

Territory Development Department

Agreement No CE 21/97

Planning & Development Study of
Potential Housing Site in Area 54,
Tuen Mun : *EIA - Executive Summary*

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In response to the Territorial Development Strategy Review (TDSR) published by the Government of the Hong Kong Special Administrative Region (the Government) in July 1996, which identified a shortfall of housing supply between 2001/02 and 2004/05 even with the development of a number of Strategic Growth Areas (SGAs), a list of tentative housing sites, including Tuen Mun Area 54, have been identified to be potential areas for producing housing flats between 2001/02 and 2004/05.

Scott Wilson (Hong Kong) Ltd, in association with specialist sub-consultants, have been commissioned by the Territory Development Department to undertake the *Planning and Development Study of Potential Housing Site in Area 54, Tuen Mun* (Agreement No CE 21/97) (the Planning Study) in September 1997. The overall objective of the Planning Study is to establish an optimum development scheme for Tuen Mun Area 54 (the Study Area), taking into account considerations in planning, traffic, engineering, infrastructure, geotechnical, environmental, socio-economic, land acquisition, and financial aspects.

As part of the Planning Study, ERM-Hong Kong, Ltd have been commissioned to undertake an Environmental Impact Assessment (EIA) Study, with input on landscape and visual impact assessment provided by Aspinwall Clouston Ltd.

The overall purpose of this EIA Study is to establish the nature and extent of environmental constraints of the proposed developments within the Study Area and to identify measures to overcome these constraints to realise the full potential of the Study Area and safeguard the environmental quality at the same time.

The EIA Study has also provided continuous environmental planning input for the evaluation of development options; and the generation of the recommended Master Layout Plan (MLP) and Master Landscape Plan (MLSP).

The proposed development qualifies as a Designated Project under Schedule 3 of the *Environmental Impact Assessment Ordinance* (EIAO) (Cap 499) and therefore the technical assessment of the EIA Study has been conducted in accordance with the *Technical Memorandum on the Environmental Impact Assessment Process* (EIAO-TM). In addition to the development itself, the EIA study also identifies those elements of this project that are considered as schedule 2 Designated Projects under the EIAO. The individual designated projects within Tuen Mun Area 54 is given in *Table 1.1a*.

Table 1.1a *Individual Designated Projects within Tuen Mun Area 54*

Project	Description	EIAO Reference	Section Reference in EIA Report
Area 54 Road D7	District distributor road	Schedule 2, Part I, A.1	Sections 3.5.2, 3.6.2, 3.7.2, 3.8.2, 3.10.2, 4.5.2, 4.6.2, 4.7.2, 4.8.2, 4.10.2, 12.2.2
Proposed widening of Tsing Lun Road	District distributor road	Schedule 2, Part I, A.1	Sections 3.5.2, 3.6.2, 3.7.2, 3.8.2, 3.10.2, 12.2.2

Project	Description	EIAO Reference	Section Reference in EIA Report
Sewage Pumping Station in Site 2	Sewage pumping station within 150 m of residential area (only a tentative arrangement subject to findings of the Tuen Mun Sewerage Master Plan Review Study) - requires separate EIA under separate cover	Schedule 2, Part I, F.3(b)	Sections 3.5.3, 4.5.2, 4.7.2, 4.8.2, 4.10.2, 12.3.2

This Executive Summary is submitted in conjunction with an EIA Report and EM & A Manual to meet the requirements of the EIAO.

2 PROJECT DESCRIPTION

2.1 CONSTRUCTION PHASE

The Study Area and the Recommended Development Layout of Tuen Mun Area 54 is shown in *Figure 2.1a*. The proposed development within the Study Area is expected to be divided into two main development packages. A preliminary construction programme is presented in *Figure 2.1b*.

The first development package concerns the development of Site 1 or Phase 1 Development. The construction works for Development Package 1 are expected to commence in 2002. The currently envisaged completion date of this package is early 2006, when the housing development in Site 1 will be occupied.

Development Package 2 concerns the development of Sites 2, 3 and 4 or Phase 2 Development. The construction works for Development Package 2 are expected to start in late 2003 and be completed in early 2008.

Concurrent projects and the corresponding anticipated completion dates are presented in *Table 2.1a*.

Table 2.1a Concurrent Projects

Project	Anticipated Completion Date
Vertical Interim Housing (VIH) in Area 29, Tuen Mun	March 2000
Home Ownership Scheme (HOS) in Area 52, Tuen Mun	December 2000
West Rail and Tuen Mun North Station	June 2004
Possible Retail Development above West Rail Tuen Mun North Station	January 2006
Potential Housing in Area 1, Tuen Mun	January 2007
Route 10	December 2007

Taking the temporal and spatial factors of the above projects into account, it is considered that the above projects would not give rise to any discernable cumulative environmental impact.

2.2 OPERATIONAL PHASE

The recommended development layout for the Study Area (see *Figure 2.1a*) is characterised by a distributor road located to the north of the village areas. However, the alignment avoids the village areas and an area of ecologically sensitive woodland within the western portion of the Study Area. Land for village expansion is provided in the northern portion of the Study Area between the new distributor road and Tsz Tin Tsuen.

The schedule of land use and developed areas is presented in *Table 2.2a*.

