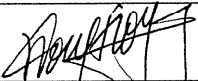
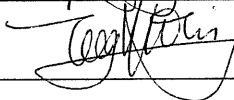


Contract No. HY/2002/19

**Widening of Yuen Long Highway
Between Tan Kwai Tsuen and Shap Pat
Heung Interchange**

Traffic Noise Monitoring Plan

May 2006

	Name	Signature
Reviewed & Checked:	Connie Wong	
Approved:	Y.T Tang	

Version: I

Date: 29 May 2006

The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and MEMCL accepts no responsibility for its use by others.

This report is copyright and may not be reproduced in whole or in part without prior written permission.

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

11/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, NT, Hong Kong
Tel: (852) 2893 1551 Fax: (852) 2891 0305 Email: mem@maunsell.aecom.com

TABLE OF CONTENTS

	Page
1. INTRODUCTION.....	1
2. NOISE MONITORING.....	1
Date and Time	1
Noise Monitoring Equipment	1
Noise Monitoring Locations	1
Noise Monitoring Parameters.....	2
3. METHODOLOGY OF NOISE LEVEL COMPARISON.....	3
4. REFERENCE	4

List of Tables

- Table 2.1 Traffic Noise Monitoring Equipment
Table 2.2 Proposed Traffic Noise Monitoring Locations

List of Figures

- Figure 2.1 Locations of Noise Monitoring Points

List of Appendix

- Appendix A Traffic Noise Monitoring Data Sheet

1. INTRODUCTION

- 1.1 This traffic noise monitoring plan outlines the procedures, proposed monitoring locations, equipment and specific criteria required for the operational traffic noise monitoring for Yuen Long Highway between Tan Kwai Tsuen and Shap Pat Heung Interchange as required in the Environmental Permit No.EP-141/2002 Clause 5.1.
- 1.2 As stipulated in the Clause 5.1 of Environmental Permit No. EP-141/2002, the Permit Holder shall, at least six months before the operation of the project, deposit with the Director a monitoring plan for the purpose of verification of traffic noise assessment, by comparing the project noise impacts predictions with the actual impacts.
- 1.3 The Monitoring plan shall contain monitoring locations, monitoring schedules, methodology of noise monitoring including noise measurement procedures, traffic counts and speed checks, and methodology of comparison with the predicted level. Monitoring details and results, including the comparison between the measured noise levels and the predicted levels, shall be recorded in a report. The report shall be certified by the Permit Holder before it be deposited with the Director, within one month after the composition of the monitoring.

2. NOISE MONITORING

Date and Time

- 2.1 The monitoring will be carried out bimonthly within the first year right after the completion of the highway widening works at the peak traffic hour. Based on the Annual Traffic Census 2004, the AM peak traffic hour is from 08:00 to 09:00 for both eastbound and westbound.

Noise Monitoring Equipment

- 2.2 The Sound Level Meters to be used for the monitoring will comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Any other noise measuring and analysis instrument used will be of comparable professional quality. The instrumentation to be used for the noise monitoring is given Table 2-1.

Table 2.1 Traffic Noise Monitoring Equipment

Manufacturer	Description	Quantity
Integrating Sound Level Meter	Rion Model NL-14	2
Calibrator	B&K 4231	1

- 2.3 The sound level meter will be calibrated using a Bruel and Kjaer Sound Level Calibrator Type 4231 for 94dB at 1kHz, prior to and after each set of measurements. The results of the calibration will be recorded on the field data sheet. Measurement results will be discarded if the calibration before and after does not agree to within 1dB(A) and measurement will be taken until this condition is fulfilled.

Noise Monitoring Locations

- 2.4 The noise measurements will be conducted at 11 proposed monitoring locations. The predicted traffic noise levels at these locations are given in the "Final Environmental Impact Assessment Report for Preliminary Design and Ground Investigation for Widening of Yuen Long Highway Between Lam Tei and Shap Pat Heung Interchange" ^[1]. The proposed monitoring locations are presented in Table 2-2 and shown in Figure 2-1.

