

2. PROJECT DESCRIPTION

2.1 Alternative Alignment

- 2.1.1 *Figure 1.1a* shows the general layout of the Route 16 Alternative Alignment.
- 2.1.2 At the southern end, a Dual-2 lane carriageway which rises up over the Lai Wan Interchange linking directly with the Route 9 - Cheung Sha Wan and Tsing Yi section, will be provided. In addition, a Dual-2 lane slip road rises up to merge with the Dual-2 direct connection, linking the Lai Wan Interchange, will be provided. A Dual-3 carriageway will be formed after the Lai Wan slip roads and the Dual-2 direct connection completely merge/diverge. The mainline will continue to rise up over the elevated structure at Lai Chi Kok Interchange and continues alongside Butterfly Valley Road.
- 2.1.3 The Dual-3 mainline structure passes over Wai Man Tsuen at high level, and a filled embankment of the Conforming Scheme is no longer required. The viaduct continues through Butterfly Valley to an abutment located on the earthworks platform approximately 250m north of Ching Cheung Road. At about 400m after crossing over Ching Cheung Road, the mainline carriageways begin to separate before joining the tunnel section, at which the northbound and southbound bores are approximately 30m apart. The crossover will be provided after the slip roads completely merge/diverge with the mainline. This arrangement will provide better traffic operation and control than that of the Conforming Alignment. Slip road connections to Ching Cheung Road will be provided.
- 2.1.4 The at-grade section of the mainline will involve cutting or filling works in certain part of Butterfly Valley, together with the associated slope stabilisation measures. The use of soil nails as stabilisation or soil-nailed concrete berm stepped walls may be required.
- 2.1.5 The tunnel portal, located near the Tai Po Road Water Treatment Works (WTW) will have a portal building located at the front end. It was originally anticipated that to overcome the potential chlorine hazard from the Tai Po Road WTW, an air-tight road enclosure extending south for a substantial length from the tunnel portal is required. However, it was considered that placing the cross-over inside the enclosure would cause safety concern. In order to overcome the potential chlorine hazard, the option of relocation of the chlorine store of the Tai Po Road WTW was proposed and has been assumed in this study. However a short length of noise enclosure would be required and is considered feasible as the short length would just avoid the cross-over constraint.
- 2.1.6 The main tunnel section (Eagle's Nest Tunnel), approximately 2000m long, runs underneath the Lion Rock Country Park and surfaces at the western end of Sha Tin. After emerging from tunnel the route follows that of the Conforming Alignment.

Surrounding Environment

- 2.1.7 The West Kowloon area surrounding the Route 16 alternative alignment is mainly industrial area. The Butterfly Valley Cottage area (Wai Man Tsuen), mainly consists of one to two storey high village type housing is located east of Butterfly Valley Road, with a number of existing industries and godowns located on the far eastern part of the valley. To the west of Wai Man Tsuen, an existing knoll, the Lai Chi Kok Hospital and Lai Chi Kok Reception Centre and its Staff Quarters are located west of Butterfly Valley Road.
- 2.1.8 The proposed tunnel portal in Butterfly Valley is currently surrounded by natural slope and occupied by some village houses in Mui Kong Tsuen and Tai Ching Cheung. The southwestern region of Butterfly Valley is within the Green Belt area of Piper's Hill according to the Kwai Chung - Outline Zoning Plan S/KC/12, 11 April 1997. There is no planned

landuse in the northeastern region of the Valley where currently occupied by scattered village houses and woodland, which will be replaced by the tunnel portal.

- 2.1.9 Three housing development sites have been identified within the Study Area including, Site 10, located to the north east of Lai Wan Interchange; the old Lai Chi Kok Amusement Park and the Sir Robert Black College Site. It is understood that the existing Wai Man Tsuen would be resumed in 2001 for future development. According to the draft Cheung Sha Wan Outline Zoning Plan, the affected Wai Man Tsuen area is currently zoned for industrial use. However, it is expected that at the Design and Construct stage, conceptual landuse layout plans will be prepared for two different development scenarios (industrial-led and housing-led) taking into consideration the environmental constraints. Based on information presented in the Lai Chi Kok Outline Zoning Plan (S/K16/5) dated 20 Oct 1998, Cheung Sha Wan Outline Zoning Plan (S/K5/15) dated 5 March 1999 and Kwai Chung Outline Zoning Plan (S/KC/13) dated 12 February 1999, the proposed landuses zoning of the Study Area is presented in *Figure 2.1a*.
- 2.1.10 Areas within the Project Limit will be cleared and acquired. It is expected that land will be cleared in September 2001. *Figures 2.1b to j* show the land requirement for this project.
- 2.1.11 Three main habitat types has been identified along the Route 16 alignment including: urbanized area, secondary woodland and stream habitat. There are no existing or proposed Sites of Special Scientific Interest or Special Areas within the Study Area. The alignment will pass under the Lion Rock Country Park in tunnel.

2.2 Likely Future Environmental Conditions in the Absence of the Project

- 2.2.1 It is anticipated that the traffic demand will be similar with or without the proposed Project. Therefore in the absence of the project, the increased of traffic are expected to re-route to the existing road network and hence severe traffic congestion could result (as the existing network are not expected to handle the number of new traffic trips generated). It is expected that in the absence of the project, the ambient noise levels in the future could increase within the Study Area owing to the increase of traffic on the local network. Since vehicle exhaust emission are mostly associated with decelerating, idling and accelerating vehicles, it is anticipated that the general air quality would deteriorate in the future due to the traffic congestion within the local road network.
- 2.2.2 The Butterfly Valley area is currently zoned Green Belt and it is expected that the present landuse would remain similar to the present condition in the absence of the Project.

2.3 Construction Activities

- 2.3.1 The construction activities associated with the Toll Plaza, Sha Tin Heights Tunnel and the section after the northern portal of Sha Tin Heights will be the same as the Conforming Alignment and detailed assessment will not be carried out in this EIA study. For details of predicted results, required mitigation measures for this section of the alignment, reference can be made to the Conforming Alignment EIA (EIAO register reference number: EIA-135/BC).
- 2.3.2 The main construction activities of the Alternative Alignment comprise:
- Earthworks excavation and construction of road embankment;
 - Tunnel portal construction;
 - Tunnel excavation; and

- Viaduct construction.

- 2.3.3 A preliminary construction programme of the Alternative Alignment is shown in *Figures 2.2a*, covering a total period of approximately 3.5 years. Details of the construction methods including plant and equipment are given in the noise assessment.
- 2.3.4 For the West Kowloon section, earthworks excavation will take place at the portals and mid ventilation building, and filling operations undertaken for embankment and Butterfly Valley. The excavated material will be 90% good quality rock, the majority of which will be used as fill material on site. It is estimated that there will be a surplus material of approximately 508,900m³ required for the West Kowloon works. Temporary stockpiles are expected at the toll plaza and Butterfly Valley area.
- 2.3.5 Portals will be constructed for the two rock tunnel sections which will be excavated by bored tunnelling method.
- 2.3.6 Piling activities for viaduct foundation works will mainly take place at the West Kowloon end.
- 2.3.7 Main works sites are anticipated to be at the Toll Plaza, Butterfly Valley and other portal areas.
- 2.3.8 Tunnel excavation are expected to be 24 hour working and the other construction activities are likely to be between 0700 to 1900 hours.

