

2.1 *INTRODUCTION*

The primary objective for the development of the Study Area is to maximise the provision of residential units from the proposed development layout, with a view to meeting the Government's pledge of achieving the supply of 85,000 flats per year. The most important element of the proposed developments comprises the development of four housing sites, which have been designated Sites 1 to 4. In this section, a brief description of the Project in the construction and operational phases is provided.

2.2 *CONSTRUCTION PHASE*

2.2.1 *Construction Work Packages*

The proposed developments within the Study Area will be divided into two main development packages.

The first development package concerns the development of Site 1 or Phase 1 Development. The major construction work packages within Phase 1 will include:

- construction for village improvements;
- construction for slope drainage and natural terrain hazard mitigation measures;
- construction for Road D7 (Part), drains, sewer mains, water mains and landscaping;
- construction for site formation works;
- construction for piling works for housing;
- construction for housing development; and
- construction for road junction improvement, including the proposed widening of Tsing Lun Road from 2 lanes to 4 lanes.

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 major construction work packages within Phase 2 will include:

- construction for village improvements;
- construction for Road D7 (Remainder), drains, and landscaping;
- construction for site formation works;
- construction for piling works for housing;
- construction for housing development;
- construction for fresh and salt water mains; and
- construction for sewage pumping station and sewers.

The construction works for Development Package 2 are expected to start in late 2003 and be completed in early 2008.

An overview of the proposed construction programme for Tuen Mun Area 54 is presented in *Figure 2.2a*.

2.2.2

Concurrent Projects

The Implementation Programme indicates that other major development projects in the vicinity of the Study Area are likely to include:

- Vertical Interim Housing (VIH) in Tuen Mun Area 29;
- Home Ownership Scheme (HOS) in Tuen Mun Area 52;
- KCRC West Rail and Tuen Mun North Station;
- possible retail development above the West Rail Tuen Mun North Station;
- possible housing development in Tuen Mun Area 1; and
- Route 10.

The first phase of construction for the VIH development in Area 29, including two residential blocks in Phase 1, commercial centre, public transport interchange and the school in Phase 2, is scheduled for completion in January 2000. The remaining residential blocks are scheduled for completion in March 2000. With the above programme in mind, these VIH blocks are expected to be occupied before the commencement of the Area 54 Development Package 1 in 2003 and therefore have been considered as environmental sensitive receivers in the assessment for this EIA-FAR.

Area 52 is located across Tuen Mun Nullah to the east of the Study Area and the HOS development within the area is considered to be located at too large a distance (over 300 m) to be affected by the development of Area 54.

The development of the West Rail and its Tuen Mun North Station will be completed approximately at the commencement of construction works for Tuen Mun Area 54 and therefore the cumulative effect will be negligible.

As there is still little information available on the retail development above Tuen Mun North Station and the housing development in Area 1, it is currently not possible to consider their contribution to the cumulative environmental effects.

For the Route 10 project, its location is considered to be too far away to have any discernable cumulative effect.

Figure 2.2b shows the location of concurrent projects that are taken into account of this EIA Study.

2.3

OPERATIONAL PHASE

2.3.1

General

During the course of the Planning Study, the Working Group on Housing Supply (WGHS) has determined that potential development sites within the Study Area will be developed solely for public housing. The WGHS has also set an overall target for the production of 11,000 flats within the Study Area, with Site 1 developed by March 2006. An initial development option and two alternative

options have been generated based on the following list of development parameters and assumptions to meet the target set by the WGHS:

- a public housing mix of 70 % Home Ownership Scheme (HOS)/Private Sector Participation Scheme (PSPS)/Subsidised Housing (SH) and 30 % public rental (PRE) housing, in terms of population intake to the developments;
- a development ratio of 7 for public housing (a plot ratio of 8 was tested in the initial layout) which is consistent with plot ratios which are being tested on other feasibility studies;
- a plot ratio of 5 for the PSPS and SH housing which is consistent with the plot ratios used in private developments in the Tuen Mun area;
- an average flat size of 55 m² for public rental housing and 65 m² for HOS, PSPS and SH housing;
- Persons Per Occupied Flat (PPOF) of 3.5 for public rental housing (which represents the existing average for public rental estates) and 3.04 for HOS/PSPS/SH housing;
- primary and secondary school provisions in accordance with Education Department (ED)'s requirements;
- the estimated population of the village components in the Study Area is 10,500;
- commercial area in the public housing estates based on 0.4 m² internal floor area per person; and
- car parking spaces in accordance with the requirements of *Hong Kong Planning Standards and Guidelines* (HKPSG).