Table 2.2 Proposed Traffic Noise Monitoring Locations

NSR ID*	Monitoring Station	Location	Predicted Noise Level (unmitigated), L10 dB(A)	Predicted Noise Level (mitigated), L10 dB(A) **
93	M1	Village House in Tan Kwai Tsuen	83	69
17	M2	Village House near Great Garden	80	70
57	M3	Village House in Tai Tao Village	82	70
20	M4	Village House beside Tong Tai Road	81	68
13	M5	Jasper Court Block 10	78	70
24	M6	Village House in Lam Hau Tsuen	76	70
88	M7	Village House in Lam Hau Tsuen	76	64
79	M8	Village House beside Kung Um Road	76	67
31	M9	Sham Chung Tusen	72	69
65	M10	32 Shung Ching San Tsuen	73	67
26	M11	Village House near Kung Um Road	70	70

Notes:

* Noise Sensitive Receiver (NSR) ID number used in the Final EIA Report

** various types of noise barriers were built as mitigation measures

- 2.5 The noise monitoring station will be at a point 1m from the exterior of the sensitive receivers building facade and be at a position not less than 1.2m above ground.
- 2.6 Basically, the selection and establishment of noise monitoring stations complies with the following principles:
- The stations closer to noise sources and providing the worst-case noise situation will be selected.
 - The station should avoid contributions of noise from other sources.
 - The most sensitive position at the affected premises where maximum noise levels under unmitigated measures and maximum noise reduction levels under mitigated measures are expected.

Noise Monitoring Parameters

- 2.7 Measurements will be made in accordance with Section III of the "Calculation of Road Traffic Noise (CRTN), 1998" [2]. The distance, view angle, screening structures, and façade effect will be recorded during the measurements. Traffic counts will be conducted concurrently for adjustment to the measured traffic noise level and comparison with prediction from the CRTN. This will include the percentage of heavy vehicles, and an estimation of average vehicle speed.
- 2.8 The operational traffic noise will be measured at the peak hour in terms of A-weighted L₁₀ over 1-hour period at each proposed noise monitoring location. Noise measurement will be paused if being influenced by other non-traffic related activities.
- 2.9 As supplementary information for data auditing, statistical results such as L_{max}, L_{eq} and L₉₀ will also be

obtained for reference.

- 2.10 The template of filed monitoring data sheet is attached in Appendix A.

3. METHODOLOGY OF NOISE LEVEL COMPARISON

- 3.1 The following equation extracted from CRTN will be adopted to correct the measured noise level if the measured traffic flow is different from the predicted traffic flow in Final EIA Report.

$$* \text{ Correction Factor} = 10 \text{Log} \left(\frac{Q'}{Q} \right) + 33 \text{Log} \left(\frac{V'+40+500/V'}{V+40+500/V} \right) + 10 \text{Log} \left(\frac{1+5p'/V'}{1+5p/V} \right)$$