Table 2.2a Recommended Development Schedule for Tuen Mun Area 54

Site Ref	Use	Gross Site Area (m ²)	Net Estate Area (m ²)	Domestic Plot Ratio /Development Ratio	No of Flats	Population
1	Subsidised Housing (SH)	12,875	12,875	(PR) 5	990	3,010
1a	Educational (1 Primary School +1 Secondary School)	13,225				
2	Public Rental Estate (PRE)	46,076	42,206	(DR) 7	5,184	18,144
2a	Proposed Sewage Pumping Station (G/IC)	2,508				
3	Private Sector Participation Scheme (PSPS)	37,649	37,099	(PR) 5	2,900	8,816
4	Home Ownership Scheme (HOS)	48,717	46,019	(DR) 7	4,600	13,984
4a	Educational (4 Primary School +4 Secondary School)	55,018				
5	Proposed Joint User Building (G/IC)	6,128				
6	Government Farm to be retained (G/IC)	41,000				
7	New Life Farm to be retained (G/IC)	8,000				
Total		271,196			13,674	43,954

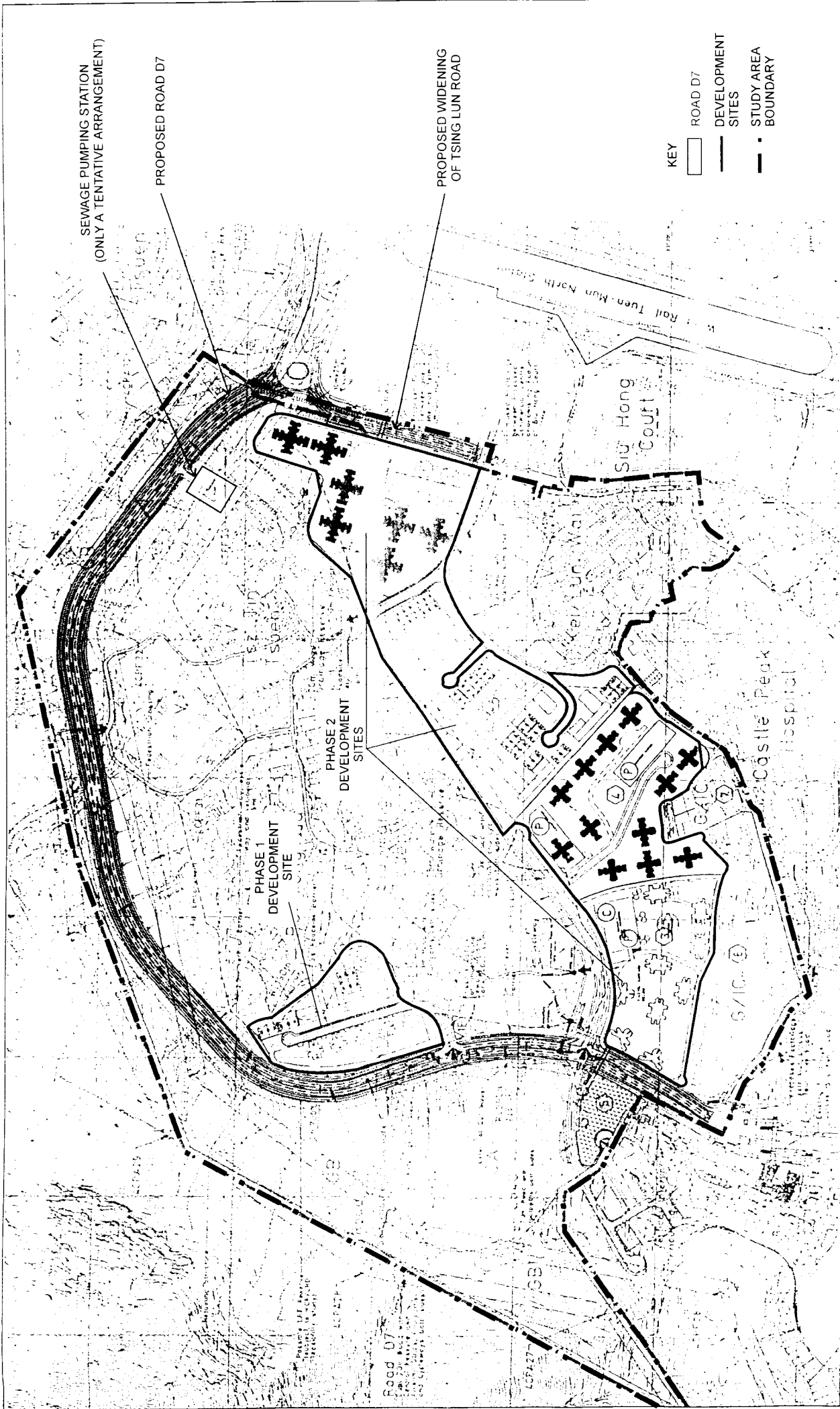
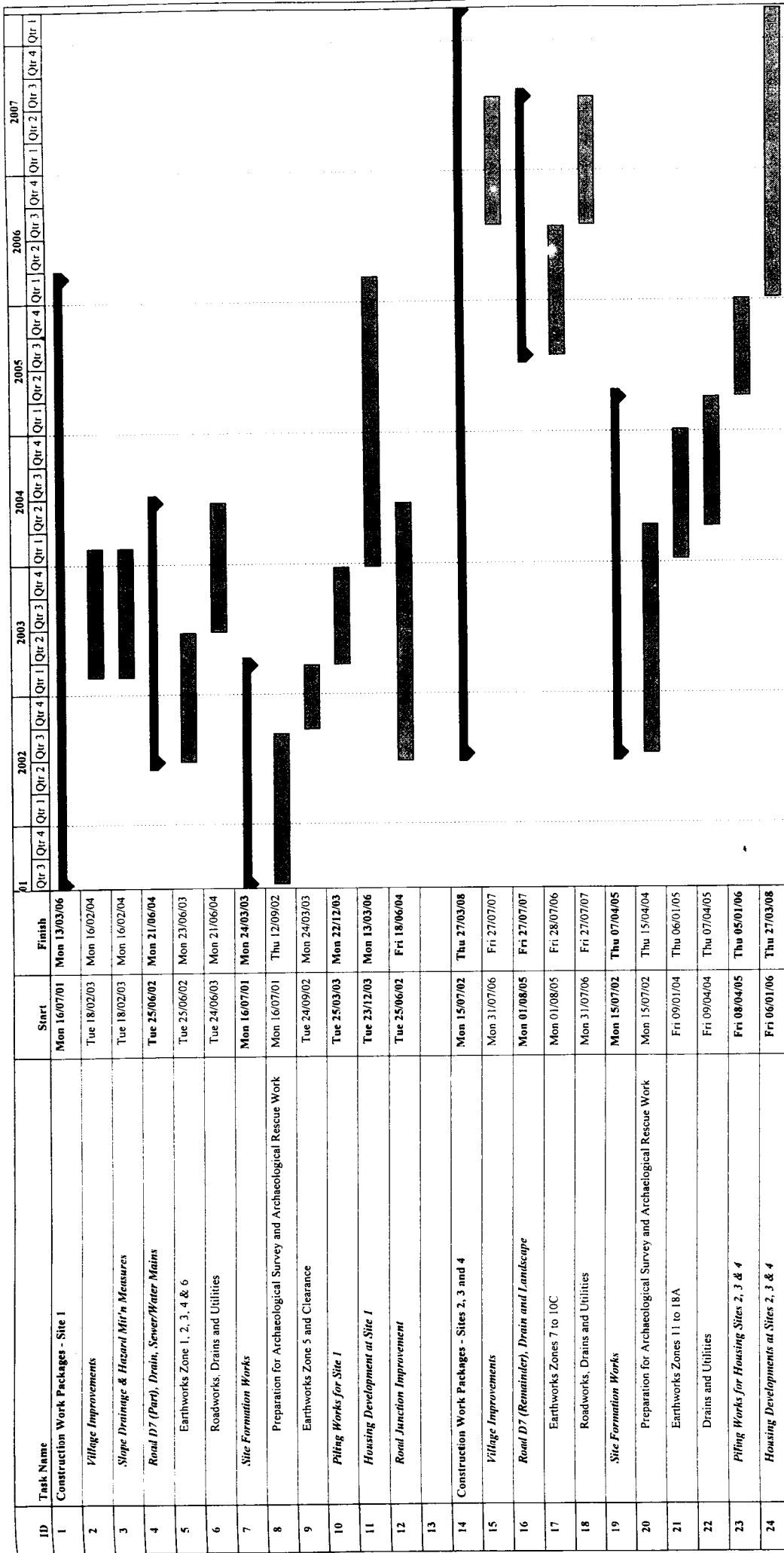


