HIGHWAYS DEPARTMENT

EIA for Salisbury Road Underpass and Associated Road Improvement Works including Middle Road Circulation System

Final EIA Report

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1 INTRODUCTION

1 INTRODUCTION

1.1 Background

The Tsim Sha Tsui Road Improvements study conducted in 1989 concluded that an underpass should be provided along Salisbury Road at the junction with Chatham Road together with the Middle Road Traffic Circulation System. Without the provision of an underpass, the junction is forecast to be operating with a negative reserve capacity by the Year 2003.

The project has recently been reactivated. A new traffic review study has been conducted and affirmed the layout for the Salisbury Road Underpass and the Middle Road Traffic Circulation System.

A preliminary environmental review (PER) was also carried out in May 1995 as part of the preliminary project feasibility study (PPFS). The PER recommended that an EIA be carried out to assess the air quality within the proposed underpass and the air quality due to portal emission from the underpass. On construction impacts, the PER concludes that short term environmental impacts during construction can be kept within established standards and guidelines with EPD's recommended pollution control clauses incorporated in the contract documents to abate dust and site run-off nuisance and a detailed construction impact assessment will not be required.

The underpass is a designated project under the schedule 2 item A9 of the Environmental Impact Assessment Ordinance (i.e. a road fully enclosed by decking above and by structure on the sides for more than 100 m), and it is necessary to obtain the environmental permit prior to the construction and operation of the underpass.

1.2 Purpose of this Report

The impact assessment includes the following:

- identify the locations of sensitive receivers
- state the relevant air quality, noise and water quality assessment criteria and guidelines
- discussion of the assessment methodology and construction and operational assumptions associated with the underpass
- investigation of potential impacts arising from the proposed project
- recommendation of mitigation measures if applicable.

1.3 The Approach

This report is compiled in accordance with the requirements of Annex 10, 11, 18, 20 and 21 of the Technical Memorandum on the Environmental Impact Assessment Process. Operational air quality impacts and noise impacts during construction and operational phases are assessed in this report. The approach adopted to assess the impacts is based on computer modelling using accepted and accredited software. In addition, this report covers the potential water quality and waste management impacts during the construction phase as well as visual, landscape and townscape impacts, and land use impact.

It is confirmed that this project would have no archaeological impact on the historical structures, including Ex-terminus Station, Peninsula Hotel, Kowloon Market and Former Marine Police Headquarters Compound together with its retaining wall, underground tunnels and access road. No cultural heritage impact assessment in this EIA study is required.

The work area in this project would involve a busy road in an urban area. There are no recognized sites of conservation, no important habitats and species of conservation within the site. Therefore, it is highly unlikely that any significant ecological resources would be affected by the project. Ecological assessment is not required in this study, however, good construction practices and housekeeping measures are required to avoid or minimize nuisance and localized damage to the natural environment.

2 DESCRIPTION OF THE PROJECT

2 DESCRIPTION OF THE PROJECT

The Tsim Sha Tsui Improvement Study conducted in 1989 concluded that an underpass should be provided along Salisbury Road at the junction with Chatham Road together with the Middle Road gyratory traffic scheme. The underpass would provide 2 lanes in each direction to cater for the increase in predicted traffic flow. The detailed design of the underpass was completed in 1990. Due to the reallocation of resources, the implementation of the works was shelved in 1991.

Salisbury Road is a primary distributor in Tsim Sha Tsui running in an east-west direction. It is also a major distributor serving traffic from central and southwest Kowloon to Tsim Sha Tsui.

This project comprises an underpass, approximately 130 m in length, along Salisbury Road and a traffic circulation system along Middle Road, Salisbury Road, Nathan Road and Kowloon Park drive. The location of the project is shown in Figures 2.1, 2.2(a) and 2.2(b). The underpass will provide grade separation at the junction of Salisbury Road and Chatham Road South. Due to the physical constraints, demolition and reprovisioning of an existing pedestrian subway across Salisbury Road will be required. The provision of the traffic circulation scheme requires significant modifications to the existing junction layout as well as traffic signs, traffic signals and road markings.

The proposed scope of the project comprises:

- Construction of an underpass along Salisbury Road at its junction with Chatham Road South
- Demolition and reprovision of an existing pedestrian subway across Salisbury Road
- Implementation of a traffic circulation scheme along Middle Road, Salisbury Road, Nathan Road and Kowloon Park Drive
- Modification to the existing traffic signals, road markings, traffic signals and street furniture
- Modification to the layout of the ground level roads
- Tree felling where necessary and reprovision of landscaping area.

Project Timetable

Design Review	:	completed by August 1999
Tender	:	June 2000 to September 2000
Construction	:	October 2000 to October 2003

Related Projects

The KCRC east rail extension from Hung Hum to Tsim Sha Tsui is currently under preliminary design prepared by the consultant for KCRC. The construction of the railway extension is expected to be completed before the end of 2004. The preferred railway extension route, as advised by KCRC is below Middle Road and will have no major implication to this project.

3 CONSTRUCTION AIR IMPACT

3 CONSTRUCTION AIR QUALITY

3.1 Introduction

Dust impact is considered as one of the key environmental issues of concern during construction phase of the proposed project. During the construction phase of the proposed underpass, there will be potential dust impacts on existing sensitive receivers from the construction activities undertaken at the site.

3.2 Environmental Legislation, Policies, Plans, Standards and Criteria

The Air Pollution Control Ordinance (APCO) provides statutory powers for controlling air pollutants from a variety of stationary and mobile sources. The APCO encompasses a number of Air Quality Objectives (AQO). Currently the AQOs stipulate concentrations for a range of pollutants, of which Total Suspended Particulates (TSP) is relevant to this study. The AQOs are listed in Table 3.1.

Table 3.1 Hong Kong Air Quality Objectives for TSP

	Maximum Average Concentration (μgm^{-3})[1]		
Air Pollutant	1-Hour	24-Hour[2]	Annual[3]
TSP	500[4]	260	80

1 Measured at 298 K and 101.325 kPa.
2 Not to be exceeded more than once per year.
3 Arithmetic mean.
4 Not AQO. In addition to the above established legislative controls, it is generally accepted that an hourly average TSP concentration of 500 μgm^{-3} should not be exceeded. Such a control limit is particularly relevant to construction work and has been imposed on a number of construction projects in Hong Kong in the form of contract clauses.

For construction dust, it is stated in Annex 4 of *Technical Memorandum of Environmental Impact Assessment Process* to use a TSP limit in air over an 1-hour period of 500 μgm^{-3}. The maximum acceptable TSP concentration averaged over a 24-hour period is 260 μgm^{-3}, as defined in the AQOs.

3.3 Construction Air Sensitive Receivers

Buildings including hotels, performing art centers, cultural uses, recreational users and commercial buildings along the proposed underpass scheme would be air sensitive receivers (ASRs).

3.4 Potential Impacts

The PER concluded that short term environmental impacts during construction can be kept within

established standards and guidelines with EPD's recommended pollution control clauses incorporated in the contract documents. In addition, all ASRs are provided with central air conditioning systems. Adverse dust impacts during construction at ASRs are not anticipated. However, good practical measures are recommended to minimise the dust impacts.

3.5 Mitigation of Adverse Environmental Impacts

The contractor and site agents should also adopt dust reduction measures while carrying out construction works in accordance with the Air Pollution Control (Construction Dust) Regulation to minimise the dust emission from the construction site. Established standards and guidelines with EPD's recommended pollution control clauses should be incorporated in the contract documents to abate dust impacts. A commitment by the contractor to adopt good practices for dust minimisation should reduce the dust nuisance to a minimum. A number of practical measures are listed below:

- Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, with complete coverage, particularly during dry weather;
- Use of frequent watering for particularly dusty static construction areas and areas close to air quality sensitive receivers;
- Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be employed to aggregate fines;
- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations;
- Establishment and use of vehicle wheel and body washing facilities at the exit points of the site, combined with cleaning of public roads where necessary;
- Imposition of speed controls for vehicles on unpaved site roads.
- Where feasible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from air quality sensitive receivers; and
- Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify methods of work if dusty conditions arise.

3.6 Definition and Evaluation of Residual Environmental Impacts

No construction dust impact would be expected after the implementation of mitigation measures.

4 CONSTRUCTION NOISE IMPACT

4 CONSTRUCTION NOISE IMPACT

4.1 Introduction

This chapter examines the construction noise impacts arising from the proposed Salisbury Road Underpass Scheme. Mitigation measures have been recommended where applicable.

4.2 Environmental Legislation, Policies, Plans, Standards and Criteria

The Noise Control Ordinance (NCO) provides the statutory framework for noise control. Assessment procedures and standards are set out in five Technical Memoranda (TM) listed below:

- TM on Noise from Places other than Domestic Premises, Public Places or Construction Sites;
- TM on Noise from Construction Work other than Percussive Piling;
- TM on Noise from Percussive Piling;
- TM on Noise from Construction Work in Designated Areas; and
- TM on Environmental Impact Assessment Process.

The NCO divides construction work into activities involving powered mechanical equipment (PME) excluding percussive piling, and percussive piling activity. The criteria for the assessment of noise from construction work are therefore similarly divided.

Under the EIAO-TM, noise standards for daytime construction activities are 75dB(A) $L_{eq\ (30\ min)}$ at the facades of dwellings, and 70 dB(A) at the facades of schools (65 dB(A) during examinations).

Sheet piling will be undertaken during the construction period. Since sheet piling is under the control of NCO, assessment for piling noise is not required. However, a Construction Noise Permit (CNP) would be required for the construction work during the period.

4.3 Construction Noise Sensitive Receivers

In accordance with TM on Environmental Impact Assessment Process, the noise standards only apply to dwellings relying on opened windows for ventilation. Since central air conditioning systems are provided for all hotels which do not rely on openable windows for ventilation, these NSRs are less sensitive to noise impacts.

4.4 Potential Impact

Based on the findings of Preliminary Environmental Review in May 1995, noise from the road construction work would be significantly reduced by window insulation of the buildings. Furthermore, adoption of good site practices as listed in Appendix H would further reduce

construction noise experienced by nearby NSR.

4.5 Definition and Evaluation of Residual Environmental Impacts

Taking into account of the surrounding NSRs provided with window insulation and central air-conditioning and the recommended noise pollution control clause, adverse construction noise impacts would not be anticipated at NSRs.

5 CONSTRUCTION WATER QUALITY IMPACT

5 CONSTRUCTION WATER QUALITY IMPACT

5.1 Introduction

This chapter examines the water quality impact during the construction phase of the proposed underpass scheme and mitigation measures have been proposed where applicable.

5.2 Environmental Legislation, Policies, Plans, Standards and Criteria

Effluent discharges are subject to control under the Water Pollution Control Ordinance (WPCO) and the provisions of the Technical Memorandum entitled *Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* (EPD, January 1991)

5.3 Potential Impacts

During the construction phase, possible impacts would arise from the discharge of construction wastewater into storm drains, site run-off and the operation of on-site sanitary accommodations. The discharge of construction wastewater into storm drains can cause blocking and silting of drains.

5.4 Mitigation of Adverse Environmental Impacts

Practice for dealing with various type of construction discharges provided in EPD's ProPECC Note PN1/94 *Construction Site Drainage* should be adopted. Practices relevant to this project are reproduced in the following paragraphs.

5.4.1 Surface Runoff

Surface runoff from construction sites should be discharged into storm drains via adequately designated sand / silt removal facilities such as sand traps, silt traps and sediment basins. Channels or earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided where necessary to intercept storm runoff from outside the site so that it will not wash across the site. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.

Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.

Construction works should be programmed to minimize soil excavation works in rainy seasons (April to September). If excavation in soil cannot be avoided in these months or at any time of year when rainstorms are likely, for the purpose of preventing soil erosion, temporarily exposed slope surfaces should be covered, for example, by tarpaulin, and temporary access roads should

be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (for example, along the crest / edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm.

Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage such as intercepting channels should be provided where necessary.

Measures should be taken to minimize the ingress of rainwater into trenches. If excavation of trenches in wet seasons is necessary, they should be dug and backfilled in short sections. Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.

Open stockpiles of construction materials (for example, aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.

Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm runoff from getting into foul sewers. Discharge of surface runoff into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.

Precautions listed below should be taken at any time of year when rainstorms are likely. Actions listed below should be taken when a rainstorm is imminent or forecast and actions to be taken during or after rainstorms.

- Precautions to be taken at any time of year when rainstorms are likely:

  - Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly.
  - Temporarily exposed slope surfaces should be covered, for example, by tarpaulin.
  - Temporary access roads should be protected by crushed stone or gravel.
  - Intercepting channels should be provided (for example, along the crest / edge of excavation) to prevent storm runoff from washing over exposed soil surfaces.
  - Trenches should be dug and backfilled in short sections. Measures should be taken to minimize the ingress of rainwater into trenches.

- Actions to be taken when a rainstorm is imminent or forecast

  - Silt removal facilities, channels and manholes should be checked to ensure that they

can function properly.

- Open stockpiles of construction materials (for example, aggregates, sand and fill materials) on site should be covered with tarpaulin or similar fabric
- All temporary covers to slopes and stockpiles should be secured.

- Actions to be taken during or after rainstorms

  - Silt removal facilities, channels and manholes should be checked and maintained to ensure satisfactory working conditions. Attention should be given to safety when carrying out this work.

5.4.2 Groundwater

Groundwater pumped out of wells, etc. for foundation construction or other activities should be discharged into storm drains after the removal of silt in silt removal facilities.

5.4.3 Boring and Drilling Water

Water used in ground boring and drilling for site investigation or rock / soil anchoring should as far as practicable be recirculated after sedimentation. When there is a need for final disposal, the wastewater should be discharged into storm drains via silt removal facilities.

5.4.4 Wastewater from Concrete Batching and Precast Concrete Casting

Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. The discharge of wastewater should be kept to a minimum.

To prevent pollution from wastewater overflow, the pump sump of any water recycling system should be provided with an on-line standby pump of adequate capacity and with automatic alternating devices.

Under normal circumstances, surplus wastewater may be discharged into foul sewers after treatment in silt removal and pH adjustment facilities (to within the pH range of 6 to 10). Disposal of wastewater into storm drains will require more elaborate treatment. Surface runoff should be segregated from the concrete batching plant and casting yard area as much as possible, and diverted to the stormwater drainage system. Surface runoff contaminated by materials in a concrete batching plant or casting yard should be adequately treated before disposal into stormwater drains.

5.4.5 Wheel Washing Water

All vehicles and plant should be cleaned before they leave a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed

before discharging into storm drains. The section of construction road between the wheel washing bay and the public road should be paved with backfall to reduce vehicle tracking of soil and to prevent site runoff from entering public road drains.

5.4.6 Bentonite Slurries

Bentonite slurries used in diaphragm wall and bore-pile construction should be reconditioned and reused wherever practicable. If the disposal of a certain residual quantity cannot be avoided, the used slurry may be disposed of at the marine spoil grounds subject to obtaining a marine dumping licence from EPD on a case-by-case basis.

If the used bentonite slurry is intended to be disposed of through the public drainage system, it should be treated to the respective effluent standards applicable to foul sewers, storm drains or the receiving waters as set out in the TM on Effluent Standards.

5.4.7 Water for Testing and Sterilization of Water Retaining Structures and Water Pipes

Water used in water testing to check leakage of structures and pipes should be reused for other purposes as far as practicable. Surplus unpolluted water could be discharged into storm drains.

Sterilization is commonly accomplished by chlorination. Specific advice from EPD should be sought during the design stage of works with regard to the disposal of the sterilizing water. The sterilizing water should be reused wherever practicable.

5.4.8 Wastewater from Site Facilities

Sewage from toilets (unless chemical toilets are used) and similar facilities should be discharged into a foul sewer.

Discharged wastewater from the construction sites to surface water and/or public drainage systems should be controlled through licensing. Discharges should follow fully the terms and conditions in the licences. Established standards and guidelines with EPD's recommended pollution control clauses should be incorporated in the contract documents.

5.5 Definition and Evaluation of Residual Environmental Impacts

With the implementation of the mitigation measures, it is expected that the impact on the local water quality would not be significant and no environmental monitoring & audit requirements or further assessment are required.

6 CONSTRUCTION WASTE MANAGEMENT

6 CONSTRUCTION WASTE MANAGEMENT

6.1 Introduction

Construction and demolition materials (C&D) arising from the construction phase of the proposed underpass scheme will comprise different kind of wastes. Handling and disposal of these wastes is addressed individually in this chapter.