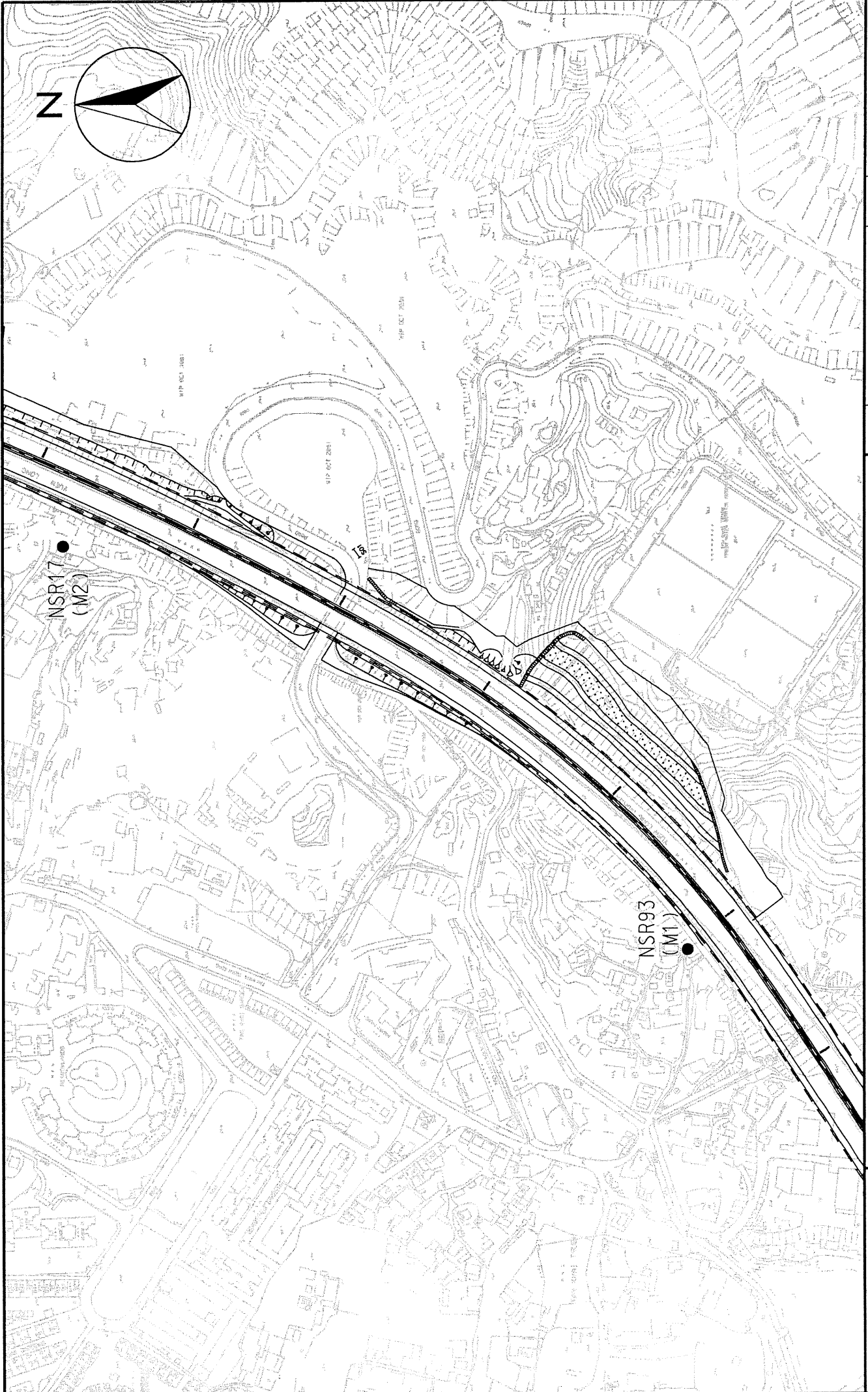
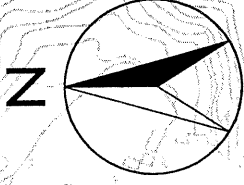
Where Q' is predicted traffic flow,
V' is predicted traffic speed,
p' is predicted percentage heavy vehicle,
Q is measured traffic flow,
V is measured traffic speed,
p is measured percentage heavy vehicle

- 3.2 As recommended in CRTN, a façade effect correction factor of 2.5dB(A) will be further added to the measured noise level if the monitoring is carried out in a free field condition.
- 3.3 The corrected noise levels will then be compared with the predicted noise level in the Final EIA Report in order to evaluate the effectiveness of the mitigation measures.

4. REFERENCE

1. Scott Wilson (Hong Kong) Ltd. Agreement No. CE 98/98, "Preliminary Design and Ground Investigation for Widening of Yuen Long Highway Between Lam Tei and Shap Pat Heung Interchange, Environmental Impact Assessment Final Report", December 2001.
2. "Calculation of Road Traffic Noise", Department of Transport, UK, 1988.

