

**Highways Department
New Territories Region**

**Agreement No. CE 38/97
PWP Item B645TH
Sai Sha Road Widening between Kam
Ying Road and Proposed Road T7 Junction
Investigation Assignment**

介乎錦英路至建議之T7路連接處之
西沙路擴闊工程
勘探研究

**Environmental Impact Assessment Report
Executive Summary**

環境影響評估研究
行政摘要

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Maunsell Consultants Asia Ltd.
in association with
ERM (Hong Kong) Ltd.
Hassell Ltd.

Environmental Impact Assessment Report

Executive Summary

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1. INTRODUCTION

1.1 Preamble

1.1.1 On 19 November 1997, the New Territories Region of Highways Department of the Hong Kong SAR Government commissioned Maunsell Consultants Asia Ltd (hereafter known as Maunsell) as the lead consultant for the Environmental Impact Assessment Study (hereafter known as the EIA study) for the Sai Sha Road Widening between Kam Ying Road and the junction of the proposed trunk road T7 (hereafter known as the Project). The purpose of the Assignment is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and all related activities taking place concurrently. This information will contribute to decisions on whether:

- the predicted levels of any environmental impacts that are likely to arise as a result of the Project are within the established standards and guidelines;
- there are any specific conditions and requirements for environmental protection that should be applied to the detailed design, construction and operation of the Project; and
- any residual impacts identified in the EIA study will meet the established standards and guidelines after the proposed mitigation measures are implemented.

1.1.3 This Executive Summary highlights the issues of concern to the community, the levels of residual environmental impacts and cumulative effects, recommended mitigation measures and requirements for implementation of the Project which have been identified in the EIA study.

1.2 Study Area

1.2.1 The boundary of the Study Area for the purpose of noise assessment is 300 m from either side and along the full stretch of the proposed alignment. However, this could be reduced if the first layer of noise sensitive receivers (NSRs), located closer than 300 m from the road, provide adequate acoustic screening to those NSRs located further away.

1.2.2 In the case of the landscape impact, the Study Area is defined by a distance of 500 m from the proposed alignment. All visually sensitive receivers (VSRs) will be assessed where necessary, regardless of the distance from the proposed alignment as part of the visual impact assessment. *Figure 1a and 1b* show the extent of the Study Area for the EIA Study.

1.3 Project Description

1.3.1 The Project includes the widening of Sai Sha Road between Kam Ying Road and its junction with the proposed Road T7, from a 7.3 m single carriageway to dual 2-lane carriageway of primary distributor standard. The Project also includes the provision of a roundabout at the junction with the access road to Lee On Estate. Two pedestrian/cyclist subways beneath the roundabout and a

footbridge across Sai Sha Road will be provided to segregate pedestrians from the road traffic for the purpose of improving safety. The current programme indicates that construction is expected to commence at the beginning of February 2001, with a 26 month construction schedule proposed. Completion of the Project is therefore expected at the end of April 2003.

1.4 Structure of the Executive Summary

1.4.1 After this introductory section, the remainder of the report is arranged as follows:

- *Section 2*, identifies the environmental impacts arising from the construction and operation of the widened of Sai Sha Road; and
- *Section 3*, discusses the overall conclusions of the EIA study.