6.2 Environmental Legislation, Policies, Plans, Standards and Criteria

The principal legislation controlling waste materials in Hong Kong is the Waste Disposal Ordinance [Cap.354] (WDO). Enacted in 1980, this ordinance generally encompasses all stages of the waste management chain, from place of arising to final disposal point.

Annex 7 of the Technical Memorandum on Environmental Impact Assessment Process specifies the assessment criteria for evaluating waste management implications.

6.3 Nature and Type of C&D Materials

C&D materials, which will be generated during the construction phase of the underpass and associated road improvement works, include the following:

- Spoil from the general excavation for construction (e.g. fill, rock)
- Spoil from site preparatory works (e.g. top soil) and general excavation (e.g. excavation for construction works)
- General C&D material (e.g. wood, scrap metal, concrete)
- Chemical waste generated by general site practices (e.g. vehicle and plant maintenance/servicing)
- Refuse and sewage wastes generated by site workers

Broad estimates for the volumes of generated waste have been calculated and are presented in Table 6.1. The construction period is approximate 3 years.

Table 6.1 Excavated and Waste Materials Arising during the Construction Phase

Activity	Material Type	Total Quantities
Site Clearance, Excavation	Excavated material (concrete, soil/rock)	45,000 m^3*
General Construction Activities	General C&D material (wood, scrap metal, concrete)	300 m^3*
	Chemical Waste (fuel, oils)	35 L/month*
	General refuse	0.06 m^3/day per employee*

* Provisional estimate

6.4 Potential Impacts & Mitigation Measures

6.4.1 Excavated Materials

Environmental impacts that may be generated during handling, storage and disposal of the excavated materials will need to be controlled. The principal adverse effects relate to dust, visual impacts, water quality and general health and safety. The majority of the material to be excavated should be suitable for re-use in public filling areas.

Excavated materials should be re-used or transported off site as soon as they are generated in order to minimise the potential for adverse environmental impacts. All excavated material will need to be handled in a manner that minimises the release of fugitive dust, especially during hot and dry weather. Dust suppression measures such as dampening with the fine water spray will be required. Where possible the movement of material should also be kept to a minimum.

6.4.2 C&D Materials

C&D materials generated during the construction phase should be sorted on site into C&D materials for re-use and recycling as far as practical. When considering the disposal options for various types of C&D materials, opportunities for reducing waste generation shall be fully evaluated, including avoidance / minimization, re-use and recycling through changing the design approach in the project planning stage and adopting proper waste management practices on site.

Waste management proposals including good site practice for waste handling should be worked out. The proposed waste management measures shall be developed according to the Criteria for Evaluating Waste Management Implications stipulated in Annex 7 of the TM EIAO and follow the Guidelines for Assessment of Waste Management Implications as stated in Annex 15 of the TM EIAO as appropriate.

On-site separation of both municipal solid waste (MSW) and C&D materials should be conducted as far as possible in order to minimize the amount of solid waste requiring disposal at landfills. In order to monitor the disposal of solid waste at the landfills and control fly-tipping, it is recommended to apply a trip-ticket system on all solid waste transfer/disposal operations.

The trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team. Independent Checker (Environment) should be responsible for auditing the result of the system. Also, records of quantities of wastes generated, recycled and disposed (locations) should be properly kept.

6.4.3 Chemical Wastes

Inappropriate handling of chemical wastes would cause potential hazards to human health, contamination of the soil and risk of fire. Chemical wastes should be stored in a locked, fully bunded area which is impermeable to both water and the waste being stored. The waste storage area should also be covered to prevent rainfall from accumulating with the bunded areas. The

storage area should have the capacity to contain 120 percent of the total volume of the containers.

Chemical waste should be removed by licenced companies. It should be handled according to the Code of Practice on the Packaging, Labeling and Storage of Chemical Wastes. When off-site disposal is required, it should be collected and delivered by licenced contractors to Tsing Yi Chemical Waste Treatment Facility and disposed of in accordance with the Chemical Waste (General) Regulation.

6.4.4 Municipal and Sewage Wastes

The storage of municipal wastes would cause odour nuisance, visual impact and hygiene problem if not appropriately managed. A temporary refuse collection point should be set-up by the contractor. Wastes should be stored in appropriate containers prior to collection and disposal. Sewage generated on the site should be controlled through the use of chemical toilets or sewage holding tanks and be removed regularly by a hygiene services company.

6.5 Definition and Evaluation of Residual Environmental Impacts

For implementation, the standard C&D materials management clause should be included in the construction contract. Environmental monitoring & audit requirement is required for the trip-ticket system on all solid waste transfer/disposal operations.

7 OPERATIONAL AIR QUALITY IMPACT

7 OPERATIONAL AIR QUALITY IMPACT

7.1 Introduction

This chapter deals with the potential impact of vehicular emissions arising from traffic on proposed Salisbury Road Underpass and associated roads which are close to a number of air sensitive uses in the vicinity. Air quality impact in underpass is also examined.

7.2 Environmental Legislation, Policies, Plans, Standards and Criteria

The assessment criteria related to air quality impact should make reference to Annex 4 of the Technical Memorandum on Environmental Impact Assessment Process, the Hong Kong Planning Standards and Guidelines (HKPSG), and the Air Pollution Control Ordinance (APCO) (Cap. 311).

The APCO (Cap. 311) provides powers for controlling air pollutants from a variety of stationary and mobile sources and encompasses a number of Air Quality Objectives (AQOs). Currently AQOs stipulate concentrations for a range of pollutants, of which carbon monoxide (CO), nitrogen dioxide (NO_2) and respirable suspended particulates (RSP) are relevant to this study. The AQOs are listed in Table 7.1.

Table 7.1 Hong Kong Air Quality Objectives

Parameter	Maximum Average Concentration (μgm^{-3})[1]			
	1-Hour[2]	8-Hour[3]	24-Hour[3]	Annual[4]
CO	30000	10000	-----	-----
NO_2	300	-----	150	80
RSP	-----	-----	180	55

1 Measured at 298 K and 101.325 kPa.
2 Not to be exceeded more than three times per year.
3 Not to be exceeded more than once per year.
4 Arithmetic mean.

Air within an underpass will be contaminated by vehicle pollutants and polluted air will be exhausted at the portals. The Environmental Protection Department (EPD) has proposed air quality guidelines for pollutant concentrations in tunnels designed for vehicular use. The minimum requirements are presented in Table 7.2.

Table 7.2 Tunnel Air Quality Criteria

Air Pollutants	Averaging Time (minutes)	Maximum Concentration ($\mu g/m^3$)[1]
Carbon Monoxide	5	115, 000
Nitrogen Dioxide	5	1, 800
Sulphur Dioxide	5	1,000

1 Measured at 298K and 101.325kPa. In some special circumstances, such as when the anticipated travelling time inside the tunnel exceeds 5 minutes, or the traffic mix is unusual, additional requirements may be necessary.

7.3 Baseline Environmental Conditions

The road improvement works will mostly be undertaken along Salisbury Road in the Tsim Sha Tsui area. Salisbury Road is located in the southern-most part of the Kowloon Peninsula. Existing buildings along the road are mostly commercial buildings and hotels. The Hong Kong Cultural Centre and the Hong Kong Space Museum is located along the western section of the road, and the Tsim Sha Tsui East Promenade is along the eastern section of the road facing the Victoria Harbour.

Existing air pollution sources in the area are mainly traffic emissions generated from the vehicles travelling in the area. Among the major traffic pollutants of concern namely NO_2, CO and RSP, only the levels of RSP were monitored at EPD's Tsim Sha Tsui Air Quality Monitoring Station and the station ceased operation in August 1993. The annual average RSP levels recorded at the Tsim Sha Tsui station during years 1989 to 1993 are listed in Table 7.3 below. The Hong Kong average values (calculated as the average value recorded at all the EPD stations) are also listed in the table.

Table 7.3 Annual Average RSP Levels Recorded at Tsim Sha Tsui (1989 - 1993)

Year	Annual Average RSP Level (μgm^{-3})	
	Tsim Sha Tsui	Hong Kong Average
1989	52	53
1990	52	51
1991	49	53
1992	55	58
1993	49	54

As shown in Table 7.3, there is no specific trend of the RSP levels during the years. The RSP levels recorded in the Tsim Sha Tsui area were always lower than the Hong Kong average values

except in year 1990 the Tsim Sha Tsui value was a bit higher than the Hong Kong average value. No exceedance of the annual average AQO for RSP was recorded during the years.

7.4 Air Sensitive Receivers

The area is mainly a tourist/commercial district, with a mixture of recreation, high class commercial premises and hotel accommodation. The Cultural Centre is specifically named in the Brief as a sensitive receiver.

The locations of air quality sensitive receivers include the following:

- Residential Uses
  Far East Mansion

- Commercial Uses
  Wing On Plaza
  Tsim Sha Tsui Centre
  Empire Centre
  New World Centre

- Hotels
  Shangri La
  Sheraton
  Peninsula
  YMCA

- Community/Cultural Uses
  Space Museum
  Museum of Art
  Cultural Centre

- Recreational Users
  Wing On Plaza Garden
  Middle Road children's playground

The buildings described above are shown in Figures 7.1(a), 7.1(b) and 7.1(c).

The height used for the assessment was 1.5m above local ground level, 1.5m being the average height of the human breathing zone. Additional modelling was undertaken at the average first floor level of 5m above ground, which was the height of the fresh air-intake points of most commercial buildings in the vicinity (e.g. YMCA building – one of the worst scenario in the study area).

7.5 Assessment Methodology

In this section are presented (i) a description and justification of the scenarios selected for modelling, (ii) the basis of the emissions calculation, (iii) the methodology adopted for pollutant dispersion modelling, and (iv) the predicted traffic flow data for the year of assessment.

Two scenarios were modelled:

- Air quality within the underpass with stationary traffic on one carriageway
- Effects of portal emissions on ambient air quality under normal traffic conditions.

The reasons for adopting these two scenarios are discussed below.

Normal Traffic Flow

Air Quality within the Underpass: At the design traffic speed of 50 km h^{-1} traffic will take less than 10 seconds to travel through the underpass. Even if the traffic is severely congested and traffic speeds are reduced to 10 km h^{-1}, the travel time will still be less than one minute. As these times are short, the internal underpass air quality under normal flow conditions is not considered critical, and therefore this situation was not modelled.

Effects of Portal Emissions: For the effects of portal emission modelling, the two directions of traffic were considered separately, and vehicle emissions were assumed to be emitted from each portal in the direction of traffic flow.

Stationary Traffic

Air Quality within the Underpass: A worst case condition could occur if traffic is stationary either because of breakdown or heavily congested traffic flow. However, as the two carriageways are separated, it is very unlikely that both directions will suffer congestion at the same time. Therefore a "worst-probable" traffic condition of one carriageway stationary and one carriageway moving at the design speed was assessed.

Effects of Portal Emissions: Assessment of impacts from portal emissions under congested traffic conditions is not a normal requirement. This is because the coincidence of worst case meteorological conditions and stationary traffic flows would be extremely rare, and stationary traffic would not be likely to persist for a length of time sufficient to cause an external environmental impact. Therefore this condition was not modelled.

7.5.1 Emission Calculations

The forecasted year 2011 pm peak hour traffic flow and vehicle mix provided by the traffic consultant were used in the assessment. The composition of the vehicle fleet was further broken down into cars, taxis, buses, light vehicles and heavy vehicles (Table D.1 of Appendix D).

Emission factors for NO_X and RSP were taken from the *Fleet Average Emission Factors - EURO2* Model provided by EPD for year 2011(Table E.1 of Appendix E). In view of the lower composite emission rates of RSP, the key air quality issue is NO_2 - because if NO_2 levels comply with the AQO, it is likely that RSP would also comply with the AQO. The ratio of guideline standard of CO (1-hour) concentration to NO_2 (1-hour) concentration is 100, however, the emission rate of CO is less than 100 times of emission rate of NO_x. Therefore, CO would comply with the AQO if NO_2 concentration comply with the standard. The composite emission factors for different kinds of vehicles are summarised in Table E.2 of Appendix E. 20 % of NO_X was assumed to be NO_2, as normally adopted for such assessment.

Portal emissions from the underpass were modelled in accordance with the *Permanent International Association of Road Congress* Report (PIARC, 1991). The portal emission rates were calculated based on traffic flow, the length of the tunnel and the calculated emission rate for NO_2 (20% of NO_X).

For the in-tunnel air quality assessment, a conversion factor of 12.5% including tailpipe NO_2 emission (taken as 7.5% of NO_x) plus 5% NO_2/NO_x for tunnel air recommended in PIARC for air expelled from the tunnel was taken in this assessment as the in-tunnel conversion factor. Details of the calculation are provided in Appendix B.

7.5.2 Dispersion Modelling Methodology

The dispersion of NO_2 for uncovered road sections (subject to availability of data within 500m of the underpass) was modelled using USEPA approved CALINE4 dispersion model. The input modelling parameters are summarised below:

Mixing height:	500m
Surface roughness:	2m
Wind direction standard deviation:	18 degrees
NO_2 background:	60 μgm^{-3} (as agreed with EPD)

NO_2 emissions from the portals were predicted assuming the emissions behave as volume sources in accordance with the recommendations in the 1991 PIARC Report. The ISCST dispersion model was used for the modelling of portal emissions. The same meteorological conditions were adopted as for the open road sections.

For the purpose of this assessment it was necessary to predict the future background NO_2 concentration. This was taken as 60 μgm^{-3} as agreed with EPD. The cumulative NO_2 concentrations were calculated by adding the results from both the CALINE4 and the ISCST models at each receptor point under the same meteorological conditions to the assumed background concentration.

Modelling was undertaken to produce the worst-case 1-hour average NO_2 concentration contours over the area at the heights of 1.5m and 5m above ground. The worst-case 1-hour conditions taken in the model are summarised below. Sample model input and output files are included in

Appendix C.

Traffic flow:	year 2011 pm peak hour flow
Wind direction:	every 1 degree
Wind speed:	$1ms^{-1}$
Pasquill stability class:	F class

For comparison purposes, a 'no underpass' scenario was also modelled based on the same traffic flows and meteorological conditions, but assuming that the vehicles travelled at ground level without the underpass.

Maximum 24-hour average concentrations were predicted at the closest air quality sensitive locations along Salisbury Road. Thirteen air quality sensitive locations were identified during a site visit carried out in April 1998. All the identified locations are locations of fresh air intake for the air conditioning systems of the buildings along Salisbury Road. The identified air quality sensitive locations are shown in Figure 7.2 and their heights are listed in Table 7.5.

A daily profile of road traffic emissions was derived from the traffic flow profile for Screenline C-C (Kowloon Peninsula - South of Dundas Street) contained in the Hong Kong Traffic Census 1994. The derived daily traffic profile is presented in Table 7.4 below.

Table 7.4 Daily Traffic Profile Relative to PM Peak Hour Flow

Hour	Profile (% of pm peak hour flow)	Hour	Profile (% of pm peak hour flow)
1	49%	13	92%
2	40%	14	92%
3	31%	15	96%
4	25%	16	98%
5	22%	17	98%
6	26%	18	100% (pm peak hour)
7	43%	19	99%
8	67%	20	95%
9	80%	21	84%
10	92%	22	75%
11	93%	23	72%
12	93%	24	62%

Modelling was undertaken to calculated the pollutant concentrations at the 13 identified locations with real meteorological data for years 1993 and 1994 recorded at Kai Tak Airport station operated by the Hong Kong Observatory. Pollutant concentrations were calculated for each hour of the year and multiplied by the profile listed in Table 7.4 to account for the variation of traffic

flow during the day. The predicted concentrations for each hour were then summed and averaged over each 24-hour period to determine the 24-hour average pollutant concentrations.

7.5.3 Traffic Flow Data

Traffic flow data for the year 2011 are given in Table D.1 of Appendix D and are shown diagrammatically in Figure 7.3. Year 2011 pm peak hour traffic figures were adopted for the assessment as these are in general higher than the am peak hour figures.

7.6 Impact from Road Traffic and Portal Emissions Assuming Normal Traffic Flow

7.6.1 1-Hour Average Results (Worst-case Meteorological Conditions)

Predicted worst-case 1-hour average NO_2 concentration contours for the underpass scenario are provided in Figures 7.4 to 7.5. The worst case 1-hour average NO_2 concentration contours for the 'no underpass' scenario are provided in Figures 7.6 and 7.7.