FIGURE 2.1a

THE STUDY AREA AND RECOMMENDED DEVELOPMENT LAYOUT OF TUEN MUN AREA 54



Project: Planning & Development Study of Potential Housing Site in Area 54, Tuen Mun
Date: 14/04/99

Task

Summary

FIGURE 2.1b Proposed Construction Programme for Tuen Mun Area 54

3.1

CONSTRUCTION PHASE

Noise during the construction phase of the project would impact on the surrounding environment. Unmitigated construction activities associated with the Project would cause exceedances of daytime construction noise standards stipulated in the EIAO-TM at Noise Sensitive Receivers (NSRs) located close to the work sites. Noise exceedances in the range of 1-9 dB(A) have been predicted, and critical noisy construction activities identified were site formation works, road construction and building construction.

Adequate control measures would be required for general construction works to meet the EIAO-TM construction noise standards. Mitigation measures including the use of quiet plant, installing noise barriers and reducing the percentage of time of noisy equipment in operation were recommended to be included as part of the Action Plan of the Environmental Monitoring and Audit (EM&A) programme. If the proposed noise mitigation measures are imposed and are effective, it is predicted that noise levels during the construction phase can be controlled within the limits stipulated under the EIAO-TM. Regular monitoring of noise at NSRs would be required during the construction phase of the project, as part of the EM&A programme, in order to ensure the environmental performance of the works through the implementation of the Action Plan.

3.2

OPERATIONAL PHASE

Road traffic noise impact is a key environmental issue for the proposed development. Based on the worst case traffic forecasts for the year 2021, noise impacts would be likely at most of the identified existing and planned NSRs. Direct technical remedies (cantilever and vertical barriers) on the proposed distributor road and Tsing Lun Road have been recommended in order to reduce the identified impacts.

