:
 - (a) the Contractor complying with its obligations under the general requirement stated above;
 - (b) the Contractor making an application for and obtaining a Construction Noise Permit in due time and in due form; and
 - (c) the Contractor not causing the cancellation or adverse variation of such Construction Noise Permit as may be issued by reason of the generation of noise in excess of the limits set out in Technical memorandum on Noise from Construction Work for the identified NSRs.

DUST SUPPRESSION MEASURES

- (i) The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. The air pollution control system installed shall be operated whenever the plant is in operation.
- (ii) The Contractor shall at his own cost, and to the satisfaction of the Engineer, install effective dust suppression equipment and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver the concentration of air-borne dust shall not exceed $500 \mu\text{g}/\text{m}^3$, at standard temperature (25°C) and pressure (91.0 bar) averaged over one hour, and $260 \mu\text{g}/\text{m}^3$, at standard temperature (25°C) and pressure (1.0 bar) averaged over 24 hours.
- (iii) The Contractor shall not burn debris or other materials on the works areas.
- (iv) The Contractor shall implement dust suppression measures which shall include, but not be limited, to be following:
 - (a) The Contractor shall frequently clean and water the site to minimize the fugitive dust emissions.
 - (b) In the process of material handling, any material which has the potential to create dust shall be treated with water or sprayed with wetting agent.
 - (c) Stockpiles of sand and aggregate greater than 20m^3 for use in concrete manufacture shall be enclosed on three sides, with walls extending above the pile and 2m beyond the front of the pile.
 - (d) Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate, and other similar materials, when dust is likely to be created and to dampen stored materials during dry and windy weather.

- (e) Areas where there is a regular movement of vehicles shall have all-weather surfaces to a standard agreed with the Engineer and be kept clear of loose surface material.
- (f) The provision of adequate dust suppression plant including water bowsers with spray bars or means of applying surface chemical treatment, the details of which shall be submitted to and approved by the Engineer.
- (g) Where dusty material are being discharged to vehicle from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust should be provided for this enclosure and vented to a fabric filter system.
- (h) Any vehicle with an open load carrying area used for moving materials which have the potential to create dust shall have properly fitting side and tail boards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.
- (i) Wheel washing facilities shall be installed and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel washing facility shall be usable prior to any earthworks excavation activity on the Site. The Contractor shall also provide a hard-surfaced road between washing facility and the public road.

WATER POLLUTION CONTROL

General Requirements

- (i) The Contractor shall carry out the Works in such a manner as to minimise adverse impacts on the water quality during the execution of the Works. In particular he shall arrange his method of working to minimise the effects on the water quality within the works areas, adjacent to the works areas, on the transport routes to and from the works areas and at the loading, and dumping areas.
- (ii) The Contractor shall devise and arrange methods of working to minimise water pollution and shall provide experienced personnel with suitable training to ensure that these methods are implemented. Reference should be made to ProPECC PN1/94 "Construction Site Drainage" for appropriate methods & techniques.
- (iii) Before the commencement of the Works, the Contractor shall submit to the Engineer the proposed methods of working.

- (iv) After the commencement of the Works, if the plant or work method are believed by the Engineer to be causing serious water pollution impacts, the Contractor shall proposed remedial measures. Where such remedial measures include the use of additional or alternative plant such plant shall not be used on the Works until approved by the Engineer. Where remedial measures include maintenance or modification of previously approved plant, such plant shall not be used on the Works until such maintenance or modification is completed and the adequacy of the maintenance or modification is demonstrated to the satisfaction of the Engineer.
- (v) If the Engineer finds that approved remedial measures are not being implemented and that serious impacts persist, he may direct the Contractor to cease related parts of the Works until the measures are implemented. No claims by the Contractor shall be entertained in connection with such a direction.

Discharge into Sewers and Drains

- (i) The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit or suffer to be discharged into any public sewer, storm-water drain, channel, stream-course or sea, any effluent or foul or contaminated water or cooling or hot water without the prior consent of the relevant Authority who may require the Contractor to provide, operate and maintain at the Contractor's own expense, within the premises or otherwise, suitable works for the treatment and disposal of such effluent or foul or contaminated or cooling or hot water.
- (ii) If any office, site canteen or toilet facilities are erected, foul water effluent shall, subject to paragraph (i) above, be directed to a foul sewer or to a sewage treatment facility.
- (iii) The Contractor's attention is drawn to the Building Ordinance, the Water Pollution Control Ordinance and the Technical Memorandum 'Standard for Effluent Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters.' and ProPECC PN 1/94 "Construction Site Drainage".