The results at heights of 1.5m (Figures 7.4 and 7.6) and 5m (Figures 7.5 and 7.7) show that there would be no exceedance of the AQO for NO_2 (300 μgm^{-3}) at any of the identified air quality sensitive locations under the worst-case conditions, either with or without the underpass. As shown in figures, there is a decrease in NO_2 concentration at the junction of Salisbury Road / Chatham Road with the proposed underpass in place. The concentration of NO_2 at the portals of the underpass is predicted to be higher than in the 'no underpass' scenario, due to portal emission effects. However, as the AQO is not breached, this effect is not considered to be of significance. The provision of the underpass will therefore not affect the future local air quality and no mitigation measures are recommended.

7.6.2 24-Hour Average Results (Real Meteorological Conditions)

The predicted maximum 24-hour average NO_2 concentrations at the thirteen identified air quality sensitive locations (Figure 7.2) using real meteorological data for years 1993 and 1994 are tabulated in Table 7.5 below. Higher concentrations are predicted at some of the sensitive locations with lower height and closer to the road, however, exceedance of the 24-hour average AQO for NO_2 is not expected.

Table 7.5 Predicted Maximum 24-hour Average NO_2 Concentrations at Air Quality Sensitive Locations using Real Meteorological Data for 1993 and 1994

Air Quality Sensitive Locations	Height Above Ground (m)	Maximum 24-hour Average NO_2 Concentration (μgm^{-3})	
		Year 1993	Year 1994
1	2.0	94	96
2	2.0	97	99
3	7.0	99	97
4	4.0	98	99
5	6.0	99	101
6	4.0	105	101
7	4.0	106	95
8	2.5	137	138
9	5.5	116	117
10	2.0	122	127
11	2.0	128	133
12	2.2	149	141
13	2.2	134	131

7.7 Air Quality in the Underpass Assuming Stationary Traffic

According to the result of calculation in Appendix B, the maximum in-tunnel concentration of NO_2 is predicted to be 424 μgm^{-3} under the worst-case situation. The result shows that there is no exceedance of the tunnel air quality criteria (1,800 μgm^{-3}).

7.8 Mitigation of Adverse Environmental Impacts

Since there are not predicted to be any exceedances of the relevant Air Quality Objectives, mitigation measures have not been recommended.

7.9 Definition and Evaluation of Residual Environmental Impacts

Since there are not predicted to be any exceedances of the relevant Air Quality Objectives, mitigation measures have not been recommended. Therefore consideration of residual impacts is not relevant. The impacts will be as stated in Sections 7.6 and 7.7.

8 VISUAL, LANDSCAPE AND TOWNSCAPE IMPACTS

8 VISUAL, LANDSCAPE AND TOWNSCAPE IMPACTS

8.1 Introduction

This report examines the impacts arising from the proposed Salisbury Road Underpass scheme on the landscape/townscape character and visual amenity of the surrounding area. The scheme consists of the construction of a vehicular underpass at the junction of Salisbury Road and Chatham Road South, the provision of a pedestrian subway crossing the junction and carriageway widening along Salisbury Road. Impacts as a result of the underpass scheme will be assessed at the construction and operation phases of the project. The principal key issues to be discussed are as follows:

- existing context of the area surrounding the underpass scheme;
- temporary impacts during the construction phase;
- permanent impacts during the operational phase;
- mitigation measures to limit the impacts identified.

Evaluations of temporary and permanent impacts from the proposed underpass scheme will be carried out from comparisons of the potential impacts against a baseline study on the existing landscape/townscape and visual context of the area.

The full scope of "Salisbury Road Underpass and Associated Road Improvement Works" also includes road improvement works along Hankow Road, Middle Road, Nathan Road and the western end of Salisbury Road. The improvement works involves only minor realignment of footpaths along these roads. In the majority of cases, there will be no reduction of footpath area as a result of the realignment works. Landscape / townscape and visual impacts from this will negligible. Therefore, this report will only concentrate on the impacts originating from the construction of the underpass scheme at the junction of Salisbury Road and Chatham Road South.

8.2 Baseline Study

8.2.1 Existing Visual and Landscape Context of the Proposed Site

The proposed location of the Salisbury Road Underpass (the section along Salisbury Road between Wing On Plaza and Sheraton Hong Kong Hotel), is currently a two lane dual carriageway. Starting from the east side, the north side of the road is fronted by the Wing On Plaza. Moving west are the Wing On Plaza Garden and the Middle Road Children's Playground as separated by the Chatham Road South. Adjacent to the Middle Road Children's Playground is the Sheraton Hong Kong Hotel.

The south side of Salisbury Road fronts the Tsim Sha Tsui waterfront promenade. Along the promenade, moving from an east to west direction is the New World Centre (at the junction of Salisbury Road and Chatham Road South) and the Palace Mall.

Photographs of existing conditions are shown in Figures 8.7, 8.9, 8.11 & 8.12. The streetscape within this area is of a high quality, with existing vegetation planting and mature tree screens along the central divider and at various sections along the footpaths both north and south of Salisbury Road. The Tsim Sha Tsui waterfront and cross harbour views combines with the local landscape to provide a pleasant visual context at the western end of the road. Westbound on Salisbury Road, the surrounding streetscape is highlighted by the Sheraton Hong Kong Hotel on the right, a building which has recently completed an upgrade of its facade and the Palace Mall on the left, which is a structure with architectural merit against a backdrop of cross harbour views.

Southbound on Chatham Road south, at its junction with Salisbury Road, the Wing On Plaza Garden and the Middle Road Children's Playground is dwarfed by the visual focus of the New World Centre. The New World Centre is a high rise multi-purpose complex with consistent form and appearance which provides a strong visual edge to the junction.

8.2.2 Visual Envelope / Visually Sensitive Receivers

The 'Visual Envelope' is defined as the approximate boundary of the 'zone of visual influence' resulting from the proposed works. This may be solid, as in building edges or diffuse, as in vegetation screens from which filtered views are possible. The visual envelope arising from the proposed Salisbury Road Underpass is illustrated in Figures 8.3 & 8.4.

'Visually Sensitive Receivers' are those people within the visual envelope who are likely to experience adverse visual impacts resulting from the proposed works. Visual impact is a function of one or a combination of:

Visual Obstruction:	Where the receiver's views are physically blocked by the proposed works.
Visual Intrusion:	Where the receiver's views are affected as a result of the proposed works or by users of the proposed works (e.g. construction machinery, vehicles etc);
Loss of Vegetation Screens:	Which may be lost as a result of the proposed works or the construction of the proposed works.

The key visually sensitive receivers from the proposed Salisbury Road Underpass are illustrated on Figures 8.3 to 8.4.

8.3 Planning and Development Control Framework

8.3.1 Planning and Development Control Framework

Salisbury Road currently serves as a distributor for motorists in the Tsim Sha Tsui area from Tsim Sha Tsui East in the east to the Star Ferry Terminal in the west. The land along Salisbury Road in this area are allocated to the statutory zonings of Comprehensive Development Area (CDA), Open Space (O), Government/Institution/Community (G/IC), Commercial (C) and Other Specified Uses (OU).

Along Salisbury Road, cross harbour views forms the overall dominating visual feature in the area. Flanking the westbound carriageway of Salisbury Road, major landmarks include New World Centre (C), Palace Mall, Public Open Space with Underground Commercial Complex and Car Park, Hong Kong Space Museum, Hong Kong Cultural Centre and the Star Ferry Terminal (OU). Along the eastbound carriageway, major landmarks include Tsim Sha Tsui Centre, Shangri-La Hotel, Sheraton Hong Kong Hotel (C), the YMCA Building (G/IC), Middle Road Children's Playground and Wing On Plaza Garden (O) and the Ex-Marine Headquarters (CDA).

In the development of the scheme, considerable efforts have been made to minimise the potential land use impacts within the area. The resulting proposed scheme will have no land use impact in the statutory zones of Comprehensive Development Area, Government / Institution / Community, Commercial and Other Specified Uses. However, due to the limited space available, a small strip of land (460m^2) at the south eastern corner of Middle Road Children's Playground (Open Space) will be required to be permanently alienated to allow for the carriageway widening of Salisbury Road and the provision of an entrance to the pedestrian subway located at the junction of Salisbury Road and Chatham Road South.

With an "Urban Forest Planting" approach and sensitive detailing of all structural elements, the outlook of the proposed scheme upon implementation will merge with the local visual, landscape / townscape context and will also result in an enhanced streetscape at the junction of Salisbury Road and Chatham Road South.

8.4 Sources of Impact

The sources of landscape and visual impacts on the surrounding area during the construction and operation of the proposed Salisbury Road Underpass are as follows:

Construction Phase

- Excavation and earthworks;
- Structures associated with the proposed Underpass (including temporary structures);
- Site hoardings;
- Site work areas (including site offices);
- Construction equipment / machinery;
- Loss of existing vegetation;

- Construction lighting.

Operation Phase

- Structures associated with proposed Underpass;
- Widened roads and loss of pedestrian footpath areas;
- Loss of existing vegetation and tree screens;
- Loss of open area.

8.5 Visual Impacts from the Proposed Works

8.5.1 Temporary Visual Impacts During Construction Phase

Temporary visual impacts on the visually sensitive receivers resulting from the construction of the Salisbury Road Underpass are evaluated in the sections below and classified as 'high', 'medium' or 'low'.

Visually sensitive receivers on the eastern end of the visual envelope include the users of Wing On Plaza, pedestrians using Salisbury Road and pedestrians along the Tsim Sha Tsui waterfront promenade. As the proposed works in this area during the construction phase is only limited to minor structural work associated with the underpass scheme and road widening, the visually sensitive receivers would experience a low level of visual impact. Existing mature tree screens on the northern footpath will be retained during construction. Visual intrusion would arise from the relocation of existing trees and vegetation along the southern footpath and central divider. As a result, visually sensitive receivers would have greater visibility of construction activity. However, as the construction works in this area is limited to minor works, the visual impact on the visually sensitive receivers is expected to be low. Furthermore, pedestrians using the Tsim Sha Tsui waterfront promenade would only have a filtered view of the construction works on the Underpass as it is partially obstructed by a number of structures separating the Salisbury Road footpath and the promenade. These visual impacts will only be temporary, lasting for the duration of the construction period.

At the junction of Salisbury Road and Chatham Road, visually sensitive receivers are expected to experience a high but temporary level of visual impact as the majority of the construction works for the proposed Underpass will occur in this area. Pedestrians along Salisbury Road and users of sections of Middle Road Children's Playground and Wing On Plaza would experience visual intrusion from the relocation of vegetation along the footpath and the central divider. This would lead to unfiltered views of erected site hoardings and the high level of construction traffic to and from the work site. Middle Road Children's Playground will be particularly affected as the proposed work site would enroach into a small area of land on the south eastern part of the Playground. This however is expected to be temporary as most of the enroached area would be reinstated upon the completion of the Underpass.

Users of the southern section of Wing On Plaza Garden away from the junction would be expected to experience a medium level of visual impact as their Tsim Sha Tsui waterfront and cross harbour views would be temporarily intruded by the erection of site hoardings. Users on

the northern part of the Garden and section facing Chatham Road South are expected to experience no impact as they are further removed from the proposed work site.

Users on lower levels of the New World Centre would expect to experience a low to medium level of visual impact as they will have visual intrusion from general construction activity occurring below within the erected site hoardings. As with other visual impacts occurring during this phase, it is temporary and will only last for the duration of the construction works. Users on the higher levels of the complex are not expected to experience any visual impact as the proposed construction works at road level will be far removed from their line of sight.

Visually sensitive receivers on the western end of the visual envelope including the users of Sheraton Hong Kong Hotel and pedestrians along Salisbury Road are expected to experience a similar level of visual impact as their eastern end counterparts. Construction works in this area is limited to minor structural work associated with the Underpass and road widening. Visual impact will be in the form of visual intrusion from construction works.

8.5.2 Permanent Visual Impacts During Operation Phase

Permanent visual impacts on the visually sensitive receivers resulting from the construction of the Salisbury Road Underpass are evaluated in the sections below and classified as 'high', 'medium' or 'low'.

As the Salisbury Road Underpass is predominately an underground structure, the main permanent visual impacts on the visually sensitive receivers of the site would be in the form of visual intrusion of existing views from minor structural elements of the Underpass at road grade, widened roads and loss of some existing vegetation and mature tree screens. However, proposed planting of heavy trees along the footpaths on Salisbury Road as shown in Figure 8.12 will provide an effective screen and minimise the visual impacts from the Underpass.

The relocation of majority of the trees along the footpaths of Salisbury Road is limited to a setback from their original locations to accommodate the widening of Salisbury Road. The southern footpath in front of the Wing On Plaza and the eastern end of the Wing On Plaza Garden will experience a loss of existing vegetation screen. This would affect the visual perception of the street environment. However, this is expected to result in a low level of visual impact as the main visual attraction along the footpath remains to be the Tsim Sha Tsui waterfront and cross harbour views.

8.6 Landscape / Townscape Impacts from the Proposed Works

In this section, temporary and permanent landscape / townscape impacts from the proposed Salisbury Road Underpass to the surrounding area will be evaluated. Figures 8.1 to 8.4 shows a location plan of existing trees within the site and future landscape proposals together with its perceived impacts. Photographs of the trees are shown in Figures 8.15 to 8.21. Extracts showing the assessment schedule of existing trees from the Tree Survey Report carried out on the area has been enclosed in Appendix F. Figures 8.7 to 8.12 shows the landscape / townscape impacts from

the proposed Underpass using a series of photomontages.

8.6.1 Temporary Landscape / Townscape Impacts During Construction Phase

Temporary landscape and townscape impacts on the visually sensitive receivers resulting from the construction of the Salisbury Road Underpass are evaluated in the sections below and classified as 'high', 'medium' or 'low'.

During the construction period of the proposed Underpass, impacts to the landscape and townscape along Salisbury Road is expected to include disruptions to footpaths from the realignment of the carriageways, increased levels of construction traffic in the area and the temporary relocation of existing vegetation. This period will affect the routing of the pedestrians in the area, especially at the junction of Salisbury Road and Chatham Road South, where the majority of the construction works will take place.

The removal of existing tree screens along the central divider of Salisbury Road will reduce the scenic value for the motorists along the road. However, this will only result in a low level of impact to the landscape since the dominant landscape and townscape features in the area are key features such as the Tsim Sha Tsui waterfront, open spaces of Middle Road Children's Playground and the Wing On Plaza Garden and buildings with architectural merit such as Palace Mall and Sheraton Hong Kong Hotel. Obstruction of views of Middle Road Children's Playground and Wing On Plaza Garden for westbound motorists by site hoardings and construction equipment is expected towards the junction of Salisbury Road and Chatham Road South. However, as the duration of these impacts is minimal for motorists, this is considered to induce medium levels of impact on landscape and townscape.

The relocation of existing vegetation and mature trees on the southern footpath of Salisbury Road in this area will temporarily reduce the amount of shade and screening available to pedestrians within the site and limit the amount of available open space along the footpath. The length of the footpath being affected is around 90m and is considered to have a low level of impact on the surrounding landscape and townscape as the predominant landscape / townscape feature in this area is the Tsim Sha Tsui waterfront.

For users of Middle Road Children's Playground, the loss of the south eastern portion of the Playground will have a high impact on the landscape and townscape of the general area. The areas affected by the construction phase include 9 individual trees (set within low circular raised planters) and a tree group (set within a large raised planting bed) marked "Area A" on Figure 8.2. With regards to the individually surveyed trees, it is recommended in the Tree Survey Report that 5 of the existing trees are to be retained during the construction phase with the remaining 4 transplanted to other locations.

For the group of approximately 37 trees in "Area A", the Tree Survey Report has recommended that 31 of these trees be transplanted with 6 to be felled. The report has indicated that as all the trees are common varieties (of Juniperus chinensis and Thevetia peruviana species), the choice of the felled trees has been made base on their relative attractiveness of form/habit and their

suitability for transplanting. The impact from the construction works and transplanting will reduce open area for recreational use. The scenic value of the Playground to motorists along Salisbury Road will also be reduced. Photographs of the felled trees from the Tree Survey Report are shown in Figure 8.13.