Noise abatement measures have also been proposed at the housing sites to further reduce noise nuisance from road traffic. At Sites 1, 2 and 3, podia of appropriate scale, screening structures including multi-storey car park and commercial centres are recommended. Noise semi-enclosure is also suggested to maximise the screening potential with regard to traffic noise from the new distributor road. For Site 3, single aspect design has been used for the building blocks to mitigate traffic noise. For the areas around San Hing Tsuen to the north of the proposed Road D7 which has been rezoned from "Industrial (Group D)" to "Residential (Group E)" on the draft Lam Tei and Yick Yuen Outline Zoning Plan, a buffer distance of about 25m is considered to be required in addition to the 5m noise barrier for the protection of future residential development. The recommended mitigation measures are indicated in *Figure 3.2a*.

Even with the proposed direct mitigation measures in place, there would still be residual noise impacts at the planned sensitive uses. Options for the use of blank façades and internal building design for Site 2 may need to be further explored to reduce the noise level at affected receivers.

In cases where the direct technical remedies were exhausted, the use of indirect technical remedies in the form of noise insulation and installation of air-

conditioning system should be considered, as the last resort, to protect the affected NSRs. It is estimated that 1154 dwellings for the Vertical Interim Housing and 251 existing dwellings at Siu Hong Court would be eligible for Indirect Technical Remedies according to the result of this EIA Study.

As suitable acoustic louvers, silencers, dampers and noise absorptive lining will be provided for the proposed sewage pumping station at Site 2 and as the proposed PTIs in Sites 2 and 3 will be covered and located under the proposed commercial centres, noise impacts from these fixed noise sources would be minimal.

Rail noise from the West Rail will be sufficiently screened by the residential towers of Siu Hong Court and, hence planned sensitive uses within Tuen Mun Area 54 would not be impacted by rail noise of West Rail.

A semi-quantitative noise assessment has been conducted for the not yet confirmed LRT extension in Tuen Mun Area 54, assessment results indicated that for NSRs at a distance of 25 m from the LRT track, noise exceedances were predicted during daytime and night time. As such, track side barrier should be considered at positions with insufficient horizontal buffer between the LRT track and the nearby NSRs. Detail noise assessment is recommended during the detailed design stage after the LRT development is confirmed.