Analyses with respect to transport, environmental, engineering and infrastructural considerations have been carried out under this Planning Study using the following evaluation framework in order to generate and evaluate alternative and preferred development option. The selection process for the Preferred Development Option started with an examination of the Layout Plan which was prepared by Planning Department. An assessment of the constraints and opportunities pertinent to the site was then undertaken and this has led to the formulation of the Initial Development Plan (IDP). The IDP was generated for transport, environmental and infrastructure testing purposes and was modified to incorporate the results of this work. Three alternative land use concepts were then prepared for Area 54 and evaluated to determine the most appropriate land use framework plan and conceptual layout to be carried forward as the Preferred Development Option for further refinement. During all the processes, environmental factors including potential noise and air quality impacts (e.g. traffic noise and vehicle emissions), ecological impacts (e.g. impacts on woodland area/habitats) and impacts to nearby sensitive developments such as Castle Peak Hospital have been considered.

The following describes the three development options which had gone through detailed evaluation.

Option 1

Option 1 is shown in *Figure 2.3a*. This option is characterised by a distributor road located to the north of the village areas and to the east of Site 1. The land use proposals in Option 1 have superseded by the decision to locate only public housing within Area 54. This option has a forecast number of flats of 14,045 and a total population of 44,840.

Option 2

Option 2 is shown in *Figure 2.3b*. This option is characterised by a distributor road which is located to the north of the villages. The road alignment is similar to Option 1 with the exception that Site 1 is now located east of the distributor road. This option has a forecast number of 13,750 flats and a total population of 44,151.

Option 3

Option 3 is presented in *Figure 2.3c*. The distributor road of this option is located immediately to the south of Siu Hang Tsuen and Tsz Tin Tsuen villages and to the north of Kei Lun Wei village. The alignment of the distributor road encroaches upon the village environs and also reduces the amount of development land that is available in Sites 2, 3 and 4. This option has a forecast number of 13,194 flats and a total population of 43,560.

2.3.2

The Evaluation Process

The following key study goals provide the starting point for the formulation of the evaluation criteria:

- maximise the provision of residential units;
- integrate new development sites with existing areas;
- ensure development is sustainable in transport, environmental and infrastructure terms;
- provide a convenient and efficient land use/transportation network;
- maximise and enhance environmental quality; and
- formulate an efficient/flexible development programme.

As described above, a framework for the evaluation and selection process has been developed for this Study. The evaluation exercise has to assess how each of the three options perform against a set of objectives/evaluation criteria that have been identified for the Study. The evaluation criteria are grouped under their respective technical disciplines which are as follows:

- Planning and urban design
- Property and land values
- Landscape, open space and visual links
- Socio-economic considerations
- Transport and traffic
- Environment
- Geotechnical infrastructure/utilities
- Implementation

There are nine technical disciplines in the evaluation framework. *Table 2.3a* presents a summary of the performance of the three options by discipline. To enable a quantitative comparison of the three alternative development options to

take place, each option has been assessed according to its performance against each of the criteria. This assessment applies objective or subjective measurement criteria and then allocates a performance rank (i.e. 1st, 2nd or 3rd) to each option as follows:

- good performance against criteria (Rank of 1)
- moderate performance against criteria (Rank of 2)
- poor performance against criteria (Rank of 3)

The sum of the "ranks" is then calculated for each discipline to determine the overall performance of each option against that discipline. The sum of ranks by discipline are then combined. The option which performs the best overall, is the option which has the lowest score in the assessment.