Low levels of impact is expected in the area of Wing On Garden Plaza as the work site will not enroach into the Garden and the tree screens on the footpath in front of the Garden on Salisbury Road is expected to be retained during construction. This is also the case for users within Wing On Plaza, New World Centre and Sheraton Hong Kong Hotel. Since the predominant landscape feature for the users in these complexes are the views of the Tsim Sha Tsui waterfront promenade and cross harbour views, the removal of vegetation and trees at road grade is generally out of sight line and the impacts will be low.

The setback of the footpath in front of the Hong Kong Cultural Centre and the Hong Kong Space Museum will require the temporary transplanting of a number of existing trees on the footpath. This will only result in low levels of impact as the existing trees are small to medium in size and are spaced widely apart. Furthermore, the temporary impacts will not be expected to last for a long duration due to the minor nature of the works involved.

8.6.2 Permanent Landscape / Townscape Impacts During Operation Phase

Permanent landscape and townscape impacts on the visually sensitive receivers resulting from the construction of the Salisbury Road Underpass are evaluated in the sections below and classified as 'high', 'medium' or 'low'.

As previously discussed in Section 8.5.2, the proposed Salisbury Road Underpass is predominantly an underground structure. From the photomontage shown in Figure 8.12, it can be seen that the underpass scheme is only expected to cause a low level of impact on the general landscape and townscape of the area upon its completion. Key landscape / townscape features such as the New World Centre, Tsim Sha Tsui waterfront and cross harbour views will in general not be obstructed or intruded by the presence of the Underpass. The majority of the impacts would come from widened carriageways, minor structural elements such as parapets and headwalls associated with the underpass scheme.

39 mature street trees along the central divider of the Salisbury Road will be required to be transplanted for the construction of the Underpass. The majority of these trees will be transplanted to other areas within the site as recommended by the Tree Survey Report. As the principle landscape and townscape attractions along the road are dominant features such as cross harbour views and the building complexes of Sheraton Hong Kong Hotel and New World Centre, the trees along Salisbury Road behave in a complementary role to the general landscape of the area. With compensatory planting in the form of heavy tree screens along both sides of the road (as shown in Figure 8.12), the loss of the mature trees is expected to have a low to medium level of impact in the sense that only the motorist's view of the apparent scale of Salisbury Road will be increased.

On the northern footpath east of the junction of Salisbury Road and Chatham Road South, all of the tree screens will be retained during the operation phase of the Underpass. As such, this will have no impact on the landscape / townscape of the area. With careful landscape detailing, it will be possible to improve the landscape / townscape along this section of Salisbury Road on the completion of the underpass scheme.

At Middle Road Children's Playground, the majority of land which consisted of the tree group "Area A" and several individually surveyed trees taken up during the construction phase will be reinstated upon completion of the proposed underpass scheme. However, 4 roadside trees adjacent to the proposed bus bay will be felled. Photographs of the trees from the Tree Survey Report are shown in Figure 8.14. The report has indicated that the crown of the trees would be in physical conflict with any buses using the bus bay and has recommended their felling as they are not suitable for transplanting. The 4 trees (of Schefflera octophylla species) are all less than 2.5m in height and in bad condition. However, a small strip of land with an area of 460m^2 at the south eastern corner of the Playground will be permanently lost to allow for the provision of a ramp/staircase entrance to the pedestrian subway. This will lead to medium levels of impact on the area. The land use impact resulting will be further detailed in Section 9.

Along the southern footpath on Salisbury Road, east of its junction with Chatham Road South, the 13 trees located in the vicinity of the proposed pedestrian subway will be required to be transplanted. The widening of the carriageway and the provision of the subway entrance will lead to a reduction in landscape area and footpath area. This will lead to medium levels of impact which will be sensitive to mitigation measures outlined in Section 8.8.3.

Moving west from the pedestrian subway along the southern footpath of Salisbury Road, 10 trees are affected near the western entrance of the proposed underpass. 5 of these trees will require transplanting to accommodate the widening of the carriageway in this area. The remaining 5 trees will be retained. Figure 8.11 shows existing site conditions and a photomontage of the landscape outlook resulting from the proposed underpass. With the provision of the pedestrian subway, this has eliminated the need for the footbridge connecting New World Centre and the Middle Road Children's Playground. The footbridge represents an intrusion on the current landscape / townscape context of the Playground. The removal of the elevated road structure and a provision of a kiosk would harmonise the appearance of the Playground and offer both users of the Playground and motorists along Salisbury Road unobstructed views of the surrounding key landscape / townscape features. Carefully detailed landscape design around the kiosk will provide an effective screen for users in the Playground against Salisbury Road and the proposed Underpass. Hence there will be a high level of permanent beneficial impact in this area.

Upon the completion and commissioning of the Underpass, planter areas as shown on Figure 8.4 will be provided at the junction of Salisbury Road and Chatham Road South. This will enhance and harmonise the surrounding townscape and will also serve to reduce the apparent scale of the junction and Underpass to motorists and pedestrians nearby. Figures 8.7 and 8.8 shows the favourable impacts from these proposed planters at the junction through photomontages.

The heavy standard trees shall be provided along the strip of footpath in front of the Hong Kong

Cultural Centre and Hong Kong Space Museum. This will reprovide and enhance the previously existing sparse tree screen in this area. The provision of heavy standard trees will also provide a shade for the pedestrians using the footpath.

8.7 Mitigation of Visual Impacts

8.7.1 Potential Mitigation of Temporary Visual Impacts

Mitigation of temporary visual impacts during the construction stages may be achieved through the implementation of the following measures which are summarised in Table 12.4 and listed below:

- Screening of site construction works by use of hoardings;
- Surface treatment of site hoardings to enhance visual interest and harmony with surrounding landscape / townscape;
- Locating site offices and other temporary buildings in least visually prominent locations;
- Pedestrians using the southern footpath of Salisbury Road may be redirected to utilise the Tsim Sha Tsui waterfront promenade;
- Provision of fences around all low, circular raised planters to ensure that materials and debris will not be dumped on tree roots;
- Retention of vegetation within the works site area where possible;
- In the works compound area (southern section of Middle Road Children's Playground), retention of existing vegetation to possibly create a screen to the activities within the compound.

8.7.2 Residual Temporary Visual Impacts

The section below evaluates the degree of residual temporary visual impacts after mitigation measures have been implemented. The impacts are rated as 'high', 'medium' or 'low.

Salisbury Road

Due to the structural nature of the proposed underpass, majority of the construction works will be carried out below grade. As such, the use of site hoardings will be effective in screening out the much of the general construction activities although large construction equipment (such as cranes) would still cause visual intrusion to the visually sensitive receivers. Also, while the presence of site hoardings may screen out visually intrusive construction activities, they themselves constitute a visual obstruction during the construction phase. The residual visual impacts levels from this is considered medium. During the construction phase, the Contractor

carrying out the construction works should be encouraged to clear and reinstate work areas as soon as practicable to reduce the source of visual intrusion to a minimum.

The diversion of pedestrians utilising the southern footpath of Salisbury Road onto the Tsim Sha Tsui waterfront promenade will be an effective mitigation measure as it will totally eliminate visual obstruction and intrusion from the visually sensitive receivers.

Middle Road Children's Playground

The use of vegetation screens within the works compound area will only partially reduce the visual obstruction and intrusion caused by general activity within the area. Medium levels of residual impact level from this is expected to be high though temporary during the construction phase.

8.7.3 Mitigation of Permanent Visual Impacts

Mitigation for the permanent visual impacts for the proposed underpass scheme are illustrated in Figures 8.5 & 8.6. Table 12.4 offers a summary of the mitigation measures listed below:

- Footpaths along both sides of Salisbury Road will be replanted with heavy standard trees where possible. The proposed planting will also reprovide shading along the footpath temporarily removed during the construction stage. The proposed landscaping areas along the footpath is shown on Figures 8.5 and 8.6.

- By virtue of the provision of a pedestrian subway at the junction of Salisbury Road and Chatham Road South, a small strip of area at the south eastern part of Middle Road Children's Playground will be permanently lost. The roof cover of the pedestrian subway however will be landscaped with small shrubs and plants to visually enhance the surroundings. Sensitive design and detailing for pedestrian subway entrances will be carried out to enhance visual features.

- The southern part of Middle Road Children previously taken up as work compound area during the construction stage will be reinstated with carefully detailed compensatory planting and a kiosk to provide a screen to Salisbury Road.

- The junction of Salisbury Road and Chatham Road South will be visually enhanced through the provision of planters consisting of small shrubs and plants. This is shown on Figure 8.4.

- The structural elements of the proposed underpass and pedestrian subway shall be sensitively detailed as advised by the "Advisory Committee on the Appearance of Bridge and Associated Structures" (ACABAS).

8.7.4 Residual Permanent Visual Impacts

The section below evaluates the degree of residual permanent visual impacts after mitigation measures have been implemented. The impacts are rated as 'high', 'medium' or 'low.

Salisbury Road

Residual permanent visual impacts from the proposed roadside planting can be seen in Figure 8.12. The proposed landscaping along the footpaths will partially screen out the visual intrusion of the Salisbury Road Underpass to the pedestrians using the footpaths and compensate for the loss of vegetation / tree screens along the central divider. The structural elements of the proposed underpass will be finished using a high grade of concrete finish and paint coating as advised by ACABAS. Motorists using the road will be subjected to a low level of residual visual impact through increased scale of Salisbury Road. The proposed roadside planting will serve to mitigate some of these residual impacts. The proposed landscape planting at the junction of Salisbury Road and Chatham Road South, will improve the visual context of the area by reducing the apparent scale of the junction with no permanent residual visual impact.

Wing On Plaza, Sheraton Hong Kong Hotel, New World Centre

The proposed landscaping on roadside and at the junction of Salisbury Road and Chatham Road South will serve to compensate for the loss of vegetation and tree screens along the central divider. However, as previously discussed, for visually sensitive receivers within these buildings, the dominant visual features of the surrounds will be the Tsim Sha Tsui waterfront and cross harbour views. The level of permanent residual visual impacts is expected to be none. Receivers on higher levels of these buildings are not expected to experience any residual visual impacts as the proposed underpass scheme will generally be out of their sight line. As advised by ACABAS, the ramp cover at the southern entrance to the pedestrian subway located front of the New World Centre is proposed to be constructed of structural steel skeletal frames with transparent roof sheeting. This will serve to increase the transparency and reduce the apparent scale of the roof cover with no residual visual intrusion on New World Centre.

Wing On Plaza Garden

The enhancement of roadside vegetation screen in front of the Wing On Plaza Garden will further reduce the visual intrusion of Salisbury Road leaving no residual visual impacts from the proposed Underpass.

Middle Road Children's Playground

The reprovision of landscaping area formerly used as a works compound in Middle Road Children's Playground will reinstate the visual context of the area. The proposed kiosk, with carefully detailed landscaping will screen out any visual intrusion of Salisbury Road. A small strip of land would be permanently lost to accommodate the entrance of the pedestrian subway. The roof cover of the entrance will be sensitively detailed with proposed landscaping on the

elevated planter roof as advised by ACABAS. The combination of these mitigation measures is expected to leave no permanent residual visual impacts.

8.8 Mitigation of Landscape / Townscape Impacts

8.8.1 Potential Mitigation of Temporary Landscape / Townscape Impacts

Mitigation of temporary landscape / townscape impacts during the construction stages may be achieved through the implementation of the following measures which are summarised in Table 12.5 and listed below:

- Re-routing of pedestrian routes away from the work site where possible. This will eliminate all temporary landscape / townscape impacts caused during the construction phase;
- Re-routing of pedestrian routes through well defined public access. Although maintaining public access would not reduce any landscape impacts, it will allow pedestrians safe and clear routes around the area and limit their time in the vicinity of the construction works. The disruption will cease once the proposed works is commissioned;
- Retaining and minimising damage to vegetation where possible. Care shall be taken not to damage those trees identified in the Tree Survey Report to be retained during the construction phase. This will minimise the temporary landscape / townscape impacts from construction activity;
- Careful and efficient transplanting of existing vegetation carried out under the supervision of a professional landscape architect;
- The introduction of penalty clauses in the Contract document for the improper removal of trees identified to be retained in the Tree Survey Report;

8.8.2 Residual Temporary Landscape / Townscape Impacts

The section below evaluates the degree of residual temporary landscape / townscape impacts after mitigation measures have been implemented. The impacts are rated as 'high', 'medium' or 'low.

Southern Footpath (Salisbury Road)

It may be feasible to divert pedestrians from the southern footpath of Salisbury Road onto the Tsim Sha Tsui waterfront promenade. By removing sensitive receivers from the general construction area, it will eliminate the source of the landscape / townscape impacts, with no residual impacts.

Remaining Areas

The scale of the proposed works restricts the likelihood of eliminating all residual landscape /

townscape impacts after mitigation measures are implemented. However, the underground nature of the Underpass will limit the impacts on the landscape to intrusion of site hoardings and large construction equipment. Hence a medium level of residual landscape / townscape impact is expected. However, as with all impacts during the construction stage, this is temporary and will cease upon commissioning of the proposed works.

The presence of retained trees and the transplanting of substantial amount of existing trees to other locations within the site at commencement of the construction will also preserve some of the landscape / townscape context of the area during this stage.

During the construction phase, the Contractor carrying out the construction works should be encouraged to clear and reinstate work areas as soon as practicable to reduce the source of landscape / townscape impacts to a minimum.

8.8.3 Mitigation of Permanent Landscape / Townscape Impacts

Mitigation for the permanent landscape / townscape impacts for the proposed underpass scheme are illustrated in Figures 8.5 & 8.6. Table 12.5 offers a summary of the mitigation measures listed below:

- Mitigation for vegetation loss may be achieved in the form of compensatory planting of transplanting of existing trees in the area or new plant material as suggested in the Tree Survey Report. This is recommended to be implemented on the footpaths of Salisbury Road where space allows to compensate the loss of vegetation and existing tree screens along the central divider;

- To further soften the visual and landscape impacts from the Underpass, planters of around 1200mm in height, with dense flowering trees will be provided on the deck area of the Underpass at the junction of Salisbury Road and Chatham Road South to create a visual buffer at the intersection;

- Provision of planters of shrubs / small palms to the junction of Salisbury Road and Chatham Road South;

- Planting of flowering trees and shrubs etc, shall be considered so as to create colour impacts, strong sense of seasonal changes and where possible, provide shade for the pedestrians;

- Sensitive detailing of the proposed pedestrian subway entrances and proposed landscaping around the entrances where possible;

- Sensitive detailing of the kiosk and landscaping in the area in Middle Road Children's Playground;
- Relocation of existing trees within the site and where possible ensuring transplanted trees are returned to the area upon completion of works;

- Detailing of street furniture such as footpath surfaces and railings to enhance the pedestrian environment;

- Mass planting shall be adopted to give good instant effect;

- The structural elements of the proposed underpass and pedestrian subway shall be sensitively detailed as advised by the "Advisory Committee on the Appearance of Bridge and Associated Structures" (ACABAS).

The tentative locations for both transplanted proposed trees and vegetation are shown in Figure 8.5 & 8.6. Detailed planting proposals / compensatory planting proposals including precise locations for transplanted trees will be produced during the detailed design stage and forwarded to the relevant Government Departments for comments.

8.8.4 Residual Permanent Landscape / Townscape Impacts

The section below evaluates the degree of residual permanent landscape / townscape impacts after mitigation measures have been implemented. The impacts are rated as 'high', 'medium' or 'low.

Salisbury Road

From the photomontages in Figures 8.7, 8.9 & 8.12, it can be seen that mitigation measures will be effective in limiting the residual impacts on the landscape / townscape during the operation phase of the proposed works.

Planting of heavy standard trees along the footpaths of Salisbury Road can be seen in Figure 8.12 to compensate and retain the landscape / townscape context of the area. With sensitive detailing of street furniture detailing, sensitive receivers along the footpaths will experience an improved pedestrian environment with the enhancement of tree screens and shaded area. The motorists will experience a low level residual landscape / townscape impact from the loss of vegetation in the central divider. However, this is unavoidable in order to accommodate the entrances to the underpass. The ACABAS has suggested a high grade of concrete finish together with a paint coating to the structural elements of the underpass at road level to harmonise with surrounding landscape / townscape context.

Figure 8.7 & 8.9 shows the provision of landscape planters at the junction of Salisbury Road and Chatham Road South and sensitive detailing of the pedestrian subway entrance together with enhanced vegetation screens. This will reduce the apparent scale of the junction and harmonise the landscape context with the surroundings eliminating residual impacts to this area. The proposed works will offer motorists an improved driving environment at the junction.