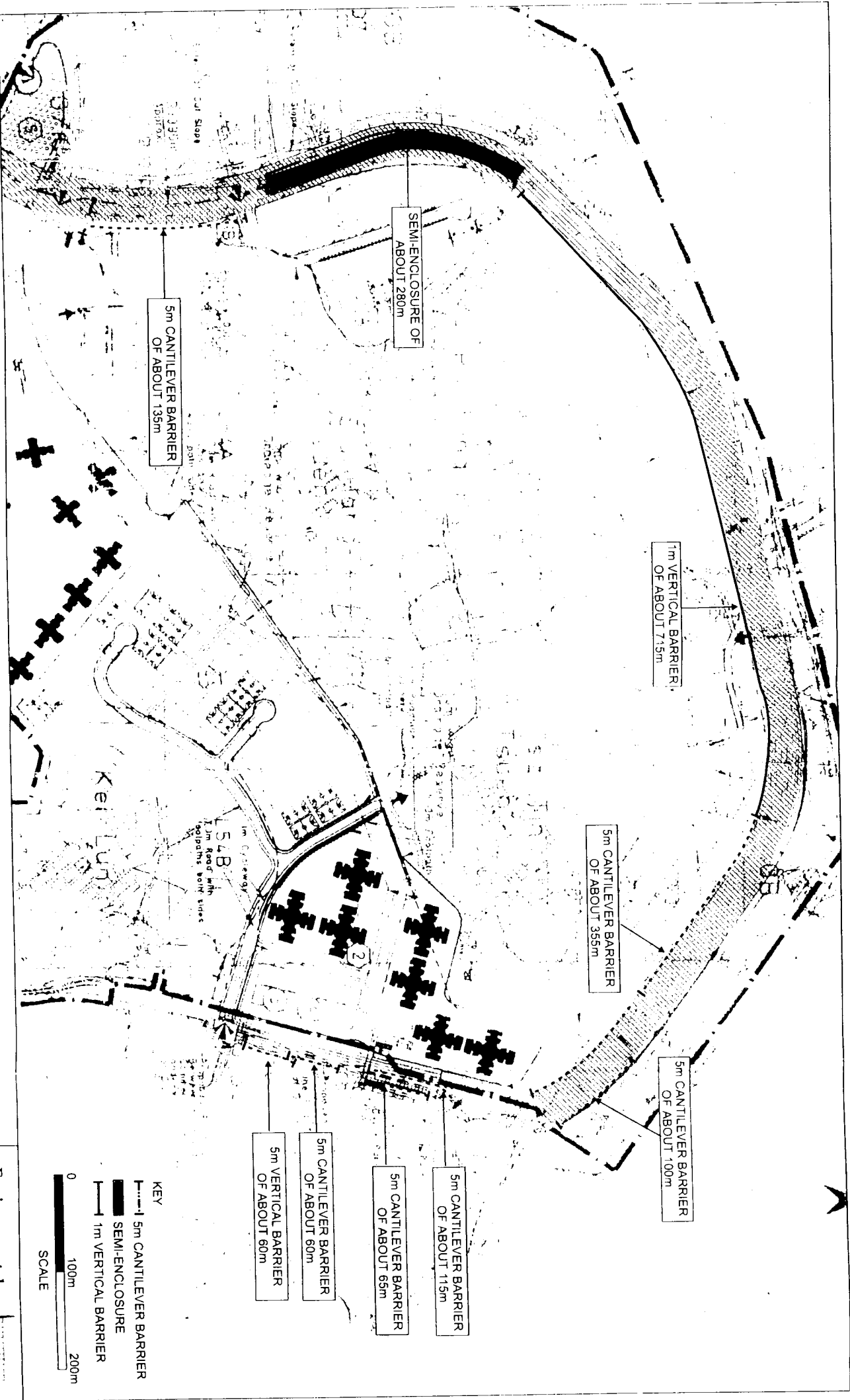


FIGURE 3.2a

NOISE MITIGATION MEASURES PROPOSED FOR SIU HANG TSUEN SITE 1 AND VILLAGE EXTENSION AREA NORTH OF PO TONG HA

4.1

CONSTRUCTION PHASE

Road works, development and infrastructure construction will be major sources of air pollutants. Construction activities such as material handling, wind erosion and truck movement on the unpaved haul roads will be the main dust generating activities.

Exceedance of the hourly and daily criteria for Total Suspended Particulates (TSP) levels at Siu Hang Tsuen West and Po Tong Ha West during Phase 1 earthworks was predicted. However, implementation of appropriate mitigation measures, as recommended in the *Air Pollution Control (Construction Dust) Regulation*, and a reduction of vehicle speed to 20 km hr⁻¹ should be sufficient to ensure compliance of the established air quality criteria. For the construction activities during Phase 2, no exceedance of hourly and daily TSP level was predicted at all identified Air Sensitive Receivers (ASRs). To ensure the efficacy of the recommended air quality control measures, dust monitoring is recommended during the construction phase.

4.2

OPERATIONAL PHASE

The Air Quality Objectives (AQO) will be satisfied at all ASRs at both low levels (ground level and 10 m above ground) and high levels (30 m - 90 m above ground) except San Hing Tsuen and Tuen Mun Government School with the existing layout. Exceedance of AQO was predicted at San Hing Tsuen (60 m above ground) and at Tuen Mun Government School (90 m above ground). However, as no air sensitive uses are present at level of 30 m above ground of these ASRs, the AQO criteria will be satisfied. Hence, no further mitigation is required.

As advised by the Planning Department, industrial uses located in San Hing Tsuen are to be phased out as the Town Planning Board has agreed to rezone the area around San Hing Tsuen to the north of the proposed Road D7 from "Industrial (Group D)" to "Residential (Group E) (RE)" on the draft Lam Tei and Yick Yuen OZP No. S/TM - LTY/1. Hence, adverse air quality impacts resulting from the industrial uses in San Hing Tsuen on the planned future residential development can be eliminated.

To minimise odour nuisance on the surrounding area, it is recommended that control measures such as activated carbon filter or scrubber system be incorporated in the design for the tentatively proposed sewage pumping station. As the proposed sewage pumping station is a Schedule 2 designated project under the EIA Ordinance, details of the mitigation measures for the sewage pumping station would be proposed in the future EIA under separate cover to meet the requirements of the EIA Ordinance.

As the designs of the Public Transport Interchanges (PTIs) within the proposed residential development sites would likely be of a semi-confined nature, the requirements specified in *Transport Terminus Air Quality Guidelines (TTAQG)* and ProPECC PN 1/98 on the *Control of Air Pollution in Semi-Confined Public Transport Interchanges* should be followed for the design of the ventilation system of the PTIs. In addition, it is suggested that the ventilation shafts should be located

away from the ASRs by a distance of at least 10 m to avoid any potential air quality impacts from the exhausts.

5 WATER QUALITY

5.1 CONSTRUCTION PHASE

Construction activities associated with construction of potential housing development in Tuen Mun Area 54 could lead to site runoff containing elevated concentration of suspended solids and associated contaminants in the water column. Detailed mitigation measures have been described which should effectively control all potential impacts. Unacceptable residual (that is, after adoption of the recommended mitigation measures) water quality impacts are not expected to occur.

5.2 OPERATIONAL PHASE

It is considered that the existing drainage facilities within the Study Area require upgrading and provision of new facilities to minimise the impact of flooding during heavy rainfalls at low lying and poor drainage area. As there are several villages in the vicinity of the proposed developments, the drainage facilities for the developments should take into account these villages. New drainage systems should be designed according to the guidelines from the EPD and the Drainage Services Department. A separate *Drainage Impact Assessment Report* has been completed as part of this Study to address the issue. With the drainage improvements to be implemented as part of the proposed developments, the threat of flooding at a number of blackspots in the Study Area, which is temporarily relieved by the Rural Planning and Improvement Strategy works, will be substantially reduced.