2. ENVIRONMENTAL IMPACTS

2.1 Baseline Conditions

- 2.1.1 The area in the vicinity of the Sai Sha Road is largely residential. To the west of the proposed alignment lie a number of small villages comprising of typical three storey dwellings. To the east are high rise residential blocks. In addition to the existing sensitive receivers, three proposed residential sites have been identified. These are as follows: proposed residential development STTL446, proposed residential development above the LEO station and residential development at DD206 Wu Kai Sha.
- 2.1.2 The landscape context of the Study Area is primarily urbanised in character comprising a mix of low and high-rise residential areas in Ma On Shan. A substantial section of the Study Area is proposed for mixed commercial and / or residential developments, located towards the north. To the west of the Study Area is Tolo Harbour, beyond which is the central New Territories land mass. To the north is the Wu Kai Sha peninsula, the former site of the Whitehead Detention Centre and now proposed to be a residential or resort development. The naturally vegetated hillsides of the Hunch Backs rise to over 300 m PD to the east and south. The topography of the site is simple with much of the Study Area being relatively flat below 50 mPD, a number of areas to the south and east have been terraced to allow development of the lower slopes of the Hunch Backs.
- 2.1.3 To the north of Sai Sha Road the visual envelope is contained by wide strip of dense roadside tree planting, although the occasional partial or glimpsed view is possible from Wu Kwai Sha New Village and Lok Wo Sha. Further north, the envelope opens over the development platform across to the former Whitehead Detention Centre. South of Sai Sha Road the visual envelope is variously contained to the east by the ridge lines of the Hunch Backs and to the west by the high rise residential estates of Lee On Estate, Kam Lung Court and Saddle Ridge Garden.

2.2 Noise

Construction Phase

- 2.2.1 The construction phase has the potential to generate noise impacts at adjacent sensitive receivers as the works will require a number of noisy activities including the use of heavy plant for excavation, filling, concreting and piling operations as well as on-site haul road traffic.
- 2.2.2 Cumulative effects may also occur where noisy construction processes take place during the construction phase of the Ma On Shan (MOS) Rail alignment between Kam Ying Road and the proposed LEO station.
- 2.2.3 Noise emissions from construction sites can be minimised through good site practice, selecting quiet plant and quiet working methods and through the use of temporary barriers. These methods will be effective in providing an overall reduction in construction noise levels. However, they will not be enough to protect fully the closest NSRs.

2.2.4 Residual impacts are likely at the following locations:

- Wu Kwai Sha New Village;
- Lok Wo Sha;
- residential blocks within Kam Lung Court;
- residential block within Lee On Estate;
- residential development STTL446; and
- residential development at DD206 Wu Kai Sha.

2.2.5 Further mitigation has therefore been developed requiring more extensive noise barriers and restrictions to be placed on the number of individual items of construction plant that may operate simultaneously. The proposed restrictions will be sufficient to prevent residual impacts at the affected NSRs.

Operational Noise

2.2.6 Traffic travelling along the widened Sai Sha Road has the potential to generate noise impacts at neighbouring existing and proposed residential areas. Potential impacts are likely to be greatest during the peak hour flow and, therefore, this has been considered in this assessment. Traffic noise impacts above the *Technical Memorandum on Environmental Assessment Process (EIAO-TM)* criterion of 70 dB $L_{A10(\text{peak hour})}$ are predicted for approximately 770 residential dwellings within the following areas.

- Wu Kwai Sha New Village (low rise residential);
- Lok Wo Sha (low rise residential);
- Kam Lung Court (high rise residential);
- Lee On Estate (high rise residential);
- residential development above LEO station (high rise residential);
- residential development at DD206 Wu Kai Sha (high rise residential);
- Villa Athena (high rise residential); and
- Saddle Ridge Gardens (high rise residential).

Mitigation Measures and Residual Impacts

2.2.7 It is recommended that direct mitigation measures are incorporated into the design of the widened Sai Sha Road in order to minimise potential traffic noise impacts at local NSRs. These measures will take the form of roadside noise barriers. The proposed barrier locations and heights are indicated in *Figure 2*.

2.2.8 Residual noise impacts of up to 6 dB(A) are likely at eight of the fifty-four assessment points considered. However these impacts arise as a result of traffic using existing roads and are therefore not considered to be attributable to the widened section of Sai Sha Road.

