1. INTRODUCTION

1.1 Background

1.1.1 In August 1997 Scott Wilson (Hong Kong) Ltd, in association with specialist sub-consultants, were commissioned by the Civil Engineering Department (CED) to undertake a Planning and Engineering Feasibility Study for Development near Choi Wan Road and Jordan Valley (Agreement No. CE 19/97). The Choi Wan Road / Jordan Valley area has been identified as a potential new development site on the periphery of a developed urban area to which new roads and infrastructure could be extended without undue difficulty.

1.1.2 This Study has examined the development potential and analysed the feasibility of various land-use options for the area. This has resulted in a preferred residential based land-use plan, a preliminary engineering design, and impact assessments to address the environmental, drainage, sewerage, water supply, traffic and geotechnical aspects of the proposed development.

1.2 Objectives of the EIA

1.2.1 As part of the Study, an Environmental Impact Assessment (EIA) has been undertaken. The purpose of the EIA has been to provide information on the nature and extent of potential environmental impacts that could arise from the construction and operation of the proposed development to determine the feasibility of the project from an environmental perspective.

1.2.2 The proposed development covers an area of approximately 36Ha. According to Schedule 3 of the Environmental Impact Assessment Ordinance, (EIAO), which came into effect on 1 April 1998, an engineering feasibility study for an urban development project with a study area greater than 20 ha, requires an EIA Report. There will not be any designated project under Schedule 2 of the EIAO within the Study Boundary.

1.3 Structure of the EIA - Executive Summary

1.3.1 This Executive Summary describes the proposed project and presents the conclusions of the EIA, indicating the major environmental impacts of the proposed development and the necessary mitigation measures to ensure the project is environmentally acceptable. Further details are given in the accompanying Final EIA Report (January 1999) and the Environmental Monitoring and Audit Manual.

1.3.2 This Executive Summary follows the format the Final EIA Report with an additional EM&A Manual as follows:

- *Section 1* Introduction
- *Section 2* Project Description
- *Section 3* Noise
- *Section 4* Air Quality
- *Section 5* Water Quality
- *Section 6* Construction Waste Management and Disposal
- *Section 7* Land Contamination
- *Section 8* Visual and Landscape Assessment
- *Section 9* Ecology
- *Section 10* Landfill Gas Hazard Assessment

- *Section 11* Environmental Monitoring & Audit Manual
- *Section 12* Conclusion

2. PROJECT DESCRIPTION

2.1 The Study Area

2.1.1 The Choi Wan Road / Jordan Valley area is situated in east Kowloon. The location and extent of the Study Area is shown in Figure 1. The environment of the Study Area comprises a variety of distinct features. To the east is the Jordan Valley Landfill, which includes an access road that extends to the eastern boundary of the Study Area. A landfill restoration project is currently being implemented by EPD as part of the Urban Landfill Restoration Programme. A steep peak dominates the south-eastern portion of the Study Area (with a service reservoir on the summit). The steep slopes of this hill are vegetated by well-developed scrub. Immediately north of this hill lies Jordan Valley Nullah, which emerges from the dam at the base of Jordan Valley Landfill. Jordan Valley Nullah, which is the main watercourse that crosses the Study Area, originates from the northern side of New Clear Water Bay Road, at its junction with Anderson Road. It passes beneath Shun Lee Estate and Shun Lee Tsuen Road in culvert before re-emerging at Jordan Valley Dam.

2.1.2 On the western side of the landfill lies a steep north-south running ridge, which slopes down towards a disused quarry and Choi Ha Estate. To the west of this ridge there is a small perched valley, heavily vegetated with scrub that has small, cultivated lots within it. The south part of the valley is bordered to the west by Flathill Quarry whilst to the north lies another disused quarry which is accessible from New Clear Water Bay Road. Flathill Quarry is the site of the Construction Industry Training Association (CITA) office.

2.1.3 The Study Area is bordered by residential areas to the south (Choi Ha Estates - including Tak Bo and Amoy Gardens) to the south-east (Lok Nga Court, Lok Wah North Estate and Lok Wah South Estate), to the north (Choi Wan Estate) and to the east (Shun Lee Estate, Shun On Estate and Shun Tin Estate).