The conceptual landscape layout plan near the southern entrance of the pedestrian subway is shown on Figure 8.10. Although the presence of the subway entrance and the widening of the carriageway will reduce footpath and landscaping area, , the provision of heavy mature trees will

result in a more solid vegetation screen, increased shaded area and an improved landscape / townscape outlook. The pedestrian subway will offer a safer alternative for pedestrians crossing Salisbury Road. Therefore, no permanent residual impacts are expected in this area say for a reduction of landscaping area.

Middle Road Children's Playground

Figure 8.7 shows the residual landscape / townscape impacts from the proposed pedestrian subway entrance at the south eastern corner of Middle Road Children's Playground. The landscaping area previously taken up during the construction stage is proposed to be reinstated. The sensitive detailing of the pedestrian subway entrance and proposed landscaping on the elevated planter roof as advised by ACABAS will enrich the landscape context at the road junction. The pedestrian subway will also offer pedestrians a safer option to cross Salisbury Road. A conceptual plan for the landscaping of the roof structure and its immediate surroundings is shown in Figure 8.8. Aside from the loss of footpath area (which will be compensated by careful detailing of street furniture), there will be no residual landscape / townscape impacts on the area as the local landscape / townscape context has been retained.

As can be seen in the photomontage of Figure 8.11, the proposed Underpass will lead to the demolition of the footbridge linking New World Centre with the Playground. The removal of the intrusive structure will increase the harmony within the surrounding landscape. The provision of the kiosk will serve both as a practical amenity facility and partially screen the local environment from Salisbury Road. No permanent residual landscape / townscape impacts is expected after implementation of mitigation measures.

New World Centre, Sheraton Hong Kong Hotel and Wing On Plaza

Visually sensitive receivers within these building complexes will generally benefit from the improved landscaping on Salisbury Road. Loss of vegetation on the central divider will increase perceptions of the road. However, as previously described, the residual impacts will be low since key landscape / townscape features for these buildings are the cross harbour views and the Tsim Sha Tsui waterfront.

Wing On Plaza Garden

Sensitive receivers within the Wing On Plaza Garden will further benefit from the enhanced vegetation screen on the footpaths of Salisbury Road. With proper detailing of the streetscape, no permanent residual impacts is expected in this area.

8.9 Conclusions

Landscape and Visual Environment

The proposed Salisbury Road Underpass will consist of the construction of an underpass structure on Salisbury Road, carriageway widening along the road and the provision of a

pedestrian subway crossing Salisbury Road at its junction with Chatham Road South.

The proposed works would lead to some reduction of pedestrian footpaths along both sides of Salisbury Road and a small strip of land at the south eastern part of Middle Road Children's Playground to accommodate the pedestrian subway's northern entrance.

During the construction phase, the proposed works would induce medium to high levels of landscape / townscape and visual impacts at the junction where the majority of the construction works occur, impact levels away from the junction is expected to decrease significantly. However, the structural nature of the underpass will limit potential impacts to potential intrusion of site hoardings and large construction equipment.

The recommended mitigation measures during the construction stage will serve to reduce the level of these impacts. However, the scale of the works prevents an elimination of residual temporary landscape / townscape and visual impacts. These impacts are temporary and will cease upon the operation phase of the works.

Existing vegetation will be retained/transplanted to other locations within the site where possible to retain the landscape and visual context of the area. As recommended in the Tree Survey Report, 66 nos. (i.e. 27.4%), 165 nos. (i.e. 68.5%) and 10 nos. (i.e. 4.1%) of trees will be retained, transplanted and felled respectively. Of the trees to be felled, 4 nos. are in bad condition and unsuitable for transplanting. The remaining 6 nos. are common varieties (Juniperus chinensis and Thevetia peruviana) and were chosen based on their relative attractiveness of form and habit. Around 4 times the number of trees felled will be planted along the footpaths on Salisbury Road to compensate the loss from tree-felling. HyD will take up a normal maintenance period of 12 months after the completion of the planting and transplanting works, and USD will take up the maintenance responsibility upon expiry of the normal maintenance period.

The proposed underpass scheme will in general result in beneficial impacts to the local landscape / townscape and visual character. Several minor areas will be subjected to acceptable levels of impacts. Figures 8.7, 8.9, 8.11 and 8.12 shows photomontages of the proposed underpass scheme.

The adoption of proposed mitigation measures such as sensitive detailing of structural elements and compensatory landscaping will complement the landscape / townscape and visual character at the junction of Salisbury Road and Chatham Road South. The resulting elimination of the existing footbridge crossing Salisbury Road and improved landscape / visual quality at the junction will provide beneficial impacts to this area.

Motorists travelling along Salisbury Road will be subjected to an increased perception of Salisbury Road which is avoidable. Roadside complementary planting and the structural nature of the underpass will result in no significant effects on the landscape, no significant visual effects from the underpass scheme and no interference to key visual / landscape features such as the New World Centre and cross harbour views. The permanent alienation of the area at the south eastern corner of Middle Road Children's Playground will be compensated by sensitive detailing of the roof cover together with the provision of an elevated landscape planter. The impacts on the

surrounding visual, landscape / townscape context in these areas is considered to be acceptable.

9 LAND USE IMPACT

9 LAND USE IMPACT

9.1 Introduction

This report examines the base land use planning assumptions pertaining to the project and key land use interfaces generated by the proposed works. The principal key issues are as follows:

- Land use and urban planning considerations with regard to the impact on the existing and planned development context within the vicinity of the proposed underpass.
- Land Resumption required for the implementation of the proposed scheme.

9.2 Planning and Land Use Context

9.2.1 General

According to Tsim Sha Tsui Outline Zoning Plan, the land along the proposed scheme are allocated to Comprehensive Development Area (CDA), Open Space zone (O), Government/Institution/Community zone (G/IC), Commercial zone (C) and Other Specified Uses zone (OU).

9.2.2 Detailed Urban and Land Use Context

Road Network

The section of Salisbury Road where the proposed works is located, is a two-lane dual carriageway running along the Tsim Sha Tsui waterfront promenade. It is fronted on its northern side by a mixture of medium to high rise commercial and institutional buildings. Major junctions along the road include Canton Road, Kowloon Park Drive, Nathan Road and Chatham Road South. Smaller side streets, including Hankow Road, Middle Road and Mody Lane, also feed into Salisbury Road.

Commercial Uses

The Peninsula Hotel, Sheraton Hong Kong Hotel, New World Centre, Wing On Plaza, Shangri-La Hotel and Tsim Sha Tsui Centre are located along the Salisbury Road. These areas are allocated Commercial Zone (C). Medium to high rise offices, hotels, shopping centres and commercial complex are located within the zone.

Government/Institution/Community Uses

The YMCA building, located at the junction of Salisbury Road and Kowloon Park Drive is allocated within the Government/Institution/Community Zone (G/IC).

Open Space Uses

Middle Road Children's Playground and Wing On Plaza Garden are located within the Open Space Zone (O). The two gardens are located at the junction of Chatham Road South and Salisbury Road. These areas are allocated primarily for public recreation purposes.

Comprehensive Development Area

Ex-Marine Police Headquarters at the junction of Canton Road and Salisbury Road are allocated within the Comprehensive Development Area (CDA). The Headquarters is elevated and surrounded by a slope.

Other Specified Uses

The Salisbury Garden (which includes the Palace Mall, Public Open Spaces together with as Underground Commercial Complex and Car Park), Hong Kong Cultural Centre and Hong Kong Space Museum are allocated within the Other Specified Uses (OU) zone. They lie in the vicinity of each other at the western side of the Salisbury Road. Next to them is the Star Ferry Pier, where the general community can take the ferry across Victoria Harbour towards Central and Wanchai.

9.3 Land Use Interfaces and Impacts

The implementation of the proposed underpass scheme will require acquisition of land within the Middle Road Children's Playground. The land requirement plan is shown on Figures no. 9.1 (a) and 9.1 (b) for reference. The extent of USD Land to be temporarily and permanently required for the works is shown on Figure 9.1 (b). The anticipated impacts on different zones are discussed in the subsequent sections.

9.3.1 Impact on Commercial Zone

No land within the Commercial zone (C) will be encroached for the implementation of the project. Thus, the underpass scheme will post no impact on land use requirement to the Commercial zone.

9.3.2 Impact on Government/Institution/Community Zone

The proposed scheme will not encroach into the Government/Institution/Community (G/IC) zone. As such, there will be no impact on land use requirement on the areas in the G/IC zone.

9.3.3 Impact on Open Space Zone

The area of land proposed for resumption under the underpass scheme lies within the zone of Open Space (O) within the Middle Road Children's Playground. Areas of temporary and permanent alienation are shown on Figures 9.1(a) & 9.1(b). An area at the south-eastern part of

the Playground at the junction of Chatham Road South and Salisbury Road will be occupied both temporarily and permanently. Temporary alienation of land is necessary to provide working space during the construction phase. An area of 460m^2 occupying a small strip of land adjacent to the northern footpath of Salisbury Road will be permanently alienated. The permanent land alienation is required to provide a bus bay at the entrance to the Playground and a ramp/staircase entrance to the pedestrian subway crossing Salisbury Road.

9.3.4 Impact on Comprehensive Development Area Zone

No land within the Comprehensive Development Area (CDA) zone will be encroached under the proposed scheme. Therefore, no land use requirement impacts is expected in this zone.

9.3.5 Impact on Other Specified Uses Zone

No land within the Other Specified Uses (OU) zone will be encroached under the proposed scheme. Therefore, no land use requirement impacts is expected in this zone.

9.4 Summary

The land use impacts from the underpass scheme are summarised below:

- No impact on land requirement for the Commercial (C), Government/Institution/ Community (G/IC), Comprehensive Development Area (CDA) and Other Specified Uses (OU) zone is envisaged as the proposed scheme will not encroach into the area classified under these zones.

- Temporary and permanent land alienation will be required at the south-eastern part of the Middle Road Children's Playground. The amount of permanent land to be alienated is 460m^2, all of which is allocated within the Open Space (O) zone.

Examination of the proposed underpass scheme has shown that considerable effort has been made in its preparation to minimise the land use impact in the area concerned. Under the current proposal, only a small strip of land in the Open Space zone is required to be resumed for the implementation of the project.

10 ENVIRONMENTAL MONITORING AND AUDIT

10 ENVIRONMENTAL MONITORING AND AUDIT

No insurmountable noise, wastes and water impacts are predicted in the EIA during construction phase. In addition, no exceedance of the relevant Air Quality Objectives is predicted during the operational phase. Therefore, there is no requirement for environmental monitoring and audit on these parameters.

Construction dust would be a nuisance if the mitigation measures are not undertaken properly. Therefore, an EM & A programme is recommended to be undertaken for the air quality during construction phase in order to ensure compliance with EPD standard. Details of the programme are described in following sections.

10.1 Air Quality Parameters

Monitoring and audit of the Total Suspended Particulates (TSP) levels shall be carried out by the Environmental Team (ET) to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in Title 40 of the *Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. Upon approval by the ER, 1-hour TSP levels can be measured by direct reading methods.

All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and any other local atmospheric factors affecting or affected by site conditions etc. shall be recorded down in details. A sample data sheet is shown in Appendix G.

10.1.1 Monitoring Equipment

High volume sampler (HVS) with the following specifications shall be used for the 1-hr and 24-hr TSP monitoring:

- 0.6-1.7 m^3/min (20-60 SCFM) adjustable flow range;
- equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm^2 (63 in^2);
- flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;
- equipped with a shelter to protect the filter and sampler;
- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;
- provided with a peaked roof inlet;
- incorporated with a manometer;

- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change the filter; and
- capable of operating continuously for 24-hr period.

The ET Leader is responsible for provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with an appropriate calibration kit are available for carrying out the baseline monitoring, regular impact monitoring and *ad hoc* monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc. shall be clearly labelled.

Initial calibration of dust monitoring equipment shall be conducted upon installation and every two months thereafter. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by the concerned parties such as the Independent Checker(Environment) (IC(E)). All data should be converted into standard temperature and pressure.

The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down in the data sheet (an example is given in Appendix G).

If the ET Leader proposes to use a direct reading dust meter to measure 1-hr TSP levels, the instrument shall also be calibrated regularly, and the 1-hr sampling shall be determined periodically by HVS to check the validity of the results measured by this direct reading method.

Wind data monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET Leader and agreed with the Engineer's Representative (ER) in consultation with the IC(E). For installation and operation of wind data monitoring equipment, the following points shall be observed:

- the wind sensors should be installed on masts at an elevated level 10 m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- the wind data should be captured by a data logger. The data recorded in the data logger shall be downloaded periodically for analysis at least once a month;
- the wind data monitoring equipment should be re-calibrated at least once every six months; and
- wind direction should be divided into 16 sectors of 22.5 degrees each.

In exceptional situations, the ET Leader may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IC(E).

10.1.2 Laboratory Measurement/Analysis

A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments, to handle the dust samples collected, shall be available

for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS accredited for this parameter or other internationally accredited laboratory.

If a site laboratory is set up or a non-HOKLAS accredited laboratory for this parameter is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER and the measurement procedures shall be witnessed by the ER in consultation with the IC(E). Measurements performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IC(E). The IC(E) shall conduct regular audits to the measurements performed by the laboratory to ensure the accuracy of the results. The ET Leader shall provide the ER with one copy of Title 40 of the *Code of Federal Regulations, Chapter 1 (Part 50), Appendix B* for his reference.

Filter paper of size 8"x10" shall be labelled before sampling. It shall be a clean filter paper with no pin holes, and shall be conditioned in a humidity controlled chamber for over 24 hours and be pre-weighed before use for the sampling.

After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper is then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

All the collected samples shall be kept in good condition for 6 months before disposal.

10.1.3 Monitoring Locations

Dust monitoring locations are shown in Figure 10.1. These locations are the closest ASRs around the major construction area. The status and locations of dust sensitive receivers may change after issuing this Manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from ER and agreement from the IC(E).

When alternative monitoring locations are proposed, the following criteria, as far as practicable, should be followed:

- at the site boundary or such locations close to the major dust emission sources;
- close to the sensitive receptors; and
- take into account the prevailing meteorological conditions.

The ET Leader shall agree with the ER on the position of the HVS for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

- a horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- no two samplers should be placed less than 2 metres apart;
- the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;

- a minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;
- a minimum of 2 metres separation from any supporting structure, measured horizontally;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 metres from the dripline;
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to gain access to the monitoring stations;
- a secured supply of electricity is needed to operate the samplers.

10.1.4 Baseline Monitoring

The ET Leader shall carry out baseline monitoring at all designated monitoring locations for at least 14 consecutive days prior to the commencement of construction works to obtain daily 24-hr TSP samples. 1-hr sampling shall also be performed at least 3 times per day while the highest dust impact is expected. Before commencing the baseline monitoring the ET Leader shall inform the IC(E) of the baseline monitoring programme such that the IC(E) can conduct on-site audits to ensure accuracy of the baseline monitoring results.

During the baseline monitoring, there should not be any construction or dust generation activities in the vicinity of the monitoring stations.

In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with the IC(E).

In exceptional case, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IC(E) to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.

Ambient conditions may vary seasonally and shall be reviewed at three-month intervals. If the ET Leader considers that the ambient conditions have changed and a repeat of the baseline monitoring needs to be carried out for updating the baseline levels, the monitoring should be at times when the contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should it be determined that ambient conditions have changed, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with the IC(E) and EPD.

10.1.5 Impact Monitoring

The ET Leader shall carry out impact monitoring during the course of the works. For regular

impact monitoring, the sampling frequency of at least once every six-days shall be strictly observed at all the monitoring stations for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs. Before commencing the impact monitoring, the ET Leader shall inform the IC(E) of the impact monitoring programme such that the IC(E) can conduct on-site audits to ensure accuracy of the results.

The specific time to start and stop the 24-hr TSP monitoring shall be clearly defined for each location and be strictly followed by the operator.

In case of non-compliance with the air quality criteria, more frequent monitoring exercise, as specified in the Action Plan in Section 10.1.7, shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

10.1.6 Event and Action Plan for Air Quality

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET Leader shall compare the impact monitoring results with the air quality criteria set up for 24-hour TSP and 1-hour TSP. Table 10.1 shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occur, actions in accordance with the Action Plan in Table 10.2 shall be carried out.