Table 2.3a Overall Performance of Each Option By Discipline

Disciplines	Performance of Option Against Criteria		
	Option 1	Option 2	Option 3
A. Planning and Urban Design	2	1	3
B. Property and Land Values	1	2	3
C. Socio - Economic	1	1	2
D. Landscape, Open Space & Visual Links	2	1	3
E. Transport and Traffic	2	2	1
F. Environment	2	1	3
G. Geotechnical	3	1	2
H. Infrastructure/Utilities	2	1	2
I. Implementation	2	2	1
Sum of "Rank" for each Discipline	17	12	20
Overall Ranking	2	1	3

As a result of the evaluation process, Option 2 is recommended to be the Preferred Development Option (*Figure 2.3d*) which has been endorsed by the Steering Group of the Planning Study. The environmental assessment reported in this EIA-FAR has been conducted based on the endorsed Preferred Development Option, with the refinement subsequent to comments made by Government departments on the Preferred Development Option also taken into account.

The endorsed Preferred Development Option is characterised by a distributor road (Road D7, District Distributor with a design speed of 70 km hr⁻¹) 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.

2.3.3 Schedule of Uses and Areas for the Preferred Development Option

The schedule of land use and developed areas for the Preferred Development

Option is presented in Table 2.3a.

Table 2.3a Development Schedule of the Preferred Development Option

Site Ref	Use	Gross Site Area (m ²)	Net Estate Area (m ²)	Domestic Plot Ratio /Development Ratio	Commercial GFA (m ²)	Domestic GFA (m ²)	No of Flats	Population
1	SH	12,875	12,875	(PR) 5	1,204	64,375	990	3,010
1a	E (1 Pr+1 Sec)	13,225						
2	PRE	46,076	42,206	(DR) 7	7,257	267,747	5,184	18,144
2a	G/IC (4)	2,508						
3	PSPS	37,649	37,099	(PR) 5	9,119	181,133	2,900	8,816
4	HOS	48,717	46,019	(DR) 7		282,709	4,600	13,984
4a	E (4 Pr+4 Sec)	55,018						
5	G/IC (1)	6,128						
6	G/IC (2)	41,000						
7	G/IC (3)	8,000						
Total		271,196			17,580	795,964	13,674	43,954

Notes:

- SH Subsidised Housing
- PRE Public Rental Estate
- PSPS Private Sector Participation Scheme
- HOS Home Ownership Scheme
- E Educational Use
- G/IC (1) Proposed joint user G/IC site incorporating Indoor Games Hall, Community Hall and Clinic
- G/IC (2) Government Farm proposed to be relocated and site retained for future government uses
- G/IC (3) New Life Farm to be retained
- G/IC (4) Proposed Sewage Pumping Station

- (1) Assumes Commercial GFA of 0.4 m² per person within the public housing areas
- (2) Assumes the Commercial Centre accounting for the Commercial GFA of Site 3 and Site 4 is located in Site 3
- (3) Assumes an average number of persons per occupied flat (PPOF) of 3.5 for public housing and 3.04 for private housing (HOS/PSPS/SH)
- (4) Assumes school provision is in accord with ED requirements for Area 54
- (5) Assumes a design population of 10500 for the village areas within Area 54

Site 1

Site 1 is proposed for SH development and is located east of the distributor road and west of Po Tong Ha and Siu Hang Tsuen villages. Two schools are located on the eastern edge of the site adjacent to the villages, and providing a buffer between the villages and the housing development.

The site is expected to provide 990 flats (5 blocks of 25-storey residential building on a podium structure), accommodating a population of 3,010, and two schools.

Site 2

Site 2 is proposed for PRE development. The location of PRE housing in Site 2 will permit people within the development to take advantage of the close proximity of the proposed KCR West Rail Tuen Mun North Station. Site 2 is expected to produce 5,184 flats (5 blocks of 40-storey and 2 blocks of 32-storey residential building). The site is expected to accommodate 18,144 people in public rental housing with a development ratio of 7. A sewage pumping station is also tentatively proposed adjacent to Site 2.

Site 3

Site 3 is situated in the southern part of the Study Area immediately north of the existing Government Farm. Site 3 is proposed for PSPS housing in the Preferred Development Option. The site is expected to accommodate 8,816 people in 2,900 PSPS flats (3 blocks of 31-storey and 6 blocks of 38-storey residential building) at a plot ratio of 5.