Removal of Waste Material

- (i) Notwithstanding the provisions of the GCC the Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the works areas onto any adjoining land or allow any waste matter or refuse to be deposited anywhere within the works areas or onto any adjoining land and shall have all such matter removed from the works areas.
- (ii) The Contractor shall be responsible for temporary training, diverting or conducting of open streams or drains intercepted by any works and for reinstating these to their original courses on completion of the Works.
- (iii) The Contractor shall submit any proposed stream course and nullah temporary diversions to the Engineer for agreement one month prior to such diversion works being commenced. Diversions shall be constructed to allow the water flow to discharge

without overflow, erosion or washout.

- (iv) The Contractor's attention is drawn to the Waste Disposal Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance.

WASTE MANAGEMENT

- (i) The Contractor shall segregate inert construction waste material suitable for reclamation or land formation and shall dispose of residual material at a public dumping area(s).
- (ii) Non-inert construction waste material deemed unsuitable for reclamation or land formation and other waste material shall be disposed of at a public landfill.
- (iii) The Contractor should ensure that all waste paints, oils and solvents are handled, collected, treated and disposed of in accordance with the Waste Disposal Regulations (Chemical Waste and General). These materials should be separated from non-chemical wastes, stored in a labelled container and collected by a licenced body.
- (iv) The Contractor should provide a temporary storage area for general refuse during the construction phase which should be enclosed to avoid environmental impacts. General refuse should be stored on site for a minimum period and disposed of to a licenced facility.

Appendix A1 Maximum Noise Levels (dB(A)) at the Noise Sensitive Receivers
without Noise Mitigation Measures

NSRs	Rd Removal			Slope work			Embankment,			
	S1	S2	S3	S1	S2	S3	S1	S2	S3	S4
R1	75	78	75	76	73	78	over 148m	over 148m	over 148m	over 148m
R2	75	78	75	76	73	78	over 148m	over 148m	over 148m	over 148m
R3	75	78	75	76	73	78	over 148m	over 148m	over 148m	over 148m
R4	84	88	85	82	79	84	over 148m	over 148m	over 148m	over 148m
R5	85	89	86	81	78	83	over 148m	over 148m	over 148m	over 148m
R6	87	90	87	73	70	75	over 148m	over 148m	over 148m	over 148m
R7	91	95	92	75	72	77	over 148m	over 148m	over 148m	over 148m
R8	87	90	87	75	72	77	over 148m	over 148m	over 148m	over 148m
R9	72	75	73	71	68	73	over 148m	over 148m	over 148m	over 148m
R10	73	77	74	73	70	75	over 148m	over 148m	over 148m	over 148m
R11	80	83	80	77	74	79	over 148m	over 148m	over 148m	over 148m
R12	79	82	79	78	75	80	over 148m	over 148m	over 148m	over 148m
R13	74	77	74	75	72	77	over 148m	over 148m	over 148m	over 148m
R14	81	84	81	79	76	81	64	61	66	60
R15	81	84	81	77	74	79	64	61	66	60
R16	75	79	76	74	71	76	65	62	67	61
R17	81	84	81	75	72	77	65	62	67	61
R18	75	79	76	73	70	75	65	62	67	61
R19	71	75	72	71	68	73	65	62	67	61
R20	73	77	74	70	67	72	66	63	68	62
R21	68	71	68	70	67	72	64	61	66	60
R22	69	72	69	71	68	73	65	62	67	61
R23	69	72	69	71	68	73	66	63	68	62
R24	70	73	70	72	69	74	67	64	69	63
R25	70	73	70	72	69	74	68	65	70	64
R26	66	70	67	69	66	71	65	62	67	61
R27	66	70	67	69	66	71	66	63	68	62
R28	67	70	67	69	66	71	67	64	69	63
R29	67	70	67	69	66	71	68	65	70	64
R30	66	70	67	69	66	71	70	67	72	66
R31	68	71	68	70	67	72	71	68	73	67
R32	77	81	78	76	73	78	72	69	74	68
R33	78	82	79	78	75	80	75	72	77	71
R34	74	77	74	75	72	77	73	70	75	69
R35	77	81	78	78	75	80	77	74	79	73
R36	71	74	71	74	71	76	75	72	77	71
R37	75	79	76	77	74	79	79	76	81	75
R38	72	75	72	74	71	76	76	73	78	72
R39	65	68	65	66	63	68	over 148m	over 148m	over 148m	over 148m
R40	64	68	65	66	63	68	over 148m	over 148m	over 148m	over 148m
R41	63	67	64	65	62	67	over 148m	over 148m	over 148m	over 148m
R42	70	74	71	69	66	71	66	63	68	62
R43	70	73	70	69	66	71	66	63	68	62
R44	67	71	68	68	65	70	66	63	68	62
R45	67	71	68	68	65	70	65	62	67	61
R46	70	74	71	68	65	70	64	61	66	60
R47	70	74	71	68	65	70	64	61	66	60
R48	71	74	71	69	66	71	64	61	66	60
R49	71	75	72	69	66	71	64	61	66	60
R50	68	72	69	over 85	over 85m	over 85	68	65	70	64
R51	67	71	68	over 85	over 85m	over 85	68	65	70	64
R52	67	70	67	over 85	over 85m	over 85	68	65	70	64
R53	66	70	67	over 85	over 85m	over 85	68	65	70	64
R54	64	68	65	over 85	over 85m	over 85	68	65	70	64
R55	64	68	65	over 85	over 85m	over 85	68	65	70	64
R56	64	68	65	over 85	over 85m	over 85	68	65	70	64
C1	71	75	72	75	72	77	68	65	70	64