Table 10.1 Action and Limit Levels for Air Quality

Parameters	Action Level	Limit Level
24 Hour TSP Level in $\mu g/m^3$	For baseline level $\geq 200\ \mu g/m^3$, Action level = (Baseline level * 1.3 + Limit level)/2; For baseline level > 200 $\mu g/m^3$, Action level = Limit level	260
1 Hour TSP Level in $\mu g/m^3$	For baseline level $\geq 384\ \mu g/m^3$, Action level = (Baseline level * 1.3 + Limit level)/2; For baseline level > 384 $\mu g/m^3$, Action level = Limit level	500

Table 10.2 Event/Action Plan for Air Quality

EVENT	ACTION			
	ET	IC(E)	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source 2. Inform IC(E) and ER 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily	1. Check monitoring data submitted by ET 2. Check Contractor's working method	1. Notify Contractor	1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	1. Identify source 2. Inform IC(E) and ER 3. Repeat measurements to confirm findings 4. Increase monitoring frequency to daily 5. Discuss with IC(E) and Contractor on remedial actions required 6. If exceedance continues, arrange meeting with IC(E) and ER 7. If exceedance stops, cease additional monitoring	1. Checking monitoring data submitted by ET 2. Check Contractor's working method 3. Discuss with ET and Contractor on possible remedial measures 4. Advise the ER on the effectiveness of the proposed remedial measures 5. Supervise implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Ensure remedial measures properly implemented	1. Submit proposals for remedial to IC(E) within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source 2. Inform ER and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results	1. Checking monitoring data submitted by ET 2. Check Contractor's working method 3. Discuss with ET and Contractor on possible remedial measures 4. Advise the ER on the effectiveness of the proposed remedial measures 5. Supervise implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Ensure remedial measures properly implemented	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	1. Notify IC(E), ER, Contractor and EPD 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Arrange meeting with IC(E) and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring	1. Discuss amongst ET, Et, and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consultation with the IC(E), agree with the Contractor on the remedial measures to be implemented 4. Ensure remedial measures properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

10.1.7 Dust Mitigation Measures

Dust control and mitigation measures have been recommended in Section 3.5. The Contractor shall be responsible for the design and implementation of these measures.

- Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, with complete coverage, particularly during dry weather;
- Use of frequent watering for particularly dusty static construction areas and areas close to air quality sensitive receivers;
- Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be employed to aggregate fines;
- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations;
- Establishment and use of vehicle wheel and body washing facilities at the exit points of the site, combined with cleaning of public roads where necessary;
- Imposition of speed controls for vehicles on unpaved site roads.
- Where feasible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from air quality sensitive receivers; and
- Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify methods of work if dusty conditions arise.

Apart from the dust suppression measures listed above, the Contractor should also satisfy the requirements in *Air Pollution Control (Construction Dust) Regulation.*

If the above measures are not sufficient to restore the air quality to acceptable levels upon the advice of ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to the ER for approval, and implement the mitigation measures.

10.2 Waste

The contractor will be responsible for waste control within the site as well as minimising the volume of waste generated. The contractor should comply with all the mitigation measures as suggested in the Section 6. Regular inspections carried out by the environmental team (ET) will be required in order to check the contractor's compliance with the relevant specifications. Independent Checker (Environment) should be responsible for auditing the result of the system.

10.3 Water Quality

10.3.1 Water Quality Parameters

Monitoring of turbidity in NTU, suspended solids (SS) in mg/l, oil and grease and chemical oxygen demand (COD) shall be carried out by the ET to ensure that any deteriorating water

quality could be readily detected and timely action be taken to rectify the situation. Turbidity should be measured *in-situ* while the rest are determined in laboratory. If there are other water quality parameters recommended in the discharge license (s), they shall also be included in the environmental monitoring work.

In association with the water quality parameters, some relevant data shall also be measured, such as monitoring location, time, water temperature, weather conditions, and any special phenomena and work underway at the construction site etc.

A monitoring record sheet is presented in Appendix G for reference.

10.3.2 Monitoring Equipment

ET Leader should provide the following monitoring equipment:

Turbidity Measurement Instrument

The instrument should be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment should use a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU (e.g. Hach model 2100P or an approved similar instrument).

Sample Container and Storage

(a) water samples for suspended solids (SS) analysis should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen), delivered to the laboratory, and analysed as soon as possible after collection.

(b) water samples for oil & grease measurement should be stored in glass bottles, acidified to pH 2 or lower with 1:1 HCl, packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory as soon as possible after collection.

(c) water sample for COD measurement should be stored in glass or plastic bottles, acidified to pH 2 using concentrated H_2SO_4, packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory as soon as possible after collection.

Calibration of In-situ Equipment

All *in-situ* monitoring instrument shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring.

For the on site calibration of field equipment, the BS 1427:1993, "Guide to Field and on-site test methods for the analysis of waters" should be observed.

Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment some equipment is under maintenance, calibration, etc.

10.3.3 Laboratory Measurement / Analysis

Analysis of suspended solids, oil and grease as well as COD shall be carried out in a HOKLAS or other international accredited laboratory. Sample volume and maximum storage time for each analytical parameter carried out in the laboratory are shown below in Table 4.1

Table 10.3 Water Sample Handling Requirements

Analytical Parameter	Sample Volume Taken (ml)	Storage Temperature	Maximum Storage Time After Sampling
SS	500	4°C	24 hours
Oil & grease	1000	4°C	7 days
COD	1000	4°C	7 days

If a site laboratory is set up or a non-HOKLAS and non-international accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control shall be approved by the DEP. All the analysis shall be witnessed by the ER.

The ET Leader shall provide the ER with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" most recent edition and any other relevant document for his reference.

For the testing methods of other parameters as recommended by EIA or required by DEP, detailed testing methods, pre-treatment procedures, instrument use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per batch, etc.), detection limits and accuracy shall be submitted to DEP for approval prior to the commencement of monitoring programme. The QA/QC shall be in accordance with the requirement of HOKLAS or international accredited scheme. The QA/QC results shall be reported. EPD may also request the laboratory to carry out analysis of known standards provided by EPD for quality assurance. Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis shall be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to DEP. In any circumstance, the sample testing shall have comprehensive quality assurance and quality control programmes. The laboratory should prepare to demonstrate the programmes to DEP or his representatives when requested.

10.3.4 Monitoring Locations

The water quality monitoring locations should be set at all discharge points to be determined by the contractor during the contract design. Due to the nature of the work programme, the discharge points may change from time to time. The actual number of monitoring stations depends on the number of discharge points at a time. The ET Leader shall propose and update monitoring locations and seek approval from the IC(E) and DEP.

10.3.5 Impact Monitoring

During the course of the construction works, water samples at the discharge points shall be collected three days per week and tested for SS and once per week for oil and grease and COD analyses. *In-situ* turbidity measurement should be conducted three days per week together collecting water samples for SS tests

10.3.6 Event and Action Plan for Water Quality

All effluent subject to control by the TM are required to be licensed. Therefore, the discharges shall be required to comply with the effluent standard for discharges into Victoria Harbour Inshore Waters. Key parameters are shown in Table 10.4. It should be noted that the effluent standards listed in the table only apply to flow less than 6,000 m^3/day. However, more stringent standards for a larger flow and more parameters may be specified in the discharge license.

Table 10.4 Selection of Effluent Standards Discharged into Inshore Waters of Victoria Harbour Water Control Zone

Measurement Parameter	Effluent Standard
COD	80 (mg/l)
Suspended solids	30 (mg/l)
Oil & Grease	20 (mg/l)

Source: Technical Memorandum on Effluent Standards, Table 9a

Should the monitoring results of the water quality parameters at any designated monitoring station indicate that the water quality criteria are exceeded, the actions in accordance with the Action Plan in Table 10.5 shall be carried out.

Table 10.5 Event and Action Plan for Water Quality

Event	ET leader	IC(E)	ER	Contractor
Action level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E) and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E) and Contractor; 6. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented;	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment, consider changes of working methods; 4. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER; 5. Implement the agreed mitigation measures.
Action level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E) and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER & Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer & confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment, consider changes of working methods; 4. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER within 3 working days; 5. Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), contractor & EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	1. Discuss with ET and Contractor on the mitigation measures 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment, consider changes of working methods; 4. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER within 3 working days; 5. Implement the agreed mitigation measures
Limit level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	1. Discuss with ET and Contractor on the mitigation measures 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly 3. Assess the effectiveness of the implementation of mitigation measures.	1. Discuss with IC(E), ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the work until no exceedance of Limit level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment, consider changes of working methods; 4. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER within 3 working days; 5. Implement the agreed mitigation measures; 6. As directed by the Engineer, to slow down or to stop all or part of the construction activities.

10.3.7 Water Quality Mitigation Measures

- Discharged wastewater from the construction sites to surface water and/or public drainage systems should be controlled through licensing. Discharges should follow fully the terms and conditions in the licences.

- Separate treatment facilities may be required for effluent from site offices and toilets (unless chemical toilets are used).

- Relevant practice for dealing with various type of construction discharges provided in EPD's ProPECC Note PN 1/94 should be adopted

- Established standards and guidelines with EPD's recommended pollution control clauses should be incorporated in the contract documents

If the above measures are not sufficient to restore the water quality to an acceptable levels upon the advice of the ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to IC(E) and ER for approval, and carry out the mitigation measures.

The implementation schedule of mitigation measures is presented in Section 12.

11 CONCLUSIONS AND RECOMMENDATIONS

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Air Quality

Adverse dust impacts would not be expected on the ASRs adjacent to the proposed underpass scheme during the construction phase.

The study has shown that, with provision of the underpass, the 1-hour average concentrations of NO_2 are in compliance with the AQO at both 1.5m and 5m heights. There is a decrease in NO_2 concentration at the junction of Salisbury Road / Chatham Road with the proposed underpass in place. The modelling results showed that there would be no exceedance of the 24-hour average AQO for NO_2 at the closest air quality sensitive locations along Salisbury Road. It is anticipated that CO and RSP would not exceed the limits in the AQO. Hence, it is expected that the provision of the underpass will not alter future local air quality in the area and adverse air quality impacts at sensitive receivers along Salisbury Road are not expected.

Calculations indicate that there would be no exceedance of the tunnel air quality criteria.

EPD's recommended pollution control clauses should be incorporated in the contract documents to abate construction dust. No mitigation measures have been recommended for this scheme during the operational phase because there are predicted to be no exceedances of the relevant AQOs.

11.2 Noise

Taking into account of the surrounding NSRs provided with window insulation and central air-conditioning and the recommended noise pollution control clause, adverse construction noise impacts would not be anticipated at NSRs.

11.3 Water Quality

Water quality impacts arising from site runoff and sewage effluent arising from the on-site construction workforce would have the potential to cause water pollution. Mitigation measures stipulated in the ProPECC PN 1/94 should be adopted and would minimise such impacts. The standard water pollution control clause should be included in the construction contract. No environmental monitoring & audit requirements or further assessment are required.

11.4 Construction Waste Management

The contractor is required to sort the construction waste into construction & demolition waste and public fill fraction in accordance with the New Disposal Arrangements for Construction Waste (1992). Construction waste proposals including good site practice for waste handling should be developed according to the Criteria for Evaluating Waste Management Implications stipulated in Annex 7 of the TM EIAO and should follow the Guidelines for Assessment of Waste Management Implications as stated in Annex 15 of the TM EIAO. The standard

construction waste management clause should be included in the construction contract. Environmental monitoring & audit is required for trip-ticket system on all solid waste transfer/disposal operations.

11.5 Visual, Landscape and Townscape Impacts

The visual envelope for the proposed underpass scheme includes recreational areas, in Middle Road Children's Playground and Wing On Plaza Garden, the buildings of New World Centre, Wing On Plaza and Sheraton Hotel Hong Kong together roadside around the junction of Salisbury Road and Chatham Road South. Visual, landscape and townscape impacts would be expected at some areas during the construction stage which will be minimised through the adoption of recommended mitigation measures. Permanent impacts will mainly be confined to Middle Road Children's Playground where a small strip of land will be lost to accommodate the entrance to a pedestrian subway and the loss of existing vegetation screens along the central divider of Salisbury Road. With proposed mitigation measures including compensatory planting to reprovide vegetation screens as well as sensitive designs of structural details, residual impact will be negligible. Moreover, in line with the construction project, a more effective landscape planting structure for this area in Tsim Sha Tsui will be developed by adopting a well designed landscape proposal. The overall significance of the proposed underpass scheme will in general result in beneficial impacts to the local landscape / townscape and visual character. Several minor areas will be subjected to acceptable levels of impacts.

11.6 Land Use Impacts

No impact on land requirement for the Commercial, Comprehensive Development Area, Government/ Institution/Community and Other Specified Uses zone is predicted as the proposed scheme does not encroach into the area of these zones. Land resumption would be required on the south-eastern part of the Middle Road Children's Playground (Open Space zone) due to limited space. The amount of land to be permanently alienated is 460 m^2. The proposed scheme has been prepared in order to minimise the land use impact on the area concerned.

12 SCHEDULE OF RECOMMENDED MITIGATION MEASURES

12 SCHEDULE OF RECOMMENDED MITIGATION MEASURES

The schedule of implementation of the recommended mitigation measures for various environmental aspects are presented in Tables 12.1 and 12.5 for different environmental aspects.

Table 12.1 Summary of Proposed Mitigation Measures for Construction Dust Impact

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures/ Timing of completion of Measures	Implementation Dept/agent	Implementation Stages			Relevant Legislation and Guidelines
					Des	C	O	
Section 3.5	Section 10.2	Established standards and guidelines with EPD's recommended pollution control clauses should be incorporated in the contract documents	During Construction Phase within the site area	Contractor	✓	✓		TM on EIA Process, APCO, Air Pollution Control (Construction Dust) Regulation
		Dust reduction measures while carrying out construction works in accordance with the Air Pollution Control (Construction Dust) Regulation to minimise the dust emission from the construction site			✓	✓		

Table 12.2 Summary of Proposed Mitigation Measures for Water Quality Impact during Construction Phase

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures/ Timing of completion of Measures	Implementation Dept/agent	Implementation Stages			Relevant Legislation and Guidelines
					Des	C	O	
Section 5.4	10.3	Discharged wastewater from the construction sites to surface water and/or public drainage systems should be controlled through licensing. Discharges should follow fully the terms and conditions in the licences.	During Construction Phase within the site area	Contractor	✓	✓		TM on EIA Process, WPCO, Pro PECC Note PN1/94
		Separate treatment facilities may be required for effluent from site offices and toilets (unless chemical toilets are used). Relevant practice for dealing with various type of construction discharges provided in EPD's ProPECC Note PN 1/94 should be adopted.						
		Established standards and guidelines with EPD's recommended pollution control clauses should be incorporated in the contract documents						

Table 12.3 Summary of Proposed Mitigation Measures for Construction Waste Management

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures/ Timing of completion of Measures	Implementation Dept/agent	Implementation Stages			Relevant Legislation and Guidelines
					Des	C	O	
Section 6.3	N/A	On-site separation of both municipal solid waste and C&D waste should be conducted as far as possible. Construction waste should be sorted on-site into construction & demolition waste and public fill fraction for re-use and recycling as far as practical.	During Construction Phase within the site area	Contractor	✓	✓		TM on EIA Process, WDO
		Waste management measures would be proposed in accordance with the Criteria for Evaluating Waste Management Implications stipulated in Annex 7 of the TM EIAO and follow the Guidelines for Assessment of Waste Management Implications stated in Annex 15 of the TM EIAO as appropriate.						
		Standard C&D materials management clause should be included in the construction contract.						

Table 12.4 Summary of Proposed Mitigation Measures for Visual Impact

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures	Funding Dept/agent	Implementation Dept/agent	Maintenance Agent	Implementation Stages			Relevant Legislation and Guidelines
							Des	C	O	
Section 8.7 (Temporary Mitigation Measures)	N/A	Screening of site works by hoardings	In place at the commencement and for the duration of the Construction Phase within the site area	HyD	Contractor	Contractor (During Construction Phase)		✓		
		Surface treatment of site hoardings to enhance their visual interest and harmony with surrounding landscape/townscape			Design Engineer /Contractor			✓		
		Locating temporary buildings (e.g. Site office) in least visually prominent locations.			Contractor			✓		
		Pedestrians using the southern footpath of Salisbury Road may be redirected to utilise the Tsim Sha Tsui waterfront promenade			Landscape Architect /Contractor		✓	✓		
		Retention of vegetation within the works site area where possible.			Contractor			✓		
		Provision of fences around all the low, circular raised planters to ensure that materials and debris will not be dumped on tree roots.								
		In the works compound area (southern section of Middle Road Children's Playground), retention of existing vegetation to possibly create a screen to the activities within the compound.								