Site 4

Site 4 is located on the southern boundary of the Study Area east of Site 3, south of Siu Hang Tsuen and northwest of the Castle Peak Hospital. In the Preferred Development Option, eight schools are located in a cluster in the northeastern corner of the site. The arrangement is intended to improve land use and transportation efficiency.

It is proposed that Site 4 will produce 4,600 flats (11 blocks of 40-storey and one block of 20-storey residential building) to accommodate 13,984 persons in HOS housing.

Site 5

Site 5 is located on the southern boundary of the Study Area adjacent to the Conservation Area. The site will be used for a joint user G/IC building, in which community facilities that cannot be located within the proposed residential development sites will be accommodated. The facilities will include an indoor games hall, a community hall and a clinic.

Site 6

Site 6 is the Government Farm located on the southern boundary of the Study Area. The site is proposed to be zoned as G/IC.

Located at the southern boundary of the Study Area between the Government Farm, Site 4 and the Castle Peak Hospital, Site 7 which accommodates the New Life Farm, is proposed to be retained. This facility is currently used by the Castle Peak Hospital who are also understood to be in the process of negotiating a Short Term Tenancy (STT) for an adjacent site within the Government Farm. The New Life Farm is proposed to be retained.

2.4 TRAFFIC DATA

The traffic data used for the assessments, in particular noise and air quality assessments, performed in this EIA-FAR has been accounted for the proposed widening of Tsing Lun Road. In the traffic forecasts provided, the projected increase in village population from 3,100 in the year 1997 to a maximum of 10,500 in the year 2006 has been allowed for. It has also been assumed that the schools will serve the local population within the Study Area and therefore will not generate any substantial traffic.

2.5 DESIGNATED PROJECTS

The Planning Study falls under Item 1 of *Schedule 3 - Major Designated Projects Requiring Environmental Impact Assessment Reports*. This category of Designated Projects is described as 'engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000'.

Individual Designated Projects under *Schedule 2* of the EIAO identified within the Study Area include the new distributor road; the proposed widening section of Tsing Lun Road and the new sewage pumping station proposed adjacent to Site 2. As the pumping station is only a tentative arrangement at present with details still unavailable, detail assessment of the pumping station would be addressed in a separate EIA under separate cover. These are also presented in *Table 2.5a*.

Table 2.5a Individual Designated Projects within Tuen Mun Area 54

Project	Description	EIAO Reference	Section Reference
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
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) - <u>requires separate EIA under separate cover</u>	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

NOTE:

Other concurrent projects that are located at more than 300m from the study area site boundary are not shown, these are:

- Home ownership scheme in Tuen Mun area 52
 - Possible Housing Development in Tuen Mun area 1
 - Route 10
- Concurrent Projects Shown:
- VIH in Tuen Mun Area 29
 - KCRC West Rail and Tuen Mun North Station
 - Possible Retail Development above Station