2.2.9 No residual noise impacts, attributable to the widened section of Sai Sha Road are anticipated.

- 2.2.10 Under the ExCo directive *Equitable Redress for Persons Exposed to Increased Noise resulting from the Use of New Roads*, where direct mitigation cannot adequately protect existing NSRs from traffic noise impacts, the provision of indirect technical remedies in the form of acoustic insulation and air-conditioning may be required. Whether or not a NSR qualifies for such equitable redress is dependent on a number of factors based on the contribution that any new road makes to the overall noise level at the NSR.
- 2.2.11 An eligibility test has been carried out for all existing NSRs. The results show that all three criteria are not met at any dwellings, consequently no dwellings will qualify for indirect technical remedies as a result of the Sai Sha Road Widening Scheme.
- 2.2.12 It is estimated that the mitigation measures proposed will prevent noise criteria exceedances at a total of approximately 595 dwellings and is likely to benefit (by more than 1dB(A)) approximately 1290 dwellings.

2.3 Landscape and Visual

Construction Phase

- 2.3.1 During the construction phase, the proposed works would have a **significant** adverse impact to the landscape and visual environment due to the construction activities, loss of open area and removal of trees within the project area, including all the temporary works area which would be located within the project site. These impacts are temporary and would cease upon the operation phase of the works. Potential mitigation measures including the erection of site hoardings, efficient programming of works and minimising the damages of trees are recommended.

Operational Phase

- 2.3.2 The Study Area is located on the northern outskirts of the primarily high-rise residential Ma On Shan new town. It comprises a mix of landscape elements from existing and future high-rise residential and residential / commercial developments, to low-rise villages, a holiday village, natural woodland planting and reforested planting with fast growing non-native species.
- 2.3.3 In general the upgrading works to Sai Sha Road, together with the roundabout will cause a number of **moderate / significant** adverse landscape impacts. However, these will be localised to the areas adjacent to the road itself. These impacts are the loss of large areas of reforested amenity planting and mixed woodland adjacent to Wu Kwai Sha New Village and Lok Wo Sha. Due to the nature of the works, all landscape impacts in the operational phase will be mid to long term. However these impacts are considered acceptable with mitigation measures.
- 2.3.4 In general the scheme proposals will cause only localised **moderate / significant** adverse visual impacts. These will be suffered by the immediately adjacent high-rise apartment blocks, both existing and future, namely parts of Kam Lung Court, Lee On Estate, adjacent low-rise villages such as Wu Kai Sha

New Village and Lok Wo Sha, and future developments adjacent to Lok Wo Sha and on the quarry. Due to the nature of the works, all visual impacts in the operational phase will be mid to long term. However these impacts are considered acceptable with mitigation measures.

2.3.5 Other VSRs will be locally affected but not as greatly. The visual impacts will arise from four sources, namely:

- the extension of the existing infrastructure increasing its dominance as a feature in views;
- the introduction of the footbridge together with subway accesses;
- the introduction of roadside noise mitigation measures; and
- the loss of substantial areas of tree planting as visual relief and screening in the urbanised areas of Ma On Shan.

Mitigation Measures and Residual Impacts

2.3.6 Summaries of the Landscape / Townscape and Visual Impact Assessment are given in *Table 2.3a* and *Table 2.3b*.

2.3.7 Existing vegetation will be retained/transplanted to other locations within the site where possible to retain the landscape and visual context of the area. As reviewed on the Tree Survey Report, 229 nos. (19.5%), 7 nos. (0.6%) and 936 nos. (79.9%) would be retained, transplanted and felled respectively. Compensatory planting should be provided to compensate the nos. of trees to be felled within the project site. The area of compensatory planting is estimated to be about 31,223 sq. m.

2.3.8 With mitigation measures such as sensitive detailing of structures, use of soil mounding and compensatory planting, the overall works would have a limited residual impact on the landscape and visual quality of the area.