FIGURES



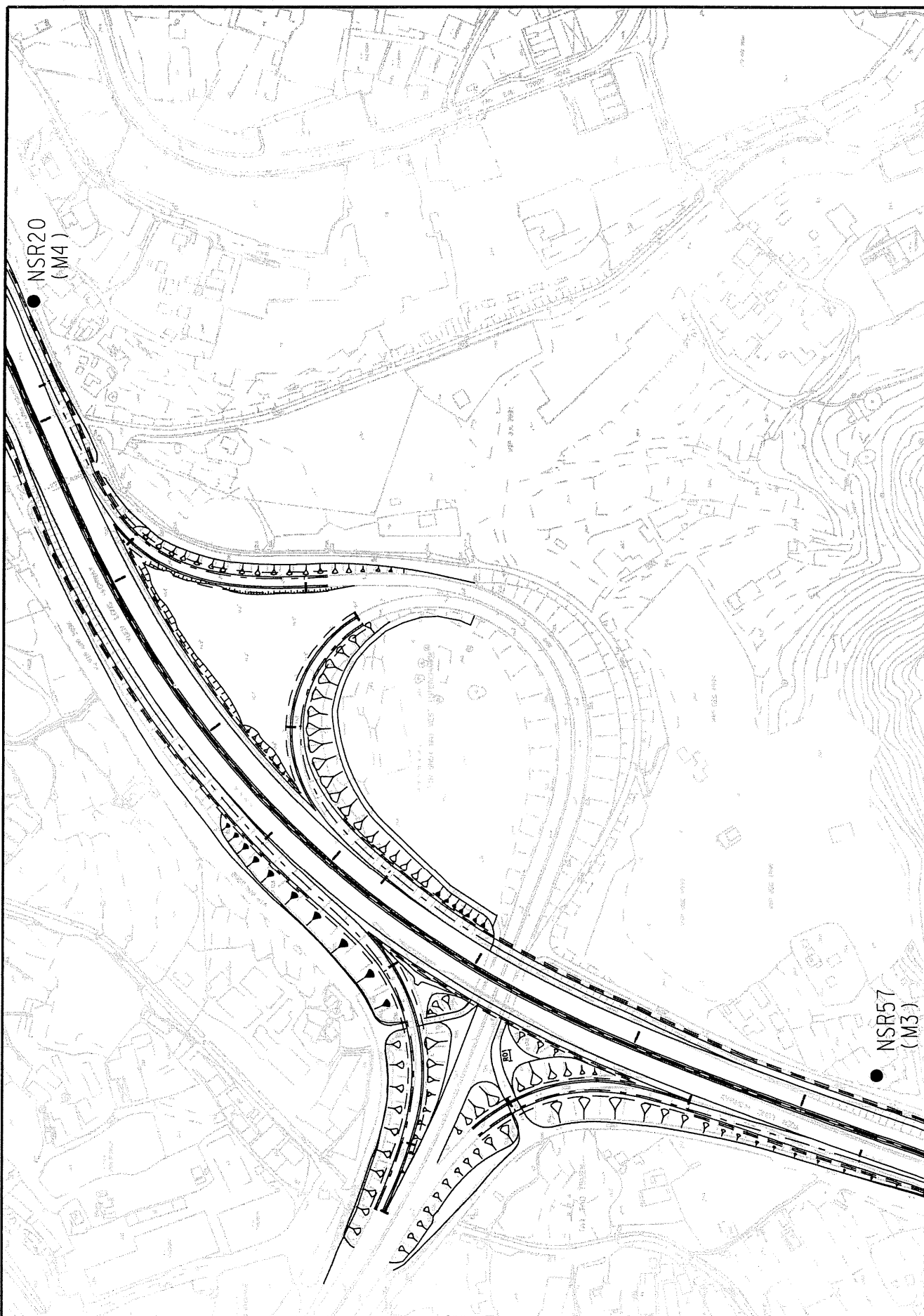
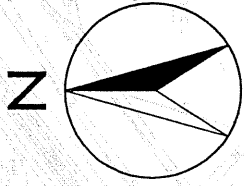
NSR17
(M2)