2.4 Traffic Forecasts

- 2.4.1 For the purpose of this EIA study, traffic flows for the year 2019, 15 years after commencement of the operation of Route 16, have been forecast and the traffic data endorsed by Transport Department. The prevailing traffic data (year 2000) and the projected peak traffic flows and vehicle split for the roads under consideration are shown in *Tables 2.4a & 2.4b* and in *Figures 2.2b & c* respectively. With reference to the Calculation of Road Traffic Noise, heavy vehicles denote all vehicles with an unladen weight exceeding 1525 kg.

Table 2.4a Prevailing Traffic Flow for the Year 2000 (PM Peak Hour)

Road	Vehicle/hr	Percentage of Heavy Vehicles
Ching Cheung Road - East of CCR Interchange	6710	53
Ching Cheung Road - West of CCR Interchange	4850	55
Castle Peak Road - South of CCR	1260	49
Castle Peak Road - North of CCR	3030	53
Butterfly Valley Road	1450	59
Lai Chi Kok Road	6460	40
Kwai Chung Road	9170	47
Cheung Sha Wan Road	3530	63
Mei Lai Road	330	42
Local Road to West Kowloon Reclamation	230	47

Table 2.4b Projected Traffic Flow for the Year 2019 (PM Peak Hour)

Road	Vehicle/hr	Percentage of Heavy Vehicles
Ching Cheung Road - East of CCR Interchange	9790	43.9
Ching Cheung Road - West of CCR Interchange	8130	46.8
Castle Peak Road - South of CCR	2540	59.8
Castle Peak Road - North of CCR	5300	48.2
Butterfly Valley Road	2340	79.5
Lai Chi Kok Road	8440	47.3
Kwai Chung Road	11830	42.9
Cheung Sha Wan Road	4570	65.9
Mei Lai Road	2840	60.6
Local Road to West Kowloon Reclamation	770	32.5
Route 16 Mainline - Tunnel (southbound)	4160	60.1
Route 16 Mainline - Tunnel (northbound)	4790	53.4
Lai Chi Kok Viaduct (southbound)	3510	56.4
Lai Chi Kok Viaduct (northbound)	4010	54.9
Ching Cheung Road Slips (southbound)	680	76.5
Ching Cheung Road Slips (northbound)	510	72.5
Castle Peak Road Slip (northbound)	1540	68.8
Route 16 to Route 9 (southbound)	500	62.0
Route 16 to Route 9 (northbound)	450	57.8

2.4.2 In addition to the traffic data presented in the above tables, traffic data taken from the completed *Route 9 between Tsing Yi and Cheung Sha Wan Detailed Feasibility Study - Final EIA Report* have been used in this Study. Traffic data for the West Kowloon Expressway, the Route 9 between Tsing Yi and Cheung Sha Wan and Lai Wan Interchange was used and are presented in *Table 2.4c* and in *Figure 2.2d*.

Table 2.4c Traffic data taken from the Route 9 between Tsing Yi and Cheung Sha Wan Detailed Feasibility Study - Final EIA Report

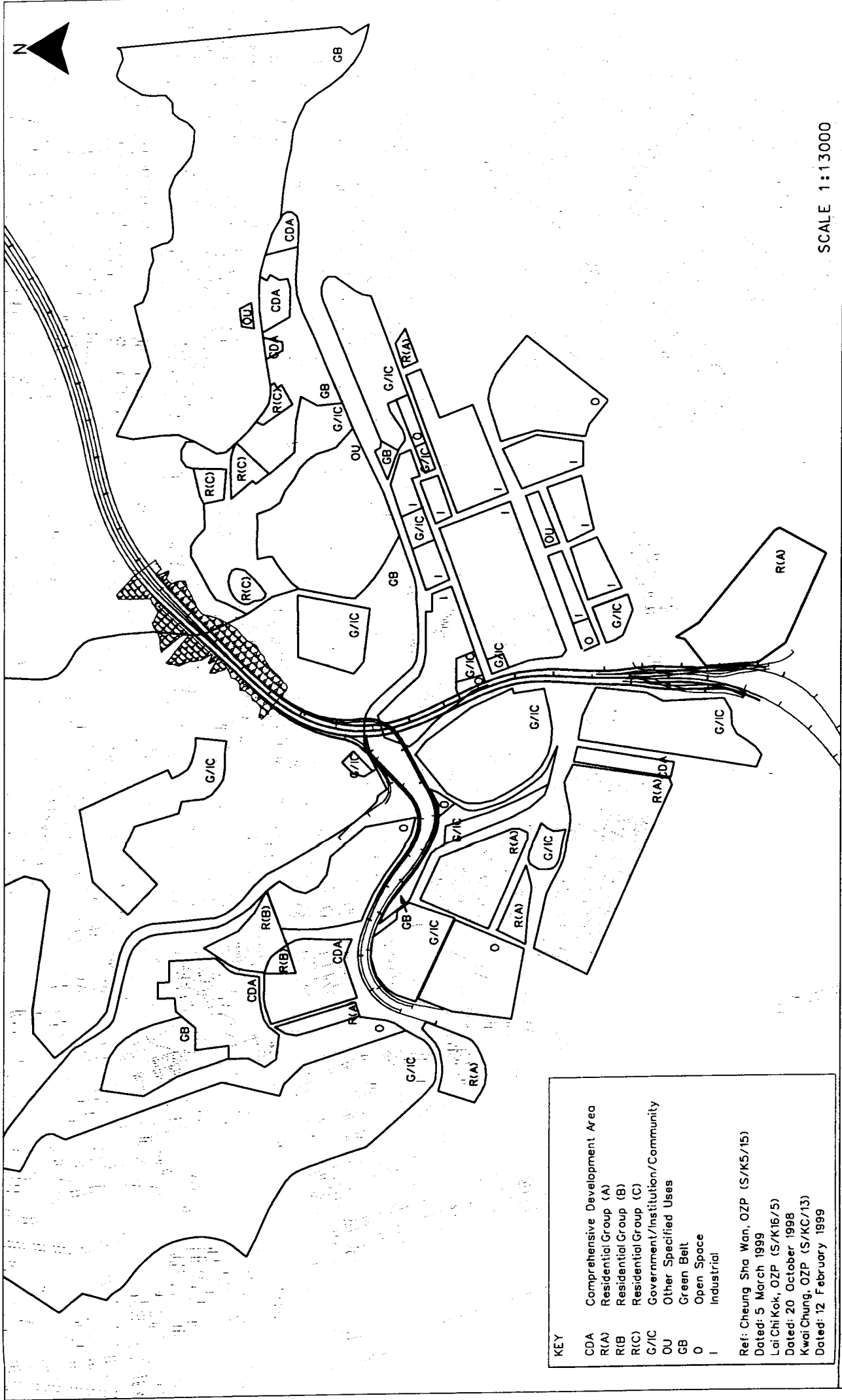
Road	Vehicle/hr	Percentage of Heavy Vehicles
West Kowloon Expressway	6402	48.3
Route 9 mainline (northbound)	3732	20
Route 9 Slips to WKE - Ramp G	3024	21
Route 9 Slips from WKE - Ramp H	2084	31
Road P1 between WKE and Slips	1752	50
Road P1 between Slips	1128	45
Road P1 (eastbound)	2088	33
Link Road G	624	41

Road	Vehicle/hr	Percentage of Heavy Vehicles
Link Road L	960	16
Slip from Road P1 (westbound) to Road D3	1164	42
Slip from Road D3 to CP3 (southbound)	864	59
Slip from Road D3 to Road P1 (westbound)	480	54

2.5 Operational Phase

Mid Ventilation Building

- 2.5.1 A ventilation building, of a much reduced scale, is retained at the Conforming Scheme ventilation building site to supply and exhaust air from the middle section of the tunnel, via one ventilation adit connected to the quarter point of the bored tunnel. The layout will again be similar to that of the Conforming Scheme, but the plan area required is reduced from 5000m² to 2100m². Four groups of tunnel ventilation fans will be installed. The new Mid Ventilation Building houses a total number of 16 fans compared with 38 fans for the Conforming Scheme. More details of the ventilation system and emission data are presented in the operational air quality assessment in *Section 3*.



