Hong Kong Housing Authority

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Term Traffic and Environmental Consultancy Services 2002-2004

Housing Development at Choi Wan Road Site 1 Environmental Assessment Study

August 2005

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1. INTRODUCTION

Background to the Study

1.1 Hong Kong Housing Authority (HKHA) plans to develop a housing estate at Choi Wan Road Site 1 (hereinafter referred to as "Site 1"). ***Figure 1.1*** shows the location of Site.

1.2 In October 1998, the Civil Engineering Department (CED) (now known as the Civil Engineering and Development Department (CEDD)) conducted an environmental impact assessment study, namely "Planning and Engineering Feasibility Study for Development near Choi Wan Road and Jordan Valley – EIA Final Assessment Report" (hereinafter referred to as "the EIA"), to investigate the environmental feasibility of the development near Choi Wan Road and Jordan Valley. Covered in this EIA was the assessment of environmental issues including traffic related noise and air quality impacts associated with the proposed housing development at Site 1. The EIA was undertaken based on a feasibility study for Site 1 which would provide a total of 3520 flats. As reported in the EIA, the percentage of flats complying with the Hong Kong Planning Standards and Guidelines (HKPSG) was predicted to be 84%. The EIA report was approved under the Environmental Impact Assessment (EIA) Ordinance by EPD in April 1999.

1.3 Following the approval of the EIA, Site 1 was handed to HKHA for public housing design development. Due to the change in housing policy, the Home Ownership Scheme (HOS) blocks used in the approved EIA had to be changed to rental blocks which were different in scale, affecting the original disposition of blocks. A development scheme comprising six residential blocks providing 4860 flats was prepared, and the environmental acceptability of this scheme was studied in the "Housing Development at Choi Wan Road Site 1 – Environmental Assessment Study (Draft Final Report)" (hereinafter referred to as the "previous EAS") dated March 2002. The previous EAS covered assessment of road traffic and railway noise as well as air quality impacts. EPD raised no adverse comment on the assessment methodology and assumptions adopted.

1.4 In July 2003 HKHA developed a new layout using Twin & Single Block Option. A railway noise impact assessment (RNIA) report addressing the potential railway noise impact upon the proposed development was submitted to EPD for comment.

1.5 In March 2004 HKHA revised the domestic block type for Site 1 from the Twin & Single Blocks to Standard New Harmony Blocks. Six Harmony blocks were proposed providing a total of 4,800 public rental housing (PRH) units. Due to changes in development parameters such as the deletion of Public Transport Interchange and Community Hall, reduction in the number of car parking spaces, size of shops and welfare facilities etc., a podium was no longer required in Phase 1. The noise performance of this layout option was assessed based on domestic blocks sitting on grade in the draft Environmental Assessment Study dated March 2004.

1.6 In July 2004, HKHA further amended the layout to incorporate the following noise mitigation means: a) increased set back distance from Road A1 by slightly reducing the width of the view corridor; b) oriented the blocks in Phase 1 to improve noise compliance; c) deleted the block with the most severe noise problem; d) introduced a non-noise sensitive car park block as noise barrier; e) erected a 1.2m planter walls along sections of the site boundary as noise barrier (refer to Figure 2.1).

1.7 The current proposal is to develop the domestic blocks of Site 1 in two phases. Upon completion of the project in 2008, it will provide approximately 4,000 public rental housing (PRH) units. In this layout, the domestic block located closest to Kwun Tong Road in Phase 1 is deleted. In lieu, a 4-storey carpark/commercial block is proposed at the same location to shield traffic noise from Kwun Tong Road and railway noise. Moreover, the two remaining blocks in Phase 1 are turned 45° to reduce the angle of noise exposures. Furthermore, these two domestic blocks are repositioned to the middle of Phase 1 to achieve maximum set back from the surrounding Road A1. By doing so however, the width of the primary view corridor will have to be slightly reduced.

1.8 An Environmental Review on the proposed Realignment of Road G1 has been undertaken by CEDD and the assessment concluded that the noise impact upon Site 1 due to the proposed road realignment would be not worse than that before the realignment. The report of "Proposed Realignment of Road G1 in Development at Choi Wan Road and Jordan Valley" can be referred at ***Appendix 1.1***.

Objectives of this Study

1.9 Maunsell Consultants Asia Limited (MCAL) in association with Maunsell Environmental Management Consultants Limited (MEMCL) was commissioned by HKHA to carry out an Environmental Assessment Study (EAS) based on this latest layout for the proposed redevelopment. This EAS focuses on the evaluation of environmental impacts and proposes mitigation measures as necessary.

1.10 Having reviewed the environmental setting of Site 1, the following environmental aspects are of concern and require detailed assessment in order to confirm the acceptability of the proposed redevelopment:

- Road traffic noise;
- MTR rail noise; and
- Traffic emissions

1.11 This EAS focuses on the evaluation of environmental impacts in respects of noise and air quality associated with the above potential sources and proposes mitigation measures as necessary.

2. DESCRIPTION OF SITE AND OBJECTIVES OF THIS STUDY

Site Description

2.1 Site 1 is located in East Kowloon within Kwun Tong District. It is bounded by Choi Wan Road to the southeast, Kwun Tong Road to the northeast and Choi Ha Road to the south. The area to the south of the site is dominated by high-rise residential developments e.g. Tak Bo Garden, Amoy Gardens and Choi Ha Estate.

2.2 The site will be constructed on a +20mPD platform adjoining Choi Wan Road and Jordan Valley. It is divided by Road A1 and Choi Wan Road into two distinct portions, and will be developed in two respective phases of residential development (refer to Figure 1.1).

2.3 Covering an approximate area of 1.4 ha, Phase 1 of the proposed development comprises two 40-storey residential towers and 4-storeys carpark. Phase 2 covers an area of about 1.5 ha and encompasses three 40-storey residential blocks, an estate road, a kindergarten and a neighbourhood elderly center. The proposed site layout and diagrammatic section plans are shown in ***Figures 2.1*** and ***2.2*** respectively.

3. ROAD TRAFFIC NOISE

Assessment Criteria

3.1 As stipulated in the Hong Kong Planning Standards and Guidelines (HKPSG), road traffic noise is assessed against the noise limit of 70dB(A) for residential dwellings and 65dB(A) for educational institutions including kindergartens. In order to facilitate project planning, EPD has issued a Practice Note for Professional Persons ProPECC PN 1/97 titled "*Streamlined Approach of the Planning of Residential Developments Against Road Traffic Noise*", which promulgates a set of streamlined self-assessment procedures. These procedures specify acceptable levels of compliance with the noise criteria for sites of different areas. These documents are used to determine the acceptability of the planned redevelopment and the necessary mitigation measures to be provided.

3.2 Given that the two phases are completely separated by a public road, the area for each phase of the proposed development site is smaller than 2 hectares, there is no requirement to design the development to fall within Zone I (i.e. Acceptable Performance) according to ProPECC PN1/97.

Assessment Methodology

3.3 Traffic noise impacts were predicted using the UK Department of Transport *"Calculation of Road Traffic Noise"* 1988 (CRTN), which is the method accepted by Environmental Protection Department for use in Hong Kong. Noise levels were predicted at 1m from the external facades of representative noise sensitive receivers (NSRs), and the assessment results are given in terms of L_{10} (1-hr) dB(A) noise levels. The assessment was based on the projected traffic flows of Year 2023, which is the design year considered to be the maximum traffic forecast within 15 years upon the occupation of the proposed redevelopment, as provided by Maunsell Consultants Asia Limited (MCAL). The traffic data, depicted in ***Figure 3.1***, has been prepared based on the revised number of flats produced by this latest layout scheme. Transport Department had no comments on the traffic forecast data adopted in this assessment.

3.4 For the present assessment, low noise road surfacing was modelled for Kwun Tong Road. For the remaining road sections including Road A1 and Choi Wan Road incorporated in the noise prediction model, impervious road surfacing was assumed.

3.5 Buildings or any structures within 300m of the Study area which offer noise screening effect to the proposed development were also included in the prediction model.

Noise Sensitive Receivers

3.6 Representative sensitive receivers of the proposed residential towers were identified for road traffic noise impact assessment, and are depicted in ***Figure 3.2***.

Impact Assessment

3.7 Unmitigated traffic noise levels at the representative NSRs for Phases 1 and 2 of the proposed development were predicted, and the assessment results are presented in ***Appendix 3.1***.

3.8 The modeling results showed that the unmitigated cumulative road traffic noise levels at representative NSRs of Phases 1 and 2 were predicted to range from 64 to 76 dB(A) and 35 to 76 dB(A) respectively. Maximum road traffic noise levels of 76 dB(A) was predicted at NSR 2E at 1/F in Phase 1 and NSR 3D at 1/F in Phase 2, which are located in close proximity to Road A1.

3.9 The predicted noise levels at the representative facades of the proposed kindergarten (K1-K3) would be 58-64 dB(A), complying with the HKPSG noise criteria of 65 dB(A).

3.10 A summary of the compliance rates for each phase of the proposed development is provided in ***Table 3.1***.

Table 3.1 Summary of Compliance Rates of HKPSG Road Traffic Limit

Residential Development		Total Number of Flats	Number of Flats Exposed to Traffic Noise Levels >70 dB(A)	Compliance Rate
Phase 1	Tower 1	800	285	64
	Tower 2	800	194	76
			Overall Compliance Rate for Phase 1	70
Phase 2	Tower 3	800	170	79
	Tower 4	800	227	72
	Tower 5	800	78	90
			Overall Compliance Rate for Phase 2	80

3.11 As shown in Table 3.1, the overall compliance rate predicted for Phase 1 of the proposed development would be lower than that for Phase 2 given the former is located closer to major traffic noise sources e.g. Kwun Tong Road and Road A1. The percentages of residential dwellings complying with the HKPSG road traffic noise limit of 70dB(A) for Phases 1 and 2 would be about 70 % and 80% respectively. The combined compliance rate for Phases 1 and 2 would be about 76%.

Noise Mitigation Measures and Residual Impact

3.12 As presented in ***Section 1.6***, features to reduce traffic noise exposure of NSRs have already been incorporated in the present layout design. A 4-storey carpark placed in between the major traffic noise source Kwun Tong Road and domestic blocks in Phase 1 has been proposed to serve effectively as a noise barrier. Furthermore, only two tower blocks are proposed in Phase 1, and this would allow more space for the tower blocks to setback from major traffic noise sources including Road A1 and Kwun Tong Road. Apart from the use of noise tolerant carpark and increase of setback, the tower blocks are oriented such that the angle of noise exposures of NSRs would be reduced as far as practicable. With all these features in place, the overall compliance rate for Phase 1 and 2 would be about 70% and 80% respectively.

3.13 Having noted that the dominant noise source to the NSRs would be Road A1, the feasibility of changing the alignment of Road A1 to reduce noise impact on the proposed development has been explored. However, since Road A1 is located outside the boundary of the Site 1, HKHA has no mean to influence the public road alignment. Besides, Road A1 has been gazetted and is now substantially complete, realignment of Road A1 would therefore be considered not practical.

3.14 To alleviate the traffic noise impact envisaged during the occupation of the study site, further mitigation measures would be considered necessary. The HKPSG recommends guidelines to reduce noise exposure of receivers. These include:

a) Setback of buildings;
b) Purpose-built noise barriers;
c) Self-protecting building design and arrangement; and
d) Acoustic insulation of buildings.

3.15 On the basis of the above guidelines, the feasibility of various measures to ameliorate traffic noise impact on each phase of the proposed development have been evaluated, and are discussed below.

Setback of Buildings

3.16 As shown in the site layout plan, the separation between the Phase 1 building blocks and the heavily trafficked Kung Tong Road has been maximized as far as practicable. However, given the small size of this phase of development and the need to maintain a view corridor (refer to Figure 2.1), maximum setback has already been achieved.

3.17 The site for the proposed Phase 2 development would need to accommodate three high-rise tower blocks, an estate road as well as two multi-purpose ballcourts. For this phase of development, the space available for further setback from dominant noise sources Road A1 and Choi Ha Road would be limited owing to the small size and irregular shape of the site. Additionally, the residential blocks in Phase 2 would be required to setback approximately 6m from the slope in order to comply with the prescribed window requirements under Building Regulations and to avoid the drainage reserve. Further setback is considered not feasible.

Purpose-built Barriers

3.18 For the Phase 1 development, purpose-built noise barriers may be effective if they are to be erected along the site boundary. Similarly, noise impact on Phase 2 development could be ameliorated if barriers are constructed along the site boundary abutting Road A1 and Choi Ha Road. It should be noted that because of the high rise building structure, low barriers would be considered ineffective to abate the noise impact predicted at mid to high floors. High barriers would thus be required but they would affect the aesthetic perception of residents, creating unwanted shadows, blocking panoramic view, reducing the visual quality of the area and restricting air movement resulting in poor ventilation at ground level. Furthermore, given there are NSRs on the opposite side of the road, the adoption of reflective barriers with transparent panels would cause reflection of noise to these receivers. To avert this problem, opaque absorptive barriers would likely be required and would no doubt affect the visual quality of the site. For these reasons, the road-side barrier option is not considered further. Nonetheless, a non-noise sensitive car park block is proposed as a large-scale and effective barrier. Planter walls of 1.2m height are also proposed along sections of the site boundary (**Figure 2.1** refers) as noise barriers to reduce the noise exposure of NSRs at low levels (i.e. 1/F to 5/F). The noise screening effect of the car park block and planter walls provided to the NSRs have already been considered in the noise prediction model for the recommended scenario.

Self-protecting Building Design and Arrangement

3.19 According to the HKPSG, internal building layout can also be effective in reducing noise exposure. Non-sensitive areas such as corridors, bathrooms, lifts and the like can be used to shield sensitive areas. The use of blank facades can also help to reduce the number of impacted sensitive facades. Nonetheless, such arrangement would have an effect of reducing the number of flats produced. To achieve the targeted flat production and to accommodate the necessary ancillary facilities, this arrangement would therefore be considered not practical.

Acoustic Insulation of Buildings

3.20 The traffic noise impact on the proposed residential development would be abated by acoustic insulation as a last resort. According to HKPSG, all the residential flats exposed to residual traffic noise impact exceeding 70dB(A) should be provided with acoustic insulation in form of 6 mm thick upgraded windows with air conditioning. Upgraded windows will be provided to the affected flats within the site to mitigate the traffic noise impacts. However, provision of air conditioning would be subject to the Housing Department's prevailing policy.

Conclusions

3.21 The impact of road traffic noise on the proposed residential development at Choi Wan Road Site 1 has been assessed against the HKPSG noise criteria. The modeling results indicated that the traffic noise levels predicted at representative NSRs would range from 35 to 76 dB(A) by year 2023, exceeding the HKPSG noise limit by 1-6dB(A). The percentage of dwellings meeting the HKPSG noise limit of 70 dB(A) would be about 70% and 80% for Phases 1 and 2 respectively.

3.22 The size of the Site is small and the space available for further setback from the road traffic noise sources nearby would be limited. It is concluded that the setback has already been maximized. As a last resort, it is recommended that acoustic insulation, in terms of thicker glazed, well-gasketted windows and air conditioning, should be provided for the affected residential units. According to HKPSG, openable well-gasketted window with 6mm pane should be provided for the affected units exceeding the noise standard less than 10dB(A). Hence, 6mm glazing is recommended for the 1004 nos. impacted residential units. However, provision of air conditioning would be subject to the Housing Department's prevailing policy.

4. RAIL NOISE

Assessment Criteria

4.1 The HKPSG documents criteria for assessing rail noise. It recommends that the acceptable rail noise level is Leq(24 hr) 65dB(A) and Lmax (2300-0700 hours) 85dB(A).

4.2 Rail noise is also controlled under the *Noise Control Ordinance* (NCO) and the associated *Technical Memorandum on Noise from Places other than Domestic Premises, Construction Sites and Public Place* (IND-TM). According to the IND-TM, the acceptable noise levels (ANL) for different Area Sensitivity Ratings are given below:

Table 4.1 Acceptable Noise Levels (ANLs) defined under IND-TM

Time Period	Area Sensitivity Ratings		
	A	B	C
Day & Evening (0700 -2300 hours)	60	65	70
Night (2300 – 0700 hours)	50	55	60

4.3 The proposed development is located in an urban area and is subject to traffic noise impact from Kwun Tong Road, which has an average traffic flow in excess of 30,000 and low traffic flow rate that would be more than 300 vehicles per hour. According to the criteria set out in the IND-TM, Area Sensitivity Rating of "C" applies to the study site. The Acceptable Noise Levels (ANLs) of Leq (30min) are 70 dB(A) and 60 dB(A) for 0700-2300 hours and 2300-0700 hours respectively.

4.4 The railway noise impact has been assessed against the more stringent noise limits as stipulated in the IND-TM.

Assessment Methodology

4.5 A computerized train noise model (known hereinafter as "CRNM95") based on the measured SELs and propagation corrections given in the UK Department of Transport *Calculation of Railway Noise 1995* (CRN, 1995) has been used to calculate train noise in this Study. In the UK these procedures are used extensively for the assessment of noise impact of railways, the design and location of new tracks, land use planning in the vicinity of existing and planned railways and the determination of entitlement under the Noise Insulation (Railways and Other Guided Transport Systems) Regulation 1995.

4.6 The SELs of the southbound and northbound trains at a speed of 80kph and at a distance of 25m have been respectively taken as 86.0dB(A) and 86.9dB(A)[1].

4.7 According to the previous EAS for the proposed development at the site[1] submitted to EPD, the railway noise assessment was based on the actual train frequency provided by MTRC. While new development layout have been developed by HKHA subsequent to previous EAS submission, MTRC was approached in June 2003 to confirm the validity of the train frequency with a view to updating the input parameters and the assessment as necessary. MTRC confirmed that the peak train service schedule would still be valid. Contrary to the information provided in the past, MTRC added that train operations may change in the future. However, MTRC did not mention that there is any solid plan for changing the existing train schedule.

[1] The SEL data are based on those reported in "Housing Development at Choi Wan Road Site 1 Environmental Assessment Study Draft Final Report" dated March 2002 by Scott Wilson (HK) Ltd.

4.8 The design capacity of the existing MTRC system would be 17 trains/30minutes/direction. However, for residential development planning purpose and for the evaluation of potential railway noise impact, the actual train running frequency has been used in our calculation, rather than the design capacity. The actual frequencies of trains (running at peak hour during daytime and nighttime) were provided by MTRC. Use of the actual running frequency is justified for the following reasons:

- There is no specific guideline documented for the assessment of railway noise impact. The commonly accepted method in Hong Kong for the assessment of railway noise is based on the actual train frequency.

- This is the generally accepted approach. Previous similar environmental studies undertaken for various housing development projects including the previous EAS, and "Environmental Assessment Study for Redevelopment of Upper Ngau Tau Kok Estate Phases 2 and 3 – Final (Issue 2)" dated October 2002 adopted the actual peak hour train frequency. The use of actual train frequency as the basis of the assessment is deemed to be a reasonable and equitable approach.

- Actual frequencies are the peak hour (maximum) figures as recorded by the railway operator, MTRC, based on actual conditions and level of service provision. Based on the train service timetable as provided by the MTRC in August 2002, the train frequency running at peak hour during daytime and nighttime is 17 and 8 trains/30 minutes/direction respectively. MTRC confirmed in June, 2003 that the timetable is still valid. Our recent site survey conducted during 06:30-10:00 on July 16, 2003, which is a normal working day, confirmed the train service timetable during peak hours provided by MTRC would be on a conservative side from the noise perspective. According to our site observation, the actual peak hour train frequency during daytime and nighttime was 15 trains/30 minutes/direction and 8 trains/30mintures/direction respectively.

- Peak train movements merely take place for one or two hours a day. Our assessment is based on the worst case scenario which adopts the highest train frequency encountered during the day (i.e. the highest actual train frequency within 30-minute period on a normal weekday). Therefore, the railway noise impact on the proposed development has been conservatively assessed.

- The validity of the actual train frequency adopted in the present assessment has been confirmed by MTRC. In the absence of any planning or forecast data provided by MTRC supporting that there will be an escalating passenger demands and thereby train frequency, the actual running frequency is considered as the best available data at the time for the purpose of the present assessment.

4.9 By contrast, adopting the design capacity would not be a reasonable and balanced approach owing to the following reasons:

- The adoption of design capacity is not specifically required by any guidelines/provisions for railway noise impact assessment.

- Future increase in train frequency would impinge more on existing residential receivers which are closer to the rail alignment than the Choi Wan Road site. This would need to be considered by MTRC when planning any increase in train frequency during night time hours (notwithstanding their exemption under Section 37 of the NCO). For instance, the use of quieter EMUs, construction of noise barriers or any other mitigation measures developed as a result of the future advancement of technology can be considered to reduce the noise level.

- The planning of the MTRC service timetable is based on passenger demand taking into account the morning and evening peaks on normal working days. Whilst the possibility of increasing train frequency cannot be ruled out, MTRC at present has no definitive plan for increasing the train service.

- The adoption of unreasonably conservative assumptions that entail conditions that may never occur would not be a reasonable approach and would effectively sterilize developable land.

4.10 Having regard to the above, the use of actual train running frequency is well justified. It is not a reasonable and balanced approach to effectively sterilize developable land by adopting unreasonably conservative assumptions that entail conditions that may never occur. The use of actual frequency is considered to be more realistic, and the assumptions are still conservative.

4.11 The assessment has been based on the worst case scenario that noise from rail traffic is the highest within any particular 30-minute period on a weekday. Two cases were selected for scenario analysis: one during daytime/evening, and one at night. Numbers of trains passing by Kowloon Bay Station during weekday, as determined from the MTRC train schedule, are shown in ***Table 4.2.***

Table 4.2 Train Service Frequency

Period	Number of Trains		
	Northbound	**Southbound**	**Total**
Daytime/Evening (in 30-minute)	17	17	34
Night-Time (in 30-minute)	8	8	16

4.12 Four potentially worst affected noise sensitive receivers (NSRs) located closest to the MTRC railway tracks have been identified for the present assessment. Locations of representative sensitive receivers of the proposed residential towers are shown in ***Figure 4.1***.