S1- Scenario 1

77 NSR exceeding 75dB(A) will require the application of mitigation measures

Appendix A2 Maximum Noise Levels (dB(A)) at the Noise Sensitive Receivers
without Noise Mitigation Measures

NSRs	Rd Subbase				Rd surfacing			Retaining S1
	S1	S2	S3	S4	S1	S2	S3	
R1	78	75	80	74	75	75	74	over 78m
R2	78	75	80	74	75	75	74	over 78m
R3	78	75	80	74	75	75	74	over 78m
R4	88	85	90	84	85	85	84	over 78m
R5	89	86	91	85	86	86	85	over 78m
R6	90	87	92	86	87	87	86	over 78m
R7	95	92	97	91	92	92	91	over 78m
R8	90	87	92	86	87	87	86	over 78m
R9	75	73	78	72	73	73	72	over 78m
R10	77	74	79	73	74	74	73	over 78m
R11	83	80	85	79	80	80	79	over 78m
R12	82	79	84	78	79	79	78	over 78m
R13	77	74	79	73	74	74	73	over 78m
R14	84	81	86	80	81	81	80	over 78m
R15	84	81	86	80	81	81	80	over 78m
R16	79	76	81	75	76	76	75	over 78m
R17	84	81	86	80	81	81	80	over 78m
R18	79	76	81	75	76	76	75	over 78m
R19	75	72	77	71	72	72	71	over 78m
R20	77	74	79	73	74	74	73	over 78m
R21	71	68	73	67	68	68	67	over 78m
R22	72	69	74	68	69	69	68	over 78m
R23	72	69	74	68	69	69	68	over 78m
R24	73	70	75	69	70	70	69	over 78m
R25	73	70	75	69	70	70	69	over 78m
R26	70	67	72	66	67	67	66	over 78m
R27	70	67	72	66	67	67	66	over 78m
R28	70	67	72	66	67	67	66	over 78m
R29	70	67	72	66	67	67	66	over 78m
R30	70	67	72	66	67	67	66	over 78m
R31	71	68	73	67	68	68	67	over 78m
R32	81	78	83	77	78	78	77	over 78m
R33	82	79	84	78	79	79	78	over 78m
R34	77	74	79	73	74	74	73	over 78m
R35	81	78	83	77	78	78	77	over 78m
R36	74	71	76	70	71	71	70	over 78m
R37	79	76	81	75	76	76	75	over 78m
R38	75	72	77	71	72	72	71	over 78m
R39	68	65	70	64	65	65	64	over 78m
R40	68	65	70	64	65	65	64	over 78m
R41	67	64	69	63	64	64	63	over 78m
R42	74	71	76	70	71	71	70	72
R43	73	70	75	69	70	70	69	71
R44	71	68	73	67	68	68	67	70
R45	71	68	73	67	68	68	67	70
R46	74	71	76	70	71	71	70	72
R47	74	71	76	70	71	71	70	73
R48	74	71	76	70	71	71	70	73
R49	75	72	77	71	72	72	71	74
R50	72	69	74	68	69	69	68	70
R51	71	68	73	67	68	68	67	69
R52	70	67	72	66	67	67	66	69
R53	70	67	72	66	67	67	66	over 78m
R54	68	65	70	64	65	65	64	over 78m
R55	over 92m	over 92m	over 92	over 92	over 92m	over 92	over 92m	over 78m
R56	over 92m	over 92m	over 92	over 92	over 92m	over 92	over 92m	over 78m
C1	75	72	77	71	72	72	71	over 78m

S1- Scenario 1

77 NSR exceeding 75dB(A) will require the application of mitigation measures

Appendix B1 Maximum Noise Levels (dB(A)) at the Noise Sensitive Receivers
with Noise Mitigation Measures