Table 12.4 Summary of Proposed Mitigation Measures for Visual Impact (con't)

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures	Funding Dept/agent	Implementation Dept/agent	Maintenance Agent	Implementation Stages			Relevant Legislation and Guidelines
							Des	C	O	
Section 8.7 (Permanent Mitigation Measures)	N/A	Footpaths along both sides of Salisbury Road will be replanted with heavy standard trees where possible. The proposed planting will also reprovide shading along the footpath temporarily removed during the construction stage.	In place by the completion of Construction Phase within the site area, to be maintained for the duration of Operation Phase	HyD	Landscape Architect /Contractor	Contractor (During Construction Phase) Please see Note (1)	✓		✓	
		The roof cover of the pedestrian subway will be landscaped with small shrubs and plants to visually enhance the surroundings. Sensitive design and detailing for pedestrian subway entrances will be carried out to enhance visual features.								
		The southern part of Middle Road Children previously taken up as work compound area during the construction stage will be reinstated with carefully detailed compensatory planting and a kiosk to provide a screen to Salisbury Road.								
		The junction of Salisbury Road and Chatham Road South will be visually enhanced through the provision of planters consisting of small shrubs and plants.								
		The structural elements of the proposed underpass and pedestrian subway shall be sensitively detailed as advised by the ACABAS.								

Note 1: HyD shall be responsible for roof planters at the pedestrian subway and landscape hardworks (During Operation Phase)
USD shall be responsible for planting within the roof planters at the pedestrian subway and all other roadside planting and planters (During Operation Phase)

Table 12.5 Summary of Proposed Mitigation Measures for Landscape and Townscape Impacts

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures/	Funding Dept/agent	Implementation Dept/agent	Maintenance Agent	Implementation Stages			Relevant Legislation and Guidelines
							Des	C	O	
Section 8.8 (Temporary Mitigation Measures)	N/A	Re-routing of pedestrian routes away from the work site where possible.	In place at the commencement and for the duration of the Construction Phase within the site area	HyD	Contractor	Contractor (During Construction Phase);		✓		
		Re-routing of pedestrian routes through well defined public access.								
		Retaining and minimising damage to vegetation where possible. Care shall be taken not to damage those trees identified in the Tree Survey Report to be retained during the construction phase.								
		Careful and efficient transplanting of existing vegetation carried out under the supervision of a professional landscape architect								
		Introduction of penalty clauses in the contract document for improper removal of vegetation identified for retention in Tree Survey Report.			Design Engineer /Contractor	HyD	✓	✓		

Table 12.5 Summary of Proposed Mitigation Measures for Landscape and Townscape Impacts (con't)

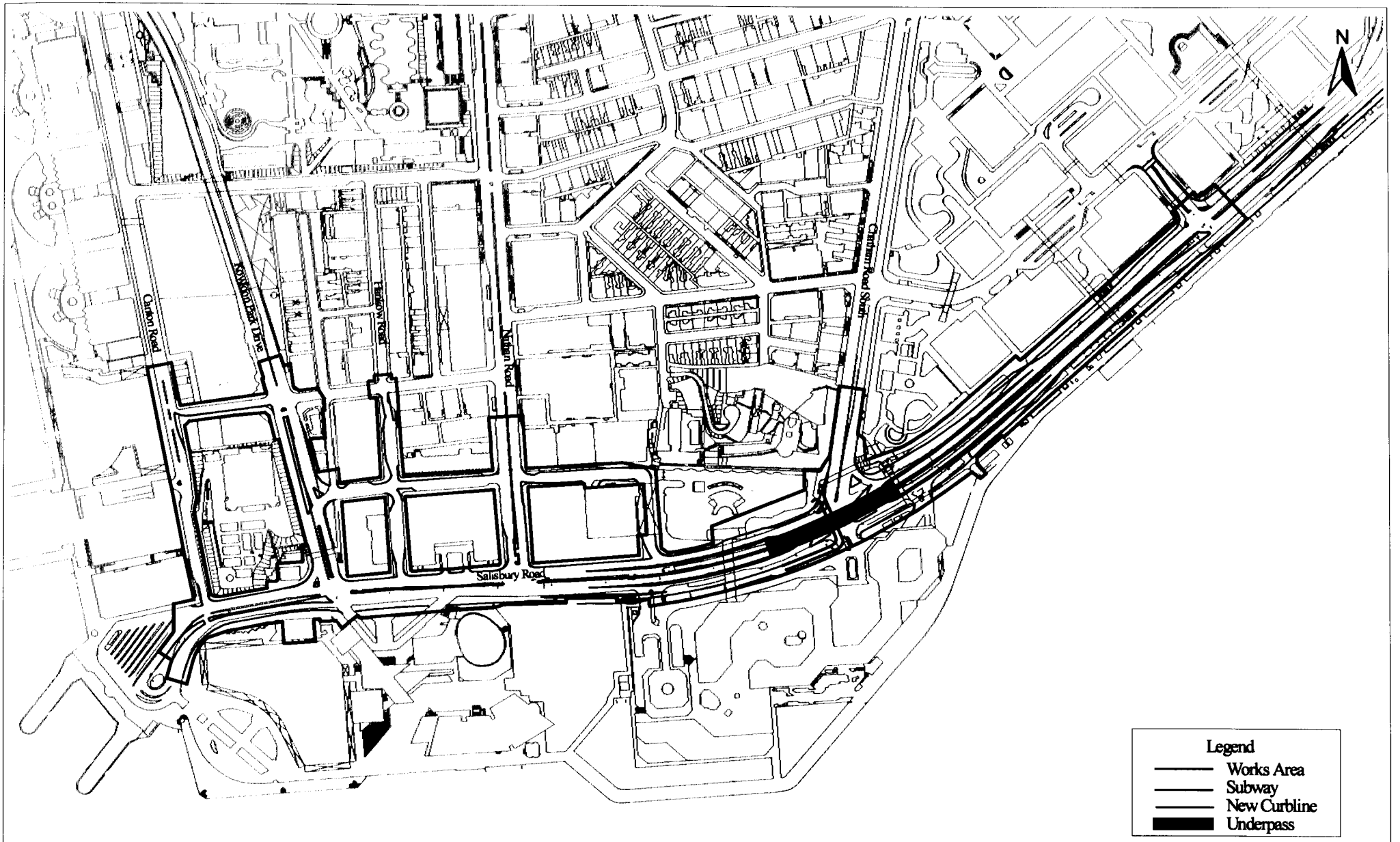
EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures/ Timing of completion of Measures	Funding Agent	Implementation Dept/agent	Maintenance Agent	Implementation Stages			Relevant Legislation and Guidelines
							Des	C	O	
Section 8.8 (Permanent Mitigation Measures)	N/A	Mitigation for vegetation loss may be achieved in the form of compensatory planting of transplanting of existing trees in the area or new plant material as suggested in the Tree Survey Report. This is recommended to be implemented on the footpaths of Salisbury Road where space allows to compensate the loss of vegetation and existing tree screens along the central divider	In place by the completion of Construction Phase within the site area, to be maintained for the duration of Operation Phase	HyD	Contractor (The detailed landscape proposal shall be provided to DUS for endorsement)	Contractor (During Construction Phase) HyD (first 12 months of operational phase); After first 12 months in operational phase, please see Note (1)			✓	Works Bureau Technical Circular No. 24/94.
		Planters of around 1200 mm in height, with dense flowering trees will be provided on the deck area of the Underpass at the junction of Salisbury Road and Chatham Road South to create a visual buffer at the intersection								
		Provision of planters of shrubs/small palms to the junction of Salisbury Road and Chatham Road South.								
		Relocation of existing trees within the site and where possible, ensuring transplanted trees are to be planted to new positions within the site.			Landscape Architect /Contractor		✓		✓	
		Planting of heavy standard trees along footpaths of Salisbury Road to create vegetation screen.								
		Adoption of mass planting to give good instant effect								
		Sensitive detailing of the proposed pedestrian subway entrances and proposed landscaping around the entrances where possible								
		Detailing of street furniture such as footpath surfaces and railings to enhance the pedestrian environment			Contractor	HyD				

Table 12.5 Summary of Proposed Mitigation Measures for Landscape and Townscape Impacts (con't)

EIA Ref	EM&A Log Ref	Environment Protection Measures	Location/Duration of measures/ Timing of completion of Measures	Funding Agent	Implementation Dept/agent	Maintenance Agent	Implementation Stages			Relevant Legislation and Guidelines
							Des	C	O	
Section 8.8 (Permanent Mitigation Measures)	N/A	Planting of flowering trees and shrubs etc, shall be considered so as to create colour impacts, strong sense of seasonal changes and where possible, provide shade for the pedestrians.	In place by the completion of Construction Phase within the site area, to be maintained for the duration of Operation Phase	HyD	Landscape Architect /Contractor	Contractor (During Construction Phase) HyD (first 12 months of operational phase); After first 12 months in operational phase, please see Note (1)	✓		✓	Works Bureau Technical Circular No. 24/94.
		The structural elements of the proposed underpass and pedestrian subway shall be sensitively detailed as advised by ACABAS								

Note 1: HyD shall be responsible for roof planters at the pedestrian subway and landscape hardworks (During Operation Phase)
USD shall be responsible for planting within the roof planters at the pedestrian subway and all other roadside planting and planters (During Operation Phase)

FIGURES

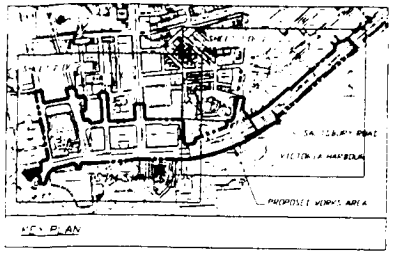


Maunsell

TITLE

Salisbury Road Underpass and Associated Works

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
PROJECT NO.	C440	DATE	Mar. 1999
DESIGNED	Fanny Lau	DRAWING NO.	Figure 2.1

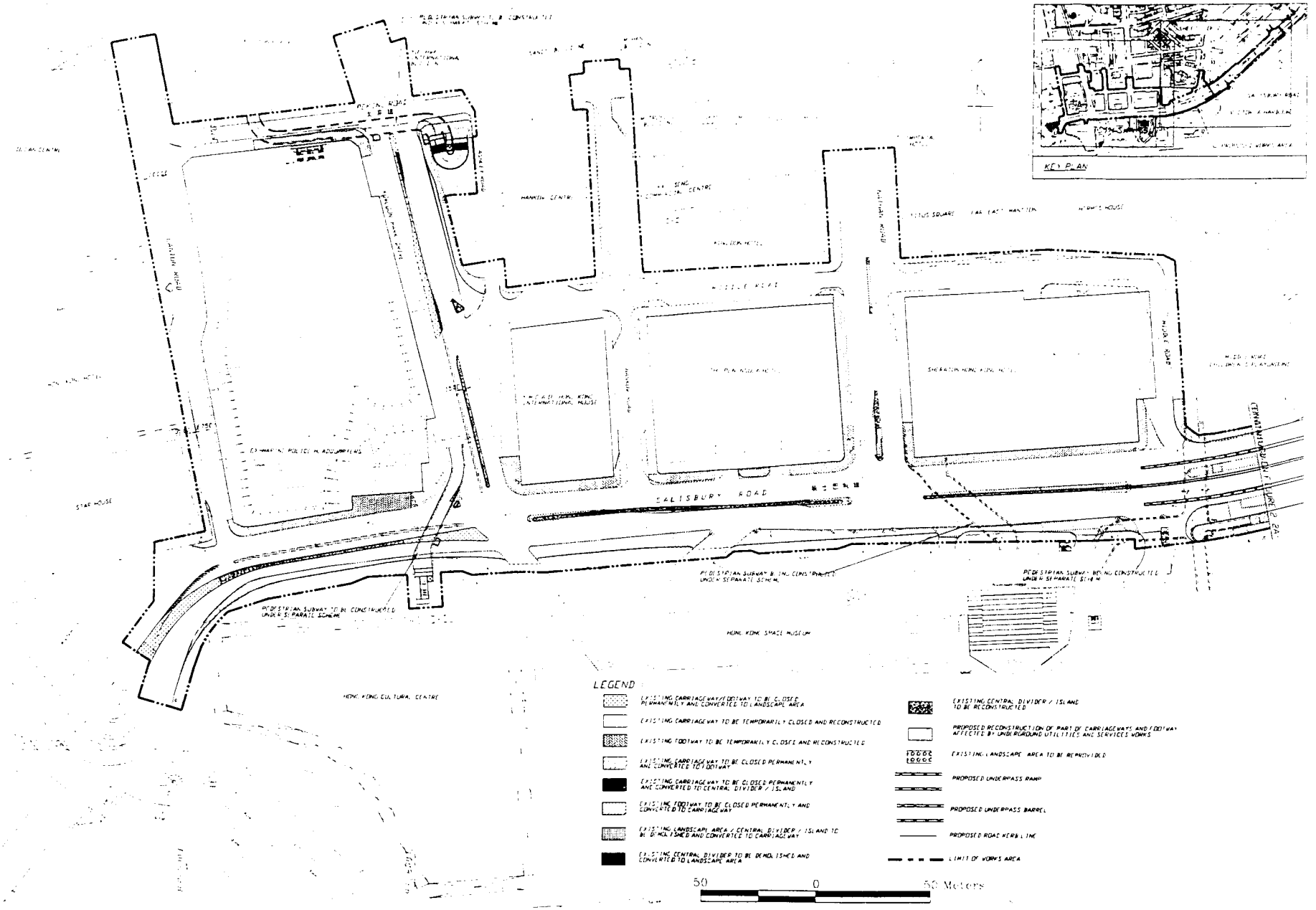


Maunsell

TITLE

Salisbury Road Underpass (East)

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Anna Chung	DRAWING NO	Figure 2.2A



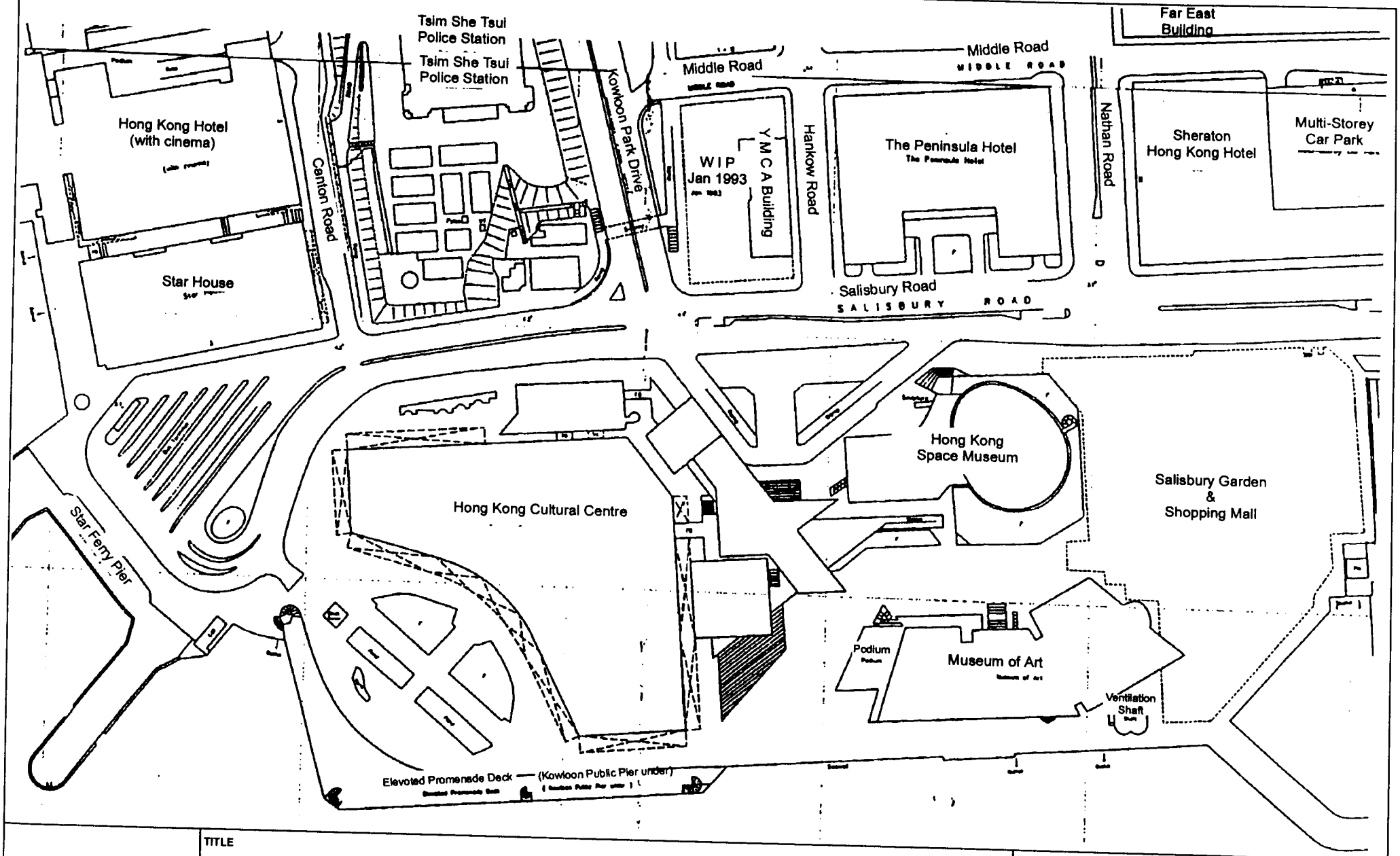
Maunsell

TITLE

Salisbury Road Underpass (West)