Impact Assessment

4.13 Unmitigated railway noise levels at the 2 representative NSRs have been predicted, and the assessment results are given in ***Table 4.3***. The modeling results show that daytime and nighttime railway noise levels predicted at NSRs N1-N2 would range from 45-57dB(A) and 42-53dB(A) respectively, meeting the daytime and nighttime railway noise criteria as set out in the IND-TM. No mitigation measure would be required. A sample railway noise calculation is provided in Appendix 4.1.

Table 4.3 Predicted Railway Noise Levels

NSR	Floor	Predicted Railway Noise Level, Leq(30min)	
		Daytime	Nighttime
N1	1	45	42
	5	53	50
	10	54	51
	15	56	52
	20	56	53
	25	57	53
	30	57	53
	35	57	53
	40	57	53
N2	1	47	44
	5	54	51
	10	55	52
	15	55	52
	20	56	52
	25	56	53
	30	56	53
	35	56	53
	40	56	53

Conclusions

4.14 The MTR railway noise impact on the proposed development has been assessed. The modeling results indicated that railway noise predicted at all noise sensitive facades within the site would comply with both the daytime and nighttime rail noise criteria as stipulated in the IND-TM. No adverse railway noise impact is expected.

5. AIR QUALITY

5.1 In order to protect future users at the study site against excessive traffic fumes, a suitable size of buffer zone should be provided to separate the roads from the sensitive uses at the development site.

5.2 In accordance with Table 3.1 as stipulated in the HKPSG, the minimum buffer distance required for separation from Truck Roads/Primary Distributors, District Distributors and Local Distributors are 20 m, 10 m and 5 m respectively. The proposed layout would be checked against the requirement regarding the minimum buffer distance between roads and sensitive use is carried out. The separation distances between the sensitive uses in the study site and other major road networks are summarized in ***Table 5.1***.

Table 5.1 Separation Distances between Sensitive Uses and the Nearby Major Roads

Name of Road	Type of Road	HKPSG Recommended Buffer Distance	Horizontal Distance to the Air Sensitive Area in the Study Site
Phase 1			
Road A1	Local Distributor	>5m	8 m
Choi Wan Road	Local Distributor	>5m	7 m
Phase 2			
Road A1	Local Distributor	>5m	6 m
Choi Ha Road	Local Distributor	>5m	6 m

5.3 Comparing the HKPSG recommended buffer distances for various road types, it is noted that the current layout design has provided adequate separations between the surrounding road networks and the sensitive uses in the study site. Insurmountable air quality impact arising from road traffic emissions is thus not anticipated.

Conclusions

5.4 Considering that adequate buffer distances have been provided between the sensitive uses in the study site and the nearby road networks, adverse impact arising from road traffic emissions is not anticipated.

6. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

6.1 The EIA approved in 1999 also included an appraisal of the landscape and visual impact of CEDD's original feasibility study. As the EIA has been deposited in the EIAO Register, the following section on landscape and visual impact assessment has been provided in this EAS to highlight proposed variations, if any, from the original EIA. The findings of the EIA, therefore, form the basis for comparison in this assessment.

Landscape

6.2 Mitigation measures have been proposed in the approved EIA report. The majority of these measures such as use of 60% of native species, reprovisioning of a morning walking trail, tree planting along footpaths and greening of slopes focus on areas outside the boundary of Site 1 and are expected to be undertaken by other departments.

6.3 The EIA does not specify any detailed landscaping requirements for the housing project in Site 1. Measures that may be applicable to this housing project include use of native species where feasible and formulation of a comprehensive system of open space. Open recreation and landscaped areas will be provided within the site (**Appendix 6.1**) and meet HKPSG requirements. Trees will be planted in various parts of the site to add visual interest and to provide a pleasant and green transition between domestic blocks, nearby open space and major roads around the site (**Appendix 6.2**). Use of native species would be adopted as far as possible when preparing the planting design in the implementation stage.

Visual Consideration

6.4 In the approved EIA, residents of existing housing developments around the site such as Tak Bo Garden, Choi Ha Estate, Amoy Garden, Kai Yip Estate and Telford Gardens as well as users of Jordan Valley Morning Walking Trail, Jordan Valley Leisure Pool and Kowloon Bay Recreation Ground were regarded as visually sensitive receivers (VSRs) to future high-rise residential blocks. It is anticipated that the impact of the current scheme will be broadly similar to CEDD's original assessment since residents of blocks with windows facing Site 1 will be able to see the high-rise man-made developments on Site in future.

6.5 According to CEDD's 1998 Feasibility Study, view corridors were adopted to preserve views to and from the highest point of the ridge at 188mPD. Low-rise developments were recommended within the view corridors.

6.6 No view corridor width was specified in the EIA. Although a description of a 60m wide primary view corridor was written into CEDD's Final Report, this did not tally with CEDD's layout plan which only achieved approximately 48m (by measurement – see **Appendix 6.3**).

6.7 Since the approval of the EIA in 1999, the cessation in the sale of HOS flats announced by SHPL in November 2002 ended the construction of HOS blocks which CEDD's original visual assessment was based on. As the footprint of rental blocks is larger than that of HOS blocks, the visual impact of Site 1 development would slightly vary from the findings of the original assessment.

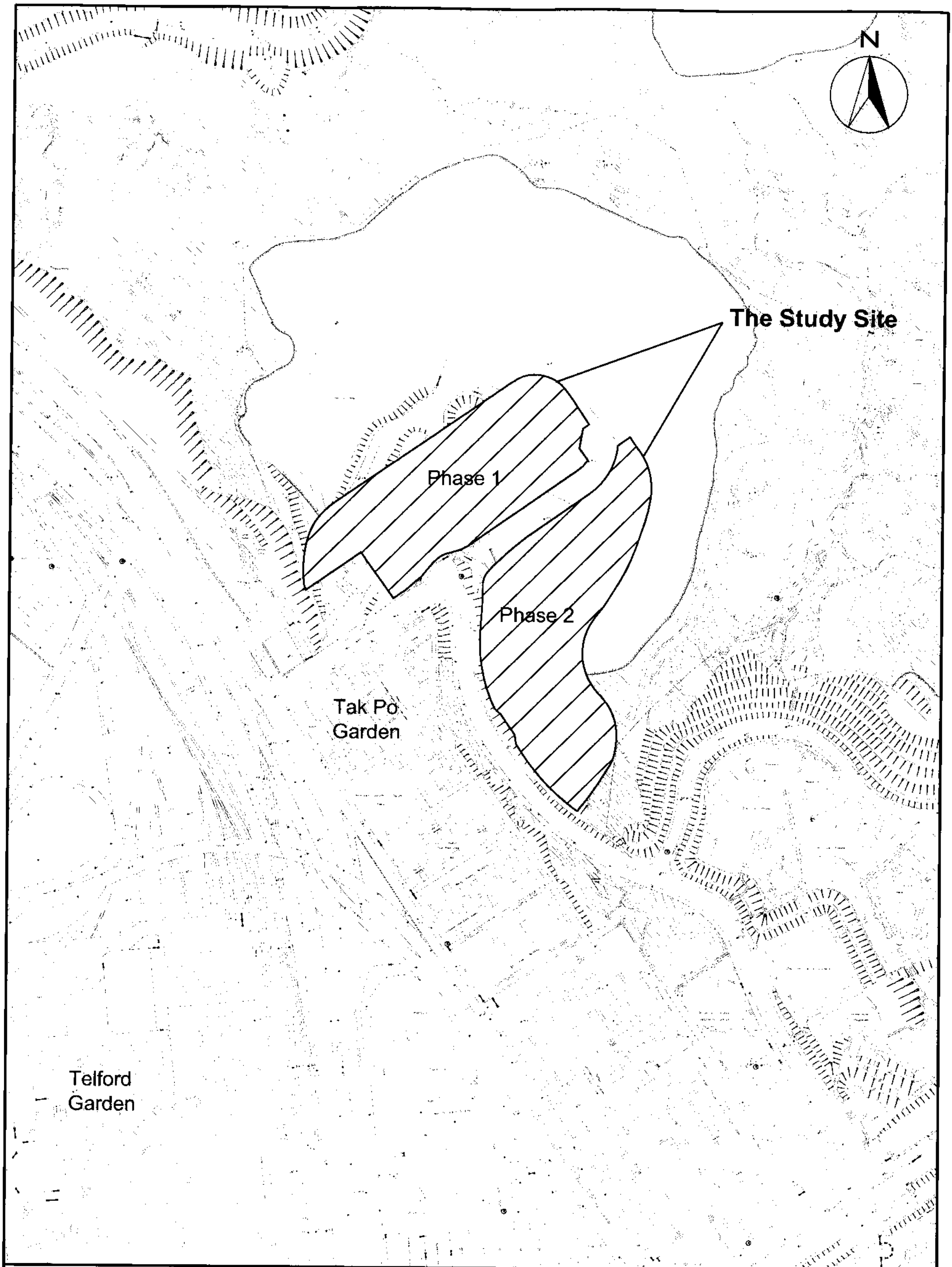
6.8 Upon examining the primary view corridor mentioned in the EIA, HKHA was unable to identify any meaningful vantage points west of Choi Wan Road. The land was basically used for flyovers, railway yards and windowless industrial/commercial buildings. The view corridor also seemed to have few beneficiaries on the eastern side, as the view from the highest point of the ridge at 188 mPD down towards Kowloon Bay was blocked by dense vegetation.

6.9 On the other hand, the secondary view corridor north of Site 1 running through Kowloon Bay Recreation Area (KBRA) appeared to be more significant than the primary view corridor. KBRA was also identified as a key viewpoint in the original EIA. By shifting the domestic blocks towards the center of Phase 1 in the current scheme, it was possible to increase the width of the secondary view corridor (**Appendix 6.4**). The effect of the current scheme is illustrated in **Appendices 6.5 and 6.6**. Its visual impact is not considered to be significantly better, or worse, than CEDD's original scheme and is therefore considered acceptable. In preparing Appendix 1.5, the photomontage showing the building height of the scheme proposed in the original EIA was rectified for comparison purpose by adding the blocks proposed by CEDD in Area 3B to their photomontage.

Conclusion

6.10 HKHA's approach is to strike a balance between the two conflicting environmental issues – noise and visual impact. By opting to slightly reduce the width of the primary view corridor, it is hoped to improve the more significant secondary view corridor and, at the same time, increase the setback of the domestic blocks in Site 1 Phase 1 from the dominant noise source, Road A1. The resultant scheme for Site 1 is therefore considered visually acceptable from the environmental point of view.

Figures



MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	HOUSING DEVELOPMENT AT CHOI WAN SITE 1 – ENVIRONMENTAL ASSESSMENT STUDY SITE LOCATION PLAN	SCALE	A4 1:4000	DATE	APR 2005
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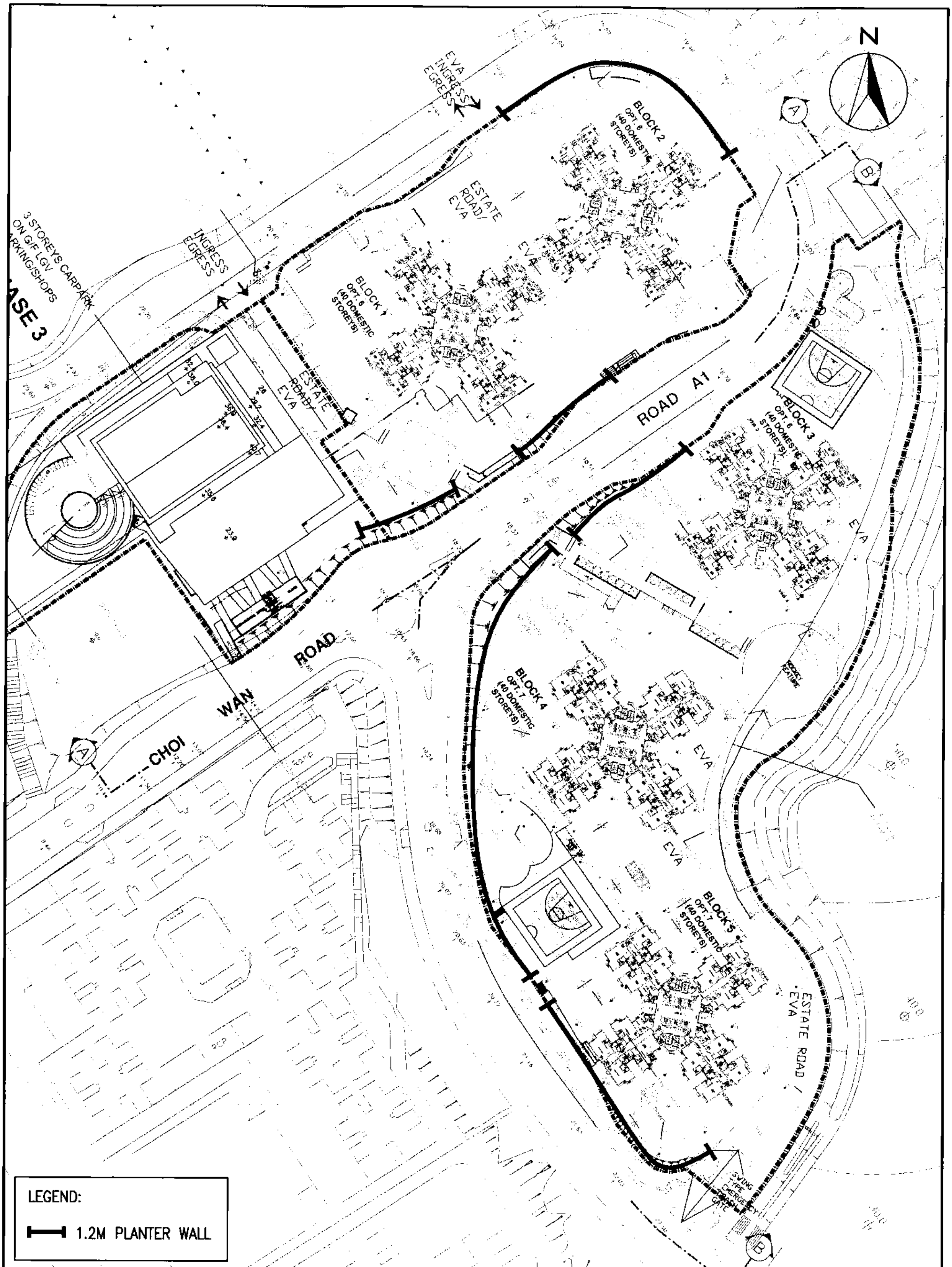

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HOUSING DEVELOPMENT AT CHOI WAN SITE 1 – ENVIRONMENTAL ASSESSMENT STUDY

SITE LAYOUT PLAN

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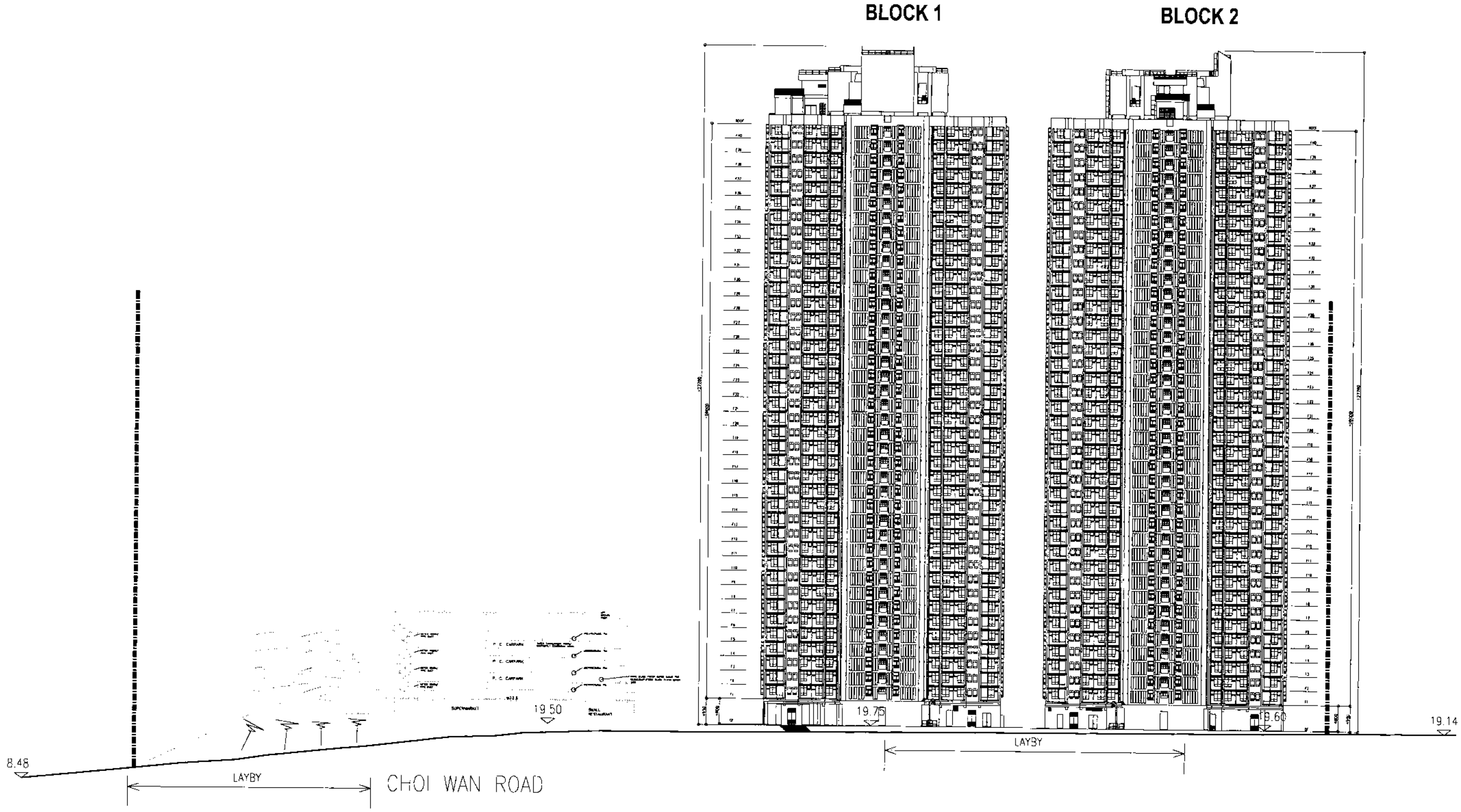

ELEVATION A

MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	HOUSING DEVELOPMENT AT CHOI WAN ROAD SITE 1 – ENVIRONMENTAL ASSESSMENT STUDY DIAGRAMMATIC SECTION PLANS (SHEET 1 OF 3)	SCALE	N.T.S.	DATE	APR 2005	
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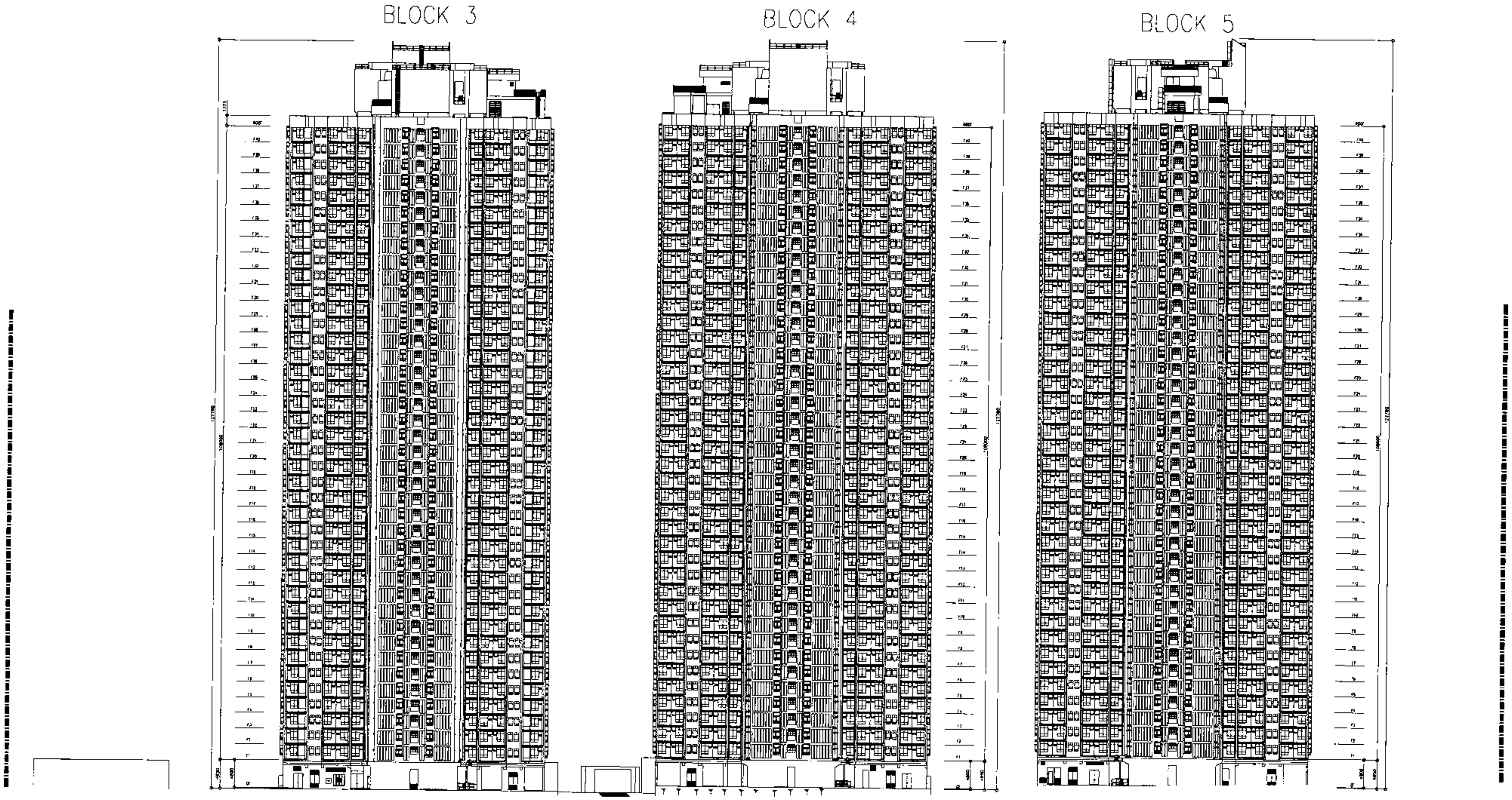