NSRs	Rd Removal			Slope work			Embankment			
	S1	S2	S3	S1	S2	S3	S1	S2	S3	S4
R1	*75	53	*75	51	*73	53	over150m	over150m	over150m	over150m
R2	*75	53	*75	51	*73	53	over150m	over150m	over150m	over150m
R3	*75	53	*75	51	*73	53	over150m	over150m	over150m	over150m
R4	69	63	60	57	54	59	over150m	over150m	over150m	over150m
R5	70	64	61	56	53	58	over150m	over150m	over150m	over150m
R6	71	65	62	*73	*70	*75	over150m	over150m	over150m	over150m
R7	75	70	67	*75	*72	52	over150m	over150m	over150m	over150m
R8	71	65	62	*75	*72	52	over150m	over150m	over150m	over150m
R9	*72	*75	*73	*71	*68	*73	over150m	over150m	over150m	over150m
R10	*73	52	*74	*73	*70	*75	over150m	over150m	over150m	over150m
R11	64	58	55	52	*74	54	over150m	over150m	over150m	over150m
R12	63	57	54	53	*75	55	over150m	over150m	over150m	over150m
R13	*74	52	*74	*75	*72	52	over150m	over150m	over150m	over150m
R14	65	59	56	54	51	56	*64	*61	*66	*60
R15	65	59	56	52	*74	54	*64	*61	*66	*60
R16	*75	54	51	*74	*71	51	*65	*62	*67	*61
R17	65	59	56	*75	*72	52	*65	*62	*67	*61
R18	*75	54	51	*73	*70	*75	*65	*62	*67	*61
R19	*71	*75	*72	*71	*68	*73	*65	*62	*67	*61
R20	*73	52	*74	*70	*67	*72	*66	*63	*68	*62
R21	*68	*71	*68	*70	*67	*72	*64	*61	*66	*60
R22	*69	*72	*69	*71	*68	*73	*65	*62	*67	*61
R23	*69	*72	*69	*71	*68	*73	*66	*63	*68	*62
R24	*70	*73	*70	*72	*69	*74	*67	*64	*69	*63
R25	*70	*73	*70	*72	*69	*74	*68	*65	*70	*64
R26	*66	*70	*67	*69	*66	*71	*65	*62	*67	*61
R27	*66	*70	*67	*69	*66	*71	*66	*63	*68	*62
R28	*67	*70	*67	*69	*66	*71	*67	*64	*69	*63
R29	*67	*70	*67	*69	*66	*71	*68	*65	*70	*64
R30	*66	*70	*67	*69	*66	*71	*70	*67	*72	*66
R31	*68	*71	*68	*70	*67	*72	*71	*68	*73	*67
R32	62	56	53	51	*73	53	47	*69	*74	*68
R33	63	57	54	53	*75	55	50	*72	52	*71
R34	*74	52	*74	*75	*72	52	48	*70	*75	*69
R35	62	56	53	53	*75	55	52	*74	54	*73
R36	*71	*74	*71	*74	*71	51	50	*72	52	*71
R37	*75	54	51	52	*74	54	54	51	56	*75
R38	*72	*75	*72	*74	*71	51	51	*73	53	*72
R39	*65	*68	*65	*66	*63	*68	over150m	over150m	over150m	over150m
R40	*64	*68	*65	*66	*63	*68	over150m	over150m	over150m	over150m
R41	*63	*67	*64	*65	*62	*67	over150m	over150m	over150m	over150m
R42	*70	*74	*71	*69	*66	*71	*66	*63	*68	*62
R43	*70	*73	*70	*69	*66	*71	*66	*63	*68	*62
R44	*67	*71	*68	*68	*65	*70	*66	*63	*68	*62
R45	*67	*71	*68	*68	*65	*70	*65	*62	*67	*61
R46	*70	*74	*71	*68	*65	*70	*64	*61	*66	*60
R47	*70	*74	*71	*68	*65	*70	*64	*61	*66	*60
R48	*71	*74	*71	*69	*66	*71	*64	*61	*66	*60
R49	*71	*75	*72	*69	*66	*71	*64	*61	*66	*60
R50	*68	*72	*69	over85	over85m	over85m	*68	*65	*70	*64
R51	*67	*71	*68	over85	over85m	over85m	*68	*65	*70	*64
R52	*67	*70	*67	over85	over85m	over85m	*68	*65	*70	*64
R53	*66	*70	*67	over85	over85m	over85m	*68	*65	*70	*64
R54	*64	*68	*65	over85	over85m	over85m	*68	*65	*70	*64
R55	*64	*68	*65	over85	over85m	over85m	*68	*65	*70	*64
R56	*64	*68	*65	over85	over85m	over85m	*68	*65	*70	*64
C1	*71	*75	*72	*75	*72	52	*68	*65	*70	*64

S1- Scenario 1

*73 Noise level below standard criteria before mitigation

R7 NSRs require further mitigation measure

Appendix B2 Maximum Noise Levels (dB(A)) at the Noise Sensitive Receivers with Noise Mitigation Measures