2.2 Description of the Development

2.2.1 The preferred development option for the sites near Choi Wan Road and Jordan Valley comprise three platform formations for residential development, namely Areas 1, 2 and 3 founded at elevations 20, 40 and 60mPD respectively (see Figure 2). In addition two platforms will be developed for infrastructure including Area 4, (which will house a fresh-water reservoir, a salt-water reservoir and two schools), and Area 5 (which will house two schools). Site formation of the platform areas will entail the movement and disposal of approximately 4.6M m^3 of spoil/rock off-site. The layout has maximised the development area for the site and has met the planning requirement by providing some 11,120 flats, in addition to providing sufficient space for government, institutional and community (G/IC) facilities and local and district open space. The development will be served by roads, which will link into the external transportation network.

There is also the need for road junction improvements at locations that are external to the study area and for drainage, sewerage and water supply infrastructure improvements to be implemented so as to cater for increased flows from the development area. Landscaping measures are associated with the establishment of the platforms and surrounding slope works. In addition, the excavated spoil generated through the formation of the platforms will be available for reclamation projects such as the South-East Kowloon Development (SEKD). A computer generated image of the development is given in Figure 3. Table 2.1 gives a schedule of uses and areas for the proposed development.

Table 2.1 - Schedule of Use and Areas

Uses	Notation	Site Area		Population
		Hectares	% of Total	
1. Residential				
Public Housing	HOS/PSPS	5.38	14.9	21,386
Private Housing	R1	3.65	10.1	13,680
Residential Total		**9.03**	**25.0**	**35,066**
2. Educational	E	**4.97**	**13.8**	
3. Government Reservation	G	1.47	4.1	
4. Institution and Community	IC	0.20	0.6	
5. District Open Space	DO	3.29	9.1	
6. Amenity Area	A	6.35	17.5	
7. Green Belt	GB	5.59	15.5	
8. Road Reserve	-	5.21	14.4	
Total Development Area		36.11	100	

2.2.2 The majority of the Planning Area (Figure 2) is currently zoned Green Belt (GB), Open Space (O) or Government, Institution or Community (G/IC). Part of Flathill Quarry is zoned Undetermined (U). The new zones that will be afforded to the site are detailed in Table 2.2.

Table 2.2 - Proposed Zoning

Proposed Uses	Proposed Zoning
Home Ownership Scheme	R(A)
Private Housing	R(A)
Educational	G/IC
Government Reservation	G/IC
Institution and Community	G/IC
District Open Space	O
Amenity Area	GB
Green Belt	GB

2.2.3 The environmental impact assessment has taken into account the following:

- Site Formation
- Building Construction
- Sewerage Infrastructure
- Drainage Infrastructure
- Water Supply Facilities
- New and up-graded roads (and associated traffic flows)
- Utilities and services including gas, electricity, telephone and cable TV.

3. NOISE

3.1 Construction Phase

3.1.1 The construction of the proposed development is anticipated to last for about 8 years from 2002 to 2009, with development activities being undertaken in phases that may cause adverse noise impacts to the adjacent noise sensitive receivers. With the use of practicable mitigation measures such as "quiet"/alternative powered mechanical equipment and temporary noise barriers, the residual noise impacts will meet the EIA-TM daytime noise criteria. Alternative methods for noise reduction and control will be incorporated into the design and construction contract clauses.

3.2 Operational Phase - Road Traffic Noise

3.2.1 Noise modelling has predicted that some of the proposed residential buildings and schools within the study area will exceed the traffic noise standards stipulated in the EIA-TM.

3.2.2 Building set-back, orientation, cantilevered barriers set atop building podiums and integrated decking designs have been considered. However, these technical remedies have proved to be ineffective/impracticable to reduce traffic noise impacts at certain residential buildings. As all practicable effective noise mitigation measures have been exhausted, indirect mitigation measures in the form of window insulation and air-conditioning should be provided to abate the residual impacts.