ELEVATION B

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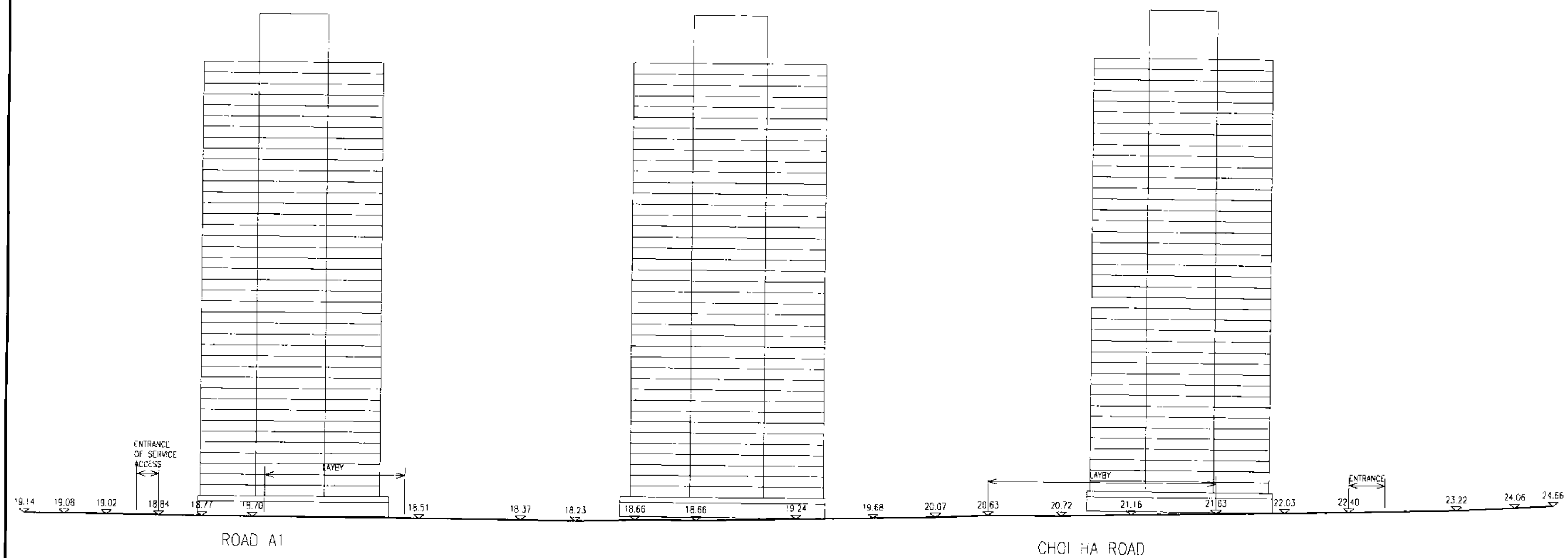

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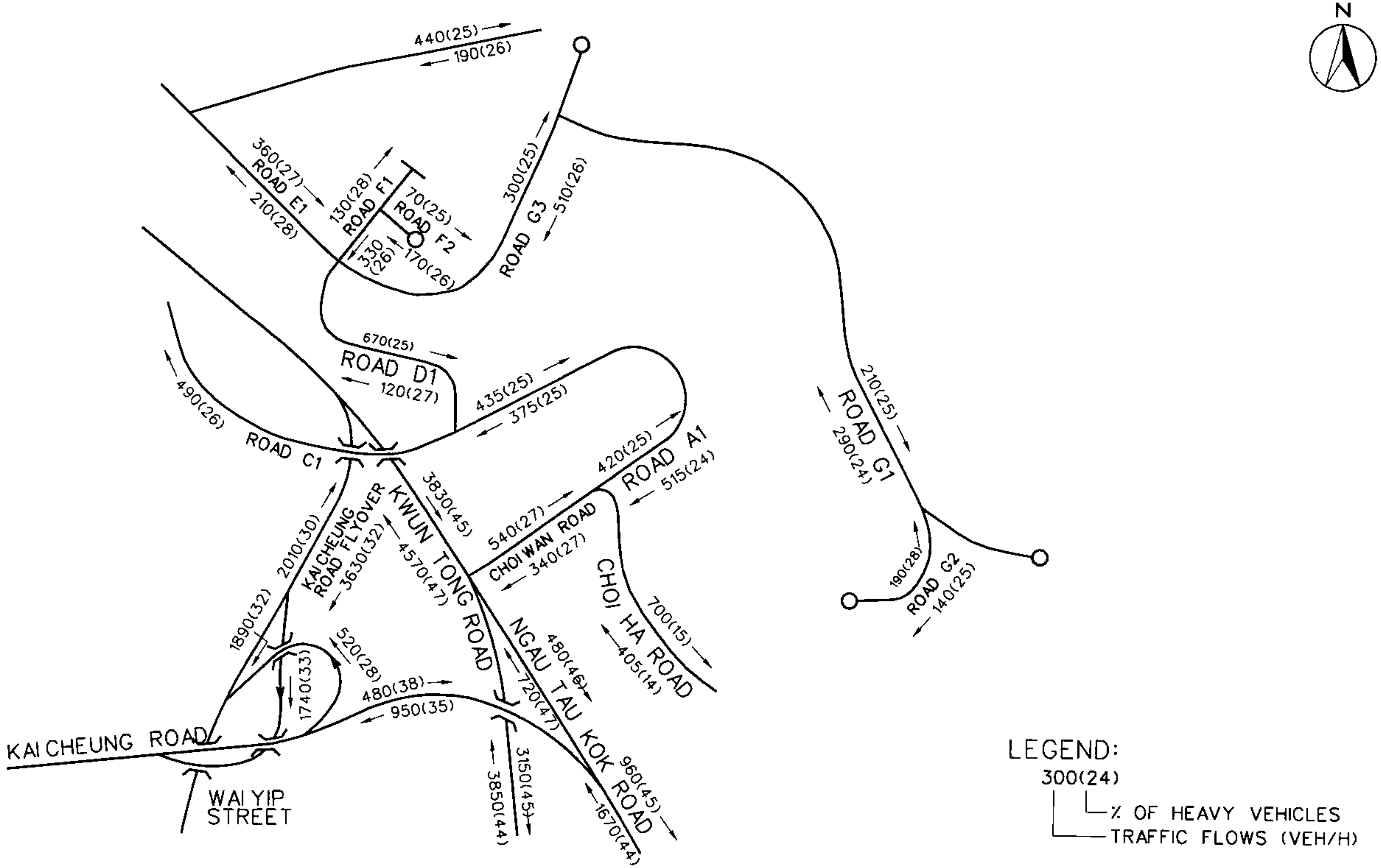

MAUNSELL

HOUSING DEVELOPMENT AT CHOI WAN ROAD SITE 1 -
ENVIRONMENTAL ASSESSMENT STUDY

PROJECTED A.M. PEAK TRAFFIC FLOW FOR YEAR 2023

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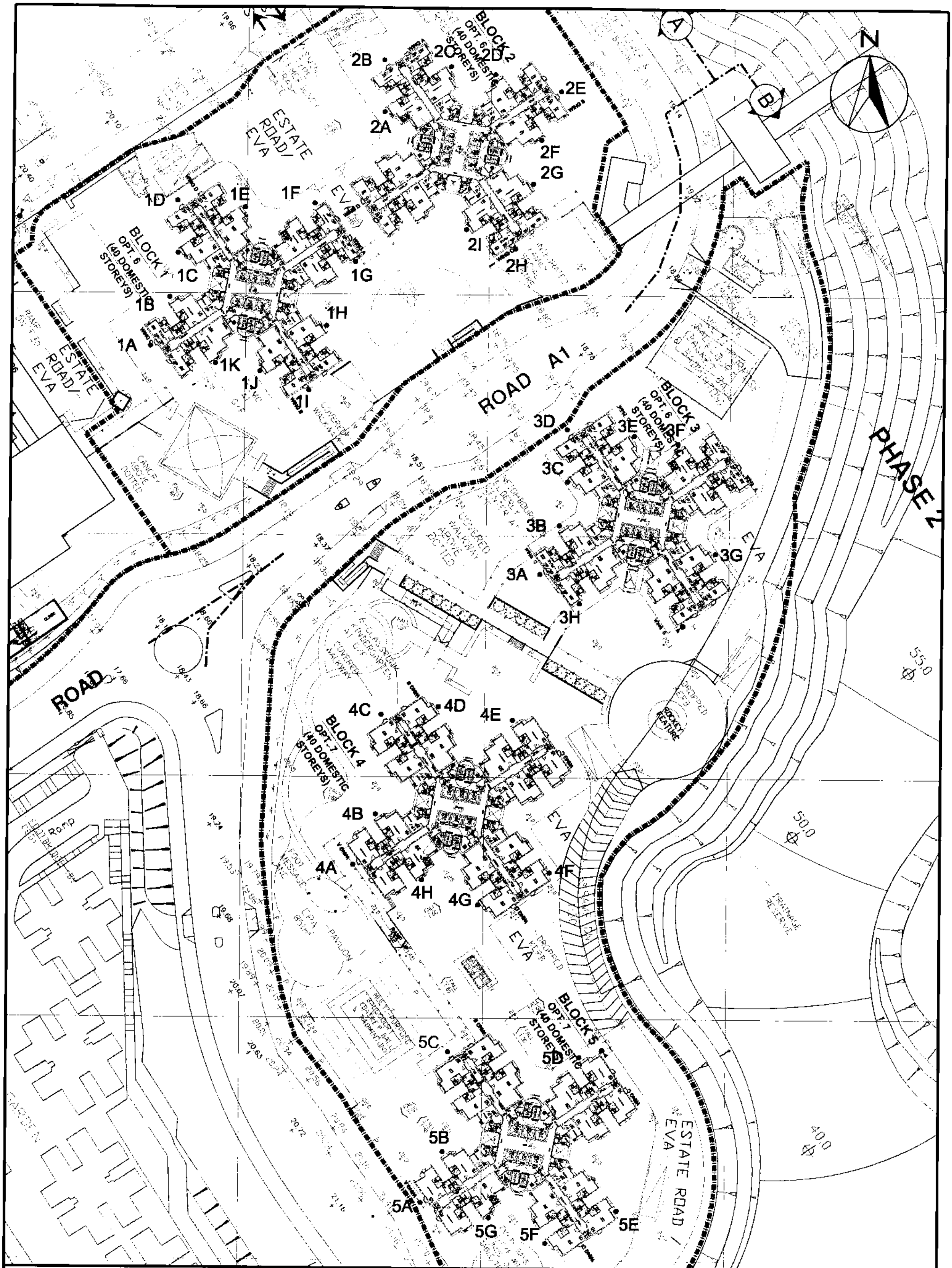

MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	HOUSING DEVELOPMENT AT CHOI WAN SITE 1 – ENVIRONMENTAL ASSESSMENT STUDY LOCATIONS OF REPRESENTATIVE NOISE ASSESSMENT POINTS (SHEET 1 OF 2)	SCALE	A4 1:1000	DATE	APR 2005	
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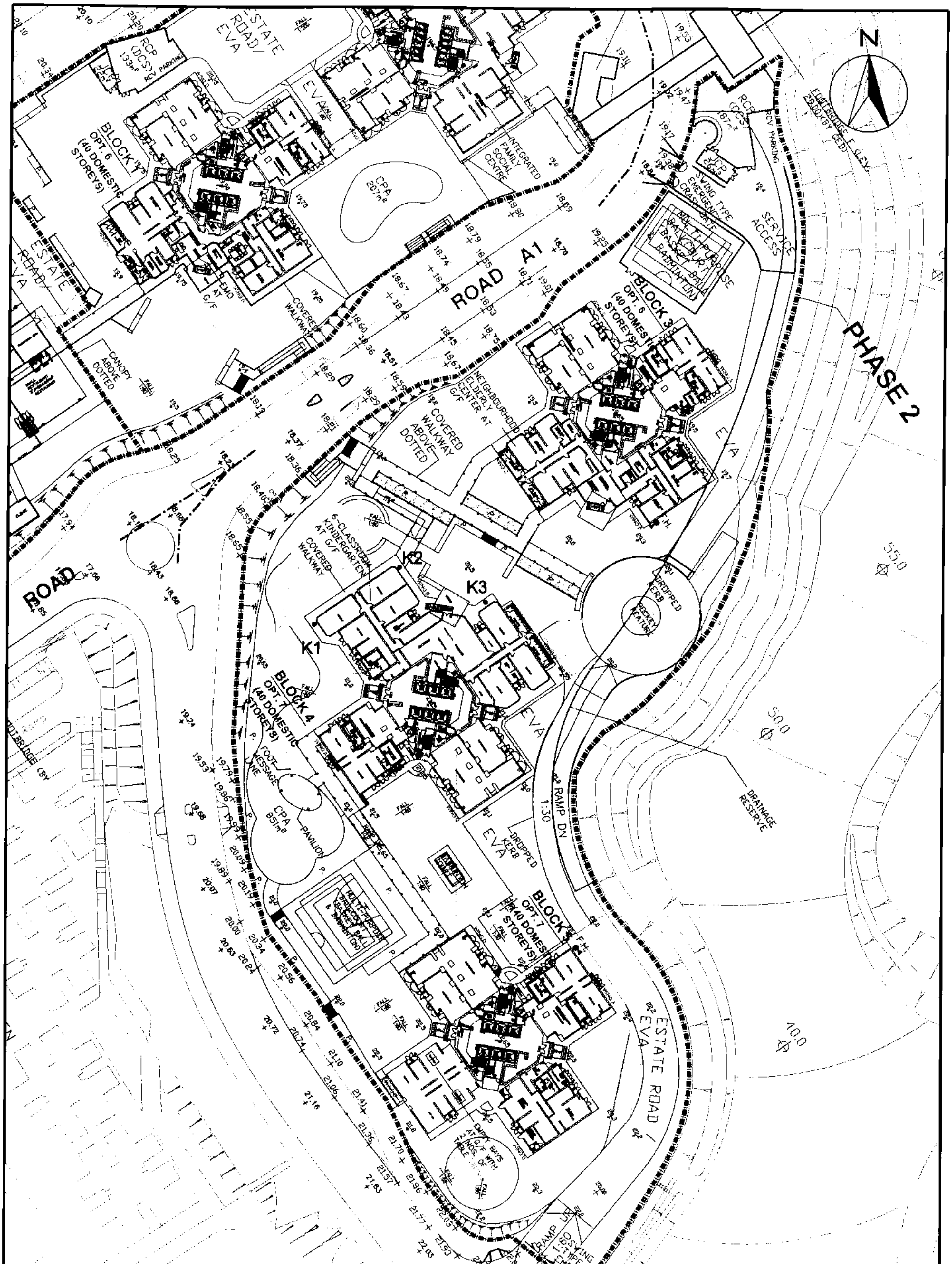

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Maunsell Environmental Management Consultants Ltd	LOCATIONS OF REPRESENTATIVE NOISE ASSESSMENT POINTS (SHEET 2 OF 2)	JOB No.	A02602(030)	DRAWING No. 3.2	REV –

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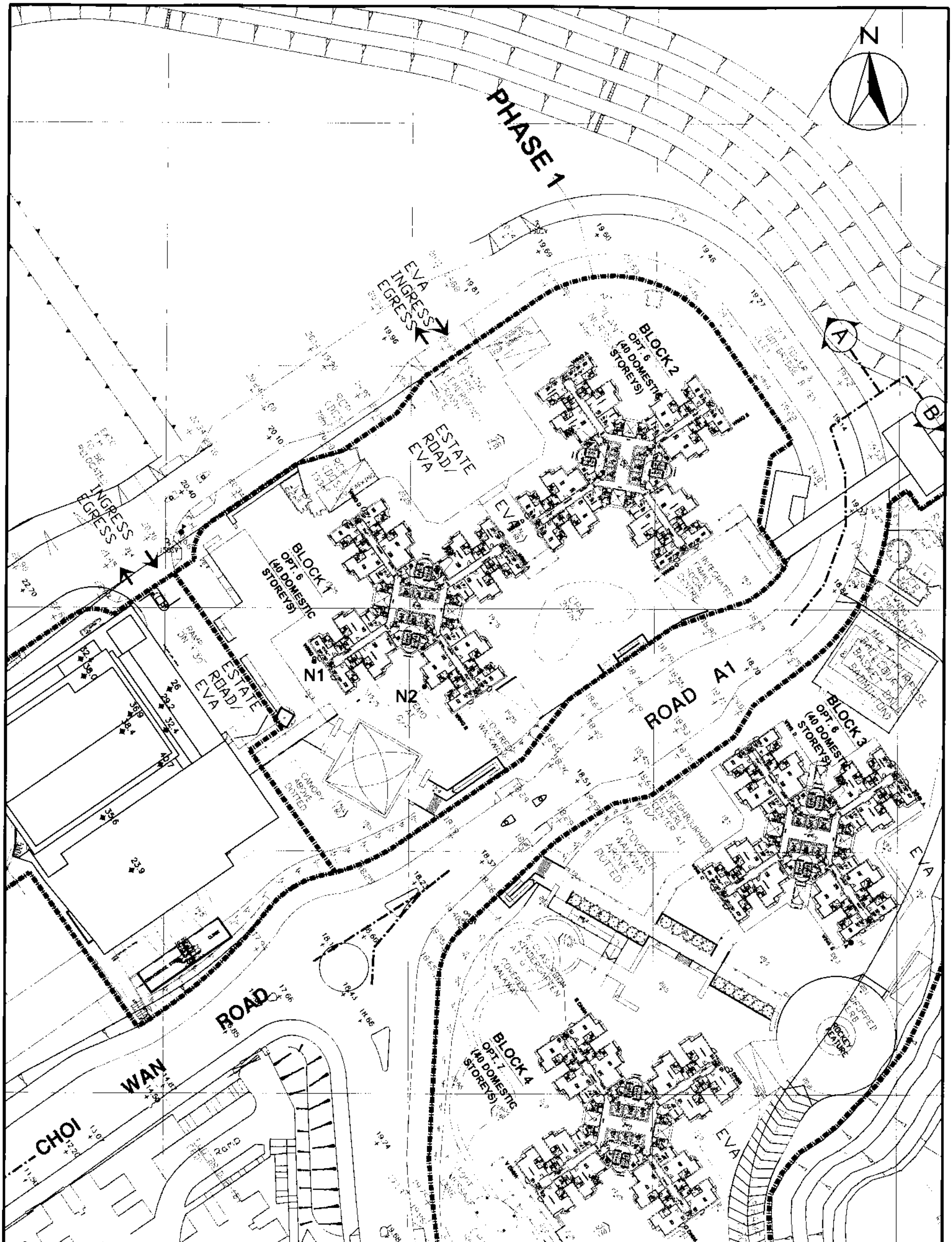

MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	HOUSING DEVELOPMENT AT CHOI WAN SITE 1 – ENVIRONMENTAL ASSESSMENT STUDY LOCATIONS OF RAILWAY NOISE ASSESSMENT POINTS	SCALE	A4 1:1000	DATE	APR 2005
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Appendix 1.1 **Environmental Review for Proposed Realignment of Road G1 in Development at Choi Wan Road and Jordan Valley**

TABLE OF CONTENTS

1 Introduction

1.1 Scott Wilson Ltd have been commissioned by the Civil Engineering and Development Department (CEDD) to undertake an Environmental Review (ER) on the Proposed Realignment of Road G1 of the Development near Choi Wan Road and Jordan Valley for the application of the associated Road Gazettal in the context of an approved EIA under Schedule 3. The ER aims to assess the potential noise impacts upon the nearby sensitive receivers, in particular, the residents of Housing Department's Site 1, Site 2, Site 3A and Site B due to the proposed road realignment.

1.2 This Review Report presents the assessment methodologies and the potential impacts as identified and evaluated in the ER.

2 Background

2.1 In October 1998, Civil Engineering Department (CED) conducted an Environmental Impact Assessment (EIA) study, namely "Planning and Engineering Feasibility Study for Development near Choi Wan Road and Jordan Valley – EIA Final Assessment Report" (the EIA Report), to investigate the environmental feasibility of the development near Choi Wan Road and Jordan Valley (the CWRJV Development). The EIA report was approved under Schedule 3 of Environmental Impact Assessment Ordinance (EIAO) by EPD in April 1999.

2.2 As a result of the subsequent change in housing policy, Housing Department (HD) have decided to change the private housing type to public rental in the CWRJV Development. In order to further enhance the site layout and efficiency, it is proposed that a portion of a local road named Road G1, instead of running through and bisecting Site 3A, is to be realigned towards the southern site boundary. Figures 1 and 2 shows the original and the proposed road alignment, respectively.

2.3 A meeting was then held on 2 February 2005 by various relevant parties, including CEDD, HD, Environmental Protection Department (EPD), District Planning Office, Highways Department and District Office, to discuss the potential environmental issues, in particular the noise aspect that may arise from the proposed realignment. It was noted that the overall traffic figures would be reduced because of the reduced number of car parks. While it is believed that the noise to be generated from Road G1 would be reduced because of the reduced traffic flows and unchanged traffic mix, the potential noise impacts upon the neighbourhood would have to be reviewed and addressed by undertaking an ER.

3 Identification of Potential Noise Impacts

3.1 Housing Site 1

3.1.1 In Site 1, there are 5 residential blocks. Among which, Blocks 1 and 2 are the closest residential towers to the realigned Road G1, with a shortest distance of 54 metres. These high rise blocks will also have a direct line of sight to Road G1. There are thus potential noise impacts upon these residential blocks due to the traffic noise of Road G1.

3.1.2 There are also 2 primary schools in Site 1, located on a platform of 20mPD. Since Road G1, to be constructed on Site 3A, is on a platform of 60mPD, despite that the primary schools are located closer to Road G1 than the residential blocks, these schools are sited in the "noise shadow zone" created by the slope and the elevation difference. There would not be direct line of sight from the schools to Road G1. The associated noise impacts are thus not considered to be significant.