KEY	
CDA	Comprehensive Development Area
R(A)	Residential Group (A)
R(B)	Residential Group (B)
R(C)	Residential Group (C)
G/I/C	Government/Institution/Community
OU	Other Specified Uses
GB	Green Belt
O	Open Space
I	Industrial
Ref: Cheung Sha Wan, OZP (S/K5/15)	
Dated: 5 March 1999	
Lai Chi Kok, OZP (S/K16/5)	
Dated: 20 October 1998	
Kwai Chung, OZP (S/KC/13)	
Dated: 12 February 1999	

LANDUSE PLAN

FIGURE 2.10

- Notes:**
1. Coordinates are related to Hong Kong Metric Datum (HKMD)
 2. Dimensions and changes are in meters unless otherwise shown
 3. Levels are in meters and refer to Principal Datum (PD)
 4. Original ground levels shown are approximate only

Legend:

- Approach to Site Clearance Limit
- Underground Works Site Limit
- Land to be Resumed in September 2001
- Land to be Resumed in September 2001
- Cut slope
- Fill slope
- Tunnel portal
- Retaining Structure

REV	DATE	BY	CHKD	DESCRIPTION
B	9/3/00			Site limit revised
A	1/3/00			Original layout Site limit revised
INITIAL				REVISED

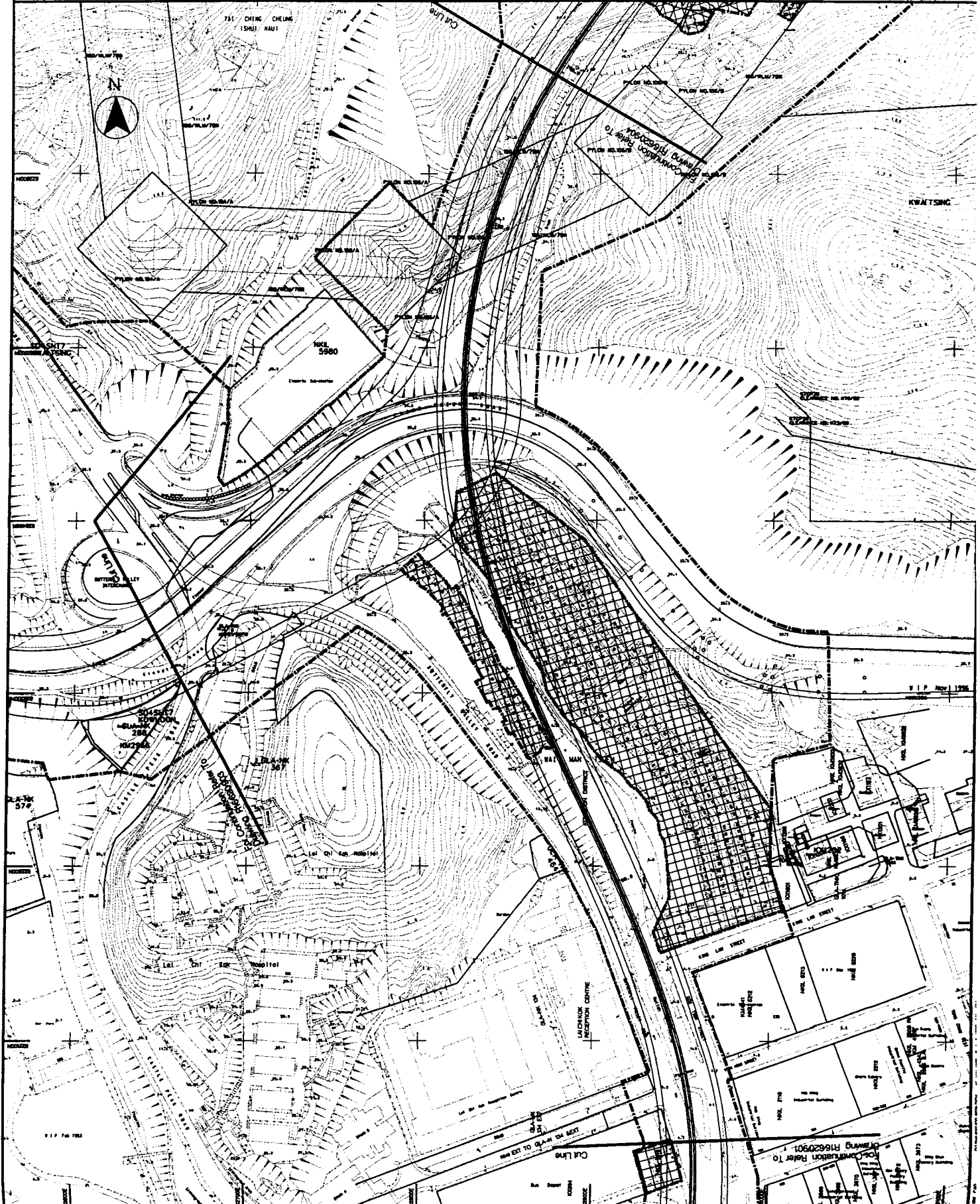
The Government of the Hong Kong
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Highways Department

Route 16
AGREEMENT NO. CE 49/06
WEST KOWLOON TO SHANTIN
INVESTIGATION ASSIGNMENT

LAND REQUIREMENT PLAN
(SHEET 2 OF 9)
FIGURE 2.1c

Drawing No.	Revised	Approved	Scale
R16 / 620 / 902B			1:1000
Sheet No.	1	1	1
Sheet Title	1	1	1

Drawn by: **Perkins Brinkerhoff**
in consultation with
M. A. Ho, M. H. Ho, S. H. Ho, H. K. Ho



Notes:

1. Coordinates are related to Hong Kong Metric Grid (1980).
2. Dimensions and changes are in Metric Units otherwise shown.
3. Levels are in meters and refer to Principal Datum (P.D.).
4. Original ground levels shown are approximate only.