NSRs	Rd Subbase				Rd surfacing			Retaining S1
	S1	S2	S3	S4	S1	S2	S3	
R1	53	*75	55	*74	*75	*75	*74	over 78m
R2	53	*75	55	*74	*75	*75	*74	over 78m
R3	53	*75	55	*74	*75	*75	*74	over 78m
R4	63	60	65	69	60	70	69	over 78m
R5	64	61	66	70	61	71	70	over 78m
R6	65	62	67	71	62	72	71	over 78m
R7	70	67	72	75	66	R7	75	over 78m
R8	65	62	67	71	62	72	71	over 78m
R9	*75	*73	53	*72	*73	*73	*72	over 78m
R10	52	*74	54	*73	*74	*74	*73	over 78m
R11	58	55	60	64	55	65	64	over 78m
R12	57	54	59	63	54	64	63	over 78m
R13	52	*74	54	*73	*74	*74	*73	over 78m
R14	59	56	61	65	56	66	65	over 78m
R15	59	56	61	65	56	66	65	over 78m
R16	54	51	56	*75	51	61	*75	over 78m
R17	59	56	61	65	56	66	65	over 78m
R18	54	51	56	*75	51	61	*75	over 78m
R19	*75	*72	52	*71	*72	*72	*71	over 78m
R20	52	*74	54	*73	*74	*74	*73	over 78m
R21	*71	*68	*73	*67	*68	*68	*67	over 78m
R22	*72	*69	*74	*68	*69	*69	*68	over 78m
R23	*72	*69	*74	*68	*69	*69	*68	over 78m
R24	*73	*70	*75	*69	*70	*70	*69	over 78m
R25	*73	*70	*75	*69	*70	*70	*69	over 78m
R26	*70	*67	*72	*66	*67	*67	*66	over 78m
R27	*70	*67	*72	*66	*67	*67	*66	over 78m
R28	*70	*67	*72	*66	*67	*67	*66	over 78m
R29	*70	*67	*72	*66	*67	*67	*66	over 78m
R30	*70	*67	*72	*66	*67	*67	*66	over 78m
R31	*71	*68	*73	*71	*68	*68	*67	over 78m
R32	56	53	58	62	53	63	62	over 78m
R33	57	54	59	63	54	64	63	over 78m
R34	52	*74	54	*73	*74	*74	*73	over 78m
R35	56	53	58	62	53	63	62	over 78m
R36	*74	*71	51	*70	*71	*71	*70	over 78m
R37	54	51	56	*75	51	61	*75	over 78m
R38	*75	*72	52	*71	*72	*72	*71	over 78m
R39	*68	*65	*70	*64	*65	*65	*64	over 78m
R40	*68	*65	*70	*64	*65	*65	*64	over 78m
R41	*67	*64	*69	*63	*64	*64	*63	over 78m
R42	*74	*71	51	*70	*71	*71	*70	*72
R43	*73	*70	*75	*69	*70	*70	*69	*71
R44	*71	*68	*73	*67	*68	*68	*67	*70
R45	*71	*68	*73	*67	*68	*68	*67	*70
R46	*74	*71	51	*70	*71	*71	*70	*72
R47	*74	*71	51	*70	*71	*71	*70	*73
R48	*74	*71	51	*70	*71	*71	*70	*73
R49	*75	*72	52	*71	*72	*72	*71	*74
R50	*72	*69	*74	*68	*69	*69	*68	*70
R51	*71	*68	*73	*67	*68	*68	*67	*69
R52	*70	*67	*72	*66	*67	*67	*66	*69
R53	*70	*67	*72	*66	*67	*67	*66	over 78m
R54	*68	*65	*70	*64	*65	*65	*64	over 78m
R55	over92	over92m	over92	over92	over92m	over92m	over92m	over 78m
R56	over92	over92m	over92	over92	over92m	over92m	over92m	over 78m
C1	*75	*72	52	*71	*72	*72	*71	over 78m

S1- Scenario 1

*73 Noise level below standard criteria before mitigation

R7 NSRs require further mitigation measure

Restricting operating hours should be applied to R7

**RPIS Minor Improvement Works, Packages 5
SK-076 Improvement of Lung Mei Tsuen Road, Sai Kung
INDICATIVE WORKS PROGRAMME**