3.2 Housing Site 2

3.2.1 Site 2 is located to the west of Site 3A. Since Road G1 is proposed to be moved southward, the road traffic would flow slightly away from Site 2 (Figure 2). There are thus not anticipated to be any adverse noise impacts upon Site 2 as a result of the proposed road realignment.

3.3 Housing Site 3A

3.3.1 Site 3A is located to the north of Site 1. Instead of running through Site 3A, Road G1 when realigned would be located along the southern boundary of the Site. The distance between Road G1 and the closest noise sensitive residential dwelling will be increased from about 8 metres as in the original alignment (Figure 1) to about 10 m (Figure 2). That is, Road G1 is proposed to be moved away from the sensitive receivers. As advised by HD, the orientations of Blocks 1 and 2 on Site 3A would be relocated such that the facades of these blocks facing Road G1 are to be blank end facades while Block 3 of Site 3A would be sited on an elevated podium by which the traffic noise level at Block 3 would be significantly reduced. No adverse noise impacts are thus expected from this proposed road realignment.

3.4 Housing Site 3B

3.4.1 Site 3B is located at a distance of about 130m to the south east of Site 3A and to the east of Site 1. Since no changes are proposed on the portion of Road G1 that is closer to Site 3B, no adverse noise impacts are expected from this proposed road realignment.

3.5 Summary

3.5.1 A preliminary screening study of the potential noise impacts upon the nearby housing sties in the CWRJV Development has been conducted.

3.5.2 No adverse impacts upon Site 2, Site 3A and Site 3B are anticipated due to the realignment of Road G1. No further assessment would be undertaken in this ER for these sites.

3.5.3 For Site 1, the associated noise impacts upon the 2 primary schools are not considered to be significant. No further assessment is considered to be required in this ER. It is noted, however, that there are potential noise impacts upon the residential blocks. An evaluation of the potential noise impacts is provided in the subsequent sections of this Report.

4 Evaluation of Noise Impacts

4.1 Methodology for Calculation of Road Traffic Noise

4.1.1 Computation of the traffic noise levels would be carried out based on the methodology of "Calculation of Road Traffic Noise, 1988." published by the UK Department of Transport.

4.2 Traffic Flow Data

4.2.1 The traffic data as presented in the Site 1 Environmental Assessment Study (EAS) Report provided by HD under the cover letter of 7 March 2005 (Ref.: HD(CE)587/113/26) have been adopted in this ER.

4.2.2 The traffic data was based on the projected traffic flows of Year 2023, the design year forecast to have the maximum traffic figures within 15 years upon the occupation of the proposed redevelopment. The AM peak hour traffic figures of Road G1, as provided in the above EAS Report, are tabulated in **Table 1** below.

Table 1: Traffic Flow Data of Road G1 (AM Peak flow)

	Traffic Flows (Veh/hr)	% of Heavy Vehicles (>1,500 kg unladen)
East-bound	210	25
West-bound	290	24

4.2.3 Referenced to Section 3.3 of the EAS Report, Transport Department had no comments on the above traffic data. Schematic traffic flow diagram of the latest scheme is shown in **Figure 3**.

4.3 Noise Sensitive Receivers

4.3.1 Based on the results of screening process as discussed above, Block 2 of Site 1 was identified to be the most affected NSR due to the realignment of Road G1, given its close proximity to Road G1 after realignment. A number of assessment points have been identified for Block 2 of Site 1. The locations of the NSRs are shown in **Figure 2**.

4.3.2 The platform where Site 1 is situated is 40 m lower than that of Sites 3A&B where Road G1 is located. The two platforms are separated by a steep slope protected by retaining walls.

4.3.3 As discussed in Section 3.1.2, no quantitative road traffic noise assessment would be carried out for the schools on Site 1 given the fact that a line of sight between the schools and Road G1 does not exist.

4.4 Relevant Assumptions

4.4.1 The road traffic noise due to the realignment of Road G1 is assessed based on the following major assumptions:

(a) Solid concrete parapet with a minimum height of 1 m is installed along edge of the slope near Road G1 for road safety reasons. The parapet is situated on the edge of the slope and has an average distance of 1.5 m from the nearest road kerb.
(b) The allowable maximum speed on the road segment is 50 km/h;
(c) The road segment of concern runs horizontally with little gradient change;
(d) The road surface is of impervious type;
(e) Both façade effect and reflection from opposite façade are taken into account.

5 Evaluation of Road Traffic Noise Impact

5.1.1 A summary of the assessment results is provided in **Tables 2(a)** to **2(e)**. The values of L_{10} under the original scenario (L_{10} w/o Rd G1) are extracted from Appendix 3.1 of the EAS Final Report provided by HD under the cover letter of 7 March 2005 (Ref.: HD(CE)587/113/26). The traffic forecast adopted in the EAS report was based on the revised number of flats and layout design produced by the latest scheme (Section 3.3 of the EAS Report refers).

Table 2(a): Road Traffic Noise Levels at NSR 2A

Floor	L_{10} w/o Rd G1, dB(A)[1]	L_{10} due to Rd G1, dB(A)	Overall L_{10}, dB(A)	Rd G1 contribution, dB
1/F	68.5	44.9	**69**	0.0
5/F	69.4	46.1	**69**	0.0
10/F	68.8	47.8	**69**	0.0
15/F	68.5	49.8	**69**	0.1
20/F	69.1	52.2	**69**	0.1
25/F	69.3	54.1	**69**	0.1
30/F	69.4	55.2	**70**	0.2
35/F	69.3	55.6	**69**	0.2
40/F	69.2	55.7	**69**	0.2

5.1.2 The above table reveals that the noise impacts upon NSR 2A without the realigned Road G1 range from L_{10} 68.5dB(A) to L_{10} 69.4dB(A). This is in compliance with the HKPSG L_{10} 70dB(A) criterion. In addition, the proposed realigned Road G1 would contribute less than 1 dB to the overall noise levels (only up to 0.2 dB). After taking the realigned Road G1 into account, the overall L_{10} would be within 70 dB(A). The proposed realignment of Road G1 is thus unlikely to have any adverse noise impacts on NSR 2A.

Table 2(b): Road Traffic Noise Levels at NSR 2B

Floor	L_{10} w/o Rd G1, dB(A)	L_{10} due to Rd G1, dB(A)	Overall L_{10}, dB(A)	Rd G1 contribution, dB
1/F	72.8	50.3	**73**	0.0
5/F	73.2	51.9	**73**	0.0
10/F	72.2	54.5	**72**	0.1
15/F	71.5	58.3	**72**	0.2
20/F	71.5	61.9	**72**	0.4
25/F	71.6	63.2	**72**	0.6
30/F	71.5	63.4	**72**	0.6
35/F	71.4	63.2	**72**	0.6
40/F	71.3	63.0	**72**	0.6

5.1.3 The above table reveals that the noise impacts upon NSR 2B without the realigned Road G1 range from L_{10} 71.3dB(A) to L_{10} 73.2dB(A), which exceed the HKPSG L_{10} 70dB(A) criterion. The predicted results also indicate that the proposed realigned Road G1 would contribute less than 1 dB (only up to 0.6dB) to the overall noise levels. The noise contribution from the proposed Road G1 is thus not considered to impose significant impacts on NSR 2B.

Table 2(c): Road Traffic Noise Levels at NSR 2C

Floor	L_{10} w/o Rd G1, dB(A)	L_{10} due to Rd G1, dB(A)	Overall L_{10}, dB(A)	Rd G1 contribution, dB
1/F	70.4	49.0	**70**	0.0
5/F	71.6	50.8	**72**	0.0
10/F	70.7	53.6	**71**	0.1
15/F	69.2	57.7	**69**	0.3
20/F	68.5	61.6	**69**	0.8
25/F	67.9	62.8	**69**	1.2
30/F	67.3	62.9	**69**	1.3
35/F	66.8	62.6	**68**	1.4
40/F	66.4	62.2	**68**	1.4

5.1.4 The above table reveals that the noise impacts upon NSR 2C without the realigned Road G1 range from L_{10} 66.4dB(A) to L_{10} 71.6dB(A). The noise levels for 5/F and 10/F are predicted to be exceeding the HKPSG L_{10} 70dB(A) criterion. However, the contribution from the proposed realigned Road G1 to the overall noise levels at these floors of concern is less than 1 dB (only up to 0.1dB). Noise levels predicted for other floors are in compliance with the HKPSG L_{10} 70dB(A) criterion. The noise contribution from the proposed Road G1 is thus not considered to impose significant impacts on NSR 2C.

Table 2(d): Road Traffic Noise Levels at NSR 2D

Floor	L_{10} w/o Rd G1, dB(A)	L_{10} due to Rd G1, dB(A)	Overall L_{10}, dB(A)	Rd G1 contribution, dB
1/F	70.7	49.0	**71**	0.0
5/F	71.4	50.7	**71**	0.0
10/F	70.4	53.5	**70**	0.1
15/F	68.9	57.4	**69**	0.3
20/F	68.3	61.2	**69**	0.8
25/F	67.7	62.5	**69**	1.2
30/F	67.2	62.7	**69**	1.3
35/F	66.7	62.4	**68**	1.4
40/F	66.3	62.1	**68**	1.4

5.1.5 Table 2(d) reveals that the noise impacts upon NSR 2D without the realigned Road G1 range from L_{10} 66.3dB(A) to L_{10} 71.4dB(A). The noise levels for 1/F and 5/F are predicted to be exceeding the HKPSG L_{10} 70dB(A) criterion. However, the contribution from the proposed realigned Road G1 to the overall noise levels at these floors of concern is less than 1 dB. Noise levels predicted for other floors are in compliance with the HKPSG L_{10} 70dB(A) criterion. The noise contribution from the proposed Road G1 is thus not considered to impose significant impacts on NSR 2D.

Table 2(e): Road Traffic Noise Levels at NSR 2E

Floor	L_{10} w/o Rd G1, dB(A)	L_{10} due to Rd G1, dB(A)	Overall L_{10}, dB(A)	Rd G1 contribution, dB
1/F	76.0	48.0	**76**	0.0
5/F	74.8	49.7	**75**	0.0
10/F	73.1	52.4	**73**	0.0
15/F	71.3	56.2	**71**	0.1
20/F	70.5	60.0	**71**	0.4
25/F	69.8	61.4	**70**	0.6
30/F	69.2	61.6	**70**	0.7
35/F	68.7	61.4	**69**	0.7
40/F	68.2	61.0	**69**	0.8

5.1.6 Table 2(e) reveals that the noise impacts upon NSR 2E without the realigned Road G1 range from L_{10} 68.2dB(A) to L_{10} 76dB(A). The noise levels for 1/F, 5/F, 10/F, 15/F and 20/F are predicted to be exceeding the HKPSG L_{10} 70dB(A) criterion. However, the contribution from the proposed realigned Road G1 to the overall noise levels at these floors of concern is less than 1 dB (only up to 0.4dB). Noise levels predicted for other floors are in compliance with the HKPSG L_{10} 70dB(A) criterion. The noise contribution from the proposed Road G1 is thus not considered to impose significant impacts on NSR 2E.

5.1.7 In conclusion, the proposed realignment of Road G1 is unlikely to have adverse noise impact on the NSRs at Block 2 of Site 1.

6 Conclusion

6.1 An Environmental Review on the Proposed Realignment of Road G1 of the Development near Choi Wan Road and Jordan Valley for the application of the associated Road Gazettal has been completed. The assessment concludes that the noise impact upon Housing Department's Site 1, Site 2, Site 3A and Site 3B due to the proposed road realignment is not worse than that before the realignment.

6.2 If there are deviations from the assumptions made in this ER on traffic mix and volume, housing block layout, facade types, etc. as a result of future changes in housing development planning / design parameters, HD will address the additional noise impact, if any, so arising in their detailed EASs for the housing development.

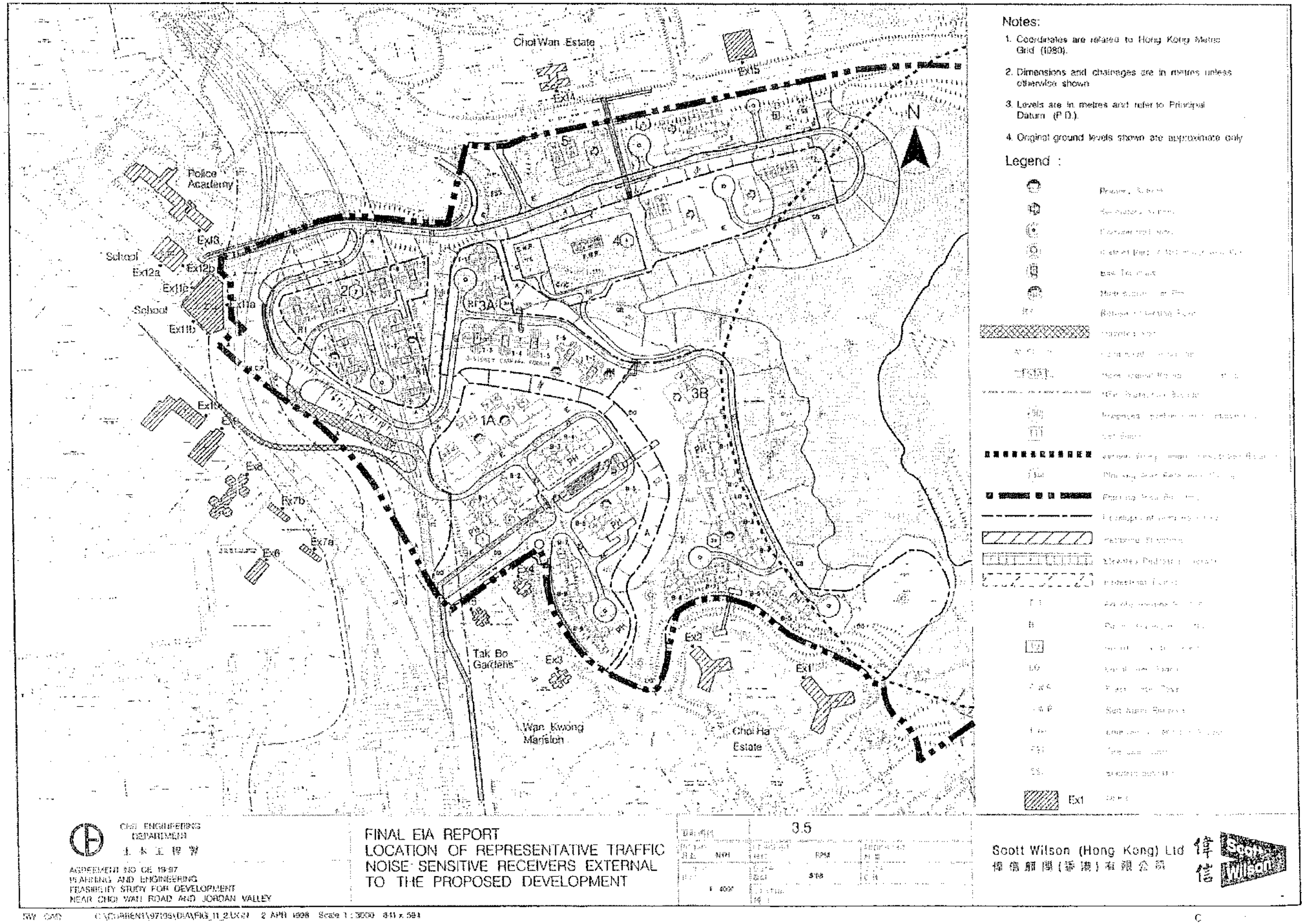


Figure 1: Original Layout Plan for the Developments at Choi Wan Road and Jordan Valley

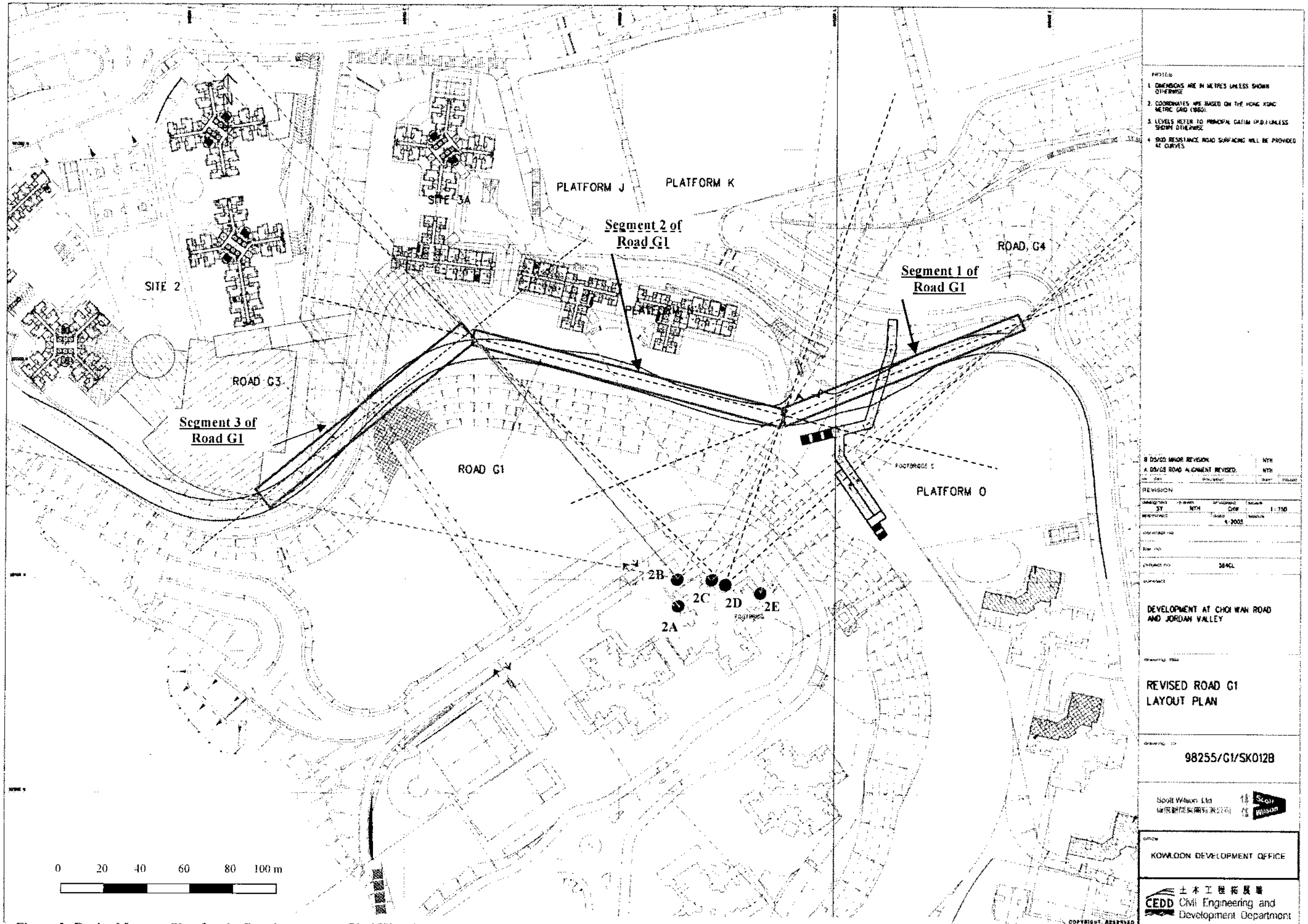


Figure 2: Revised Layout Plan for the Developments at Choi Wan Road and Jordan Valley and Affect NSRs Associated with the Realignment of Road G1

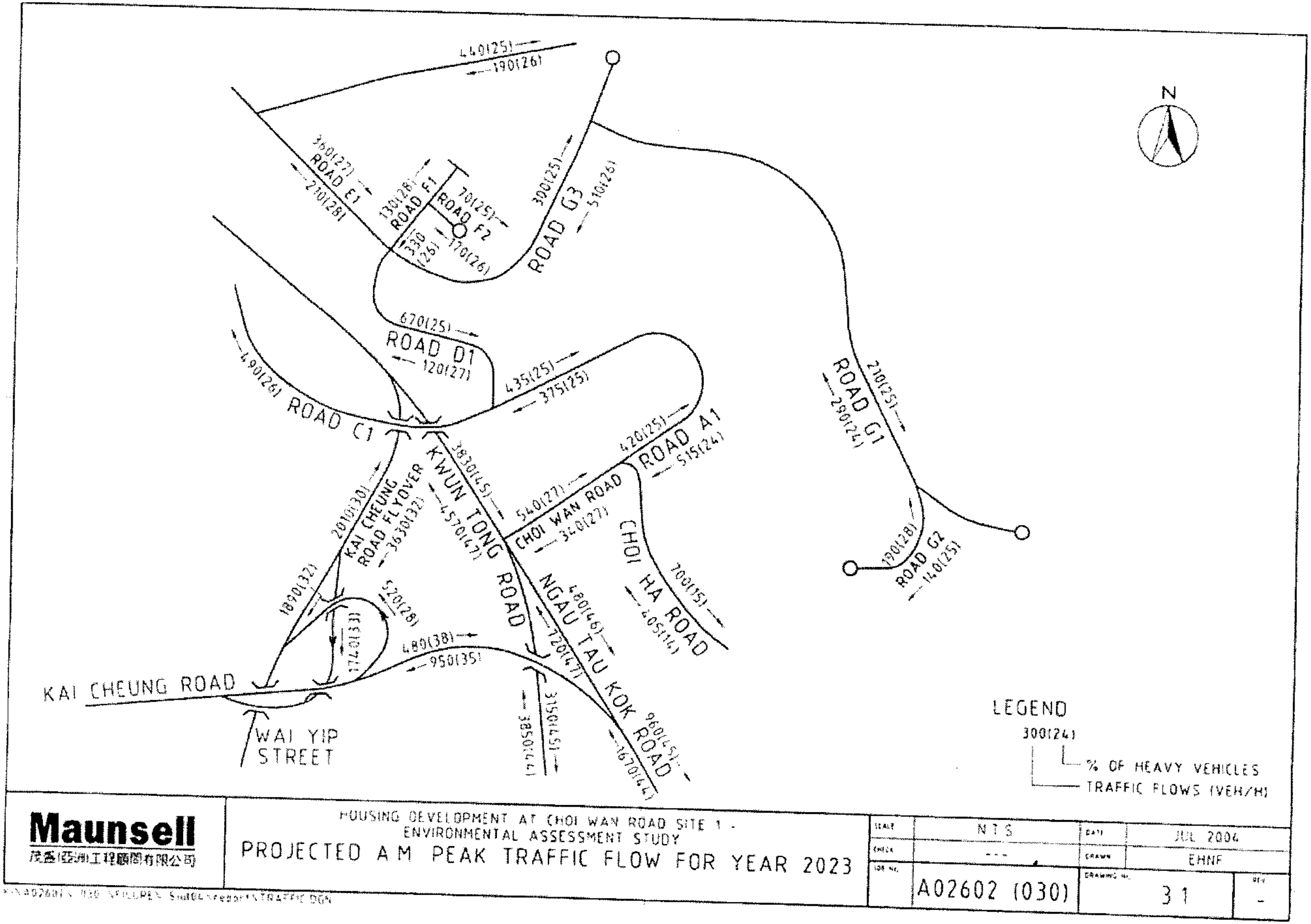


Figure 3: Traffic Flow Diagram for Developments at Choi Wan Road and Jordan Valley Based on Latest Scheme