Legend:

- Approximate Site Clearance Unit
- Underground Works Site Line
- Land to be Released in September 2001
- Land to be Returned in September 2001
- Cut slope
- Fill slope
- Tunnel portal
- Retaining Structure

Symbol	Description	ITCW	Unit
B	Minor revision	ITCW	Unit
A	Layout (shaded) Site area shown	ITCW	Unit
	Scale	Scale	Scale
	Scale	Scale	Scale

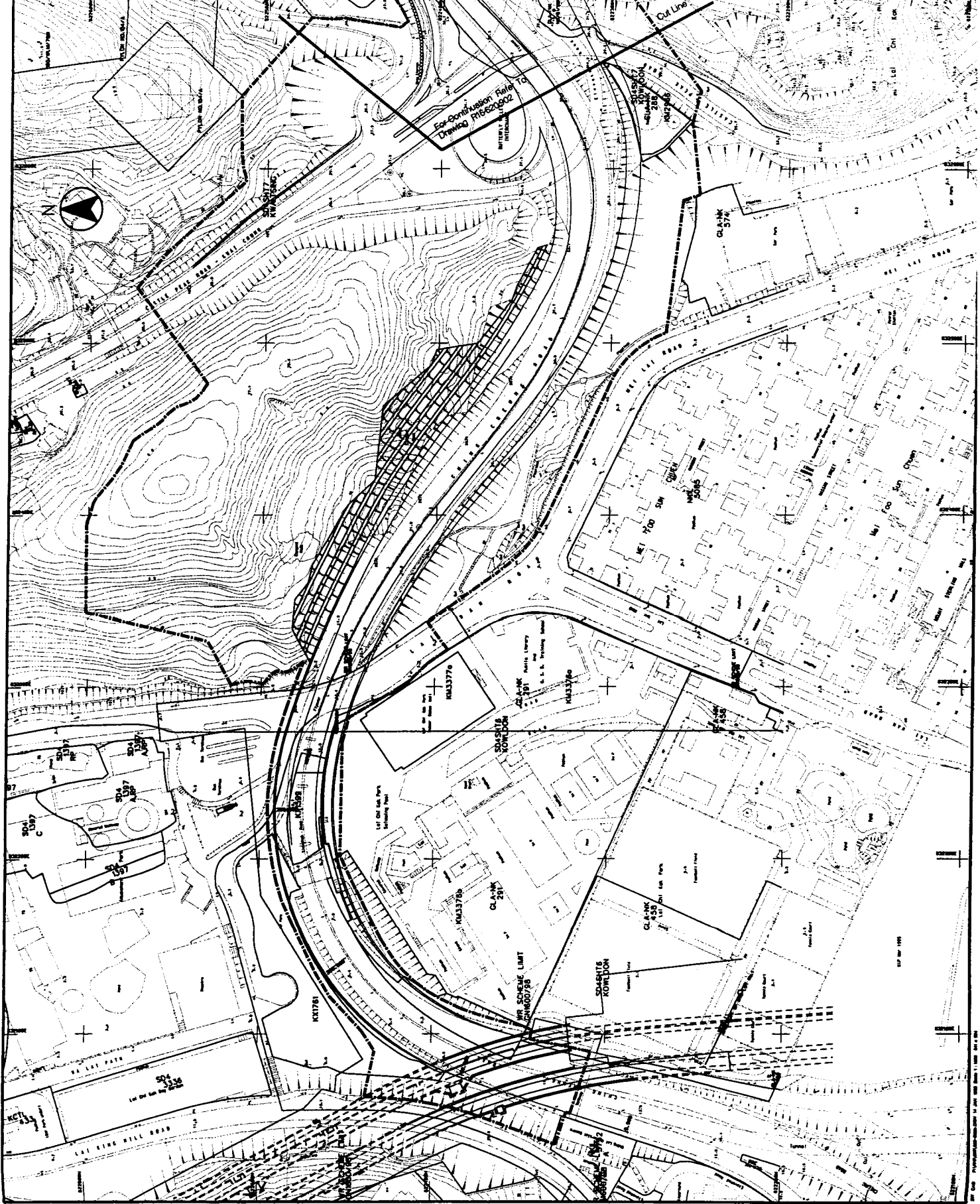
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Route 16
AGREEMENT NO. CE 42/96
WEST KOWLOON TO SHATIN
INVESTIGATION ASSIGNMENT

LAND REQUIREMENT PLAN
(SHEET 3 OF 9)
FIGURE 2.1d

Drawing No.	Design	Approval	Date	For Comment
R16 / 620 / 903B			22.12.96	

Mark Williams - Technical Director
M.A. Ltd. 228, Hong Kong



Notes:

1. Contourlines are related to Hong Kong Metric Grid (HKMG)
2. Dimensions and changes are in metric units unless otherwise shown.
3. Levels are in metres and refer to Principal Datum (P.D.).
4. Original ground levels shown are approximate only.

Legend:

- Approximate Old Clearance Line
- Underground Works Site Limit
- Land to be cleared in September 2001
- Land to be cleared in September 2001
- Cut slope
- Fill slope
- Trench/Drain
- Retaining Structure

	Site area revised	TON
B	163.96	
A	13.98	
	Unrevised	177.94
	Revised	191.92

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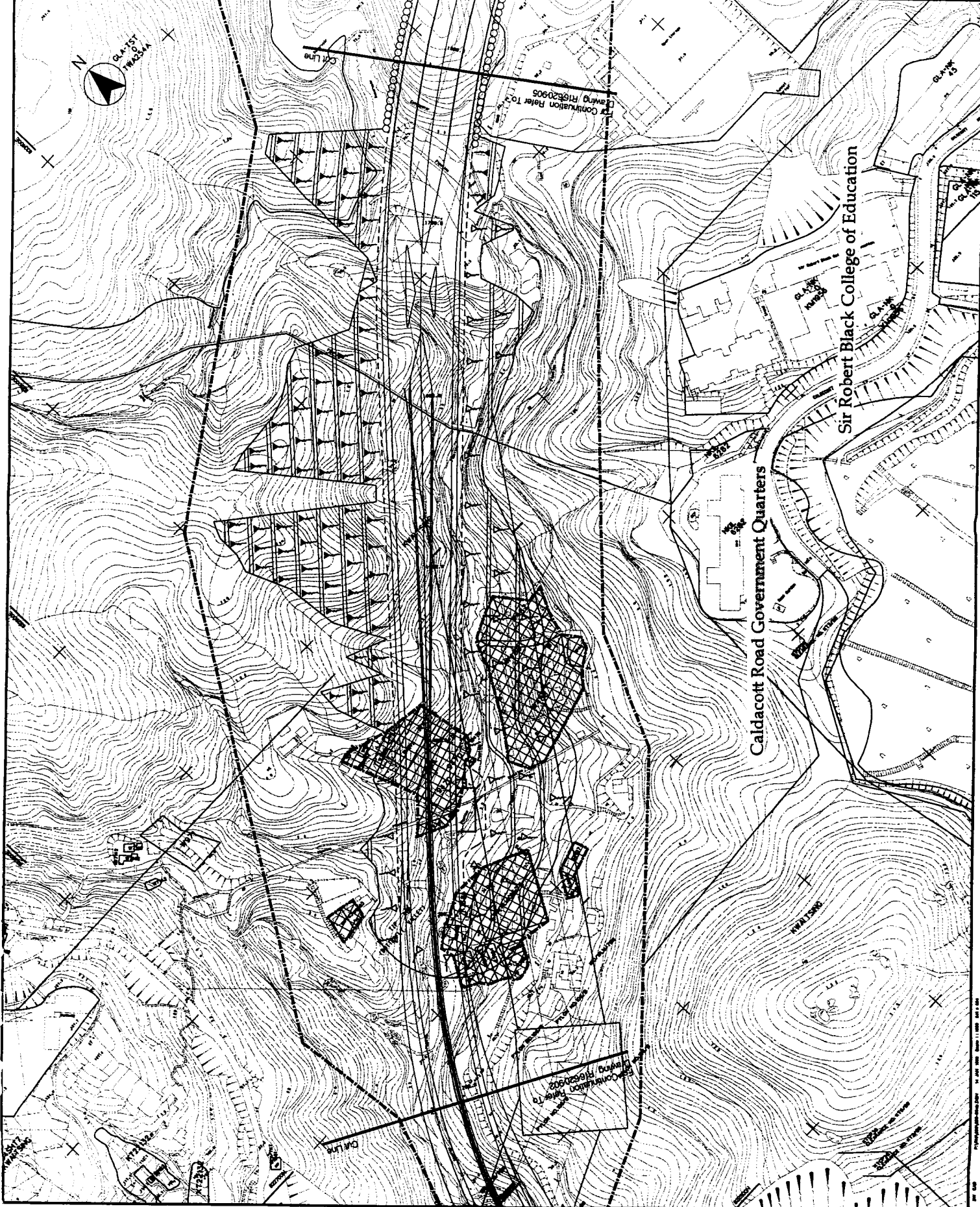
Route 16