Table 2.3a Summary of Landscape / Townscape Impact Assessment

Landscape	Existing Quality / Sensitivity	Landscape Impact	Magnitude of Impact	Significance of Impact *	Mitigation Measure **	Residual Impact
High Rise Residential Areas	Medium	Loss of amenity area and buffer tree planting adjacent to Lee On Estate	Medium	Moderate adverse impact	Replacing of buffer tree zone	Slight
Reforested Amenity Planting	Medium	Extensive loss of reforested amenity planting with fast growing non-native species from the roadside adjacent to the villages, the Lee On Estate access and quarry site	High	Moderate / Significant adverse impact	Replanting of buffer tree zone	Slight / Moderate
Low Rise Village Settlements	Medium	Partial loss of buffer tree planting between villages and road	low	Slight / Moderate adverse impact	Replanting of buffer tree zone	Slight
Future Development Areas	Medium	Extension of infrastructure and partial loss of buffer tree planting	low	Slight / Moderate adverse impact	Replanting of buffer tree zone	Slight
Holiday Village	Medium	Remote from works with intermediate landscape buffer zone	No change	No change	n/a	n/a
Mixed Woodland	High	Loss of substantial areas of woodland adjacent to Lok Wo Sha Village. Regarding of local levels and extension of infrastructure.	High	Significant adverse impact	Replanting of trees	Moderate
Campus	Medium	Remote from works will large intermediate buffer zones	No change	No change	n/a	n/a
Grass / scrubland	Medium	Remote from works will large intermediate buffer zones	No change	No change	n/a	n/a

Note: * The landscape impacts are considered to be 'acceptable with mitigation measures' in terms of the criteria of evaluating landscape impacts of the TM on EIA Process (Annex 10).

** Existing trees should be transplanted where possible.

Criteria for Significance of Impacts:

Magnitude of Impact	High	Moderate Impact	Moderate / Significant Impact	Significant Impact
	Medium	Slight / Moderate Impact	Moderate Impact	Moderate / Significant Impact
	Low	Slight Impact	Slight / Moderate Impact	Moderate Impact
		Low	Medium	High
				Sensitivity / Quality

Table 2.3b Summary of Visual Impact Assessment

Visually Sensitive Receiver Group	Existing Visual Quality / Sensitivity	Visual Impact	Magnitude of Impact	Significance of Impact *	Mitigation Measure **	Residual Impact
Primary High Rise Residential VSRs	Medium	Increased dominance infrastructure and loss of reforested amenity planting as visual relief. Introduction of noise barriers, footbridges and subway ramps	High	Moderate / Significant adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight / Moderate
Secondary High Rise Residential VSRs	Medium	Introduction of visual elements extending Ma On Shan infrastructure	Low	Slight / Moderate adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight
Potential Future Developments VSRs	Medium	Introduction of major infrastructure features in existing views, including noise barriers. Loss of visual relief of tree planting	High	Moderate / Significant adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight / Moderate
Low-rise Village VSRs	High	Reduction in efficiency of vegetative visual screen to road	Medium	Moderate / Significant adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight / Moderate
Pedestrian VSRs	Medium	Increased dominance of local infrastructure including noise barriers	Medium	Moderate adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight
Vehicular VSRs	Medium	Increased dominance of local infrastructure including noise barriers	Medium	Moderate adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight
Hunch Back Trails VSRs	Medium	Extension of infrastructure	Low	Slight / Moderate adverse impact	Retention of planting. Replanting of trees consideration of design of all hard elements	Slight

Note: * The visual impacts are considered to be 'acceptable with mitigation measures' in terms of the criteria of evaluating visual impacts of the TM on EIA Process (Annex 10).

** Existing trees should be transplanted where possible.

Criteria for Significance of Impacts:

Magnitude of Impact	High	Moderate Impact	Moderate / Significant Impact	Significant Impact
	Medium	Slight / Moderate Impact	Moderate Impact	Moderate / Significant Impact
	Low	Slight Impact	Slight / Moderate Impact	Moderate Impact
		Low	Medium	High

Sensitivity / Quality

3 CONCLUSIONS

3.1 Noise

Construction Phase

3.1.1 Potential noise impacts resulting from the general construction works for the Sai Sha Road Widening can be avoided through the use of suitable mitigation measures.