POSSIBLE RETAIL DEVELOPMENT ABOVE STATION

KEY

- ROAD D7
- DEVELOPMENT SITES
- STUDY AREA BOUNDARY

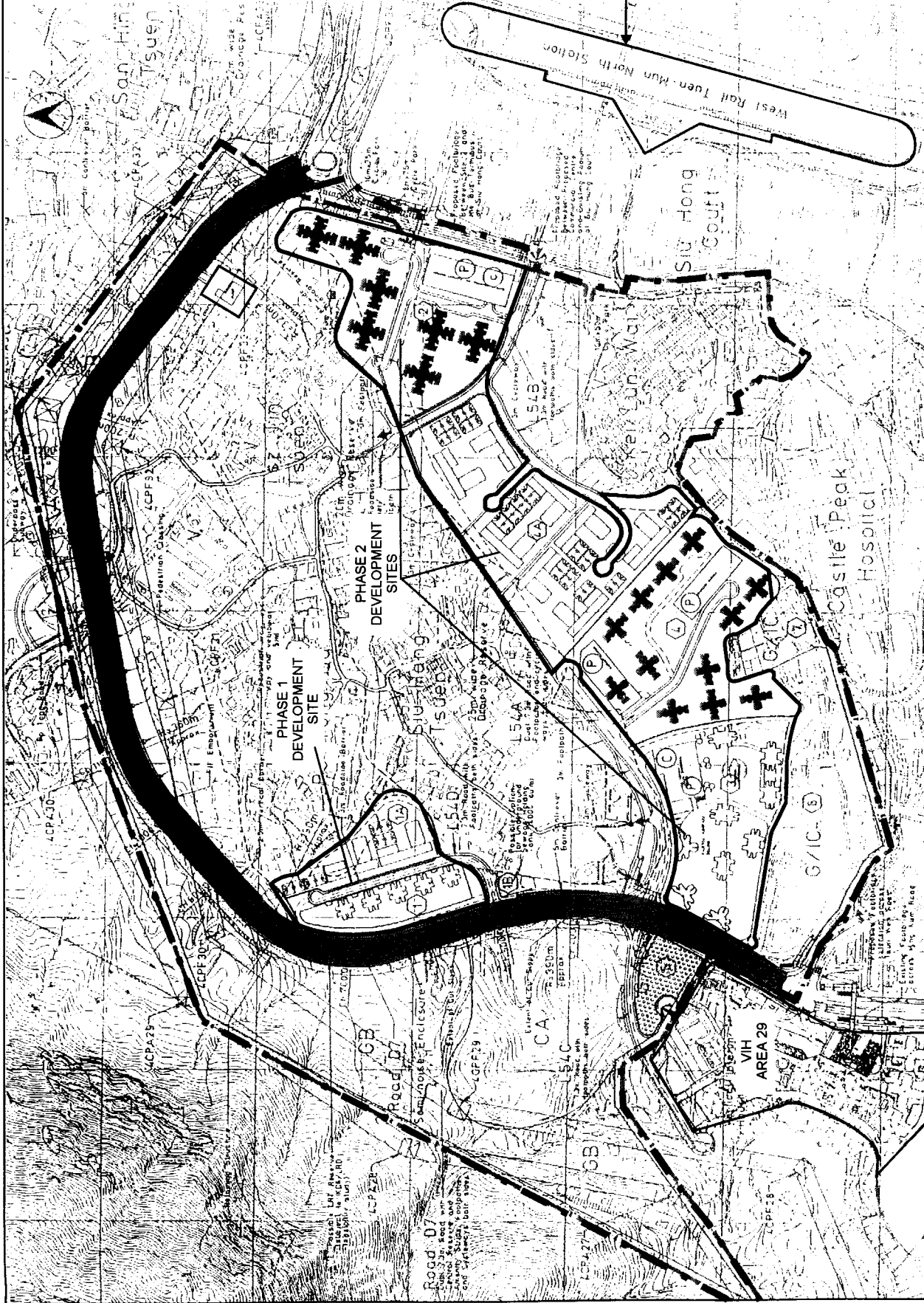
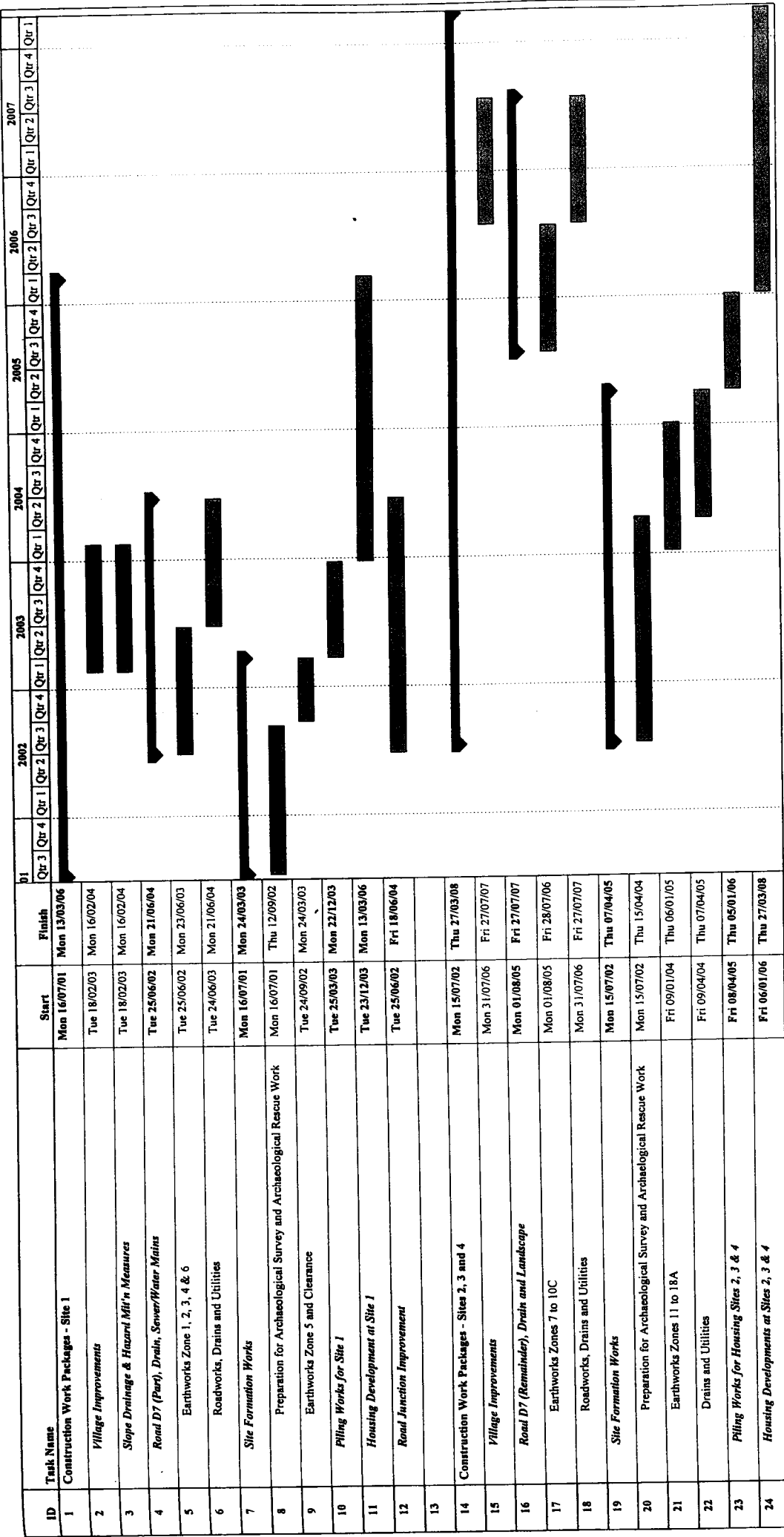