AGREEMENT NO. CE 02/96
WEST KOWLOON TO SHANTIN
INVESTIGATION ASSIGNMENT

**LAND REQUIREMENT PLAN
(SHEET 4 OF 9)
FIGURE 2.1e**

Drawing No.	Scale	Approved	Scale
R16 / 620 / 904B	1:1000		
Drawn	1:1000		
Checked	1:1000		

Small Works - Pre-construction
In Association with
M.V.A. Arts & Design Hong Kong

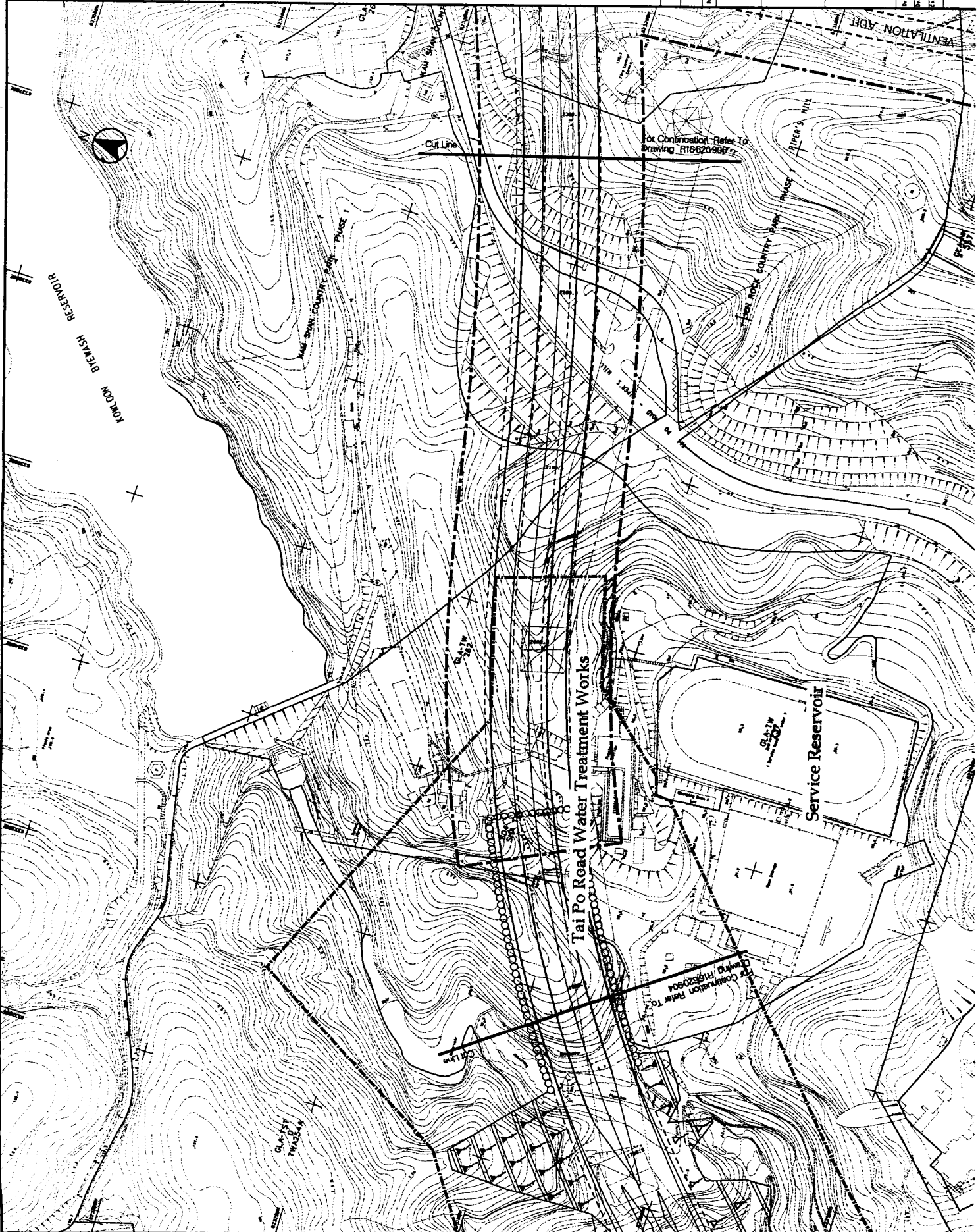


NOTE:

- 1 Coordinates are related to Hong Kong Metric Grid (HK80)
- 2 Dimensions and changes are in metres unless otherwise shown
- 3 Levels are in metres and refer to Principal Datum (P.D.)
- 4 Digital ground levels shown are approximate only

Legend:

- Approximate Site Clearance Line
- Underground Works Site Line
- Land to be Returned in September 2001
- Land to be Returned in September 2001
- Cut slope
- Fill slope
- Tunnel portal
- Retaining Structure



B	10.00	Site level marked	TDN
A	13.00	Original ground level	LWN
		Proposed ground level	Prop. Chg.

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Highways Department

Route 16
AGREEMENT NO. CE 42/96
WEST KOWLOON TO SHATIN
INVESTIGATION ASSIGNMENT

LAND REQUIREMENT PLAN
(SHEET 5 OF 9)
FIGURE 2.1f

Drawing No.	R16 / 620 / 906B	
Scale	1:1000	1:1000
Author	21.8.96	21.8.96
Checked		

Blank White - Permeable Paved Surface
in Association with

NOTES:
 1. Contours are related to Hong Kong Mean.
 2. Dimensions and changes are in metres unless otherwise stated.
 3. Levels are in metres and refer to Principal Datum (P.D.).
 4. Original ground levels shown in approximate only.

Legend:

- Approximate Site Clearance Limit
- Underground Works Site Limit
- Land to be Returned to September 2001
- Land to be Returned to September 2001
- Cut slope
- Fill slope
- Level ground
- Retaining Structure

A	1:2.5	Legend scaled	ITCW	Scale
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				1:200
				1:100
				1:50
				1:25
				1:12.5