Operational Phase

3.1.2 Potential noise impacts attributable to the operation of the widened section of Sai Sha Road can be minimised through the use of road side barriers.

3.1.3 The proposed mitigation will prevent noise impacts above the EIAO-TM criterion at the majority of the NSRs considered. However, criteria exceedances are predicted approximately 770 dwellings. Noise levels at these dwellings will be dominated by existing roads therefore these impacts are not considered to be attributable to the Sai Sha Road Widening.

3.1.4 The proposed mitigation is likely to benefit approximately 1290 dwellings by at least 1 dB(A) and protect a total of 595 from traffic noise criteria exceedances.

3.1.5 An eligibility test has been carried out for all NSRs. The results show that no dwellings will qualify for indirect technical remedies as a result of the Sai Sha Road Widening Scheme.

3.2 Landscape and Visual

Construction Phase

3.2.1 During the construction phase, the proposed works would have a **significant** adverse impact to the landscape and visual environment due to the construction activities, loss of open area and removal of trees within the project site. Potential mitigation measures including the erection of site hoardings, efficient programming of works and minimising the damages of trees are recommended.

Operational Phase

Landscape / Townscape

3.2.2 The Study Area is located on the northern outskirts of the primarily high-rise residential Ma On Shan new town. It comprises a mix of landscape elements from existing and future high-rise developments to low-rise villages and natural and amenity woodland planting. Overall, the landscape quality of the Study Area is **medium**.

3.2.3 In general the upgrading works to Sai Sha Road, together with the roundabout will cause a number of **moderate / significant** adverse landscape impacts. However, these will be localised to the areas adjacent to the road itself. These

impacts are the loss of large areas of reforested amenity planting and mixed woodland adjacent to Wu Kwai Sha New Village and Lok Wo Sha.

Visual

- 3.2.4 In general, the scheme proposals will cause only *localised moderate / significant* adverse visual impacts. These will be suffered by the immediately adjacent high-rise apartment blocks, both existing and future, namely parts of Kam Lung Court, Lee On Estate, adjacent low-rise villages such as Wu Kai Sha New Village and Lok Wo Sha, and future developments adjacent to Lok Wo Sha and on the quarry.

Mitigation Measures and Residual Impacts

- 3.2.5 With mitigation measures such as sensitive detailing of structures, use of soil mounding and compensatory planting, the overall works would have only limited residual impact on the landscape and visual quality of the area.
- 3.2.6 According to the approved Ma On Shan Outline Zoning Plan S/MOS/S/5 the land use impact of the proposed Sai Sha Road widening would be minimal.

3.3 Future Requirements

Environmental Monitoring and Audit

- 3.3.1 During the construction and operational phases, monitoring will be required for noise impacts.
- 3.3.2 A tree survey should be conducted before the works commence to fulfil the requirements of WBTC 24/94 and PELBTC 3/94. Auditing of the implementation of the recommended construction phase mitigation measures for noise, landscape and visual impact mitigation will also be necessary. Operational phase mitigation measures should be audited during commissioning and during the operational phase for the development of the newly vegetated areas.