ID	Task Name	Duration	Start	Finish	2002																		
					11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05
1	Total Working Days	380d	01 Dec '00	16 May '02	[Gantt bar from Dec '00 to May '02]																		
2	Site Establishment	4w	01 Dec '00	28 Dec '00	[Gantt bar from Dec '00 to Dec '00]																		
3	Slope Works	25w	11 Dec '00	01 Jun '01	[Gantt bar from Dec '00 to Jun '01]																		
4	Embankment Formation	13w	15 May '01	13 Aug '01	[Gantt bar from May '01 to Aug '01]																		
5	Retaining wall construction	16w	12 Jul '01	31 Oct '01	[Gantt bar from Jul '01 to Oct '01]																		
6	Road Removal	20w	16 Aug '01	02 Jan '02	[Gantt bar from Aug '01 to Jan '02]																		
7	Road Construction	12w	01 Jan '02	25 Mar '02	[Gantt bar from Jan '02 to Mar '02]																		
8	miscellaneous	14w	08 Feb '02	16 May '02	[Gantt bar from Feb '02 to May '02]																		

Project: [redacted] Milestone [redacted] Rolled Up Task [redacted] Rolled Up Progress [redacted]
 Date: 14 Dec '99 Summary [redacted] Rolled Up Milestone [redacted]

Please Note: All construction periods are estimated. The duration and times may vary according to the Contractor's actual programme.

APPENDIX D SPECIES RECORDED IN THE SITE OF SK 076Shrubland and Grassland Habitat Species List

Shrubland	Status	Grassland	Status
<i>Rhus succedanea</i>	R	<i>Scenecio scandens</i>	D
<i>Mikania guaco</i>	D	<i>Chloris barbata</i>	D
<i>Sapium discolor</i>	R		
<i>Lantana camara</i>	O		
<i>Ficus hispida</i>	O		

Woodland Habitat Species

Understorey	Status
<i>Lantana camara</i>	O
<i>Aqualaris sinensis</i>	R
<i>Lygopodium japonium</i>	O
<i>Ehloranthus glaber</i>	F
<i>Psychotria serpens</i>	O
<i>Chloranthus glaber</i>	F
<i>Pueraria lobata</i>	O
<i>Smilax glabra</i>	R
<i>Derris trifoliata</i>	O
<i>Buettneria aspera</i>	F

Status

D- Dominant

F- Frequent

O -Occasional

R - Rare

APPENDIX D SPECIES RECORDED IN THE SITE OF SK 076

Tree Species recorded in SK076	
Woodland Species	Exotic Species
<i>Celtis sinensis</i>	<i>Araucaria heterophylla</i>
<i>Engelhardtia crysolepis</i>	<i>Bauhinia purpurea</i>
<i>Ficus variegata</i>	<i>Cunninghamia lanceolata</i>
<i>Litsea cubeba</i>	<i>Euphoria longan</i>
<i>Aquilaria spp.</i>	<i>Mangifera indica</i>
<i>Bridelia spp.</i>	<i>Livistonia chinensis</i>
<i>Cinnamomum spp.</i>	
<i>Ficus spp.</i>	
<i>Schefflera spp.</i>	
<i>Sterculia spp.</i>	
<i>Viburnim spp.</i>	
<i>Lithocarpus glaber</i>	

Full details of the tree species within the site boundary are presented in the Tree Survey Report.