3.2.3 For schools, noise barriers in the form of boundary walls are considered to be effective to reduce the traffic noise impacts and are thus proposed as direct technical remedies. In addition, window insulation and air conditioners are to be provided to address the residual noise impacts.

3.2.4 The predicted results indicate that the proposed development, with its proposed new roads, will not cause noise impacts on the existing noise sensitive receivers. It has also been proved that contribution from new roads to the overall noise levels at the existing receivers will not be greater than 1 dB(A). The existing NSRs would therefore not be eligible for indirect mitigation measures.

3.3 Industrial Noise

3.3.1 With the use of effective noise control equipment and proper design of plant, the associated noise impacts due to the operation of the proposed electric sub-station and fire sub-station upon identified noise sensitive receivers will comply with the EIA-TM requirements.

4. AIR QUALITY

4.1 Construction Phase

4.1.1 Based on the results of the air quality impact assessment, no significant dust impacts on Air Sensitive Receivers (ASRs) and the surrounding environment are anticipated. Relevant Air Quality Objectives (AQO) / assessment criteria (for levels of Total Suspended Particulates (TSP) and Respirable Suspended Particulates (RSP)) will be met provided that effective dust mitigation measures are implemented. Site-specific mitigation measures are proposed such as a conveyor belt to transport fill material to SEKD (should SEKD be available for receipt of fill). These will significantly reduce vehicles travelling within the site with consequent benefits for air quality.

4.2 Operation Phase

4.2.1 From the modelling exercise using Caline4 for the traffic air assessment, there are no predicted exceedances of 1 hour AQO for NO_2 or 24 hour AQO for RSP at planned ASRs.

4.2.2 According to the modelling results of the Industrial Source Complex Short - Term (ISCST3) model, it is concluded that industrial sources and the landfill gas flare will not pose unacceptable air quality impact on the planned ASRs.

4.2.3 By considering the predicted air emissions from different models, it is concluded that the combined sources during the operational phases will not pose unacceptable air quality impacts on the planned ASRs.

5. WATER QUALITY

5.1 Construction

5.1.1 During the construction phase, the greatest potential for adverse impacts on the aquatic environment is from the discharge of silt-laden sediment into the surface drainage and trunk sewer system. If good site management practices (as detailed in ProPECC PN 1/94) prevail to remove suspended solids prior to discharge, adverse impacts on the drainage/sewer systems and the receiving marine environment are not anticipated.

5.1.2 Impacts related to the on-site generation of sewage can be mitigated through the supply of temporary facilities or the use of facilities currently available at the CITA site.

5.1.3 The Choi Wan Road/Jordan Valley development site is not considered to be at risk from leachate breakout or leakage given that the site is hydraulically separated from the Jordan Valley Landfill with groundwater movement being away from the construction site. No mitigation measures for leachate are required during either construction and operation phases.

5.2 Operation

5.2.1 The major effluents that have the potential to impact upon water quality during site operation include surface run-off and sewage effluents.

5.2.2 The proposed housing development comprises some 11,120 flats. The design peak sewage flow has been estimated to be in the order of 0.504 m^3/s with a total daily Biological Oxygen Demand (BOD) load of 24.8 tonnes. The sewage flow arising from the proposed development will be conveyed to the Kwun Tong Sewage Treatment Plant which needs to be upgraded to meet the demand from this site as well as those arising from other developments in East Kowloon. In this connection the Environmental Protection Department will commission a study entitiled "Review of Central and East Kowloon Sewerage Master Plans" (SMP Review) to address this sewerage issue. If the sewerage upgrading works to be recommended in the SMP Review cannot be completed in time to meet the population intake of the development, the Civil Engineering Department will provide interim measures such as the use of holding tanks to ameliorate the impact.

5.2.3 The proposed land development will increase the amount of surface run-off entering the drainage system. This surface run-off is estimated to result in the discharge of approximately 41 kg of BOD to Victoria Harbour per day. This additional BOD load is not considered to be significant with respect to the other identified pollution sources entering Victoria Harbour in the south-east Kowloon area. Water quality impacts resulting from the additional surface water run-off is not expected to be significant.

6. CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

6.1.1 Provided that waste arisings from the construction of the proposed development are handled, transported and disposed of using recommended methods, no unacceptable adverse environmental impacts are envisaged. In most cases the waste material can be easily re-used at public filling areas or disposed of to landfill.

6.1.2 The mitigation measures recommended in the Final EIA Report should be incorporated into Contract Specifications and applied to ensure that environmental nuisance does not arise from the storage, transport and disposal of the various types of waste arisings from this proposed development. These recommendations will form the basis of the site waste management plan to be developed at the detailed design stage.

6.1.3 It is proposed that fill should be beneficially used in the nearby SEKD or other reclamation or earth-filling projects. Should the SEKD development be available for receipt of surplus fill during the earthwork activities, it is recommended that the spoil is exported from the Site directly to SEKD via a spoil conveyor system. Use of a conveyor will simplify site management and reduce secondary environmental impacts associated with the less desirable alternative disposal method of transportation via trucks. The design and alignment of the conveyor system shall be subject to review at the detailed design stage.

6.1.4 During operation of the proposed development, domestic waste arising will need to be collected and delivered to a Refuse Collection Point (RCP) from where wastes will be transported to waste transfer stations and an appropriate landfill site. Through the appropriate design of the RCP, as well as public information on reducing, reusing and re-cycling waste, no unacceptable adverse environmental impacts are envisaged.

7. LAND CONTAMINATION

7.1.1 A desk study in accordance with EPD ProPECC Note 3/94 was carried out at the former Flathill Quarry. The potential for contamination at Flathill Quarry is considered minimal. There is no reason to suspect that any undocumented activities with the potential to contaminate the area have

been carried out either at, or adjacent to the quarry. No further assessment is required.

8. LANDSCAPE AND VISUAL IMPACTS

8.1.1 Landscape and visual impact issues have played an important role in dictating the form of the development. Several fundamental measures have been included in the Master Layout Plan to minimise the impact of this large scale development.

8.1.2 The development of the Study Area will have a significant impact on the character of the existing landscape which, although disturbed, has considerable local and regional importance. As part of the development of the site, the main landscape features have been retained and will form an integral part of the landscape framework. The landscape framework, as developed in the Landscape Master Plan, demonstrates an opportunity to enhance the overall amenity of the area for the local residents by improving connections between existing residential areas, through the site to the hillsides, the adjacent planned urban fringe park and open space areas.

8.1.3 The development of this Study Area combined with the density of the development will lead to significant and permanent visual impacts to the VSR's around the Study Area, however measures are recommended in the EIA to minimise the impacts through the design and disposition of the development.

9. ECOLOGY

9.1.1 Major habitats found within the Study Area include plantation, tall shrubland, low shrub with grass, agriculture, marsh, disturbed area and streams. Potential impacts of the project will include loss of 11.5 ha plantation, 4.5 ha tall shrubland, 5.1 ha low shrub with grass, 0.9 ha agriculture and 0.3 ha marsh will constitute the major direct impacts of the project. Loss of plantation and agricultural fields will have a minor impact on flora. Impacts to invertebrate fauna are not likely to be severe due to the commonness of the species recorded. Mitigation measures include 5.2 ha of compensatory planting on the soft cut slope belt, inclusion of native species in replanting and establishment of an ecology park on the restored landfill. Jordan Valley Ecology Park is currently programmed to open in Mid-2001 providing approximately 4.5 ha of additional compensatory planting.

10. LANDFILL GAS HAZARD ASSESSMENT

10.1.1 The proposed development is situated in close proximity to the Jordan Valley Landfill and the "250m - Landfill Gas Consultation Zone". A Landfill Gas Hazard Assessment was thus considered an essential part of the EIA. Monitoring data indicates that the Jordan Valley landfill is still producing LFG with hazardous concentrations of methane and carbon dioxide. Under the Urban Landfills Restoration Contract, a comprehensive, landfill gas management system has been designed and is due to be operational in May 1998. The effectiveness of the landfill gas management system has yet to be demonstrated.