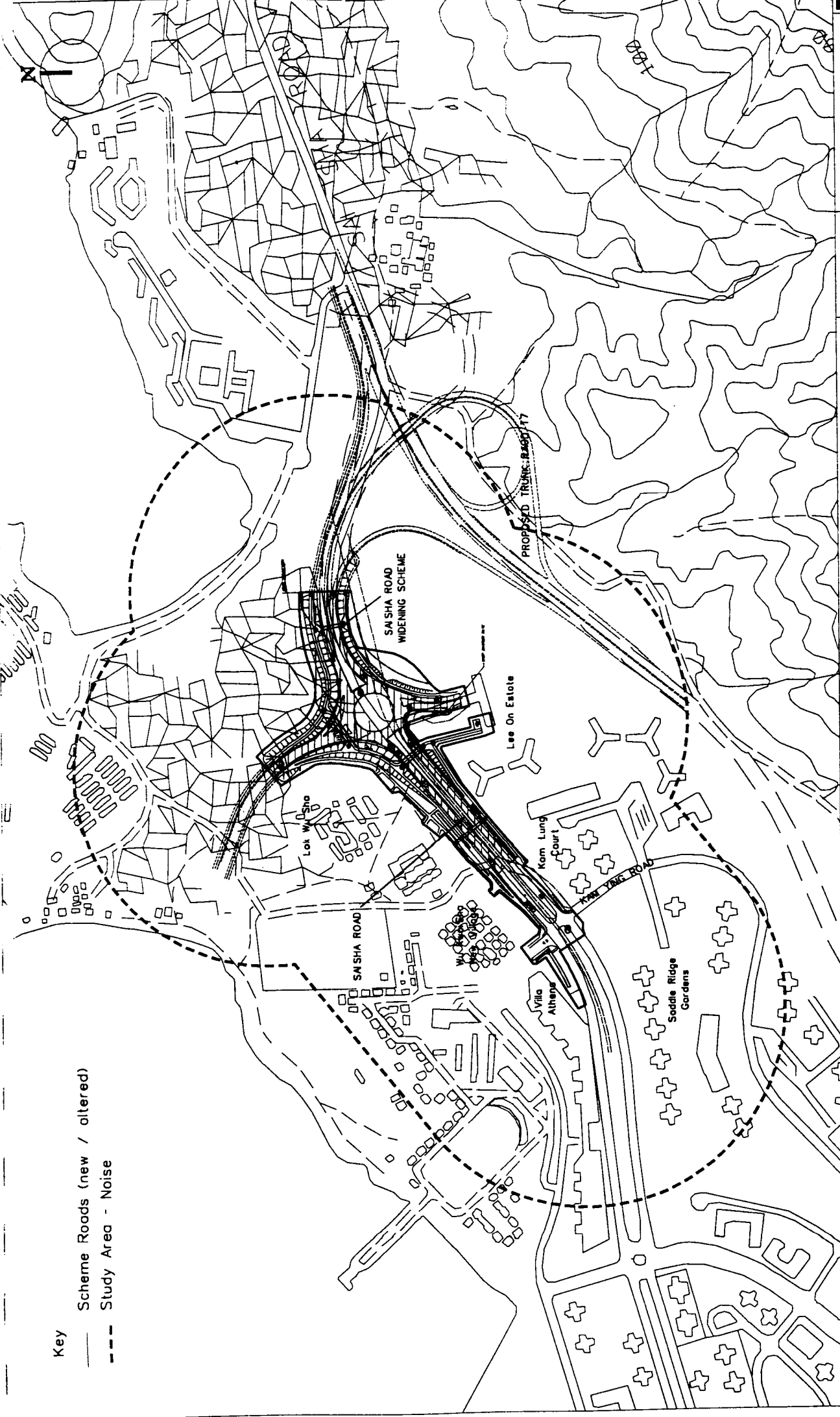
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