Appropriate sewage collection facilities should be incorporated into the design of potential housing development. Sewerage systems for residential development should be installed and designed according to the EPD's guidelines. A sewage pumping station is proposed as a tentative arrangement subject to findings of the Tuen Mun Sewage Master Plan Review Study. The sewage pumping station, depending on its installed capacity, would be a *Schedule 2 Designated Project* under the EIAO. In the event that this sewage pumping station is confirmed to be required by the forthcoming *Review of Tuen Mun and Tsing Yi Sewerage Master Plans*, a separate EIA Study would be conducted for the pumping station.

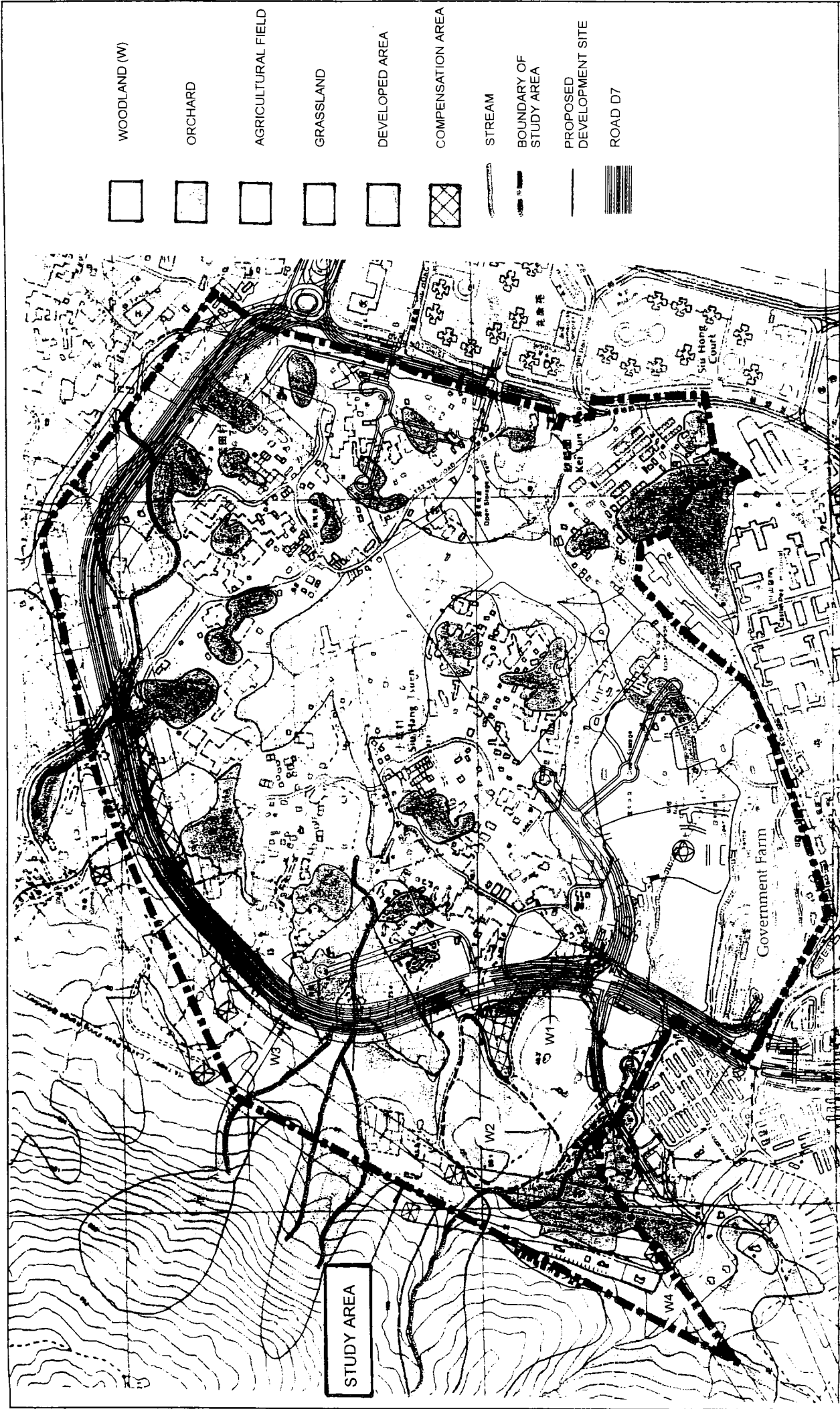
It is considered that, with the adoption of the recommended mitigation measures addressed in the EIA Report, no unacceptable water quality and drainage impacts will result from the operational phase of the potential housing development within and downstream of the proposed housing development site. Sufficient wastewater disposal facilities should however be designed in the future housing site in order to avoid expedient connection of untreated wastewater to storm drains.

The potential environmental impacts of waste arising from the construction and operation of the proposed housing and commercial developments, and the associated infrastructure and community facilities have been assessed. Key issues include the need for effective waste management planning during both of these phases. Waste management methods and practices and other environmental control measures have been recommended to ensure that potential impacts are avoided or controlled to acceptable levels. With the implementation of the recommended measures, no residual environmental impact is expected with respect to waste management.