10.1.2 The design of the proposed residential development has been developed to maximise the distance between the development and the landfill. It is situated outside the 50m 'no development zone' and the 250m Consultation Zone. Although the site has three major geological faults, the locations of the two NW/SE trending faults are uncertain, there appears to be no direct pathway to the proposed development. No further assessment is therefore required for the operational phase of the development.

10.1.3 There are a number of at-risk elements to the proposed development, although no sub-surface structures are proposed for the development. The precise routing of services to the development will need to be carefully considered and defined at the design stage, in consultation with the relevant utilities companies. The freshwater and power supplies are likely to join the development at Site 3 via the existing trunk mains that run across the Study Area from the Jordan Valley North Road. This utility route passes in close proximity to the NE-SW trending geological fault, which in turn intersects with the NW-SE geological fault crossing the landfill site. As such there is the possibility for gas migration to take place via a ***long and indirect*** pathway.

10.1.4 Additional boreholes have been constructed as part of a ground investigation for this Study; it is recommended that these are monitored to gain further information about the nature of the LFG and its migration potential in the area of the proposed development.

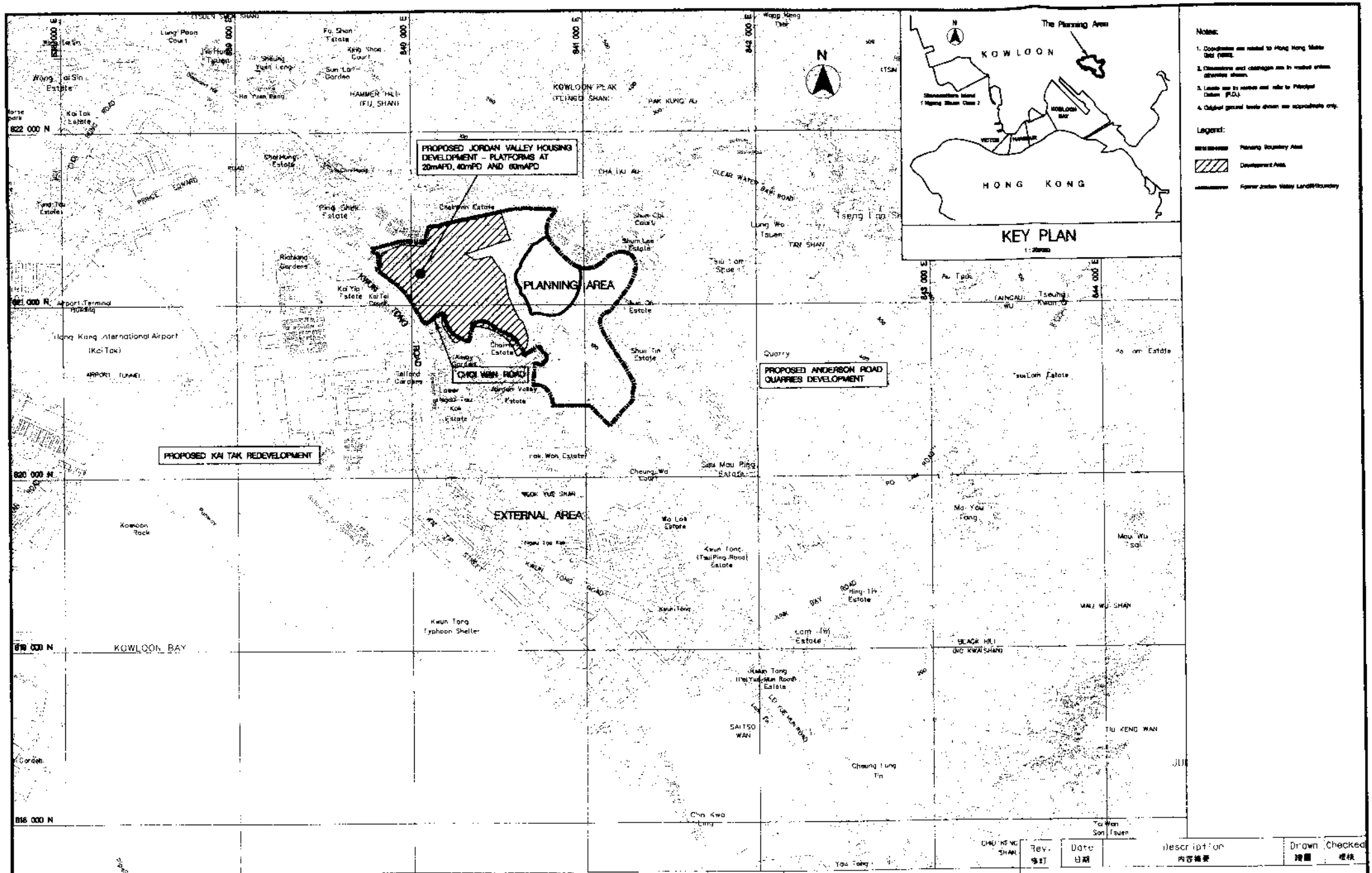
10.1.5 This qualitative landfill gas hazard assessment concludes that at present the landfill presents a ***Medium*** risk to the proposed development. On the basis of the available information, it is considered that the Jordan Valley Landfill does not present an undue hazard to the proposed development. However, a critical review will be undertaken at the detailed design stage to confirm the level of risk assessed and to determine the suitable protective measures to ensure the development is safe.

11. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

11.1.1 An Environmental Monitoring and Audit (EM&A) Manual has been prepared for the construction phase of this development to monitor construction noise, air quality (dust), ecology and landfill gas. Further details are given in the EM&A Manual.

12. CONCLUSION

12.1.1 The EIA concludes that with the implementation of the recommended mitigation measures and monitoring of the environmental conditions at sensitive receivers in accordance with the environmental monitoring and audit requirements, the construction and operation of the proposed development will be environmentally acceptable.



CIVIL ENGINEERING DEPARTMENT
土木工程署

AGREEMENT NO. CE 19/97
PLANNING AND ENGINEERING
FEASIBILITY STUDY FOR DEVELOPMENT
NEAR CHOI WAN ROAD AND JORDAN VALLEY

FINAL EIA REPORT
EXECUTIVE SUMMARY
LOCALITY PLAN

Figure No. 圖則編號	1		
Drawn 繪圖 NYH	Checked 核對	NTD	Approved 批准
Scale 比例 1 : 20000	Date 日期	9/98	Date 日期
	Status 現況	Preliminary	

Rev. 修訂	Date 日期	Description 內容摘要	Drawn 繪圖	Checked 核對

Scott Wilson (Hong Kong) Ltd
偉信顧問(香港)有限公司

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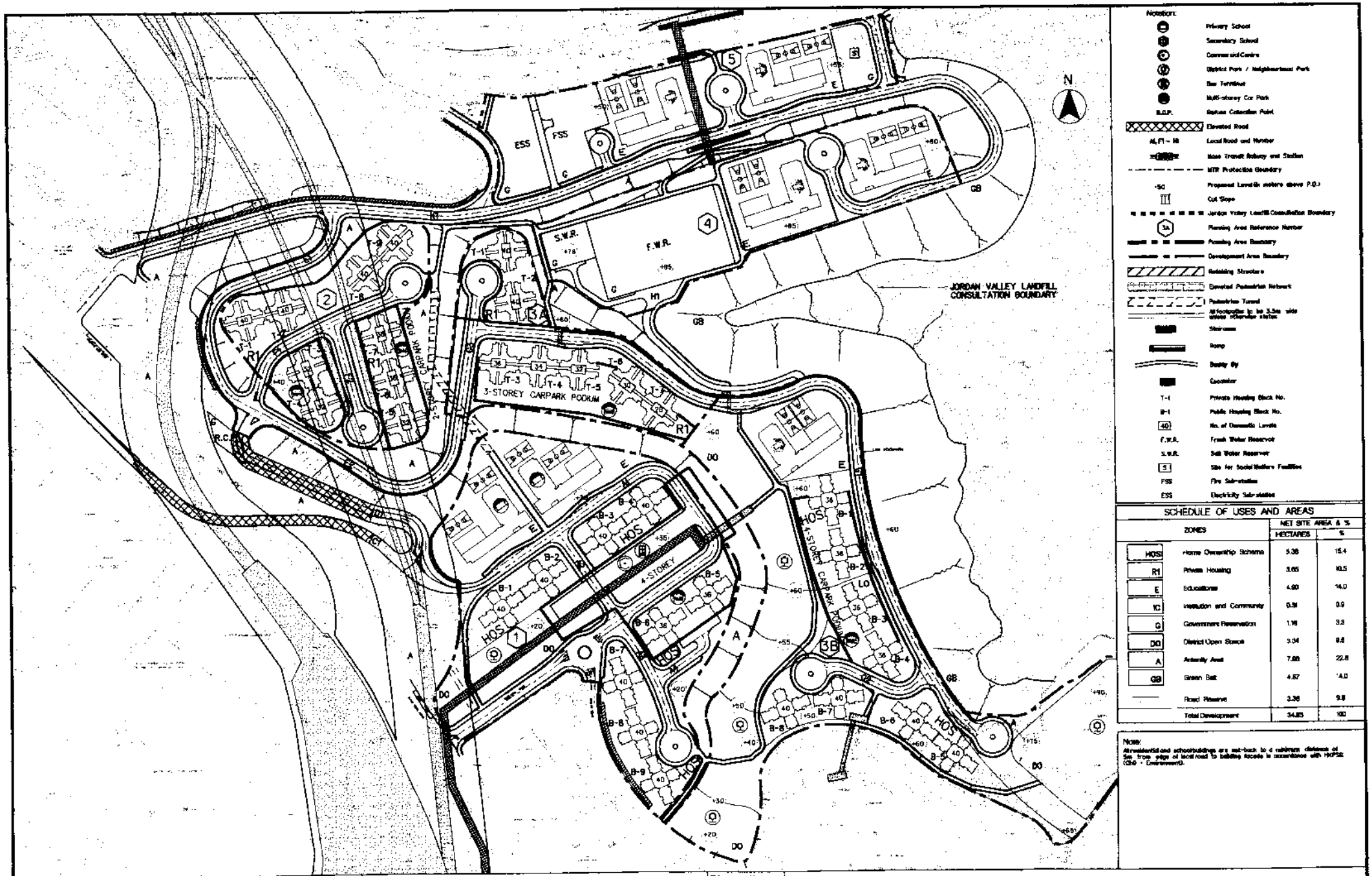

SCHEDULE OF USES AND AREAS

ZONES		NET SITE AREA & %	
		HECTARES	%
HOS	Home Ownership Scheme	5.36	15.4
R1	Private Housing	3.65	10.5
E	Educational	4.90	14.0
IC	Institution and Community	0.31	0.9
G	Government Reservation	1.16	3.3
DO	District Open Space	3.34	9.6
A	Amenity Area	7.88	22.6
GB	Green Belt	4.87	14.0
	Road Reserve	3.36	9.6
	Total Development	34.85	100

Note:
All residential and schoolbuildings are set-back to a minimum distance of 5m from edge of local road to building façade in accordance with HKPSG (Chp 9 - Environment).

CIVIL ENGINEERING DEPARTMENT
土木工程署

AGREEMENT NO. CE 19/97
PLANNING AND ENGINEERING
FEASIBILITY STUDY FOR DEVELOPMENT
NEAR CHOI WAN ROAD AND JORDAN VALLEY

FINAL EIA REPORT EXECUTIVE SUMMARY
MASTER DEVELOPMENT PLAN

Figure No. 圖則編號	2		
Drawn 繪圖 NYH	Checked 核對 NTD		Approved 批准
Scale 比例 1:3000	Date 日期 8/98		Date 日期
	Status 狀況 Preliminary		