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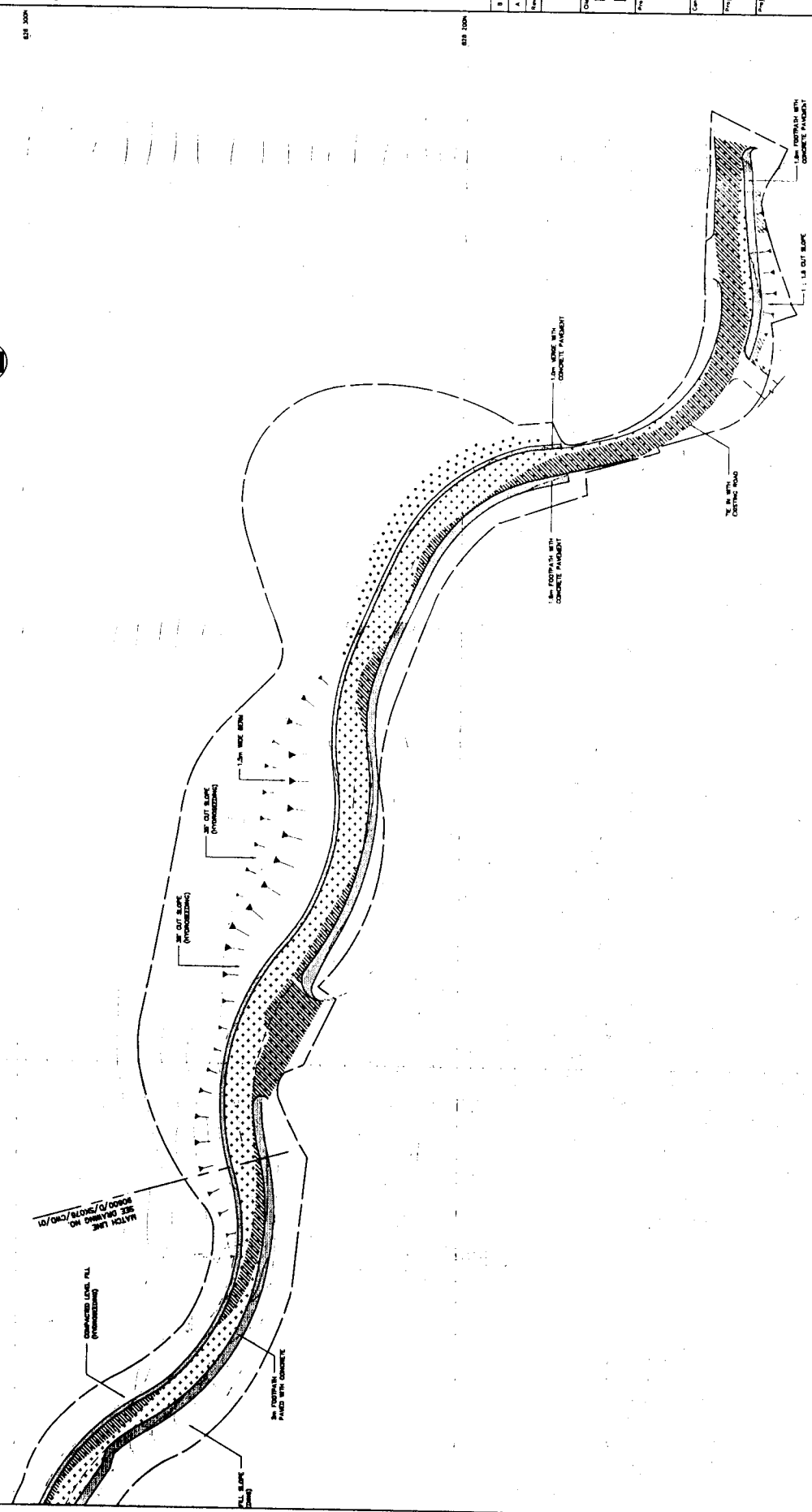
Drawing No.

3

Habitat Map of SK-076

NOTES:
 1. For general notes, refer to drawing no. SK0600/02/001/001.
 2. For detailed notes, refer to construction with drawings no. SK0600/02/002/001 & 002.

- LEGEND**
- Site boundary
 - Existing road surface to be removed and reconstructed
 - Proposed footpath/verge
 - Proposed road work
 - Existing slope work with soil nail
 - New slope work
 - New embankment
 - Proposed retaining wall



PLAN

Rev	Desc	By	CHK	Appr	Date
B	PTC				
A	PTC				
	Issue for information and comment				
	Issue for construction				

Rural Planning & Improvement Strategy
 Highways Department
 Government of the Hong Kong
 Special Administrative Region

Project: RPIS MINOR RURAL IMPROVEMENT WORKS PACKAGE 5
 Contract No: CE 47/98
 Project Ref No: SK - 076