	Total	Noise L10 (1 hour)	Formula
Flow (veh/hr)	500	68.2	CRTN Chart 2
Speed (kph)	50		
Heavy Percentage	25%	2.6	CRTN Chart 4
Road Surface	impervious	-1.0	
	Sub Total	70.8	

Height of each storey		2.8 m
distance between 1/F and ground level		4.0 m
Receiver height above floor level		1.2 m
Reflection	Facade	2.5 dB(A)
height of parapet	1 m	
distance between road kerb and barrier	1.5 m	

NSR

2A

	Segment 1	Segment 2	Segment 3
angle of view (deg)	0	3	38
opposite façade (deg)	0	3.00	3
horiz. Distance (m)	5	94	161

vert. dist. btw S & R h (m)		d1	d2	L10(1)	L10(2)	L10-G1	original	overall	overall (rounded-off)	difference	SB
1/F	35.3	-	103.69	0.0	34.9		44.9	68.5	68.5	69	0.0
5/F	24.1	-	100.42	0.0	36.5		46.1	69.4	69.4	69	0.0
10/F	10.1	-	98.02	0.0	38.9		47.8	68.8	68.8	69	0.0
15/F	3.9		97.58	0.0	42.1		49.8	68.5	68.6	69	0.1
20/F	17.9		99.13	0.0	45.6		52.2	69.1	69.2	69	0.1
25/F	31.9	-	102.59	0.0	47.2		54.1	69.3	69.4	69	0.1
30/F	45.9		107.79	0.0	47.7		55.0	69.4	69.6	70	0.2
35/F	59.9		114.43	0.0	47.7		55.6	69.3	69.5	69	0.2
40/F	73.9		127.34	0.0	47.5		55.7	69.2	69.4	69	0.2

Seg1

	BR	path diff	slope diff btw BR & SR (+ve values for shadow zone) x	dB
1/F	5.02			
5/F	5.02			
10/F	5.02			
15/F	5.02			
20/F	5.02			
25/F	5.02			
30/F	5.02			
35/F	5.02			
40/F	5.02			

Seg2

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F		96.19	0.517565	0.02	-0.28	**-13.25**
5/F		95.72	0.305636	0.02	-0.51	**-11.79**
10/F		93.11	0.108576	0.01	-0.56	**-9.50**
15/F		92.56	0.009434	0.00	2.63	**-6.36**
20/F		94.12	0.017741	[illegible]	-1.75	**-2.90**
25/F		97.66	0.125308	[illegible]	-0.91	**-0.94**
30/F		103.04	0.301840	[illegible]	0.52	**-0.32**
35/F		109.93	0.524508	[illegible]	0.26	**-0.10**
40/F		118.05	0.762776	[illegible]	0.12	**-0.02**

segment 3

	d3	L10(3)	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F	158.24		44.5	169.47	0.249372	0.01	-0.60	**-11.27**
5/F	166.26		45.6	151.39	0.154494	0.01	0.61	**-10.20**
10/F	164.8		47.2	159.85	0.067000	0.01	1.17	**-8.67**
15/F	184.55		49.0	159.54	0.014947	0.00	-1.83	**-6.81**
20/F	165.47		51.1	160.45	0.000187	0.00	-3.71	**-4.65**
25/F	167.56		53.1	162.55	0.021647	[illegible]	1.86	**-2.69**
30/F	170.78		54.3	165.84	0.076754	[illegible]	1.11	**-1.37**
35/F	175.07		54.8	170.20	0.160133	[illegible]	-0.60	**-0.73**
40/F	180.34		55.0	175.56	0.256365	[illegible]	-0.07	**-0.35**

2B

	Segment 1	Segment 2	Segment 3
angle of view (deg)	26	75	39
opposite façade (deg)	0	47	3
2B horiz. Distance (m)	52	34	151

vert. dist. btw S & R h (m)		d1	d2	L10(1)	L10(2)	L10-G1	original	overall	overall (rounded-off)	difference	SB
1/F	35.3	65.77	94.35	41.0	48.2	50.3	72.8	72.8	73	0.0	
5/F	-24.1	60.51	90.76	43.1	48.9	51.9	73.2	73.2	73	0.0	
10/F	10.1	55.41	88.08	46.7	52.5	54.6	72.2	72.3	72	0.1	
15/F	3.9	55.64	87.58	52.5	55.0	58.3	71.5	71.7	72	0.2	
20/F	17.9	58.32	89.31	56.5	59.7	61.9	71.5	71.9	72	0.4	
25/F	31.9	64.01	93.13	56.5	61.3	63.2	71.6	72.2	72	0.6	
30/F	45.9	72.02	99.81	56.5	61.5	63.4	71.5	72.1	72	0.6	
35/F	59.9	81.66	106.04	56.0	61.4	63.2	71.4	72.0	72	0.6	
40/F	73.9	92.42	114.53	55.4	61.1	63.0	71.3	71.9	72	0.6	

Seg1

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F	5.02	51.90	1.152280	0.07	0.06	**-15.92**
5/F	5.02	56.17	0.691280	0.05	0.16	**-14.14**
10/F	5.02	51.60	0.212865	0.03	0.67	**-10.92**
15/F	5.02	50.55	0.007406	0.00	2.52	**-4.09**
20/F	5.02	53.41	0.123335	[illegible]	5.91	**-4.84**
25/F	5.02	59.47	0.476449	[illegible]	-0.32	**-0.13**
30/F	5.02	67.91	0.911054	[illegible]	-0.04	**-0.01**
35/F	5.02	77.97	1.330954	[illegible]	0.12	**0.00**
40/F	5.02	83.09	1.659306	[illegible]	0.23	**0.00**

Seg2

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F		89.93	0.61	0.03	-0.22	**-13.72**
5/F		88.05	0.36	0.02	0.45	**-12.19**
10/F		83.15	0.12	0.01	0.61	**-9.72**
15/F		82.57	0.01	0.00	-2.09	**-6.22**
20/F		84.31	0.03	[illegible]	1.56	**-2.42**
25/F		88.27	0.16	[illegible]	-0.78	**-0.70**
30/F		94.17	0.38	[illegible]	-0.42	**-0.21**
35/F		101.66	0.65	[illegible]	-0.19	**-0.05**
40/F		110.43	0.92	[illegible]	-0.04	**-0.01**

segment 3

	d3	L10(3)	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F	158.48		44.5	153.73	0.27	0.01	0.57	**-11.48**
5/F	155.37		45.2	151.51	0.17	0.01	-0.78	**-10.37**
10/F	154.63		47.3	149.88	0.07	0.01	-1.16	**-8.75**
15/F	154.56		49.4	149.54	0.01	0.00	1.84	**-6.27**
20/F	155.53		51.5	150.51	0.00	[illegible]	-3.26	**-4.67**
25/F	157.76		53.7	152.73	0.03	[illegible]	-1.55	**-2.41**
30/F	161.17		54.8	156.24	0.06	[illegible]	1.03	**-1.19**
35/F	165.71		55.3	160.67	0.19	[illegible]	-0.73	**-0.61**
40/F	171.26		55.5	166.55	0.31	[illegible]	-0.51	**-0.31**

2C

	Segment 1	Segment 2	Segment 3
angle of view (deg)	27	62	0
opposite façade (deg)	0	43	0
2C horiz. Distance (m)	60	80	0

vert. dist. btw S & R h (m)		d1	d2	L10(1)	L10(2)	L10-G1	original	overall	overall (rounded-off)	difference
1/F	35.3	72.86	90.56	42.5	47.8	49.0	70.4	70.4	70	0.0
5/F	-24.1	67.97	86.51	43.8	48.6	50.6	71.6	71.6	72	0.0
10/F	-10.1	54.35	84.11	47.8	52.3	53.6	70.7	70.8	71	0.1
15/F	3.9	63.52	85.59	52.8	56.0	57.7	69.2	69.5	69	0.3
20/F	17.9	65.97	85.40	56.9	59.8	61.5	68.5	69.3	66	0.8
25/F	31.9	71.06	89.36	57.6	61.2	62.8	67.5	69.1	66	1.3
30/F	45.9	78.35	95.26	57.4	61.4	62.5	67.3	68.6	66	1.3
35/F	59.9	87.39	102.75	57.0	61.2	62.6	66.6	68.2	68	1.4
40/F	73.9	97.43	111.51	58.5	60.9	62.2	66.4	67.8	68	1.4

seg1

	SB BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	red dB	
1/F	5.02	66.58	0.567864	0.06	0.02	**-15.25**
5/F	5.02	63.46	0.557305	0.04	-0.25	**-13.52**
10/F	5.02	55.45	0.170312	0.02	-0.75	**-10.52**
15/F	5.02	58.60	0.004007	0.00	-2.46	**-5.54**
20/F	5.02	61.93	0.083156	[illegible]	1.28	**-1.29**
25/F	5.02	68.35	0.356923	[illegible]	-0.45	**-0.24**
30/F	5.02	74.35	0.722935	[illegible]	-0.14	**-0.03**
35/F	5.02	83.37	1.101155	[illegible]	0.04	**0.00**
40/F	5.02	93.86	1.451138	[illegible]	0.19	**0.00**

Seg2

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	red dB	
1/F		86.28	0.65	0.03	-0.19	**-13.84**
5/F		82.25	0.38	0.02	-0.47	**-12.37**
10/F		79.21	0.13	0.01	-0.89	**-9.83**
15/F		78.57	0.01	0.00	-2.12	**-6.14**
20/F		80.41	0.03	[illegible]	1.48	**-2.23**
25/F		84.56	0.19	[illegible]	-0.73	**-0.62**
30/F		90.62	0.42	[illegible]	-0.37	**-0.17**
35/F		98.44	0.70	[illegible]	-0.15	**-0.04**
40/F		107.47	0.99	[illegible]	0.00	**0.00**

Segment 3

	d3	L10(3)	BR	path diff	slope diff btw BR & SR (+ve values for shadow zone) x	dB
1/F			0			
5/F			0			
10/F			0			
15/F			0			
20/F			0			
25/F			0			
30/F			0			
35/F			0			
40/F			0			

2D

	Segment 1	Segment 2	Segment 3
angle of view (deg)	30	65	0
opposite façade (deg)	5	41	0
2D horiz. Distance (m)	64	94	0

vert. dist. btw S & R h (m)		d1	d2	L10(1)	L10(2)	L10-G1	original	overall	overall (rounded-off)	difference	SB
1/F	35.3	79.17	94.35	43.1	47.7	49.0	70.7	70.7	71	0.0	
5/F	-24.1	71.67	90.76	45.0	46.4	50.7	71.4	71.4	71	0.0	
10/F	-10.1	68.25	88.08	46.2	52.0	53.5	70.4	70.5	70	0.1	
15/F	3.9	67.61	87.59	52.6	55.5	57.4	68.5	69.2	65	0.3	
20/F	17.9	69.83	89.31	56.9	59.2	61.2	68.3	68.1	69	0.8	
25/F	31.9	74.66	93.13	57.8	60.6	62.5	67.7	68.9	69	1.2	
30/F	45.9	81.63	98.61	57.7	61.0	62.7	67.2	68.5	69	1.3	
35/F	59.9	90.25	105.04	57.3	60.6	62.4	66.7	68.1	68	1.4	
40/F	73.9	100.09	114.53	56.9	60.6	62.1	66.3	67.7	68	1.4	

Seg1

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F	5.02	72.03	0.878854	0.05	0.56	**-14.95**
5/F	5.02	67.57	0.518682	0.04	-0.29	**-13.25**
10/F	5.02	63.39	0.165596	0.02	0.78	**-10.35**
15/F	5.02	62.59	0.004777	0.00	-2.32	**-5.71**
20/F	5.02	64.98	0.066734	[illegible]	1.16	**-1.47**
25/F	5.02	69.94	0.310985	[illegible]	-0.51	**-0.31**
30/F	5.02	77.25	0.645362	[illegible]	-0.19	**-0.05**
35/F	5.02	86.22	1.003568	[illegible]	0.00	**0.00**
40/F	5.02	96.40	1.342064	[illegible]	0.13	**0.00**

Seg2

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	red dB	
1/F		89.93	0.61	0.03	0.22	**-13.72**
5/F		86.09	0.38	0.02	-0.45	**-12.19**
10/F		83.18	0.12	0.01	0.91	**-9.72**
15/F		82.57	0.01	0.00	-2.09	**-6.22**
20/F		84.31	0.03	[illegible]	-1.56	**-2.42**
25/F		88.27	0.18	[illegible]	-0.76	**-0.70**
30/F		94.17	0.38	[illegible]	-0.42	**-0.21**
35/F		101.66	0.65	[illegible]	-0.19	**-0.05**
40/F		110.43	0.93	[illegible]	-0.04	**-0.01**

Segment 3

	d3	L10(3)	BR	path diff	slope diff btw BR & SR (+ve values for shadow zone) x	dB
1/F			0			
5/F			0			
10/F			0			
15/F			0			
20/F			0			
25/F			0			
30/F			0			
35/F			0			
40/F			0			

2E

	Segment 1	Segment 2	Segment 3
angle of view (deg)	36	42	0
opposite façade (deg)	0	25	0
2E horiz. Distance (m)	74	94	0

vert. dist. btw S & R h (m)		d1	d2	L10(1)	L10(2)	L10-G1	original	overall	overall (rounded-off)	difference	SB
1/F	35.3	85.16	94.35	44.1	45.7	48.0	76.0	76.0	76	0.0	
5/F	-24.1	81.16	90.76	45.5	47.4	48.7	74.8	74.8	75	0.0	
10/F	-10.1	76.16	88.08	48.7	50.0	52.4	73.1	73.1	73	0.0	
15/F	3.9	77.60	87.59	53.7	53.6	56.2	71.3	71.4	71	0.1	
20/F	17.9	79.54	89.21	[illegible]	57.3	60.0	70.5	70.9	71	0.4	
25/F	31.9	83.81	93.13	57.5	58.8	61.4	69.8	70.4	70	0.6	
30/F	45.9	90.07	98.81	58.0	59.0	61.6	69.2	69.9	70	0.7	
35/F	59.9	97.95	106.04	57.7	58.9	61.4	68.7	69.4	69	0.7	
40/F	73.9	107.09	114.53	57.3	58.6	61.0	68.2	68.0	68	0.8	

Seg 1

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	dB	
1/F	5.02	90.96	0.721486	0.04	-0.14	**-14.20**
5/F	5.02	76.56	0.424079	0.03	0.37	**-12.67**
10/F	5.02	73.27	0.140379	0.02	-0.35	**-10.06**
15/F	5.02	72.56	0.006551	0.00	-2.18	**-6.01**
20/F	5.02	74.56	0.043402	[illegible]	-1.36	**-1.95**
25/F	5.02	79.01	0.224124	[illegible]	-0.65	**-0.49**
30/F	5.02	85.54	0.494273	[illegible]	0.31	**-0.12**
35/F	5.02	93.73	0.800695	[illegible]	-0.10	**-0.02**
40/F	5.02	103.17	1.107553	[illegible]	0.04	**0.00**

Seg2

	BR	path diff		slope diff btw BR & SR (+ve values for shadow zone) x	red dB	
1/F		89.93	0.65	0.03	-0.22	**-13.72**
5/F		86.09	0.39	0.02	0.45	**-12.19**
10/F		83.16	0.12	[illegible]	-0.61	**-9.72**
15/F		82.57	0.01	0.00	-2.09	**-6.22**
20/F		84.31	0.03	[illegible]	-1.56	**-2.42**
25/F		88.27	0.15	[illegible]	-0.79	**-0.70**
30/F		94.17	0.38	[illegible]	-0.42	**-0.21**
35/F		101.66	0.65	[illegible]	-0.19	**-0.05**
40/F		110.43	0.92	[illegible]	-0.04	**-0.01**

Segment 3

	d3	L10(3)	BR	path diff	slope diff btw BR & SR (+ve values for shadow zone) x	dB
1/F			0			
5/F			0			
10/F			0			
15/F			0			
20/F			0			
25/F			0			
30/F			0			
35/F			0			
40/F			0			

Appendix 3.1 **Predicted Road Traffic Noise Levels- Unmitigated Scenario**

Predicted Road Traffic Noise Levels by Year 2023

NSR(s)	Floor	Noise Level dB(A)
1A	1	68.9
	5	70.4
	10	**71.7**
	15	**72.5**
	20	**73.5**
	25	**73.8**
	30	**73.7**
	35	**73.7**
	40	**73.6**
1B	1	67.9
	5	68.8
	10	69.7
	15	**70.9**
	20	**72.2**
	25	**72.5**
	30	**72.4**
	35	**72.4**
	40	**72.4**
1C	1	69.3
	5	69.9
	10	70.4
	15	**71.2**
	20	**72.3**
	25	**72.7**
	30	**72.7**
	35	**72.6**
	40	**72.6**
1D	1	**71.1**
	5	**73.3**
	10	**72.7**
	15	**72.7**
	20	**73.0**
	25	**73.2**
	30	**73.1**
	35	**72.9**
	40	**72.8**
1E	1	67.3
	5	68.6
	10	67.9
	15	67.1
	20	66.2
	25	65.5
	30	64.9
	35	64.4
	40	63.9
1F	1	66.7
	5	68.4
	10	68.2
	15	67.9
	20	67.5
	25	67.0
	30	66.5
	35	66.1
	40	65.7

NSR(s)	Floor	Noise Level dB(A)
1G	1	68.0
	5	68.8
	10	68.1
	15	67.4
	20	66.8
	25	66.1
	30	65.6
	35	65.1
	40	64.6
1H	1	68.3
	5	68.7
	10	67.8
	15	66.9
	20	66.2
	25	65.5
	30	64.9
	35	64.4
	40	63.9
1I	1	**73.7**
	5	**73.3**
	10	**72.3**
	15	**71.6**
	20	**71.1**
	25	**70.7**
	30	70.4
	35	70.2
	40	70.0
1J	1	69.4
	5	70.3
	10	70.2
	15	70.3
	20	**70.6**
	25	**70.7**
	30	**70.8**
	35	**70.7**
	40	**70.7**
1K	1	69.1
	5	70.2
	10	70.3
	15	70.0
	20	69.9
	25	69.9
	30	69.8
	35	69.7
	40	69.6
2A	1	68.5
	5	69.4
	10	68.8
	15	68.5
	20	69.1
	25	69.3
	30	69.4
	35	69.3
	40	69.2

NSR(s)	Floor	Noise Level dB(A)
2B	1	**72.8**
	5	**73.2**
	10	**72.2**
	15	**71.5**
	20	**71.5**
	25	**71.6**
	30	**71.5**
	35	**71.4**
	40	**71.3**
2C	1	70.4
	5	**71.6**
	10	**70.7**
	15	69.2
	20	68.5
	25	67.9
	30	67.3
	35	66.8
	40	66.4
2D	1	**70.7**
	5	**71.4**
	10	70.4
	15	68.9
	20	68.3
	25	67.7
	30	67.2
	35	66.7
	40	66.3
2E	1	**76.0**
	5	**74.8**
	10	**73.1**
	15	**71.3**
	20	**70.5**
	25	69.8
	30	69.2
	35	68.7
	40	68.2
2F	1	**72.0**
	5	**71.4**
	10	70.3
	15	68.9
	20	68.1
	25	67.3
	30	66.7
	35	66.2
	40	65.8
2G	1	**71.9**
	5	**71.4**
	10	70.3
	15	68.9
	20	68.2
	25	67.6
	30	67.1
	35	66.6
	40	66.2

NSR(s)	Floor	Noise Level dB(A)
2H	1	**73.7**
	5	**73.1**
	10	**71.9**
	15	**71.0**
	20	70.2
	25	69.5
	30	69.0
	35	68.7
	40	68.4
2I	1	68.7
	5	68.8
	10	68.0
	15	67.5
	20	66.8
	25	66.2
	30	65.6
	35	65.1
	40	64.7
3A	1	68.0
	5	69.9
	10	70.0
	15	70.2
	20	70.4
	25	**70.7**
	30	**70.9**
	35	**70.9**
	40	**70.8**
3B	1	70.3
	5	**70.9**
	10	**70.6**
	15	70.4
	20	**70.4**
	25	**70.7**
	30	**70.8**
	35	**70.8**
	40	**70.8**
3C	1	**71.2**
	5	**71.1**
	10	70.4
	15	70.1
	20	70.1
	25	70.1
	30	70.2
	35	70.2
	40	70.2
3D	1	**75.8**
	5	**74.4**
	10	**72.9**
	15	**72.0**
	20	**71.4**
	25	**71.2**
	30	**71.0**
	35	**70.9**
	40	**70.7**