Scott Wilson (Hong Kong) Ltd
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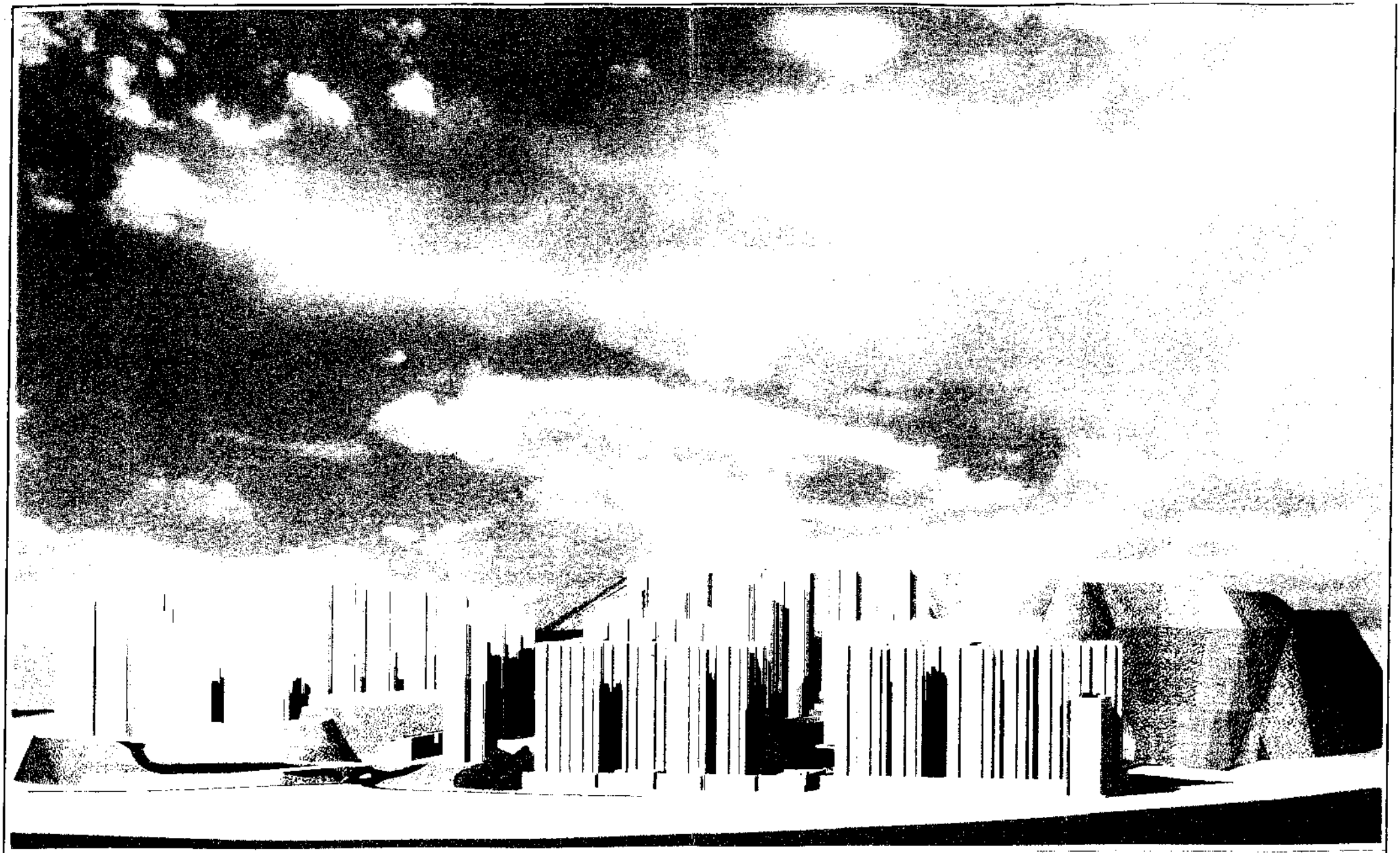

CIVIL ENGINEERING DEPARTMENT
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AGREEMENT NO. CE 19/97
PLANNING AND ENGINEERING
FEASIBILITY STUDY FOR DEVELOPMENT
NEAR TAI WAI ROAD AND JORDAN VALLEY

FINAL E.A REPORT - EXECUTIVE SUMMARY
ILLUSTRATIVE ELEVATION VIEW OF
THE PROPOSED DEVELOPMENT

3

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