FIGURE 2.2b

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 2.2a Proposed Construction Programme for Tuen Mun Area 54

Legend

















- Study Area
- Site Reference Number
- Public Rental Estate
- HOS/PSPS/SCH
- Educational Use
- Commercial Centre/Bus Terminus
- Joint User G/C Development
- Government Farm-to be relocated
- New Life Farm-to be retained
- Distributor Road
- Access Points to Estate Roads
- Local Open Space
- Proposed KCR Station
- Village Land (including Village Environs)
- Conservation Area
- Green Belt



FIGURE 2.3a

OPTION 1 LAND USE FRAMEWORK

Legend

-  Study Area
-  Site Reference Number
-  Public Rental Estate
-  HOS/PSPS/SCH
-  Educational Use
-  Commercial Centre/Bus Terminus
-  Joint User G/C Development
-  Government Farm-to be relocated
-  New Life Farm-to be retained
-  Distributor Road
-  Access Points to Estate Roads
-  Local Open Space
-  Proposed KCRC Station
-  Village Land (Including Village Environs)
-  Conservation Area
-  Green Belt

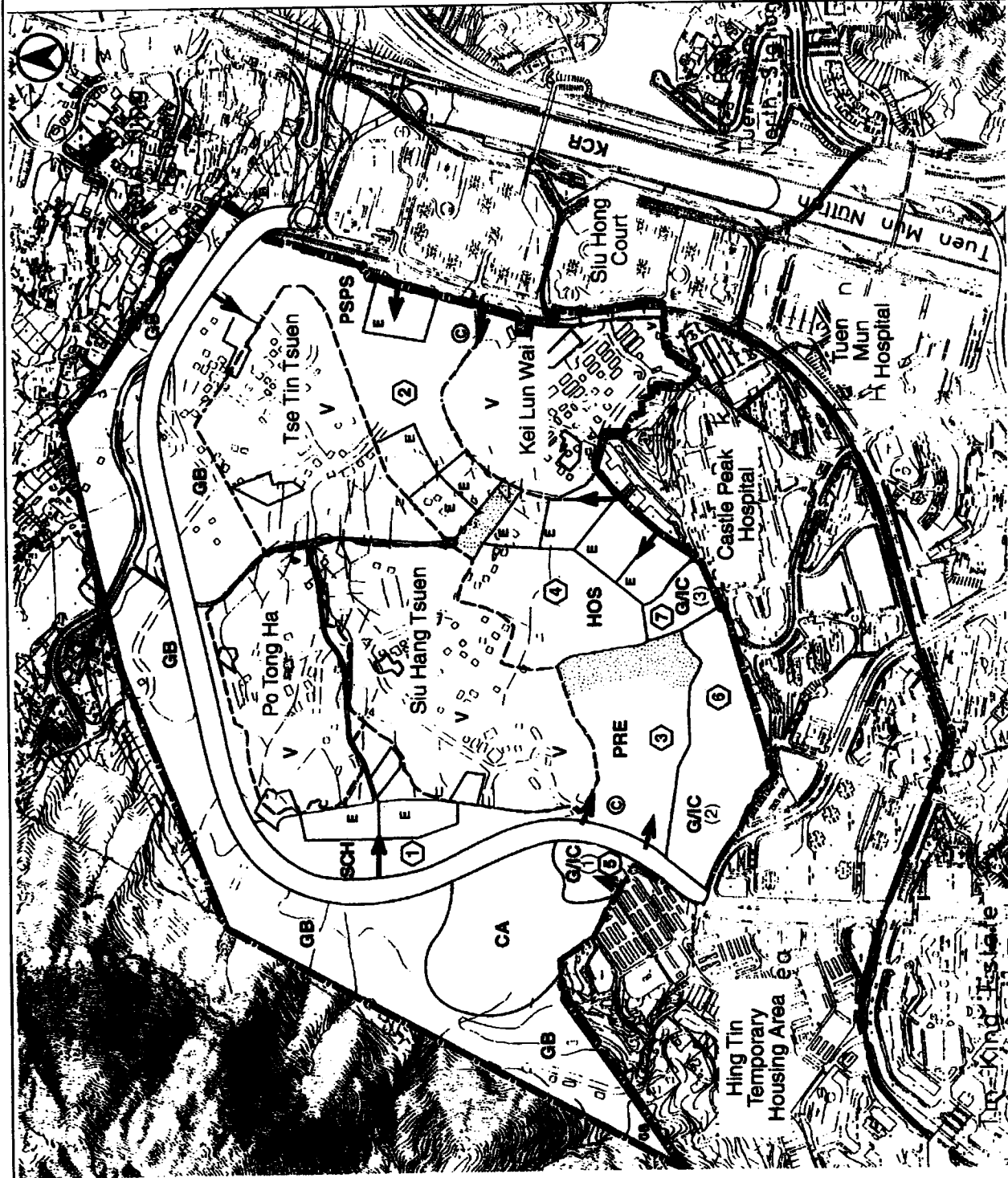