NSR(s)	Floor	Noise Level dB(A)
3E	1	70.4
	5	69.7
	10	68.4
	15	67.3
	20	66.3
	25	65.7
	30	65.1
	35	64.5
	40	64.0
3F	1	69.3
	5	69.1
	10	68.1
	15	67.1
	20	66.2
	25	65.6
	30	65.0
	35	64.5
	40	64.1
3G	1	34.5
	5	37.3
	10	46.0
	15	51.9
	20	52.2
	25	52.6
	30	52.8
	35	53.0
	40	53.5
3H	1	47.4
	5	52.5
	10	56.5
	15	57.6
	20	57.5
	25	57.4
	30	57.4
	35	57.2
	40	57.0
4A	1	69.5
	5	**72.3**
	10	**72.3**
	15	**72.3**
	20	**72.1**
	25	**71.8**
	30	**71.6**
	35	**71.4**
	40	**71.1**
4B	1	66.9
	5	**70.7**
	10	**71.0**
	15	**71.3**
	20	**71.4**
	25	**71.3**
	30	**71.1**
	35	**71.0**
	40	**70.8**

NSR(s)	Floor	Noise Level dB(A)
4C	1	70.1
	5	**72.5**
	10	**72.4**
	15	**72.6**
	20	**72.6**
	25	**72.5**
	30	**72.4**
	35	**72.2**
	40	**72.0**
4D	1	64.8
	5	67.3
	10	67.0
	15	66.5
	20	66.0
	25	65.6
	30	65.2
	35	64.7
	40	64.4
4E	1	62.5
	5	65.9
	10	66.2
	15	66.5
	20	66.5
	25	66.5
	30	66.3
	35	66.1
	40	65.9
4F	1	43.1
	5	51.6
	10	56.1
	15	55.9
	20	55.6
	25	55.4
	30	55.2
	35	55.0
	40	54.8
4G	1	62.8
	5	65.9
	10	66.3
	15	66.0
	20	65.7
	25	65.4
	30	65.2
	35	64.9
	40	64.7
4H	1	63.1
	5	65.4
	10	65.4
	15	65.0
	20	64.7
	25	64.6
	30	64.3
	35	64.1
	40	63.9

NSR(s)	Floor	Noise Level dB(A)
5A	1	**75.0**
	5	**74.1**
	10	**72.8**
	15	**72.0**
	20	**71.4**
	25	**71.0**
	30	**70.6**
	35	70.3
	40	70.3
5B	1	69.8
	5	70.1
	10	69.5
	15	69.1
	20	68.8
	25	68.5
	30	68.2
	35	67.9
	40	67.9
5C	1	67.9
	5	69.4
	10	69.3
	15	69.2
	20	68.9
	25	68.7
	30	68.4
	35	68.1
	40	68.0
5D	1	56.9
	5	60.9
	10	62.7
	15	63.3
	20	63.7
	25	63.9
	30	63.9
	35	63.9
	40	63.7
5E	1	52.8
	5	62.7
	10	62.9
	15	62.4
	20	61.9
	25	61.4
	30	60.9
	35	60.4
	40	60.0
5F	1	70.0
	5	**70.8**
	10	70.2
	15	69.7
	20	69.1
	25	68.7
	30	68.3
	35	67.9
	40	67.8

NSR(s)	Floor	Noise Level dB(A)
5G	1	69.8
	5	70.0
	10	69.0
	15	68.1
	20	67.3
	25	66.7
	30	66.1
	35	65.7
	40	65.4
K1	G	64.4
K2	G	62.9
K3	G	59.6
K4	G	58.2

Appendix 4.1 Sample Calculation of Railway Noise Levels

Sample Calculation of Railway Noise

Railway segment:

Track	1: MTS1	Type	Flow/30min	SEL	Ref. Speed	Source Height
		1	17.0	86.0	80.0	.7
Seg.	Easting	Northing	Mean Elev.	Speed		
1	40048.0	20995.2	14.2	80.		
2	40049.6	20975.8	14.0	80.		
3	40060.2	20863.8	12.9	80.		
4	40069.4	20774.9	.0	0.		

Track	2: MTS2	Type	Flow/30min	SEL	Ref. Speed	Source Height
		1	17.0	86.0	80.0	.7
Seg.	Easting	Northing	Mean Elev.	Speed		
1	40069.1	20774.2	12.0	80.		
2	40071.8	20745.2	12.2	80.		
3	40075.8	20722.6	12.7	80.		
4	40086.1	20675.6	.0	0.		

Track	3: MTS3	Type	Flow/30min	SEL	Ref. Speed	Source Height
		1	17.0	86.0	80.0	.7
Seg.	Easting	Northing	Mean Elev.	Speed		
1	40085.5	20675.4	13.3	80.		
2	40089.8	20655.0	.0	0.		

Track	4: MTN5	Type	Flow/30min	SEL	Ref. Speed	Source Height
		1	17.0	86.9	80.0	.7
Seg.	Easting	Northing	Mean Elev.	Speed		
1	40077.6	20653.7	13.2	80.		
2	40072.5	20694.9	.0	0.		

Track	5: MTN6	Type	Flow/30min	SEL	Ref. Speed	Source Height
		1	17.0	86.9	80.0	.7
Seg.	Easting	Northing	Mean Elev.	Speed		
1	40072.8	20694.9	12.6	80.		
2	40069.7	20722.1	12.6	80.		
3	40062.8	20795.6	.0	0.		

Track	6: MTN7	Type	Flow/30min	SEL	Ref. Speed	Source Height
		1	17.0	86.9	80.0	.7
Seg.	Easting	Northing	Mean Elev.	Speed		
1	40062.8	20795.6	13.4	80.		
2	40049.8	20926.1	14.0	80.		
3	40044.8	20975.7	14.2	80.		
4	40041.0	21003.3	.0	0.		

Barrier Configuration :

Seg.	Easting	Northing	Base Height	Segment Height	Barrier Height	Barrier Angle	Segment Length
Barrier	1: LO-N1-Building barrier at Ngau Tau Kok Fifth street						
1	40146.7	20683.5	.0	49.8	.0	.0	13.8
2	40133.0	20682.2	.0	49.8	.0	.0	54.6
3	40137.9	20627.8	.0	49.8	.0	.0	47.8
4	40142.2	20580.2	.0	49.8	.0	.0	2.7
5	40143.7	20577.9	.0	49.8	.0	.0	9.0
6	40144.8	20569.0	.0	4.9	.0	.0	24.1
7	40147.7	20545.1	.0	38.6	.0	.0	6.1
8	40141.6	20544.5	.0	38.6	.0	.0	13.8
9	40142.8	20530.8	.0	4.9	.0	.0	14.8
10	40156.7	20525.8	.0	26.0	.0	.0	33.7
11	40160.0	20492.3	.0	4.9	.0	.0	15.5
12	40161.1	20476.8	.0	26.0	.0	.0	11.5
13	40149.6	20475.9	.0	26.0	.0	.0	17.8
14	40151.1	20458.2					
Barrier	2: LO-N2-Building barrier at Ngau Tau Kok Fifth street						
1	40146.7	20683.5	.0	49.8	.0	.0	14.0
2	40132.7	20682.5	.0	49.8	.0	.0	55.0
3	40138.1	20627.8	.0	47.0	.0	.0	68.0
4	40205.9	20633.4	.0	47.0	.0	.0	14.4
5	40204.8	20647.8					
Barrier	3: TP-PO-Tak Po Podium						
1	40171.0	20958.9	.0	20.0	.0	.0	23.9
2	40151.3	20945.3	.0	20.0	.0	.0	20.5
3	40134.5	20933.6	.0	20.0	.0	.0	11.7
4	40124.8	20927.0	.0	20.0	.0	.0	10.9
5	40115.9	20920.7	.0	20.0	.0	.0	11.3
6	40106.7	20914.1	.0	20.0	.0	.0	19.8
7	40090.3	20903.0	.0	20.0	.0	.0	13.8
8	40079.0	20895.1	.0	20.0	.0	.0	8.6
9	40078.7	20886.5	.0	20.0	.0	.0	31.4
10	40095.9	20860.2	.0	20.0	.0	.0	24.8
11	40109.4	20839.4	.0	5.2	.0	.0	5.0
12	40112.2	20835.3	.0	20.0	.0	.0	45.7
13	40137.2	20797.0	.0	5.2	.0	.0	4.0
14	40139.4	20793.6	.0	20.0	.0	.0	20.9
15	40150.8	20776.1	.0	20.0	.0	.0	15.4
16	40159.1	20763.1	.0	5.0	.0	.0	7.8
17	40163.6	20756.7	.0	20.0	.0	.0	36.1
18	40183.6	20726.6	.0	20.0	.0	.0	6.3
19	40187.0	20721.3	.0	20.0	.0	.0	37.2
20	40207.2	20690.1	.0	20.0	.0	.0	5.0
21	40209.7	20685.8	.0	20.0	.0	.0	85.5
22	40280.8	20733.3					
Barrier	4: TBB1-Tak Po Building						
1	40141.7	20933.4	.0	125.1	.0	.0	5.6
2	40137.2	20930.1	.0	125.1	.0	.0	40.1
3	40104.1	20907.4	.0	125.1	.0	.0	11.0
4	40110.1	20898.2	.0	20.0	.0	.0	2.9
5	40111.2	20895.5	.0	124.7	.0	.0	11.0
6	40102.1	20889.3	.0	124.7	.0	.0	21.9
7	40113.8	20870.8	.0	20.0	.0	.0	3.3
8	40113.4	20867.5	.0	124.6	.0	.0	10.7
9	40104.4	20861.7	.0	124.6	.0	.0	21.5
10	40116.2	20843.7	.0	5.2	.0	.0	5.2
11	40118.8	20839.2	.0	31.0	.0	.0	8.0
12	40114.2	20832.7	.0	31.0	.0	.0	42.2
13	40137.1	20797.2	.0	31.0	.0	.0	7.3
14	40143.3	20801.1	.0	31.0	.0	.0	2.5
15	40142.1	20803.3	.0	31.0	.0	.0	29.6
16	40166.9	20819.5					

Barrier 5: TBB2-Tak Po Building

1	40163.5	20931.3	.0	105.2	.0	.0	10.8
2	40154.6	20925.1	.0	105.2	.0	.0	21.4
3	40166.1	20907.1	.0	20.0	.0	.0	14.5
4	40155.1	20897.6	.0	105.7	.0	.0	21.6
5	40166.9	20879.5	.0	20.0	.0	.0	11.3
6	40159.3	20871.1	.0	105.3	.0	.0	21.9
7	40171.1	20852.6	.0	20.0	.0	.0	2.7
8	40172.8	20850.5	.0	105.3	.0	.0	21.7
9	40184.4	20832.2	.0	105.3	.0	.0	11.2
10	40193.9	20838.2					

Barrier 6: JFG1-Jade Field Garden, Wang Kwong and Lee Kee Building

1	40177.8	20818.6	.0	98.2	.0	.0	25.2
2	40170.4	20794.5	.0	20.0	.0	.0	7.0
3	40165.0	20790.0	.0	97.9	.0	.0	13.2
4	40154.1	20782.5	.0	97.9	.0	.0	18.9
5	40164.3	20766.6	.0	5.0	.0	.0	11.7
6	40174.2	20760.3	.0	97.9	.0	.0	23.3
7	40186.9	20740.8	.0	97.9	.0	.0	13.6
8	40198.3	20748.3	.0	20.0	.0	.0	7.5
9	40205.3	20751.0	.0	95.2	.0	.0	18.7
10	40223.1	20756.6					

Barrier 7: turr1-slope adjacent to the site

1	40013.3	21056.3	.0	28.4	.0	.0	12.7
2	40023.4	21048.6	.0	28.0	.0	.0	12.1
3	40033.2	21041.5	.0	27.0	.0	.0	16.8
4	40046.8	21031.6	.0	25.9	.0	.0	15.0
5	40061.0	21026.7	.0	24.9	.0	.0	14.0
6	40074.9	21024.8	.0	23.8	.0	.0	16.3
7	40090.9	21027.9	.0	23.3	.0	.0	8.4
8	40098.7	21031.1	.0	22.2	.0	.0	12.6
9	40090.4	21021.6	.0	19.8	.0	.0	11.9
10	40084.9	21011.1	.0	18.7	.0	.0	14.0
11	40081.7	20997.5	.0	17.5	.0	.0	14.4
12	40080.5	20983.2	.0	15.2	.0	.0	17.9
13	40082.1	20965.4	.0	14.0	.0	.0	4.7
14	40086.8	20965.4	.0	13.3	.0	.0	12.7
15	40088.0	20952.8	.0	11.8	.0	.0	9.5
16	40088.9	20943.3	.0	10.6	.0	.0	6.7
17	40091.3	20937.0	.0	9.7	.0	.0	9.2
18	40093.9	20928.2					

Barrier 8: turr3-slope adjacent to the site

1	40046.1	21057.2	.0	28.8	.0	.0	11.7
2	40038.9	21048.0	.0	27.0	.0	.0	15.1
3	40051.5	21039.6	.0	25.9	.0	.0	10.1
4	40060.8	21035.7					

Barrier 9: turr7-slope adjacent to the site

1	40033.8	21036.1	.0	30.0	.0	.0	11.7
2	40043.1	21029.0	.0	30.0	.0	.0	13.6
3	40051.5	21018.3	.0	30.0	.0	.0	9.8
4	40059.4	21012.5	.0	30.0	.0	.0	2.0
5	40060.8	21011.1	.0	30.0	.0	.0	2.7
6	40062.6	21009.1	.0	30.0	.0	.0	10.3
7	40068.6	21000.7	.0	28.7	.0	.0	3.7
8	40070.7	20997.6	.0	27.3	.0	.0	7.6
9	40074.2	20990.9	.0	24.7	.0	.0	7.9
10	40076.7	20983.4	.0	22.0	.0	.0	8.6
11	40079.3	20975.2	.0	19.3	.0	.0	4.5
12	40080.7	20970.9	.0	17.2	.0	.0	4.1
13	40081.9	20967.0					

Barrier 10: os-Platform for the open space

1	40143.2	20965.8	.0	20.0	.0	.0	25.8
2	40120.5	20953.6	.0	20.0	.0	.0	12.7
3	40110.0	20946.4	.0	20.0	.0	.0	9.3
4	40103.2	20940.0	.0	20.0	.0	.0	5.4
5	40097.8	20940.6	.0	20.0	.0	.0	26.4
6	40090.1	20965.8	.0	20.0	.0	.0	3.7
7	40089.5	20969.5	.0	20.0	.0	.0	4.3
8	40085.2	20969.2	.0	20.0	.0	.0	45.3
9	40122.5	20994.9					

Barrier 11: bu1-Amoycan Industrial Central Block and Tak Po Building

1	40167.2	20819.5	.0	31.0	.0	.0	29.8
2	40142.1	20803.4	.0	31.0	.0	.0	7.7
3	40137.2	20797.5	.0	31.0	.0	.0	45.2
4	40112.5	20835.3	.0	5.2	.0	.0	6.4
5	40112.7	20841.7	.0	124.6	.0	.0	17.2
6	40103.2	20856.0	.0	124.6	.0	.0	33.2
7	40101.7	20889.2	.0	124.6	.0	.0	18.5
8	40103.8	20907.6	.0	125.1	.0	.0	6.6
9	40106.2	20913.8	.0	125.1	.0	.0	34.3
10	40134.5	20933.2	.0	125.1	.0	.0	7.3
11	40141.8	20933.1	.0	125.1	.0	.0	10.4
12	40147.6	20924.5	.0	20.0	.0	.0	7.6
13	40153.1	20919.3	.0	105.2	.0	.0	19.2
14	40163.0	20902.9	.0	105.7	.0	.0	9.5
15	40154.9	20897.9	.0	105.7	.0	.0	6.9
16	40153.4	20891.2	.0	105.7	.0	.0	20.1
17	40164.3	20874.3	.0	105.3	.0	.0	6.2
18	40159.2	20870.8	.0	105.3	.0	.0	7.3
19	40159.3	20863.5	.0	105.3	.0	.0	39.8
20	40180.7	20829.9	.0	5.2	.0	.0	7.7
21	40184.9	20823.5	.0	5.2	.0	.0	8.8
22	40177.5	20818.8	.0	98.2	.0	.0	13.5
23	40166.3	20811.2	.0	98.2	.0	.0	7.5
24	40163.2	20804.4	.0	98.2	.0	.0	12.1
25	40170.0	20794.4	.0	5.2	.0	.0	6.8
26	40165.0	20789.8	.0	97.9	.0	.0	12.9
27	40154.3	20782.6	.0	97.9	.0	.0	7.0
28	40151.2	20776.3	.0	97.9	.0	.0	12.0
29	40157.5	20766.1	.0	4.9	.0	.0	20.6
30	40173.2	20752.8	.0	97.9	.0	.0	12.0
31	40179.9	20742.9	.0	4.9	.0	.0	23.0
32	40197.6	20728.2					

Barrier 12: bu2-Amoycan Industrial Central Block and Tak Po Building

1	40166.9	20819.4	.0	31.0	.0	.0	29.7
2	40141.9	20803.4	.0	31.0	.0	.0	7.7
3	40137.4	20797.2	.0	31.0	.0	.0	45.3
4	40112.5	20835.1	.0	5.2	.0	.0	6.8
5	40112.6	20841.9	.0	124.6	.0	.0	14.7
6	40125.2	20849.5	.0	124.6	.0	.0	7.2
7	40125.0	20856.7	.0	124.6	.0	.0	17.9
8	40114.9	20871.5	.0	124.7	.0	.0	10.0
9	40123.3	20876.9	.0	124.7	.0	.0	6.3
10	40124.3	20883.1	.0	124.7	.0	.0	16.3
11	40115.5	20896.8	.0	125.1	.0	.0	36.5
12	40145.4	20917.8	.0	125.1	.0	.0	6.9
13	40148.0	20924.2	.0	20.0	.0	.0	7.1
14	40153.1	20919.3	.0	105.2	.0	.0	19.2
15	40163.0	20902.9	.0	105.7	.0	.0	9.5
16	40154.9	20897.9	.0	105.7	.0	.0	6.9
17	40153.4	20891.2	.0	105.7	.0	.0	20.1
18	40164.3	20874.3	.0	105.3	.0	.0	6.2
19	40159.2	20870.8	.0	105.3	.0	.0	7.3
20	40159.3	20863.5	.0	105.3	.0	.0	39.8
21	40180.7	20829.9	.0	5.2	.0	.0	7.7
22	40184.9	20823.5	.0	5.2	.0	.0	8.8
23	40177.5	20818.8	.0	98.2	.0	.0	13.5
24	40166.3	20811.2	.0	98.2	.0	.0	7.5
25	40163.2	20804.4	.0	98.2	.0	.0	12.1
26	40170.0	20794.4	.0	5.2	.0	.0	6.8
27	40165.0	20789.8	.0	97.9	.0	.0	12.9

28	40154.3	20782.6	.0	97.9	.0	.0	7.0
29	40151.2	20776.3	.0	97.9	.0	.0	12.0
30	40157.5	20766.1	.0	4.9	.0	.0	20.6
31	40173.2	20752.8	.0	97.9	.0	.0	12.0
32	40179.9	20742.9	.0	4.9	.0	.0	23.0
33	40197.6	20728.2					

Barrier 13: M1 3-Storeys carpark in Phase 1

1	40143.3	21050.6	.0	21.0	.0	.0	51.9
2	40100.7	21020.9	.0	21.0	.0	.0	5.0
3	40103.6	21016.8	.0	32.6	.0	.0	6.3
4	40097.8	21014.3	.0	32.9	.0	.0	5.2
5	40094.2	21010.6	.0	33.2	.0	.0	5.7
6	40092.2	21005.3	.0	33.5	.0	.0	5.4
7	40092.0	20999.9	.0	33.8	.0	.0	5.7
8	40094.3	20994.7	.0	34.0	.0	.0	5.7
9	40098.5	20990.9	.0	34.2	.0	.0	5.2
10	40103.4	20989.2	.0	34.5	.0	.0	5.5
11	40108.9	20989.3	.0	34.8	.0	.0	5.4
12	40113.8	20991.6	.0	35.1	.0	.0	6.2
13	40117.9	20996.2	.0	35.4	.0	.0	2.8
14	40118.9	20998.8	.0	35.6	.0	.0	4.2
15	40122.9	20997.6	.0	23.9	.0	.0	4.7
16	40125.6	20993.7	.0	23.9	.0	.0	16.3
17	40136.1	20981.2	.0	23.9	.0	.0	3.2
18	40137.9	20978.6	.0	23.9	.0	.0	32.3
19	40164.4	20997.0	.0	23.9	.0	.0	3.0
20	40162.7	20999.5	.0	23.9	.0	.0	13.2
21	40173.6	21007.0	.0	23.9	.0	.0	19.3
22	40162.6	21022.9	.0	26.0	.0	.0	33.7
23	40143.3	21050.5					

Barrier 14: M2 3-Storeys carpark in Phase 1

1	40103.6	21016.9	.0	35.6	.0	.0	4.3
2	40107.1	21019.4	.0	35.6	.0	.0	3.5
3	40105.0	21022.2	.0	35.6	.0	.0	28.0
4	40128.1	21038.1	.0	32.4	.0	.0	9.1
5	40135.6	21043.2	.0	32.4	.0	.0	2.8
6	40137.3	21041.0					

Barrier 15: M3 3-Storeys carpark in Phase 1

1	40153.3	21019.8	.0	40.7	.0	.0	36.3
2	40123.5	20999.1	.0	39.6	.0	.0	13.2
3	40115.9	21009.9	.0	37.5	.0	.0	13.3
4	40108.4	21020.9	.0	38.0	.0	.0	36.2
5	40138.1	21041.6	.0	38.0	.0	.0	1.0
6	40138.6	21040.7	.0	32.4	.0	.0	.9
7	40139.4	21041.2	.0	32.4	.0	.0	1.8
8	40140.4	21039.7	.0	29.2	.0	.0	1.3
9	40141.5	21040.4	.0	41.4	.0	.0	5.7
10	40138.2	21045.1	.0	41.4	.0	.0	5.9
11	40143.0	21048.5	.0	41.4	.0	.0	5.8
12	40146.3	21043.7	.0	41.4	.0	.0	4.4
13	40142.7	21041.2	.0	26.0	.0	.0	26.6
14	40158.0	21019.4	.0	26.0	.0	.0	5.7
15	40162.6	21022.8	.0	23.9	.0	.0	19.3
16	40173.6	21007.0					