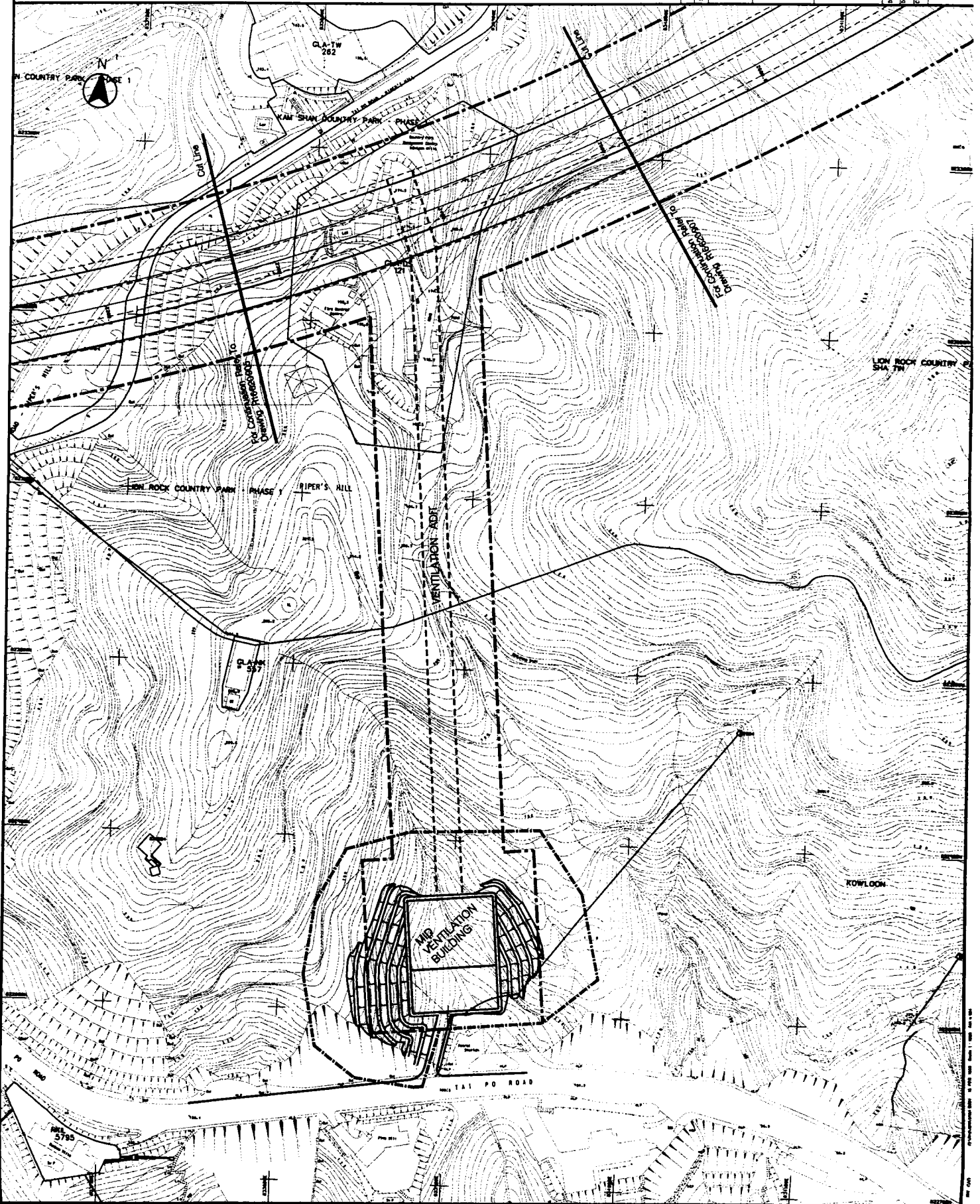
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Route 16
 AGREEMENT NO. CE 42/96
 WEST KOWLOON TO SHATIN
 INVESTIGATION ASSIGNMENT

LAND REQUIREMENT PLAN
 (SHEET 6 OF 9)
 FIGURE 2.16

Drawing No. R16/620/906A
 Drawing Date: 22.2.99
 Drawing Scale: 1:500
 Drawing Status: Final For Comment

Drawn: Wilson - Process: Brinkworth
 In Charge: Wilson
 S.K.H. Ltd. 218 Hong Kong



Notes:

1. Contours are related to Hong Kong datum (HK datum).
2. Dimensions and elevations are in meters unless otherwise shown.
3. Levels are in meters and refer to Hong Kong datum (P.D.).
4. Digital ground levels shown are approximate only.

Legend:

- Approximate Site Clearance Limit
- Underground Works Site Limit
- Land to be Resumed in September 2021
- Land to be Resumed in September 2021
- Cut slope
- Fill slope
- Tunnel portal
- Retaining Structure

A	1:250	Upper sheet	RDW	Sheet
				Sheet

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Highways Department

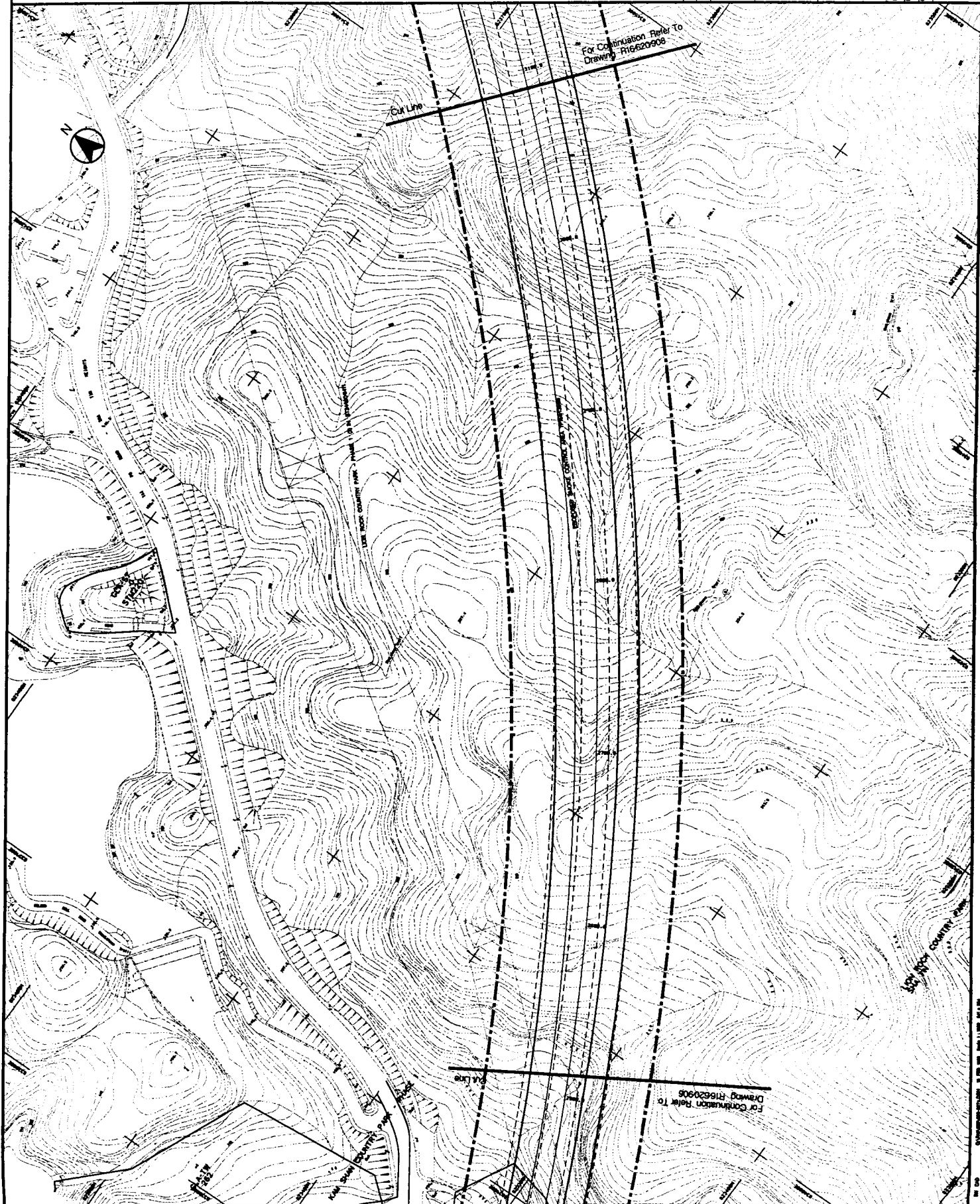
Route 16

AGREEMENT NO. CE 42/96
WEST KOWLOON TO SHATIN
INVESTIGATION ASSIGNMENT

**LAND REQUIREMENT PLAN
(SHEET 7 OF 9)
FIGURE 2.1h**

Drawing No.	R16 / 620 / 907A
Drawn	1:1000
Checked	1:1000
Scale	1:1000
Date	22.10.96
By	22.10.96
For Comment	

Small Works - Private Development
in consultation with
M.T.S. Ltd. R16 Hong Kong



Notes:

1. Contours are related to Hong Kong Metric Scale (1:50,000).
2. Dimensions and elevations are in metric unless otherwise shown.
3. Levels are to centre and refer to Principal Datum (P.D.).
4. Original ground levels shown are approximate only.