NSR93
(M1)

CONTRACT NO. HY/2002/19 WIDENING OF YUEN LONG HIGHWAY
BETWEEN TAN KWAI TSUEN AND SHAP PAT HEUNG INTERCHANGE
LOCATIONS OF NOISE MONITORING POINTS
(SHEET 1 OF 4)

MAUNSELL | AECOM
Maunsell Environmental
Management Consultants Ltd

SCALE	A4 1:3000	DATE	MAR 06
CHECK	TKTT	DRAWN	CCCM
JOB NO.	S05903-210	DRAWING NO.	2.1
		REV	-

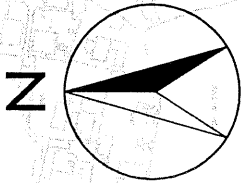


NSR20
(M4)

NSR57
(M3)

CONTRACT NO. HY/2002/19 WIDENING OF YUEN LONG HIGHWAY
BETWEEN TAN KWAI TSUEN AND SHAP PAT HEUNG INTERCHANGE
LOCATIONS OF NOISE MONITORING POINTS
(SHEET 2 OF 4)

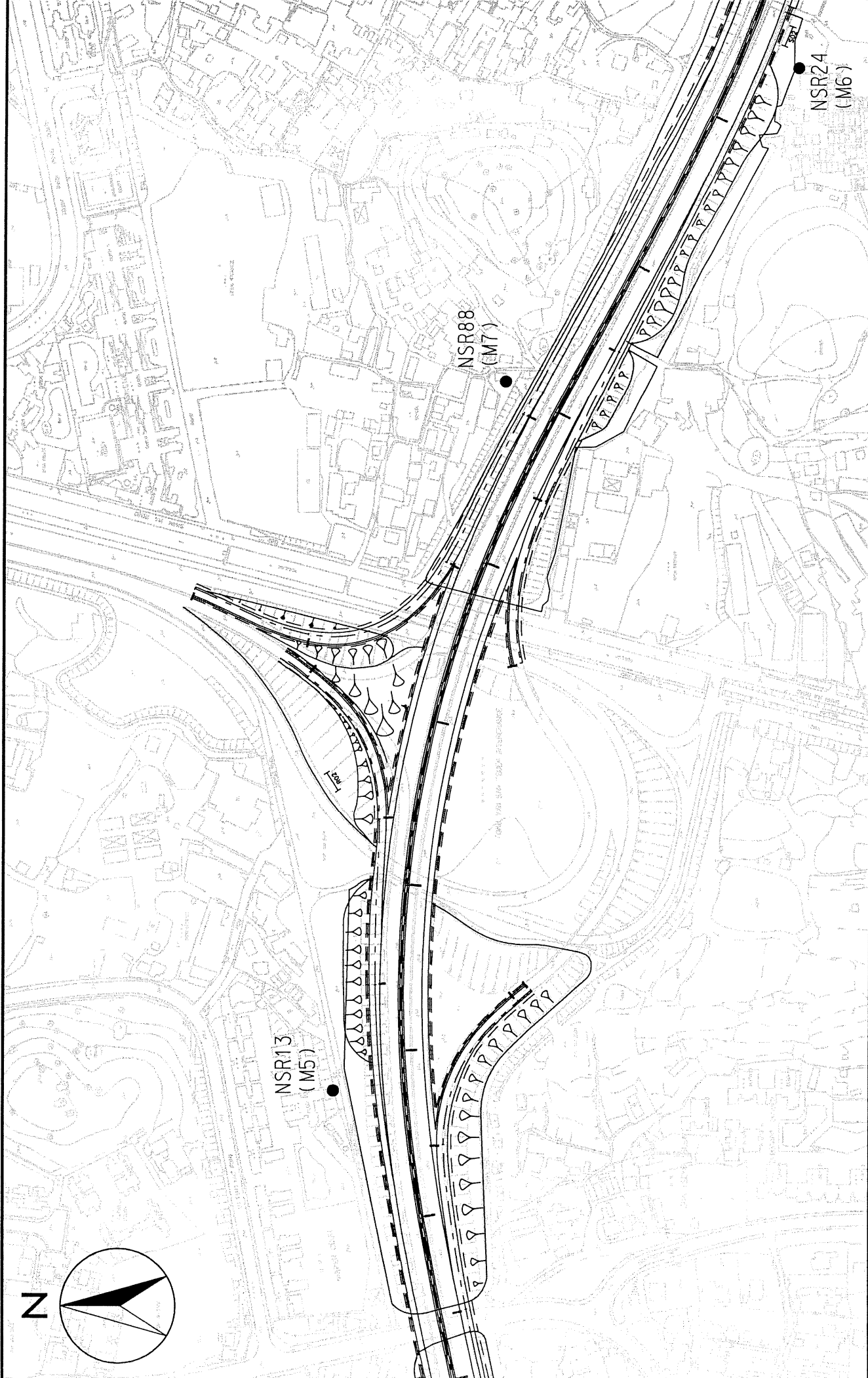
SCALE	A4 1:3000	DATE	MAR 06
CHECK	TKTT	DRAWN	CCCM
JOB No.	S05903-020	DRAWING No.	2.1
		REV	-