The ecological resources within the Study Area comprises secondary woodland, agricultural field (active/abandoned), orchard and degraded area (open storage/wasteland). Field visits conducted within the period from November 1997 to July 1998 identified that the secondary woodland 2 within the Study Area is an ecologically important habitat that supports uncommon/rare or protected flora including *Tutcheria spectabilis*, *Camellia sinensis*, *Camellia crapnelliana*, *Rhodoleia championi* and *Michelia macclurei*. There are two other large secondary woodland areas with the woodland 1 in better condition and more mature, therefore ecologically more important than the woodland 3 with fruit and plantation species, as well as Woodland 4 with *Acacia* plantation. However, several individual of protected tree species, *Tutcheria spectabilis*, were found in Woodland 3. The other identified habitats in the Study Area are mostly disturbed with low ecological importance. Animal wildlife recorded was limited and no species of conservation interest observed except some mammal scats in the secondary woodland. The ecological habitats within the Study Area is presented in *Figure 7.1a* and *Figure 7.1b*.

Recommendations on alternative development options during the evaluation process were made to avoid and minimise the potential impact to the secondary woodland in general, and Woodland 2 in particular. The ecologically important Woodland 2 area has been conserved as a Conservation Area where no development should be allowed.

Although the proposed development will encroach upon some of the less important woodland areas and probably lead to fragmentation of the woodland habitat, compensation planting has been maximised within the project limit to mitigate the impact. Given the relatively small scale of the residual low quality woodland loss, approximately 1.9 ha as compared to the entire woodland area of over 15 ha, as well as the even larger woodland area further up the hill slope, low ecological impact is considered from the residual low quality woodland habitat loss and fragmentation. The designation of the majority of the unaffected secondary woodland area as Green Belt will also afford an appropriate level of protection to the woodland ecological resources.



- WOODLAND (W)
- ORCHARD
- AGRICULTURAL FIELD
- GRASSLAND
- DEVELOPED AREA
- COMPENSATION AREA
- STREAM
- BOUNDARY OF STUDY AREA
- PROPOSED DEVELOPMENT SITE
- ROAD D7