Legend:

	Approximate Site Clearance Limit
	Underground Works Site Limit
	Land to be Resumed in September 2021
	Land to be Resumed in September 2027
	Cut slope
	Fill slope
	Trench
	Retaining Structure

A	1:250	Legend	Scale	1:50,000
B	1:500	Scale	1:50,000	Scale
C	1:1,000	Scale	1:50,000	Scale
D	1:2,000	Scale	1:50,000	Scale

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Highways Department

Route 16
AGREEMENT NO. CE 48/96
WEST KOWLOON MAIN
INVESTIGATION ASSIGNMENT

LAND REQUIREMENT PLAN
(SHEET 8 OF 9)
FIGURE 2.11

Drawing No.	R16 / 620 / 908A
Scale	1:50,000
Date	22.10.00
By	For Comment

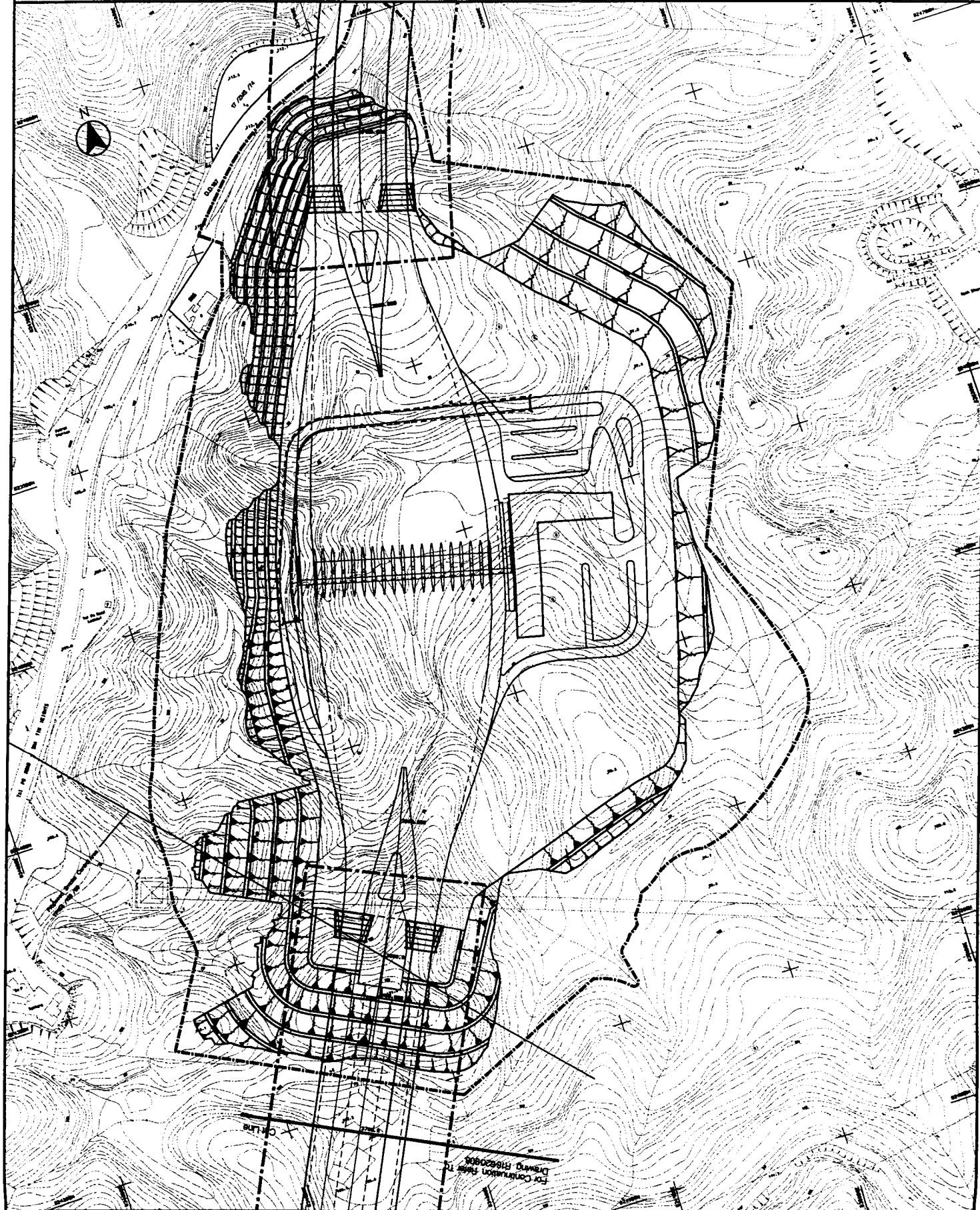
Sheet 8 of 9 - Proposed Road
In Association with
M.T.R. Line 2002 Hong Kong



- Notes:**
- Coordinates are related to Hong Kong Metric Grid (1980).
 - Dimensions and changes are in metres unless otherwise shown.
 - Levels are in metres and refer to Principal Datum (P.D.).
 - Original ground levels shown are approximate only.

Legend:

- Appropriate Site Clearance Line
- Underground Works Site Line
- Land to be Resumed in September 2007
- Land to be Resumed in September 2011
- Cut slope
- Fill slope
- Tunnel portal
- Retaining Structure



For Continuation Refer To Drawing 11020005

A	13/9	Legend added	11/04	✓
Drawn	1/04	Revised	11/04	✓
Checked	1/04	12/04	11/04	✓