NSR13
(M5)

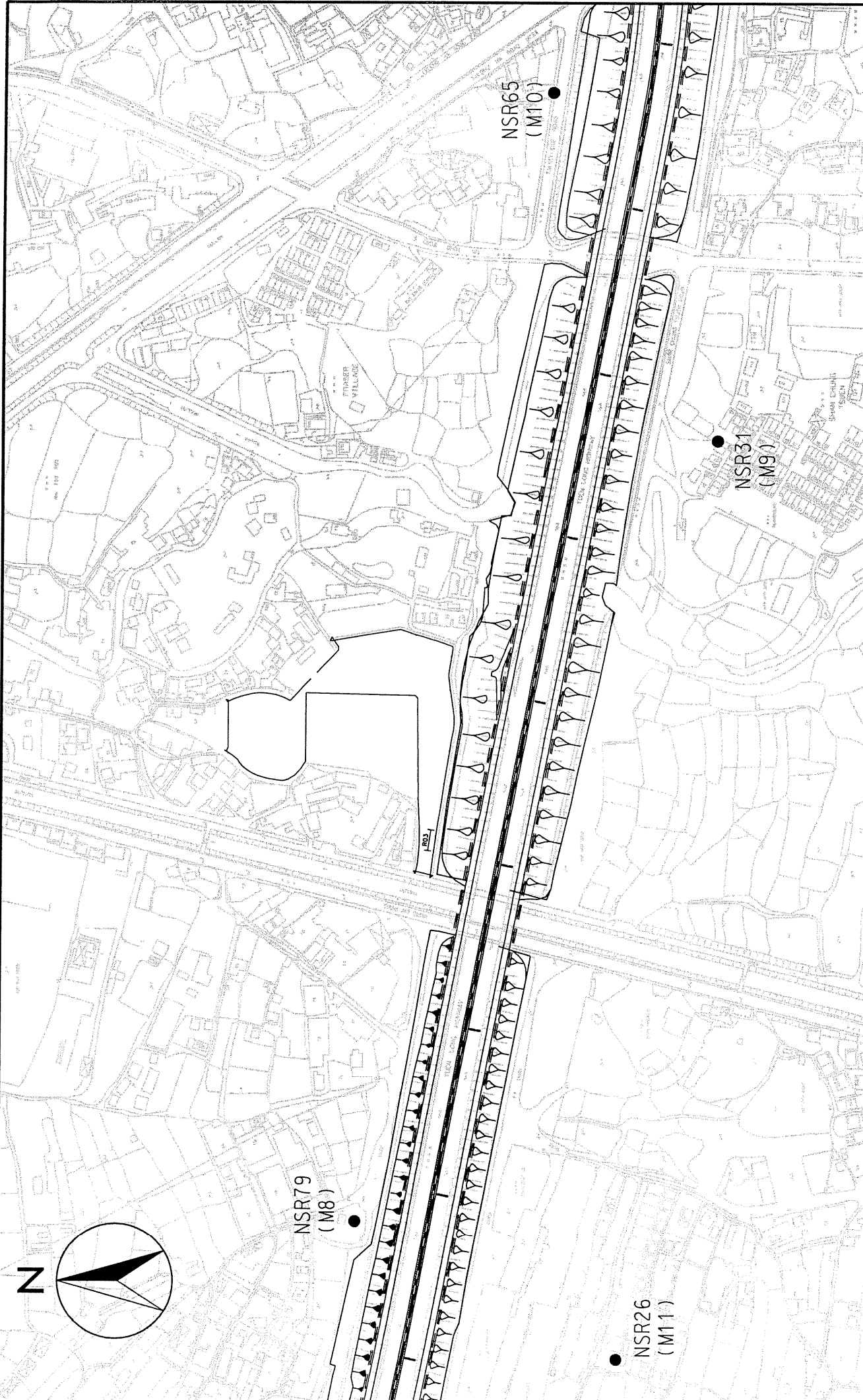
NSR88
(M7)