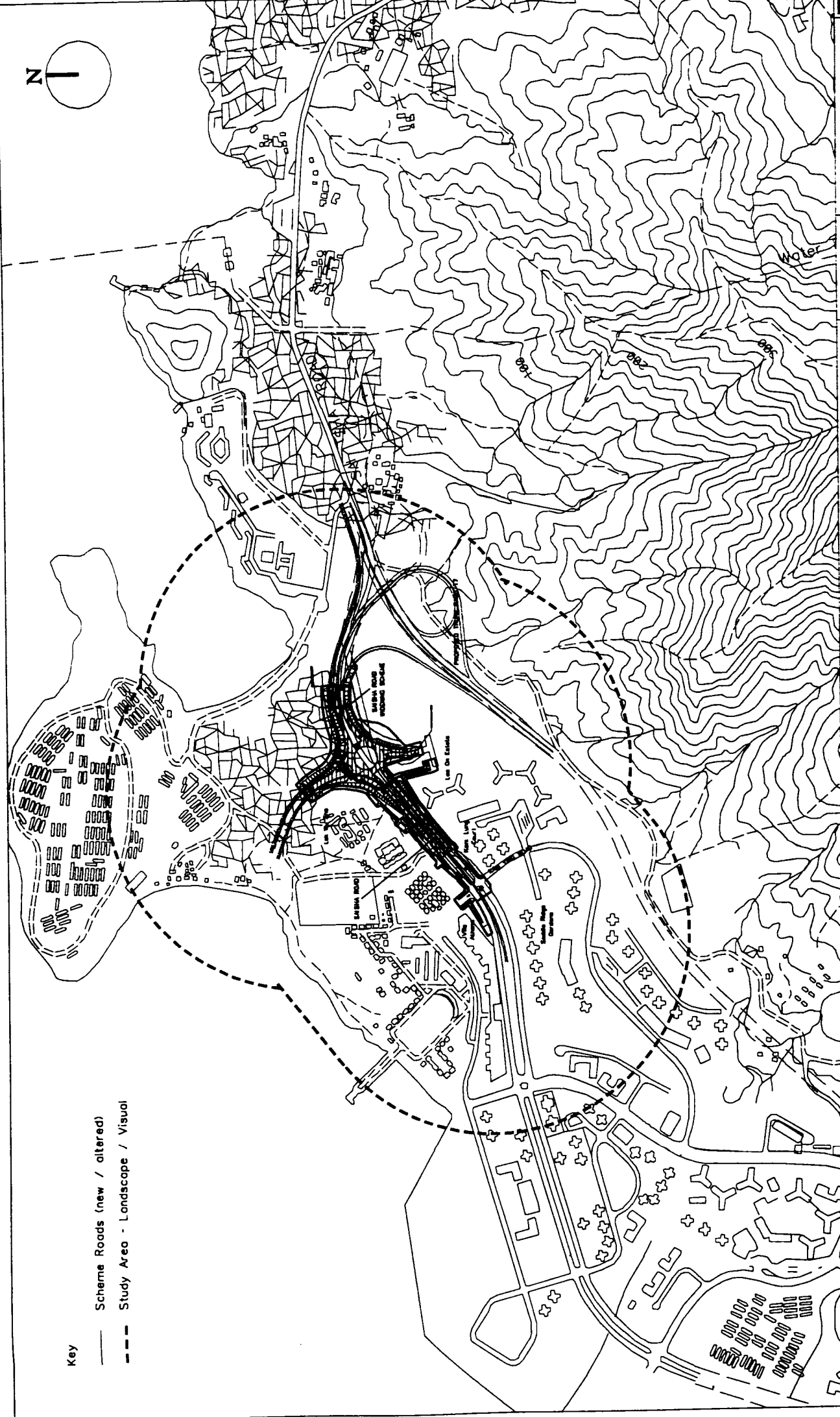
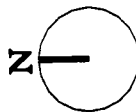
300m - STUDY AREA FOR NOISE ASSESSMENT