Barrier 16: M4 3-Storeys carpark in Phase 1

1	40120.1	20998.3	.0	35.6	.0	.0	2.9
2	40122.5	21000.0	.0	35.6	.0	.0	6.8
3	40126.4	20994.4	.0	35.6	.0	.0	4.9
4	40130.4	20997.2	.0	35.6	.0	.0	2.5
5	40128.9	20999.2	.0	35.6	.0	.0	30.5
6	40153.9	21016.7	.0	32.4	.0	.0	2.2
7	40155.7	21017.9	.0	29.2	.0	.0	2.5
8	40157.7	21019.4	.0	26.0	.0	.0	5.8
9	40162.5	21022.7	.0	23.9	.0	.0	19.3
10	40173.5	21006.9					

Prediction of Daytime Railway Noise Levels at NSR N1-1/F

Receptor	Easting	Northing	Height	Theta1	Theta2
201-1	40180.5	21039.2	25.8	137.0	340.1

Track	Seg.	Train Type	SEL	SC	ABC	DC	SGC	AC	BC	OFC	FAC	CSEL	Flow
MTS1	1	1	86.0	.0	-.9	-7.3	.0	-11.2	-21.0	.0	2.5	48.0	17.0
	2	1	86.0	.0	-.9	-7.4	.0	-6.7	-13.4	.0	2.5	60.2	17.0
	3	1	86.0	.0	-.9	-7.4	.0	-13.8	-20.3	.0	2.5	46.1	17.0
MTS2	1	1	86.0	.0	-.9	-7.3	.0	-22.5	-21.0	.0	2.5	36.8	17.0
	2	1	86.0	.0	-1.1	-8.0	.0	-22.8	-21.0	.0	2.5	35.6	17.0
	3	1	86.0	.0	-1.2	-8.3	.0	-20.2	-20.4	.0	2.5	38.4	17.0
MTS3	1	1	86.0	.0	-1.1	-8.3	.0	-25.5	-20.0	.0	2.5	33.6	17.0
MTN5	1	1	86.9	.0	-1.0	-7.8	.0	-23.7	-20.3	.0	2.5	36.6	17.0
MTN6	1	1	86.9	.0	-1.0	-7.7	.0	-24.3	-21.0	.0	2.5	35.4	17.0
	2	1	86.9	.0	-.9	-7.5	.0	-18.0	-21.0	.0	2.5	42.0	17.0
MTN7	1	1	86.9	.0	-.9	-7.5	.0	-9.2	-9.6	.0	2.5	62.2	17.0
	2	1	86.9	.0	-.9	-7.5	.0	-8.6	-16.2	.0	2.5	56.2	17.0
	3	1	86.9	.0	-.9	-7.6	.0	-9.5	-21.0	.0	2.5	50.4	17.0

Leq(30 min) from track MTS1 = 40.3 dB(A)
Leq(30 min) from track MTS2 = 21.6 dB(A)
Leq(30 min) from track MTS3 = 13.4 dB(A)
Leq(30 min) from track MTN5 = 16.4 dB(A)
Leq(30 min) from track MTN6 = 22.6 dB(A)
Leq(30 min) from track MTN7 = 43.2 dB(A)

Overall Leq(30 min) = 45.0 dB(A)

Prediction of Daytime Railway Noise Levels at NSR N1-5/F

Receptor	Easting	Northing	Height	Theta1	Theta2
201-5	40180.5	21039.2	36.6	137.0	340.1

Track	Seg.	Train Type	SEL	SC	ABC	DC	SGC	AC	BC	OFC	FAC	CSEL	Flow
MTS1	1	1	86.0	.0	-.9	-7.4	.0	-11.2	-20.4	.0	2.5	48.6	17.0
	2	1	86.0	.0	-.9	-7.4	.0	-6.7	-3.4	.0	2.5	70.1	17.0
	3	1	86.0	.0	-.9	-7.4	.0	-13.8	-20.3	.0	2.5	46.0	17.0
MTS2	1	1	86.0	.0	-.9	-7.4	.0	-22.5	-21.0	.0	2.5	36.7	17.0
	2	1	86.0	.0	-1.1	-8.0	.0	-22.8	-21.0	.0	2.5	35.6	17.0
	3	1	86.0	.0	-1.2	-8.3	.0	-20.2	-17.9	.0	2.5	40.9	17.0
MTS3	1	1	86.0	.0	-1.2	-8.3	.0	-25.5	-17.1	.0	2.5	36.5	17.0
MTN5	1	1	86.9	.0	-1.0	-7.8	.0	-23.7	-17.3	.0	2.5	39.6	17.0
MTN6	1	1	86.9	.0	-1.0	-7.7	.0	-24.3	-21.0	.0	2.5	35.4	17.0
	2	1	86.9	.0	-.9	-7.5	.0	-18.0	-21.0	.0	2.5	41.9	17.0
MTN7	1	1	86.9	.0	-.9	-7.6	.0	-9.2	-2.9	.0	2.5	68.9	17.0
	2	1	86.9	.0	-.9	-7.6	.0	-8.6	-7.1	.0	2.5	65.1	17.0
	3	1	86.9	.0	-1.0	-7.6	.0	-9.5	-20.0	.0	2.5	51.3	17.0

Leq(30 min) from track MTS1 = 49.9 dB(A)
Leq(30 min) from track MTS2 = 22.9 dB(A)
Leq(30 min) from track MTS3 = 16.3 dB(A)
Leq(30 min) from track MTN5 = 19.4 dB(A)
Leq(30 min) from track MTN6 = 22.6 dB(A)
Leq(30 min) from track MTN7 = 50.2 dB(A)

Overall Leq(30 min) = 53.1 dB(A)

Prediction of Daytime Railway Noise Levels at NSR N1-10/F

Receptor	Easting	Northing	Height	Theta1	Theta2
201-10	40180.5	21039.2	50.1	137.0	340.1

Track	Seg.	Train Type	SEL	SC	ABC	DC	SGC	AC	BC	OFC	FAC	CSEL	Flow
MTS1	1	1	86.0	.0	-.9	-7.5	.0	-11.2	-16.9	.0	2.5	52.0	17.0
	2	1	86.0	.0	-.9	-7.5	.0	-6.7	-2.6	.0	2.5	70.8	17.0
	3	1	86.0	.0	-.9	-7.5	.0	-13.8	-20.3	.0	2.5	45.9	17.0
MTS2	1	1	86.0	.0	-.9	-7.5	.0	-22.5	-21.0	.0	2.5	36.6	17.0
	2	1	86.0	.0	-1.1	-8.1	.0	-22.8	-21.0	.0	2.5	35.5	17.0
	3	1	86.0	.0	-1.2	-8.4	.0	-20.2	-12.7	.0	2.5	46.0	17.0
MTS3	1	1	86.0	.0	-1.2	-8.4	.0	-25.5	-10.2	.0	2.5	43.3	17.0
MTN5	1	1	86.9	.0	-1.0	-7.9	.0	-23.7	-9.7	.0	2.5	47.1	17.0
MTN6	1	1	86.9	.0	-1.0	-7.8	.0	-24.3	-21.0	.0	2.5	35.3	17.0
	2	1	86.9	.0	-1.0	-7.6	.0	-18.0	-21.0	.0	2.5	41.8	17.0
MTN7	1	1	86.9	.0	-1.0	-7.6	.0	-9.2	-2.2	.0	2.5	69.4	17.0
	2	1	86.9	.0	-1.0	-7.6	.0	-8.6	-5.4	.0	2.5	66.7	17.0
	3	1	86.9	.0	-1.0	-7.7	.0	-9.5	-16.8	.0	2.5	54.5	17.0

Leq(30 min) from track MTS1 = 50.7 dB(A)
Leq(30 min) from track MTS2 = 26.6 dB(A)
Leq(30 min) from track MTS3 = 23.1 dB(A)
Leq(30 min) from track MTN5 = 26.8 dB(A)
Leq(30 min) from track MTN6 = 22.5 dB(A)
Leq(30 min) from track MTN7 = 51.1 dB(A)

Overall Leq(30 min) = 53.9 dB(A)

Prediction of Daytime Railway Noise Levels at NSR N2-1/F

Receptor	Easting	Northing	Height	Theta1	Theta2
211-1	40203.0	21034.0	25.8	132.1	264.8

Track	Seg.	Train Type	SEL	SC	ABC	DC	SGC	AC	BC	OFC	FAC	CSEL	Flow
MTS1	1	1	86.0	.0	-1.1	-8.0	.0	-11.5	-21.0	.0	2.5	46.9	17.0
	2	1	86.0	.0	-1.1	-8.0	.0	-6.2	-11.6	.0	2.5	61.6	17.0
	3	1	86.0	.0	-1.1	-8.0	.0	-12.4	-21.8	.0	2.5	45.2	17.0
MTS2	1	1	86.0	.0	-1.1	-8.0	.0	-20.8	-21.1	.0	2.5	37.6	17.0
	2	1	86.0	.0	-1.2	-8.6	.0	-21.3	-20.9	.0	2.5	36.5	17.0
	3	1	86.0	.0	-1.3	-8.8	.0	-18.8	-20.2	.0	2.5	39.3	17.0
MTS3	1	1	86.0	.0	-1.3	-8.8	.0	-24.0	-21.0	.0	2.5	33.4	17.0
MTN5	1	1	86.9	.0	-1.2	-8.3	.0	-22.0	-21.0	.0	2.5	36.8	17.0
MTN6	1	1	86.9	.0	-1.1	-8.3	.0	-22.7	-21.0	.0	2.5	36.3	17.0
	2	1	86.9	.0	-1.1	-8.1	.0	-16.4	-18.1	.0	2.5	45.7	17.0
MTN7	1	1	86.9	.0	-1.1	-8.1	.0	-8.2	-6.9	.0	2.5	65.0	17.0
	2	1	86.9	.0	-1.1	-8.1	.0	-8.5	-13.0	.0	2.5	58.6	17.0
	3	1	86.9	.0	-1.1	-8.2	.0	-9.9	-21.0	.0	2.5	49.2	17.0

Leq(30 min) from track MTS1 = 41.6 dB(A)
Leq(30 min) from track MTS2 = 22.5 dB(A)
Leq(30 min) from track MTS3 = 13.2 dB(A)
Leq(30 min) from track MTN5 = 16.6 dB(A)
Leq(30 min) from track MTN6 = 25.9 dB(A)
Leq(30 min) from track MTN7 = 45.8 dB(A)

Overall Leq(30 min) = 47.2 dB(A)

Prediction of Daytime Railway Noise Levels at NSR N2-5/F

Receptor	Easting	Northing	Height	Theta1	Theta2
211-5	40203.0	21034.0	36.6	132.1	264.8

Track	Seg.	Train Type	SEL	SC	ABC	DC	SGC	AC	BC	OFC	FAC	CSEL	Flow
MTS1	1	1	86.0	.0	-1.1	-8.0	.0	-11.5	-20.8	.0	2.5	47.1	17.0
	2	1	86.0	.0	-1.1	-8.0	.0	-6.2	-2.4	.0	2.5	70.8	17.0
	3	1	86.0	.0	-1.1	-8.1	.0	-12.4	-21.8	.0	2.5	45.1	17.0
MTS2	1	1	86.0	.0	-1.1	-8.0	.0	-20.8	-21.1	.0	2.5	37.5	17.0
	2	1	86.0	.0	-1.2	-8.6	.0	-21.3	-19.1	.0	2.5	38.3	17.0
	3	1	86.0	.0	-1.3	-8.8	.0	-18.8	-19.8	.0	2.5	39.7	17.0
MTS3	1	1	86.0	.0	-1.3	-8.8	.0	-24.0	-21.0	.0	2.5	33.4	17.0
MTN5	1	1	86.9	.0	-1.2	-8.4	.0	-22.0	-21.0	.0	2.5	36.8	17.0
MTN6	1	1	86.9	.0	-1.1	-8.3	.0	-22.7	-21.0	.0	2.5	36.3	17.0
	2	1	86.9	.0	-1.1	-8.1	.0	-16.4	-13.7	.0	2.5	50.1	17.0
MTN7	1	1	86.9	.0	-1.1	-8.2	.0	-8.2	-4.0	.0	2.5	67.8	17.0
	2	1	86.9	.0	-1.1	-8.2	.0	-8.5	-3.4	.0	2.5	68.3	17.0
	3	1	86.9	.0	-1.1	-8.2	.0	-9.9	-20.0	.0	2.5	50.2	17.0

Leq(30 min) from track MTS1 = 50.6 dB(A)
Leq(30 min) from track MTS2 = 23.1 dB(A)
Leq(30 min) from track MTS3 = 13.2 dB(A)
Leq(30 min) from track MTN5 = 16.6 dB(A)
Leq(30 min) from track MTN6 = 30.0 dB(A)
Leq(30 min) from track MTN7 = 50.9 dB(A)

Overall Leq(30 min) = 53.8 dB(A)

Prediction of Daytime Railway Noise Levels at NSR N2-10/F

Receptor	Easting	Northing	Height	Theta1	Theta2
211-10	40203.0	21034.0	50.1	132.1	264.8

Track	Seg.	Train Type	SEL	SC	ABC	DC	SGC	AC	BC	OFC	FAC	CSEL	Flow
MTS1	1	1	86.0	.0	-1.1	-8.1	.0	-11.5	-18.3	.0	2.5	49.5	17.0
	2	1	86.0	.0	-1.1	-8.1	.0	-6.2	-1.0	.0	2.5	72.1	17.0
	3	1	86.0	.0	-1.1	-8.1	.0	-12.4	-21.8	.0	2.5	45.0	17.0
MTS2	1	1	86.0	.0	-1.1	-8.1	.0	-20.8	-21.1	.0	2.5	37.4	17.0
	2	1	86.0	.0	-1.3	-8.6	.0	-21.3	-19.1	.0	2.5	38.2	17.0
	3	1	86.0	.0	-1.3	-8.9	.0	-18.8	-19.8	.0	2.5	39.6	17.0
MTS3	1	1	86.0	.0	-1.3	-8.8	.0	-24.0	-21.0	.0	2.5	33.3	17.0
MTN5	1	1	86.9	.0	-1.2	-8.4	.0	-22.0	-21.0	.0	2.5	36.7	17.0
MTN6	1	1	86.9	.0	-1.2	-8.4	.0	-22.7	-21.0	.0	2.5	36.2	17.0
	2	1	86.9	.0	-1.1	-8.2	.0	-16.4	-11.8	.0	2.5	51.8	17.0
MTN7	1	1	86.9	.0	-1.1	-8.2	.0	-8.2	-4.0	.0	2.5	67.8	17.0
	2	1	86.9	.0	-1.1	-8.2	.0	-8.5	-1.7	.0	2.5	69.9	17.0
	3	1	86.9	.0	-1.1	-8.3	.0	-9.9	-16.9	.0	2.5	53.2	17.0

Leq(30 min) from track MTS1 = 51.8 dB(A)
Leq(30 min) from track MTS2 = 23.0 dB(A)
Leq(30 min) from track MTS3 = 13.1 dB(A)
Leq(30 min) from track MTN5 = 16.5 dB(A)
Leq(30 min) from track MTN6 = 31.7 dB(A)
Leq(30 min) from track MTN7 = 51.8 dB(A)

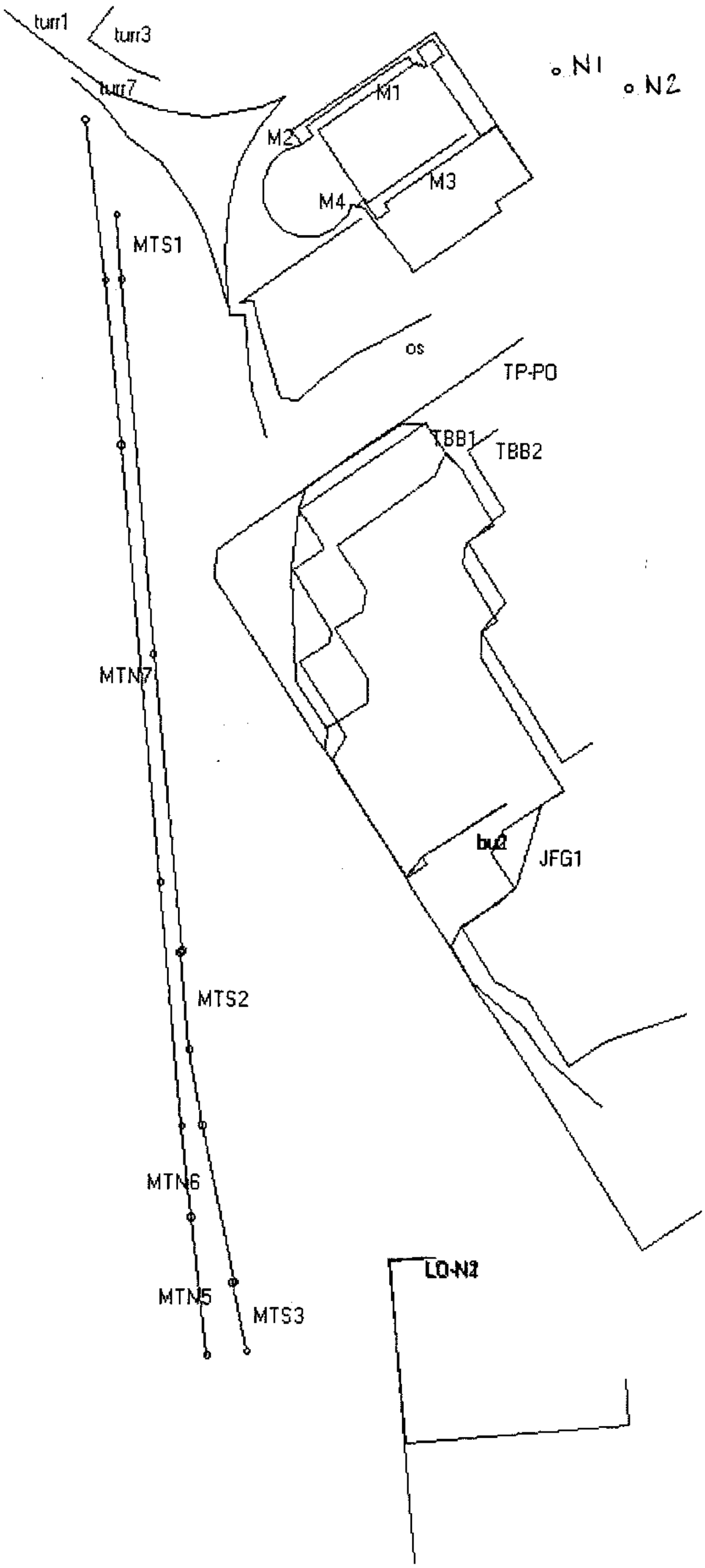
Overall Leq(30 min) = 54.8 dB(A)

Remarks:

1 Seg - Road Segment Number
2 Train Type - Train Type
3 SEL - Sound Exposure Level for each different train type at a reference distance of 25m from the track
4 SC - Speed Correction
5 ABC - Air Absorption Correction
6 DC - Distance Correction
7 SGC - Ground Correction
8 AC - Angle of view Correction
9 BC - Barrier Correction
10 OFC - Opposite Façade Correction
11 FAC - Façade Correction
12 CSEL - Corrected Sound Exposure Level
13 Flow - Total number of trains in 30 min