NSR24
(M6)



CONTRACT NO. HY/2002/19 WIDENING OF YUEN LONG HIGHWAY
 BETWEEN TAN KWAI TSUEN AND SHAP PAT HEUNG INTERCHANGE
LOCATIONS OF NOISE MONITORING POINTS
 (SHEET 3 OF 4)

SCALE	A4 1:3000	DATE	MAR 06
CHECK	TKTT	DRAWN	CCCM
JOB NO.	S05903-020	DRAWING NO.	2.1
		REV	-



NSR79
(M8)

NSR26
(M11)

NSR31
(M9)

NSR65
(M10)

CONTRACT NO. HY/2002/19 WIDENING OF YUEN LONG HIGHWAY
 BETWEEN TAN KWAI TSUEN AND SHAP PAT HEUNG INTERCHANGE
LOCATIONS OF NOISE SENSITIVE RECEIVERS
 (SHEET 4 OF 4)

SCALE	A4 1:3000	DATE	MAR 06
CHECK	TKTT	DRAWN	CCCM
JOB No.	S05903-020	DRAWING No.	2.1
		REV	-

APPENDIX A
Field Monitoring Data Logsheet

Appendix - Traffic Noise Monitoring Data Sheet

A. General

Monitoring station			
Date & day of monitoring	()		
Measurement time (hh:mm)	From :	To :	(minutes)
Location description (floor level)			
Microphone position	Façade / Free Field / Others (please specify):		

B. Weather Condition

Weather conditions	
Temperature (°C)	
Wind speed (ms ⁻¹)	

C. Equipment

Instrument	Model No.	Type	Kit No. (Equipment No.)	Setting
Sound level meter				
Calibrator				

D. Calibration

Before measurement :	After measurement :
----------------------	---------------------

E. Raw Data

Time	Traffic count *				Noise level (1 hour) [dB(A)]				Average speed [kph]			
	East bound		West bound		L ₁₀	L ₉₀	L _{eq}	L _{max}	East bound		West bound	
	LV	HV	LV	HV					LV	HV	LV	HV

Note: LV - light vehicle (i.e. private car, motorcycle, taxi and van)
 HV - heavy vehicle (i.e. other than LV)
 * - traffic count for a duration of 15 minutes

F. Others

Mitigation measures in place near measurement point	
Other noise source(s) during measurement	
Remarks	

G. Personnel

	Name	Signature	Date
Recorded by			
Checked by			