Key

— Scheme Roads (new / altered)

- - - Study Area - Noise





Key

— Schema Roads (new / altered)

- - - Study Area - Landscape / Visual

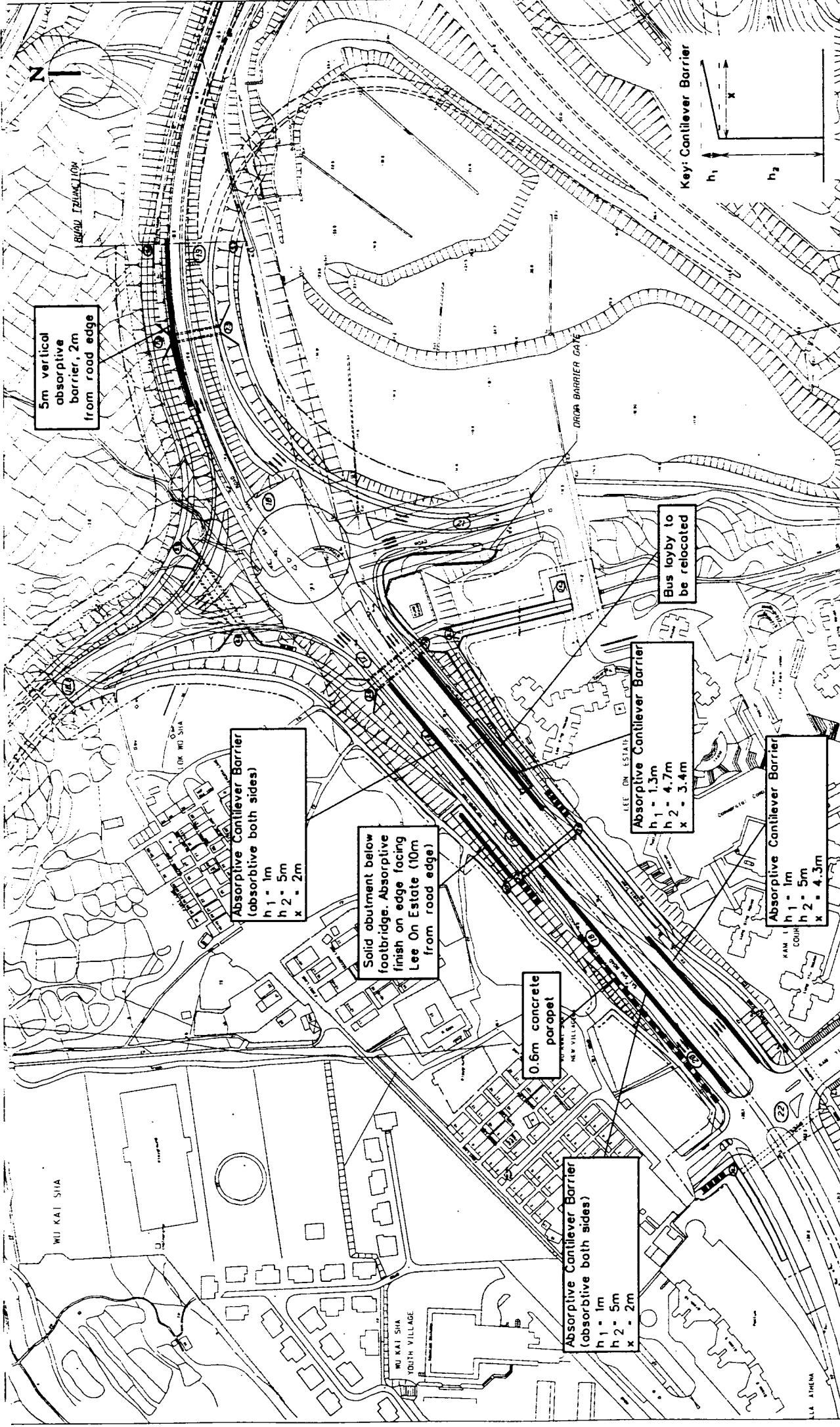
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500m - STUDY AREA FOR VISUAL & LANDSCAPE ASSESSMENT

FIGURE No.
 1b

Manseill



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OPERATIONAL NOISE MITIGATION

Note: that the dimensions of the noise barriers proposed in this assessment are subject to detailed design when suitable equivalent configurations may be considered to be more appropriate.