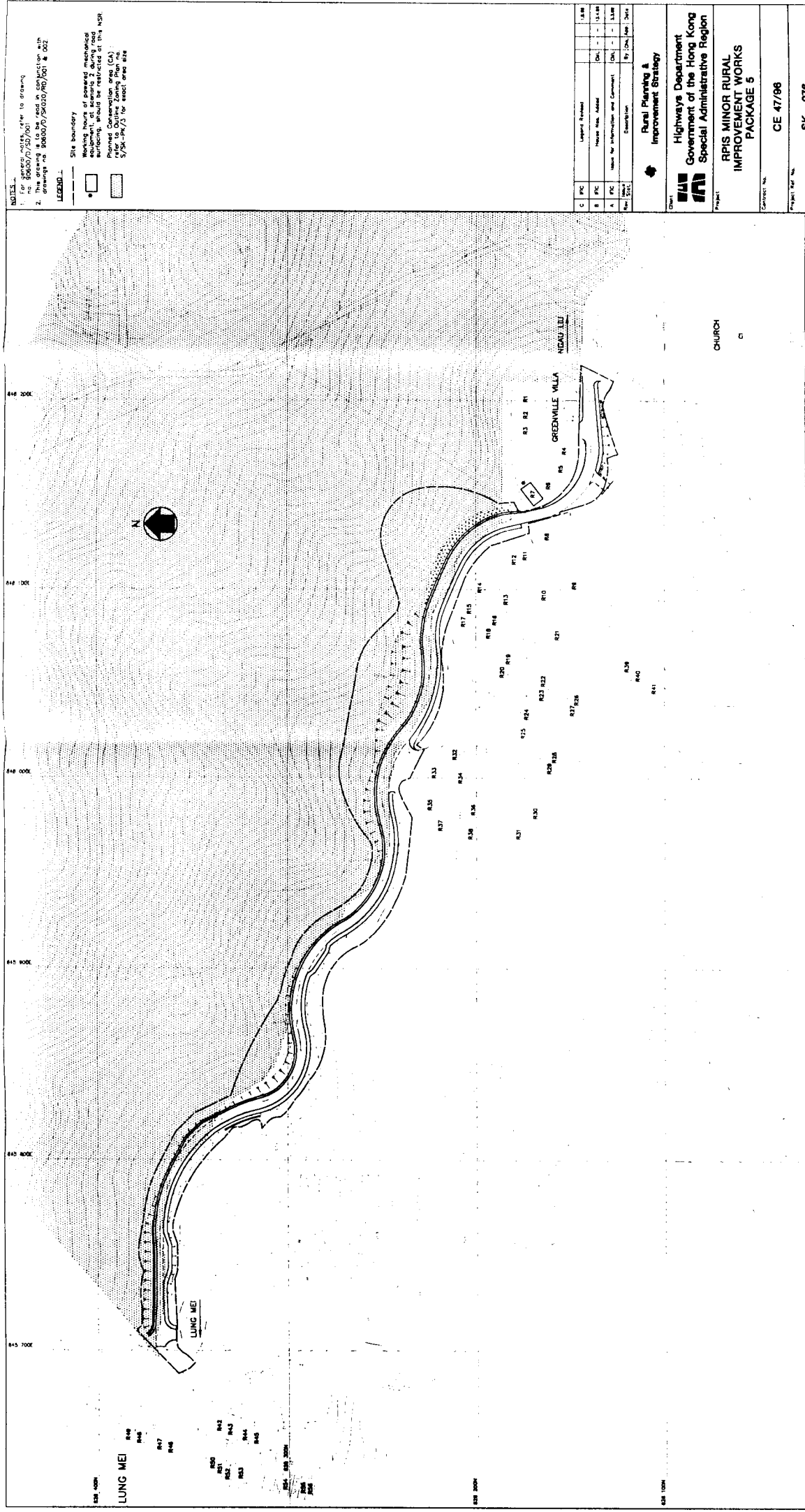
Project Title: IMPROVEMENT OF LUNG MEI TSUEN ROAD, SAI KUNG

Drawing Title: CONSTRUCTION WORK DETAILS
 (SHEET 2 OF 2)

Mouchel
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 Consulting Engineers

Scale: 1:100 (A3)
 Date: 25.11.99
 Drawing No: 90600/D/SK076/CWD/02 B

PRELIMINARY DRAWING



PLAN

NOTES:
 1. For general information refer to drawing NSR/006/075/011.
 2. This drawing is to be read in conjunction with drawing no. 90600/D/SK076/NSR/011 & 002.

LEGEND:
 [Symbol] Site boundary
 [Symbol] Existing boundary
 [Symbol] Proposed Conservation Area (CA)
 [Symbol] 5/50-10/70 for street area size

Code	Description	Scale
C	EPIC	1:500
B	EPIC	1:500
A	EPIC	1:500
1	EPIC	1:500

Rural Planning & Improvement Strategy
 Highways Department
 Government of the Hong Kong
 Special Administrative Region

Project:
 RPIS MINOR RURAL
 IMPROVEMENT WORKS
 PACKAGE 5

Contract No.: CE 47/96

Project Ref. No.: SK - 076

Project Title:
 IMPROVEMENT OF
 LUNG MEI TSUEN ROAD,
 SAI KUNG

Drawing Title:
 NOISE SENSITIVE RECEIVERS
 & CONSERVATION AREA

Drawn	Date	Checked	Date	Approved	Date
	1998		1998		1998

Mouchel
 Mouchel Asia Limited
 Consulting Engineers

Drawn	Date	Checked	Date	Approved	Date
	1998		1998		1998

PRELIMINARY DRAWING

90600/D/SK076/NSR/011.C

100045

Do not issue drawing for use in connection with any contract or agreement unless the drawing is accompanied by the title block and the legend. The drawing is the property of the client and shall be returned to the client upon completion of the project. Any alterations shall be made by the client and shall be made in the presence of the architect. The architect is not responsible for the accuracy of the data or the results of the design. The architect is not responsible for the construction of the project.

legend

- existing tree retained
- filled tree
- new tree planting
- new woodland mix planting
- hydroseeded area

REVISIONS

ENGINEER
Mouchel Asia Ltd

CLIENT
Highways Department
Government of the Hong Kong Special Administrative Region

Rural Planning & Improvement Strategy
SK-076
improvement of
Lung Mei Tsuen Road
Sai Kung

TITLE
landscape proposal

initiatives

date 9/4/99
drawn bow
scale 1:500

rev.
SK-075L.P001