FIGURE 2.3b

OPTION 2 LAND USE FRAMEWORK



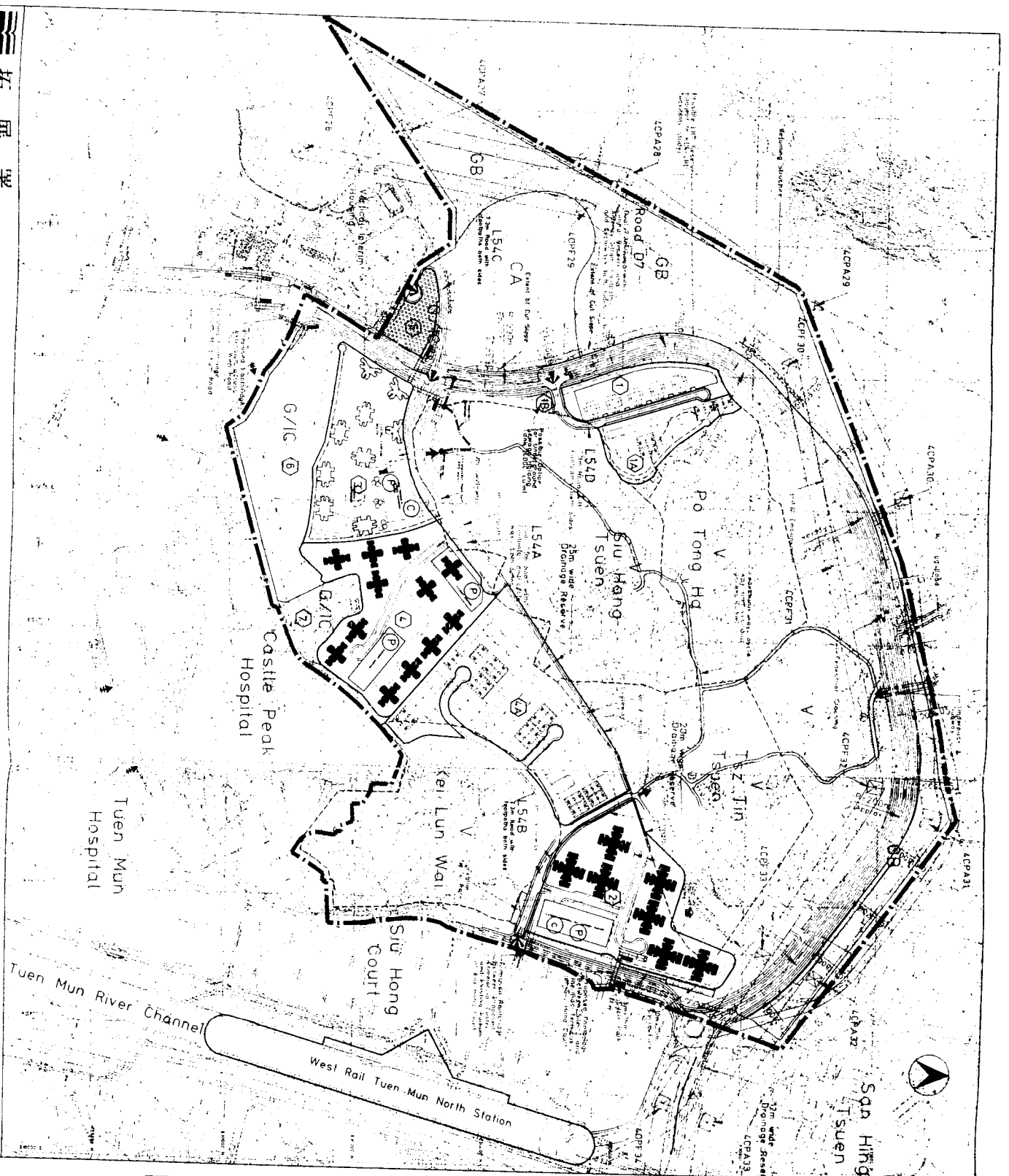
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- Study Area
- Site Reference Number
- Public Rental Estate
- HOS/PSPS/SCH
- Educational Use
- Commercial Centre/
Bus Terminus
- Joint User G/I/C
Development
- Government Farm-
to be relocated
- New Life Farm-
to be retained
- Distributor Road
- Access Points to
Estate Roads
- Local Open Space
- Proposed KCRC Station
- Village Land
(including Village Environs)
- Conservation Area
- Green Belt




FIGURE 2.3C

OPTION 3 LAND USE FRAMEWORK



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拓展署
 Territory Development Department, Hong Kong
 AGREEMENT NO. CE 21 97
 PLANNING AND DEVELOPMENT STUDY OF
 POTENTIAL HOUSING SITE IN AREA 54, TUEN MUN

PREFERRED DEVELOPMENT OPTION
 (WITHOUT NOISE BARRIER)

2.3 D

Scott Wilson (Hong Kong) Ltd
 Territory Development Department
 Planning and Development Study of
 Potential Housing Site in Area 54, Tuen Mun
 David C Lee, Surveyors