HABITAT MAP FOR AREA 54, TUEN MUN

FIGURE 7.1a

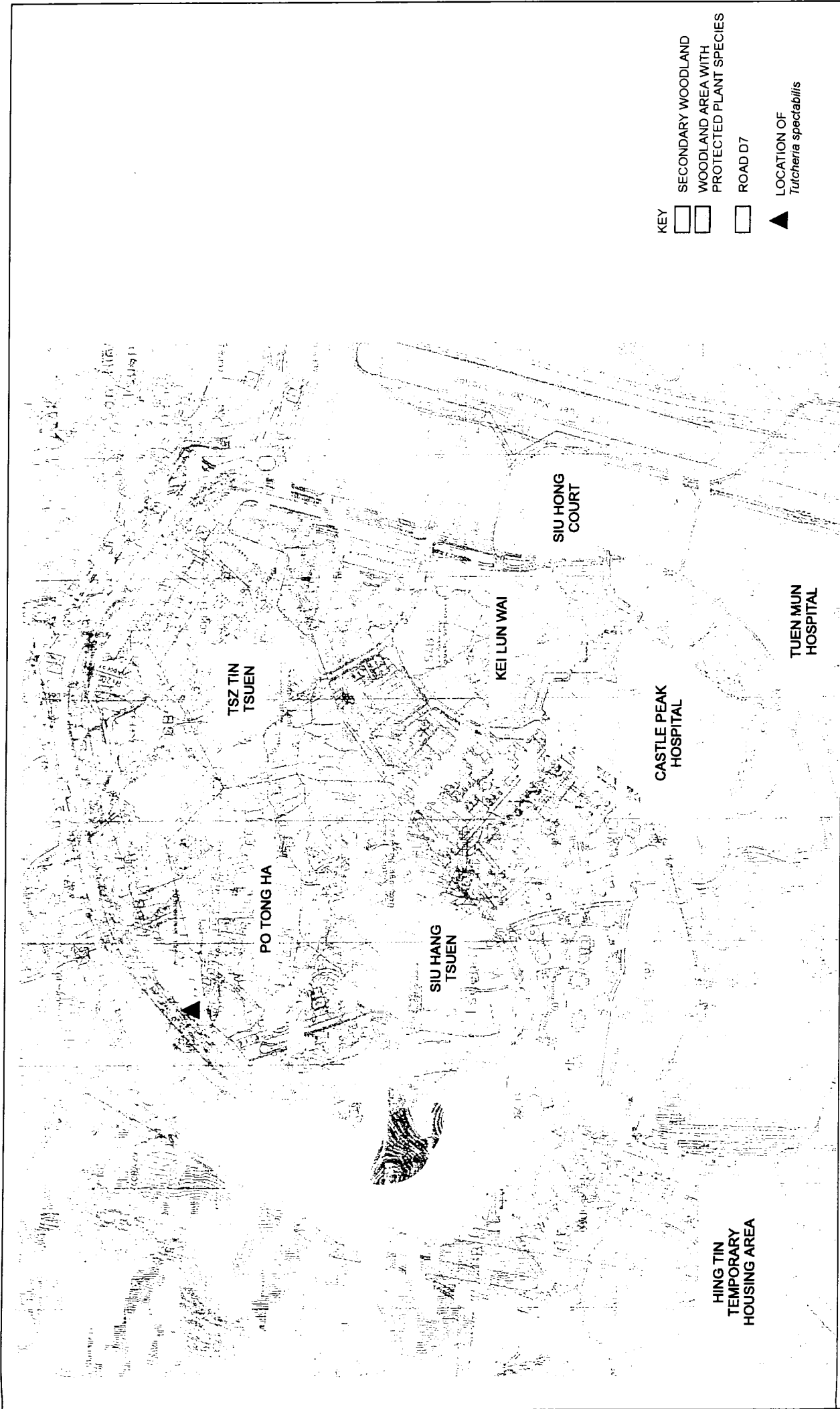


FIGURE 7.1b

EXTENT OF WOODLAND IN TUEN MUN AREA 54

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8.1 *LANDSCAPE IMPACTS*

The site planning solution proposed for Area 54 is considered to be the best practical design that satisfied planning, engineering and landscape. The design features which should be incorporated into the Preferred Development Option as part of the MLSP would substantially mitigate the direct landscape impacts in Area 54.

It is identified that the unmitigated impacts both during and immediately after construction will be of a high degree with many being significantly adverse. However, the incorporation of the mitigation measures will, in general, result in these being acceptable with several being beneficial. While it is recognised that construction of the development will result in the removal of vegetation over a wide area, no significant vegetation will be affected. In particular, the proposal of a Conservation Area would enhance the protection of the existing landscape.

It is recommended that a woodland management plan should be formulated for woodland areas during the detail design stage. This management plan would be based on detailed ecological, landscape and species analysis of the woodland. Both short-term and long-term management goals and objectives would be formulated and would be achieved by the implementation of detailed maintenance schedules.

8.2 *VISUAL IMPACTS*

During construction, the proposed developments would be seen from the sensitive viewpoints, particularly the high-rise buildings. The visual impact is predicted to be significantly adverse but limited to the construction period. During operation, the impacts, when mitigated, will be acceptable.

The residents in the estates in Area 54 will be most affected by the construction and operation of the road. This will occur mainly due to the introduction of direct noise mitigation measures such as roadside barriers. The detail design of these structures will assist in minimising these visual impacts.

9.1

HISTORICAL AND CULTURAL RESOURCES

The historical and cultural resources in the Study Area have been identified by the archaeological survey conducted by Zhongshan University. Four grave sites will be encroached by the proposed development at Site 4 and Road D7, and therefore relocation of these graves is required. The relocation of graves should be undertaken in consultation with the affected families. However, the detailed arrangements for grave relocation are beyond the scope of this cultural heritage assessment. However, a field survey is required before the relocation work is to be started, which should include a full photographic recording of each face of the grave sites and a detailed recording of the stone tablet inscriptions for AMO's record.

A review of findings from other technical assessments conducted for the project also indicates that the proposed developments and associated works would not cause any adverse indirect impacts on the identified historical and cultural resources.

9.2

ARCHAEOLOGICAL RESOURCES

The findings from the archaeological survey conducted by the archaeological team of Zhongshan University identified areas of archaeological deposit in the Study Area. Areas to be impacted by the development include Site 1, west of Siu Hang Tsuen and Site 2, north of Kei Lun Wai.

With the maximisation of housing flat production from the Study Area as the prime objective of the Planning Study, there would be little scope in adjusting the layout of the Preferred Development Option to maximise the preservation of archaeological deposits. As the adjustment of development layout is considered not practicable, it is recommended that archaeological excavation of identified deposits be undertaken in advance of construction activities and that a watching brief is provided during construction. Sufficient time has been allowed for archaeological investigation/survey/rescue work by Antiquities and Monuments Office within Phase 1 and Phase 2 of the Implementation Programme. Sufficient funds should also be provided for such work.

Relevant background information with regard to land contamination has been reviewed and preliminary site surveys have been conducted for the identification of potential areas of concerns. The potential impacts from land contamination, if any, would be related to the disposal of contaminated materials, including soil and groundwater, and the potential health risks to construction workers and future users of the sites.

A CAP for the Study Area has been prepared (see *Annex I* of the EIA - Final Assessment Report). Contamination investigations will be conducted as part of the Implementation Programme in accordance with the CAP. The site investigation programme will be reviewed prior to the site investigation works. If site contamination is confirmed, a Remediation Action Plan will be compiled and the necessary remedial actions will be carried out prior to any site clearance works in accordance with requirements of the EIAO-TM.

The EIA Study has recommended regular monitoring of noise and air quality, as part of an EM&A programme, be undertaken for the proposed development within the Study Area. The detailed EM&A requirements are presented in a separate EM&A Manual.

The findings of the EIA Study has provided information on the nature and extent of environmental impacts arising from the construction and operation of the proposed development in the Study Area. The EIA Study has also been used as a means to provide continuous environmental planning input for the generation of the recommended MLP and MLSP. Appropriate mitigation measures have been recommended, where environmental impacts are identified, in accordance with the relevant environmental legislation and guidelines.

The findings of the EIA Study indicate that there will still be limited residual environmental impacts, in the form of a small residual loss (approximately 1.9 ha) of low quality woodland habitat, even with the implementation of the recommended mitigation measures.

The environmental mitigation requirements should be incorporated into the Contract Specifications of the Tuen Mun Area 54 Development. The recommended EM&A procedures will ensure the efficacy of the environmental control measures as detailed in the separate EM&A Manual.