Appendix 4.1 Sample Calculation of Railway Noise Levels

The plot of "CRNM95" Model

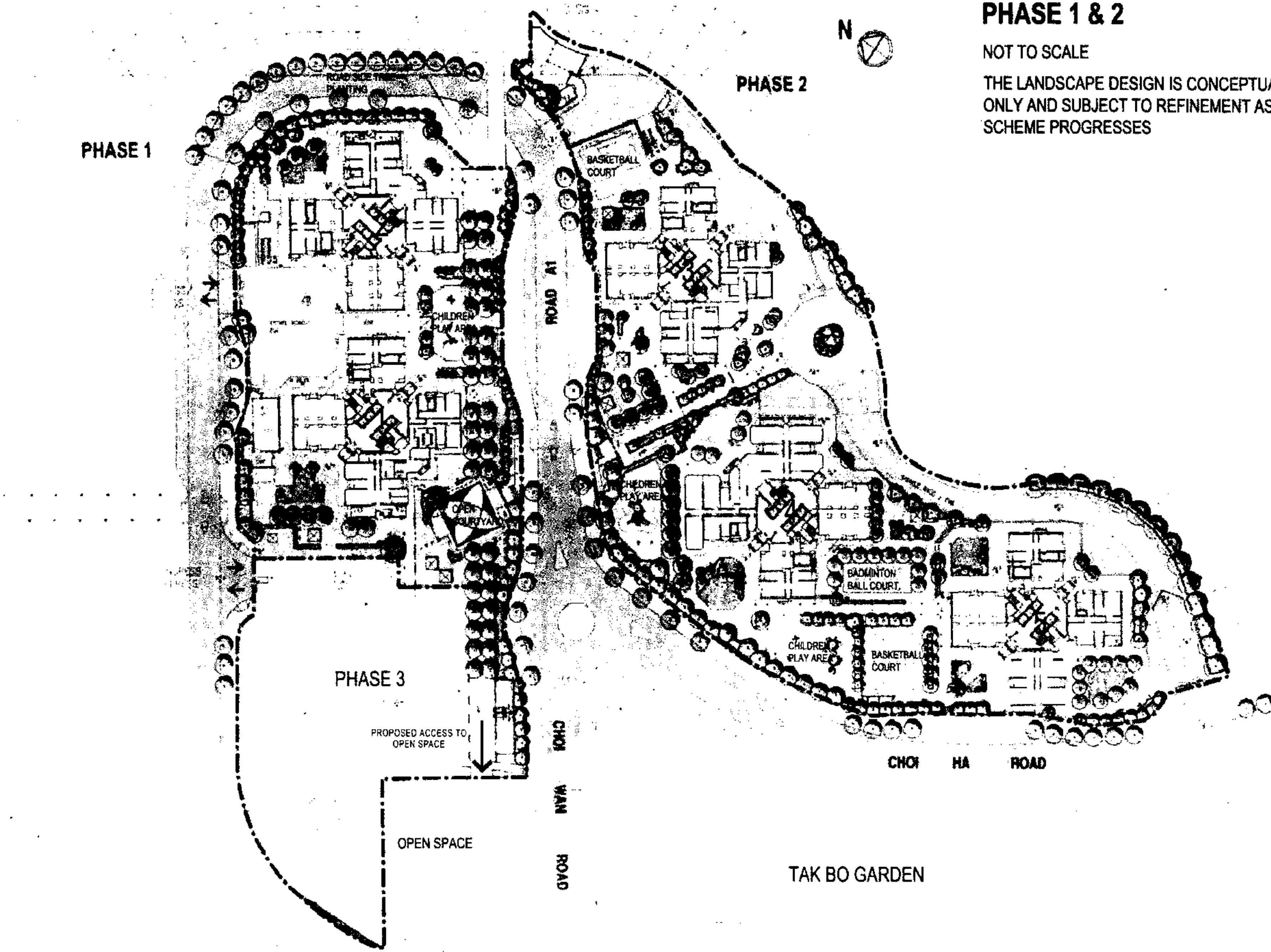


Appendix 6.1 Master Landscape Plan

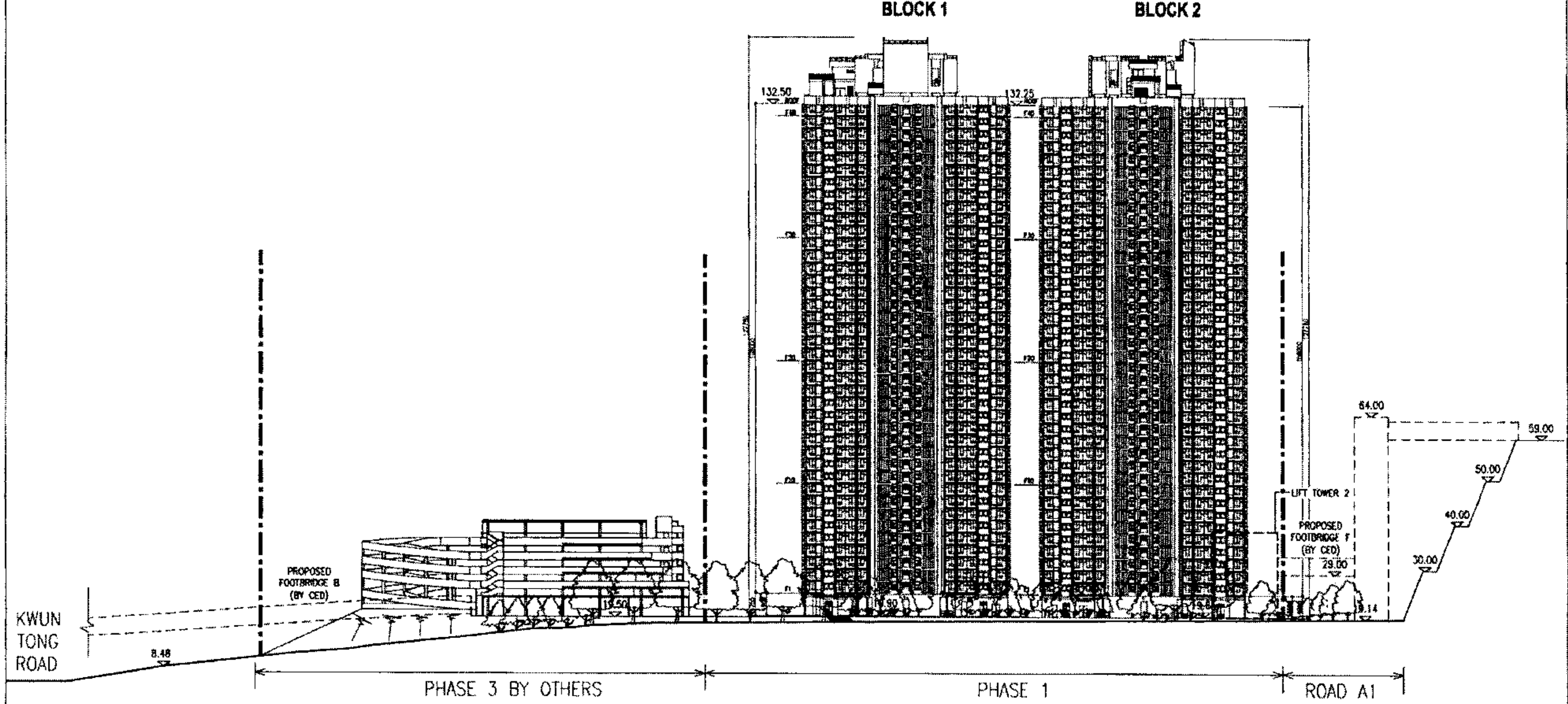
CHOI WAN ROAD SITE 1
PHASE 1 & 2

NOT TO SCALE

THE LANDSCAPE DESIGN IS CONCEPTUAL ONLY AND SUBJECT TO REFINEMENT AS THE SCHEME PROGRESSES



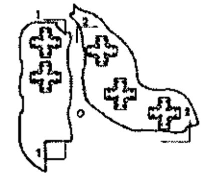
Appendix 6.2 Linkage between Site 1 and the Adjacent Open Space



ELEVATION 1

NOTES

KEY PLAN



REVISIONS

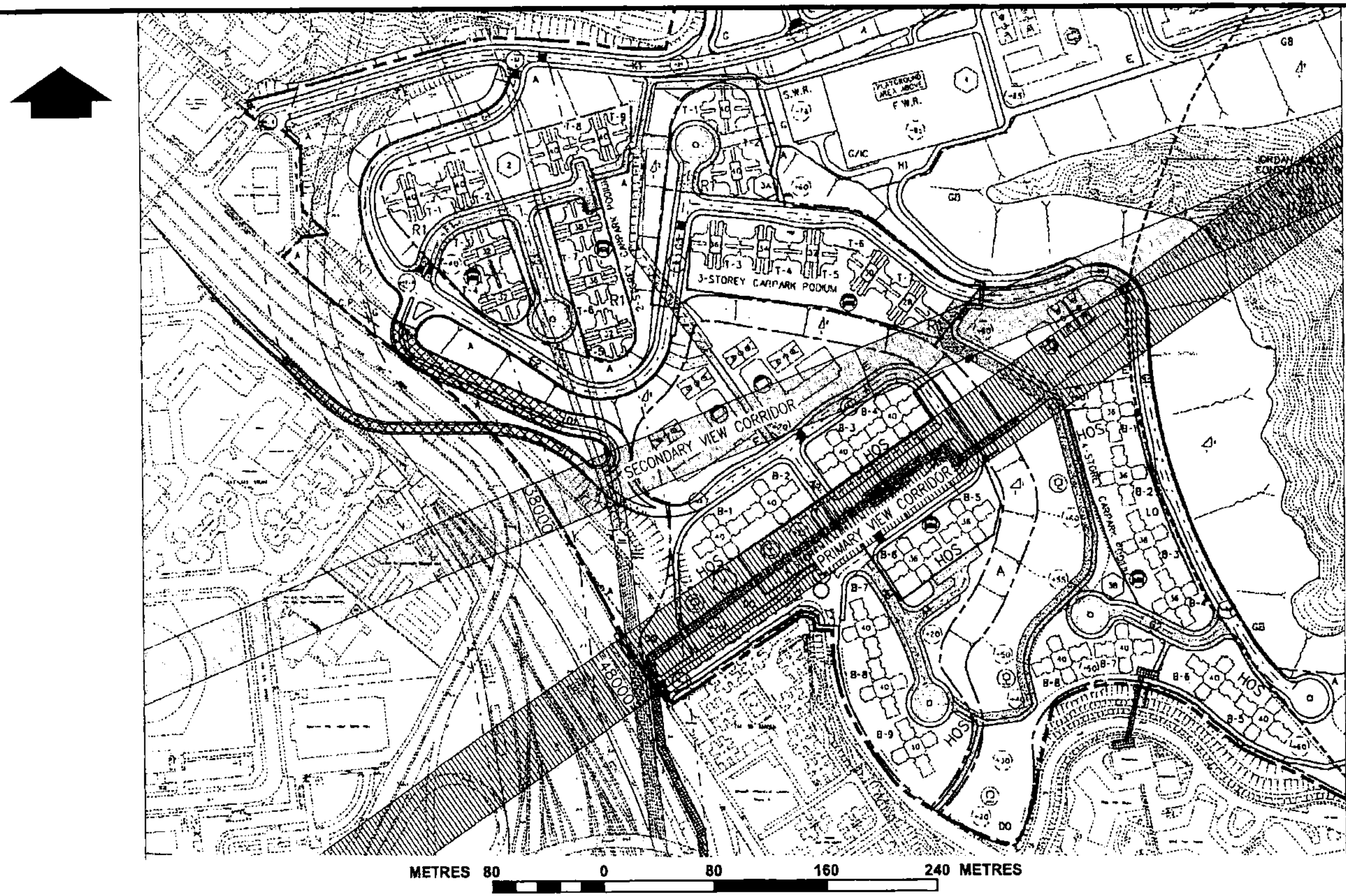
CHOI WAN ROAD
SITE 1 PHASE 1 & 2

SITE ELEVATION 1

KE05/1&2/SITE/DDR-03

HOUSING DEPARTMENT

Appendix 6.3 **Original Feasibility Scheme with HOS Block and 48m view corridor**



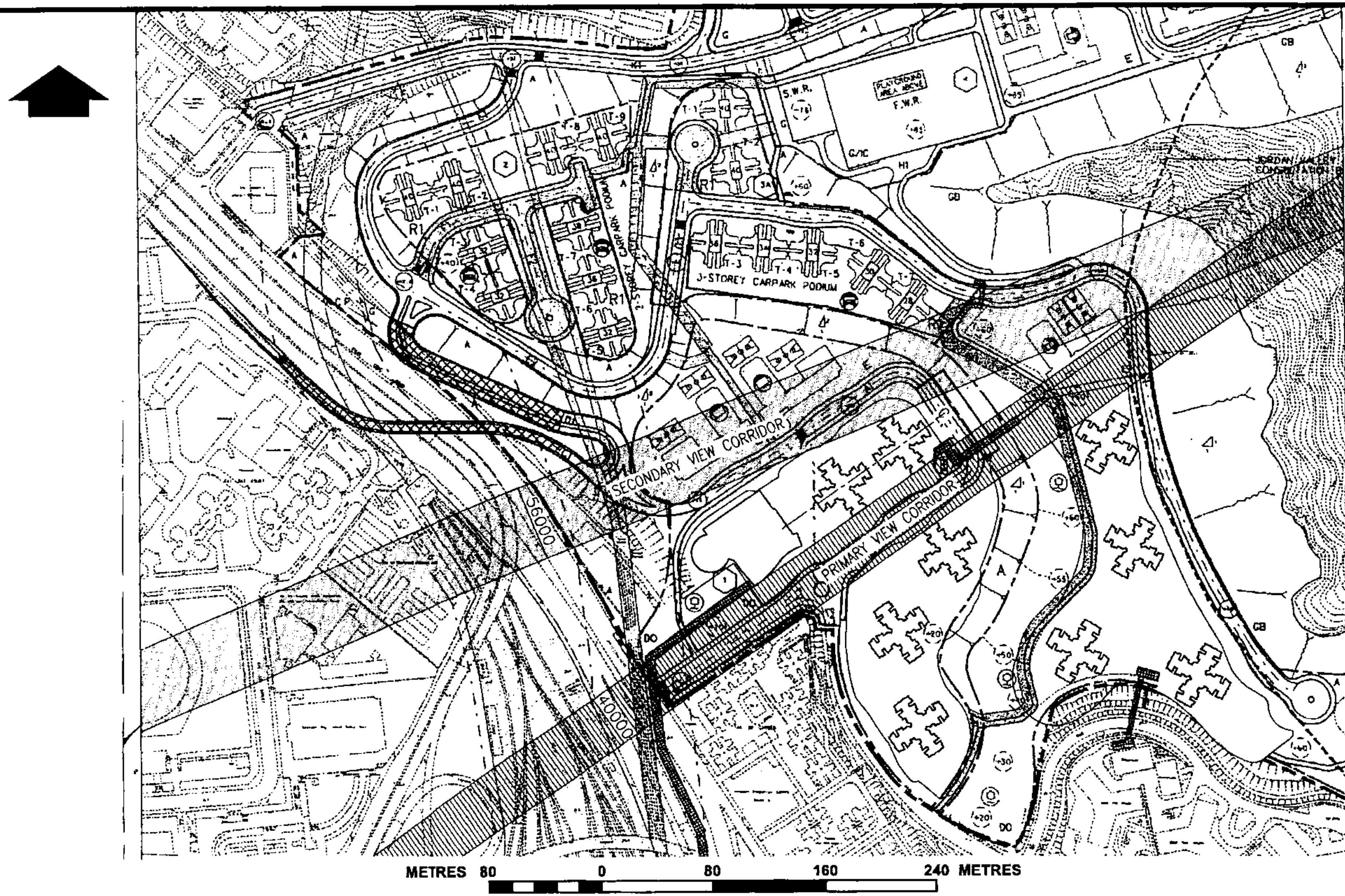
CHOI WAN ROAD SITE 1
Original Feasibility Scheme with HOS Blocks
- View Corridor approx. 48m

HOUSING DEPARTMENT
PLANNING SECTION

PLAN No.	DATE :
	14. 1. 05

05_001BKLN

Appendix 6.4 **Current Scheme with NH1 Blocks and 40m view corridor**



CHOI WAN ROAD SITE 1
Scheme with NH1 Blocks
- View Corridor approx. 40m

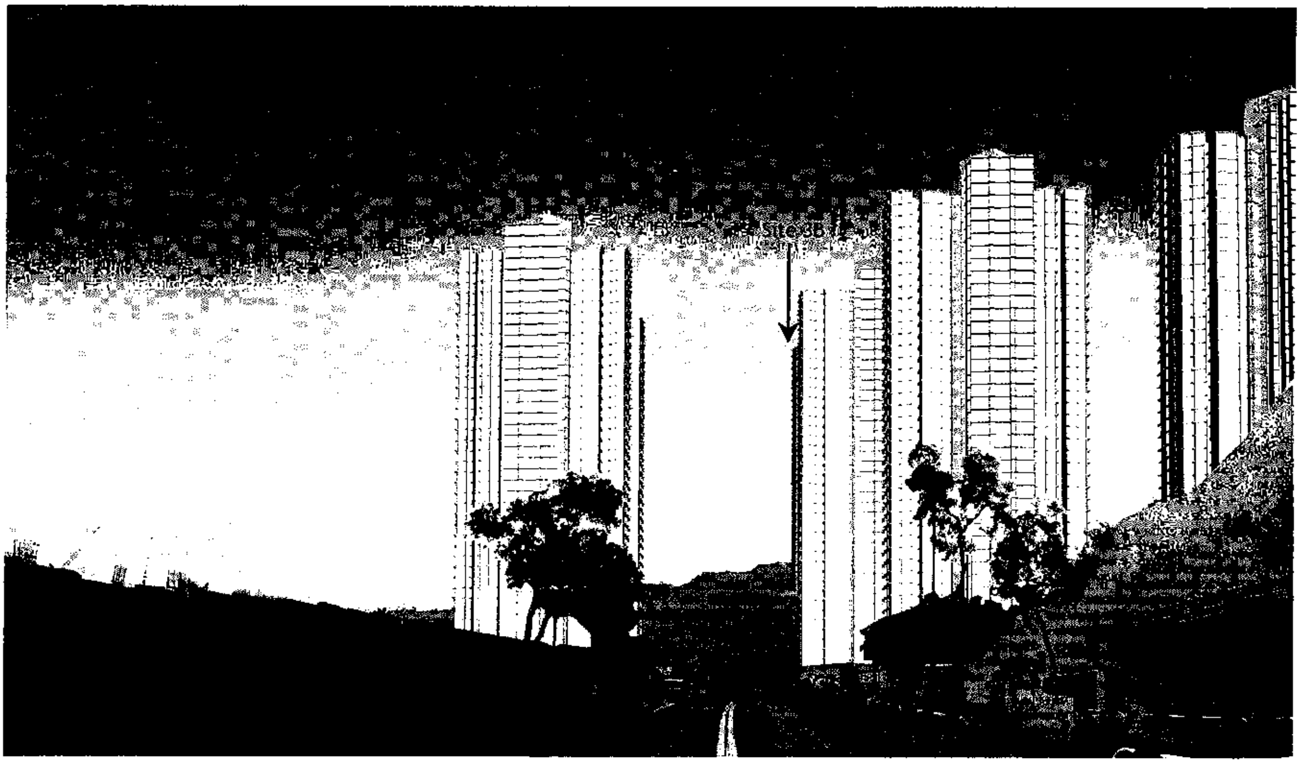
HOUSING DEPARTMENT
PLANNING SECTION

PLAN No.	DATE : 14. 1. 05

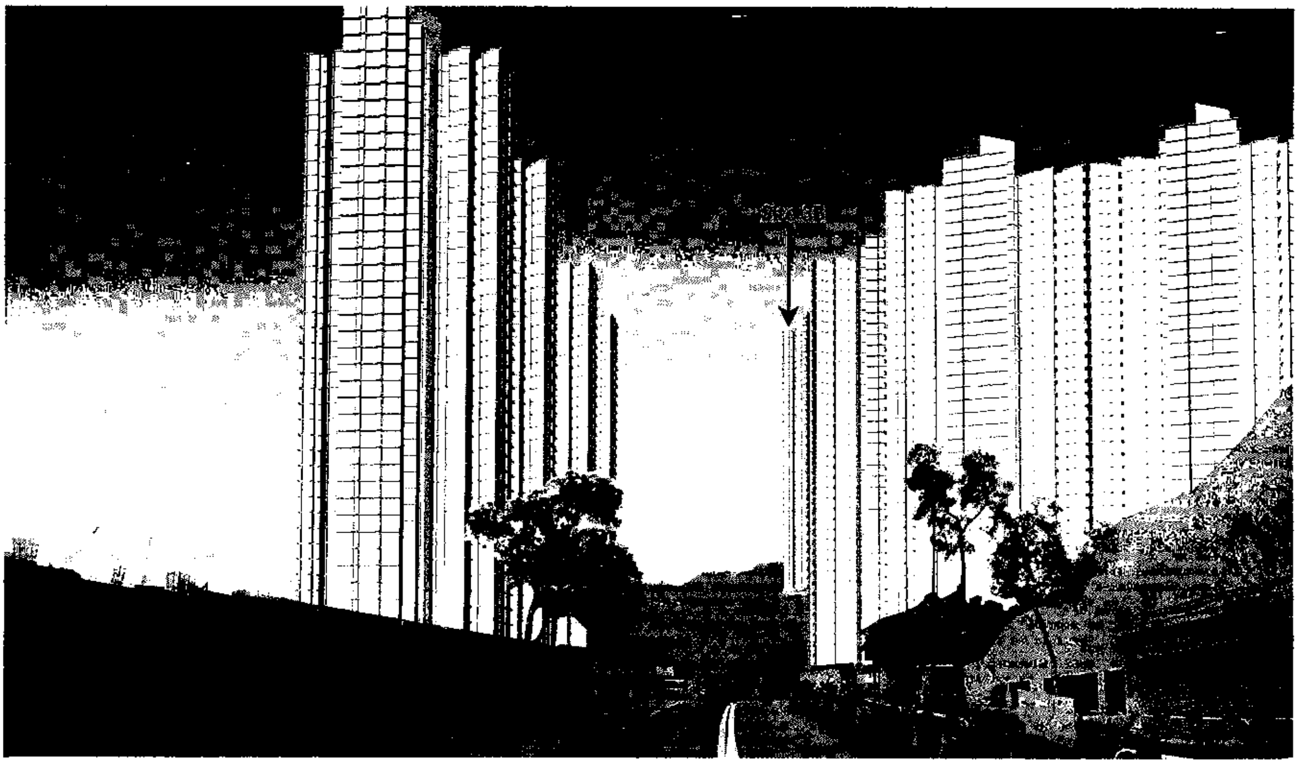
05_0018KLN-40m

Appendix 6.5 View Corridor from Choi Wan Road

Appendix 6.5 – View Corridor from Choi Wan Road (Primary View Corridor)



Current Scheme: Scheme with NH1 blocks – view corridor approx. 40m

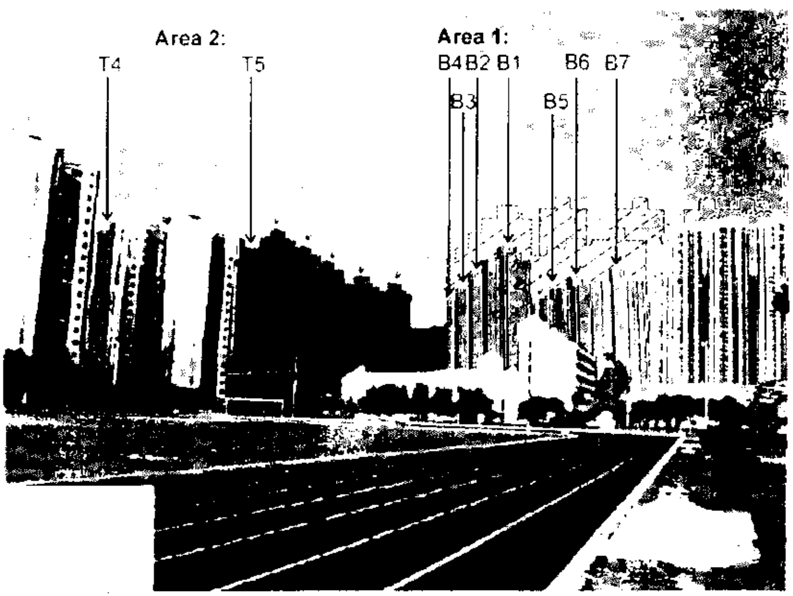


CED's Feasibility Scheme (Scheme with HOS blocks) – view corridor approx. 48m

Appendix 6.6 View Corridor from Kowloon Bay Recreation Area

Appendix 6.6 – View Corridor from Kowloon Bay Recreation Area (Secondary View Corridor)

Current Scheme – view corridor approx. 56m



View Corridor from Kowloon Bay Recreation Area

Existing View

CED's Feasibility Scheme (HOS Blocks Assumed) - view corridor approx. 38m