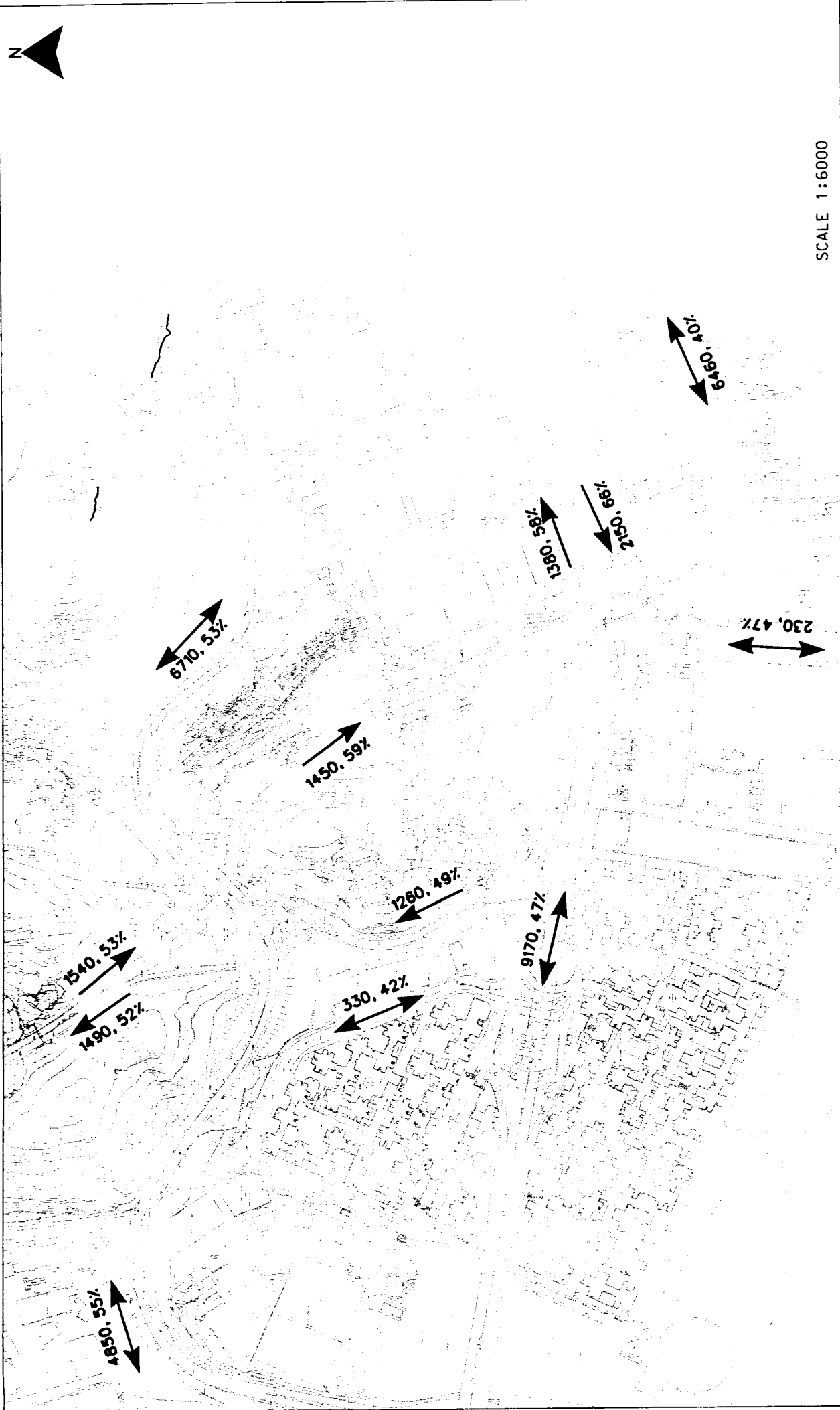
Route 16

AGREEMENT NO. CE 42/96
WEST KOWLOON TO SHATIN
INVESTIGATION ASSIGNMENT

**LAND REQUIREMENT PLAN
(SHEET 9 OF 9)
FIGURE 2.1j**

Drawing No.	R16 / 620 / 909A
Scale	As Shown
Checked	12/04
For comment	11/04

Shau Wah - Design Understudy
in association with
M.V.A. Ltd. 888 Hong Kong



SCALE 1:6000



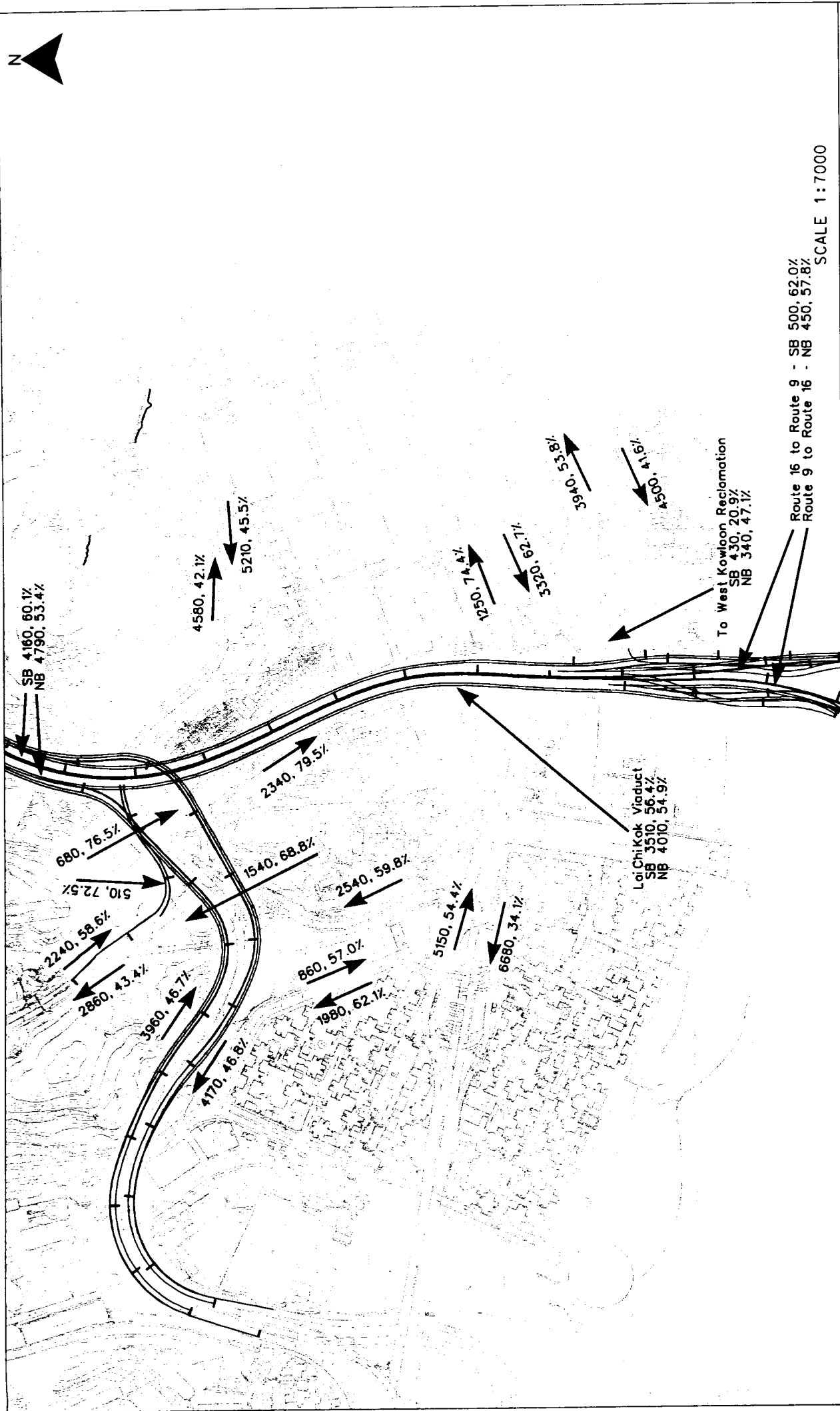
**Environmental
Resources
Management**

Key
1450, 59% Traffic Flow in
veh/hr, % Heavy
Vehicle

PREVAILING TRAFFIC FLOW FOR THE YEAR 2000 (PM PEAK HOUR)

FIGURE 2.2D

USTN FILE: C1884.20
DATE: 25/03/98



PROJECTED TRAFFIC FLOW FOR THE YEAR 2019 (PM PEAK HOUR)

FIGURE 2.2C

USTM FILE: C1884.31
 DATE: 22/03/18