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Anna Chung	DRAWING NO	Figure 2.2B



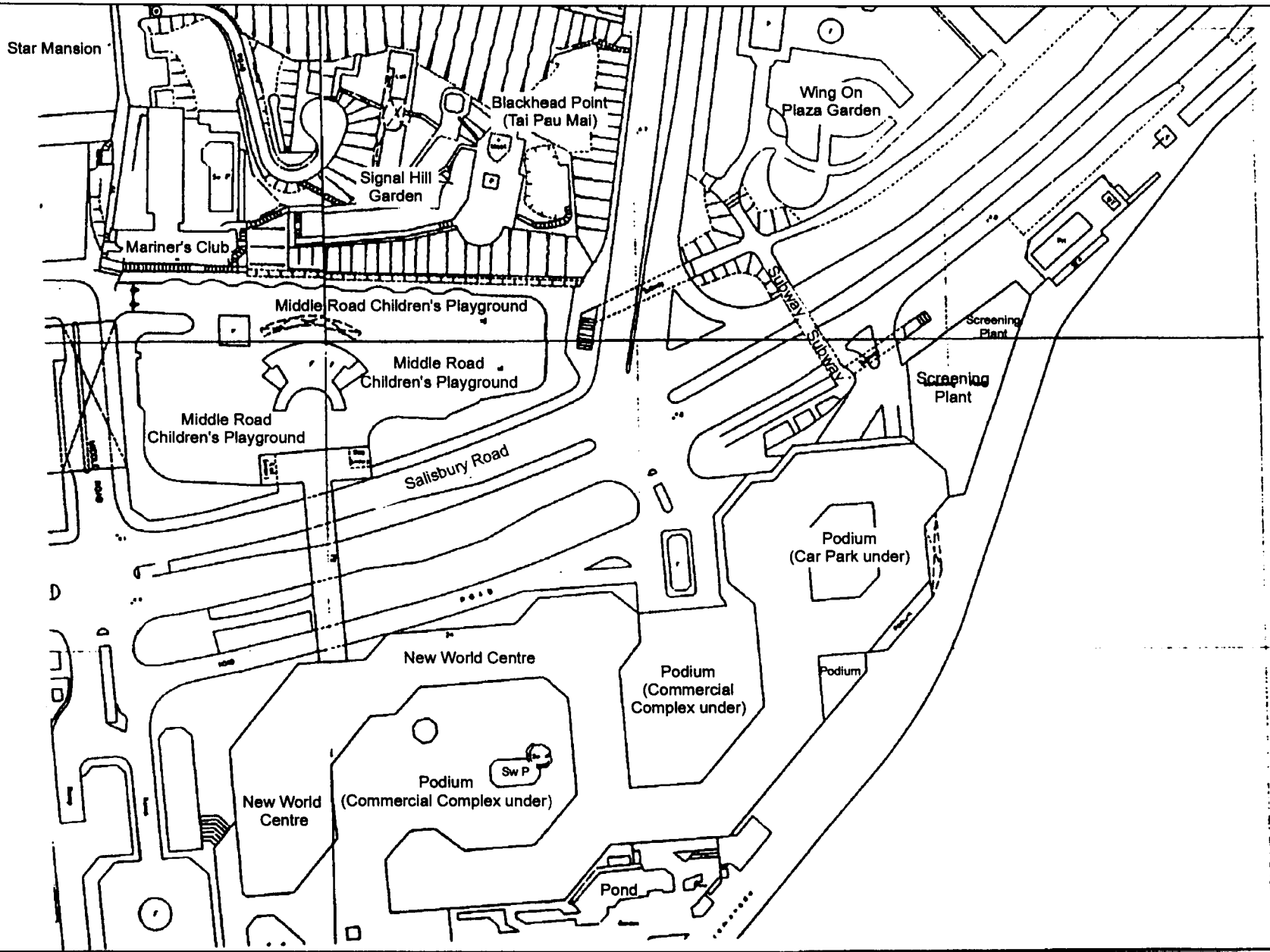
Maunsell

TITLE

Salisbury Road Surrounding Buildings

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	March 1998
DESIGNED	Suki Chung	DRAWING NO	Figure 7.1a



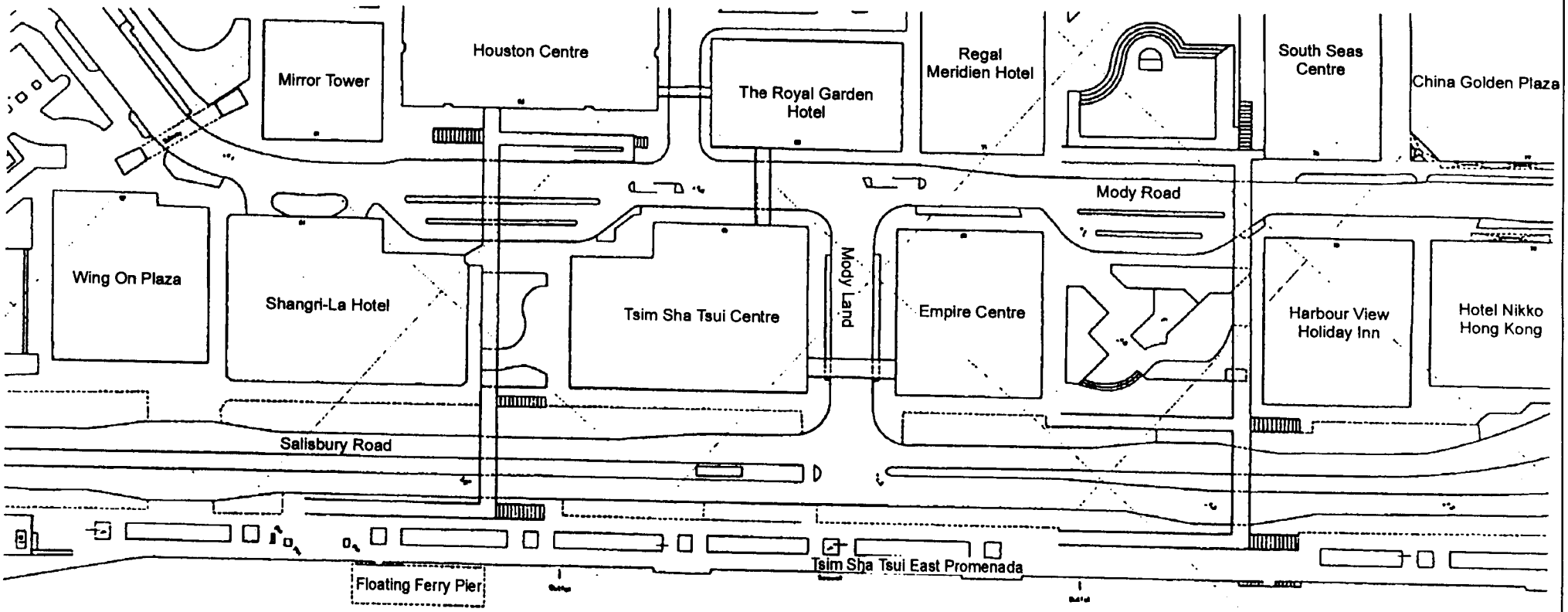
Maunsell

TITLE

Salisbury Road Surrounding Buildings

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	March 1998
DESIGNED	Suki Chung	DRAWING NO	Figure 7.1b



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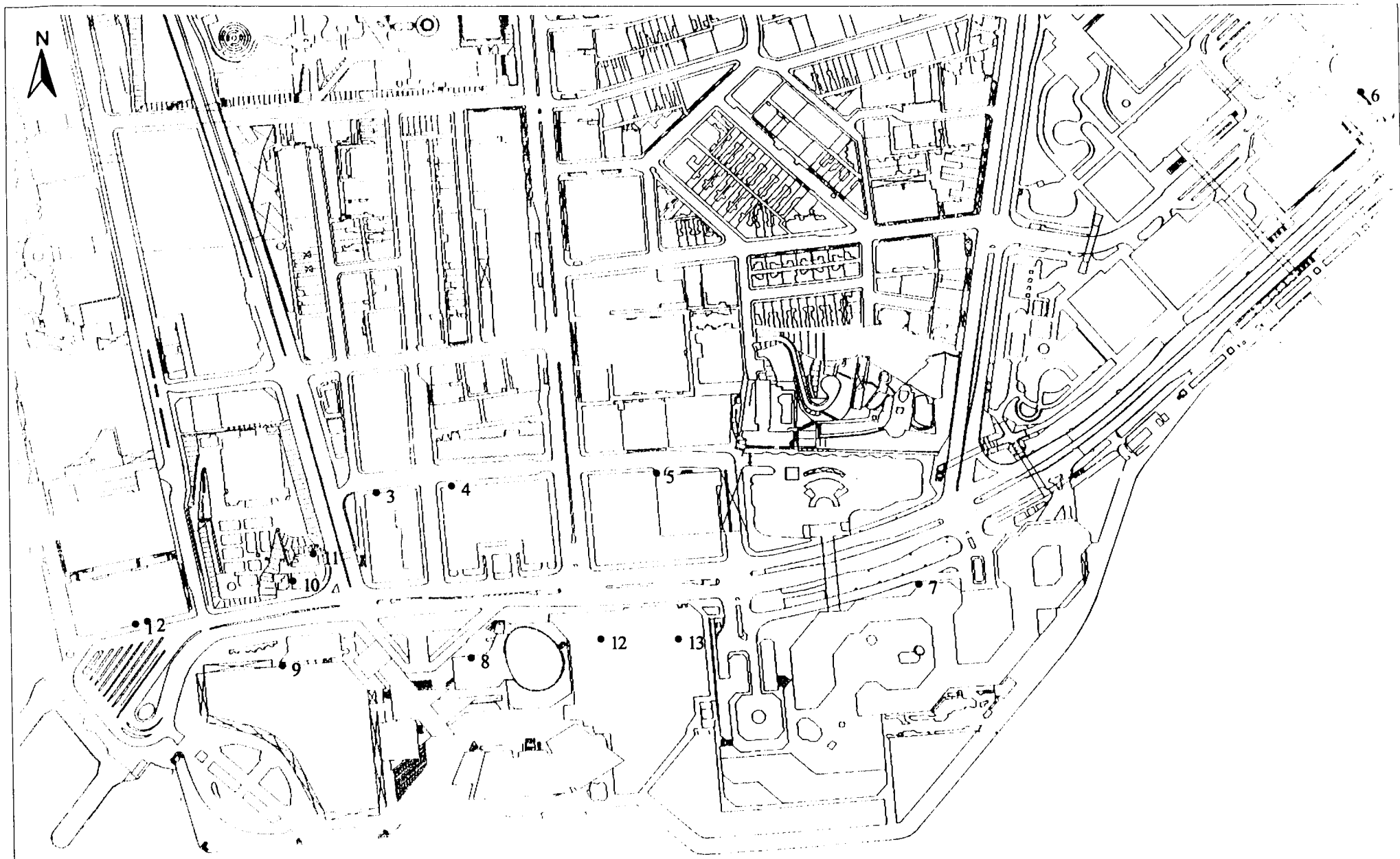
TITLE

Salisbury Road Surrounding Buildings

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	March 1998
DESIGNED	Suki Chung	DRAWING NO	Figure 7.1c



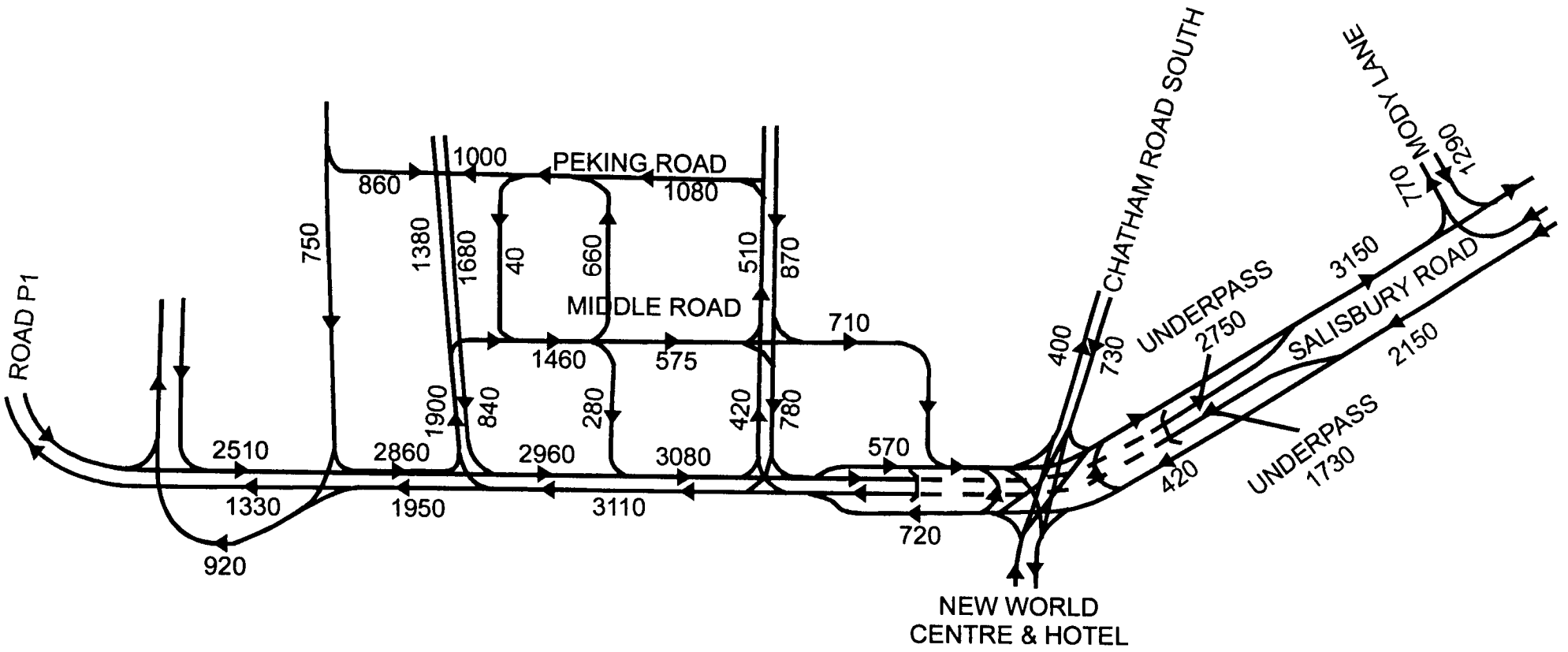
Maunsell

TITLE

Air Quality Sensitive Locations along Salisbury Road

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

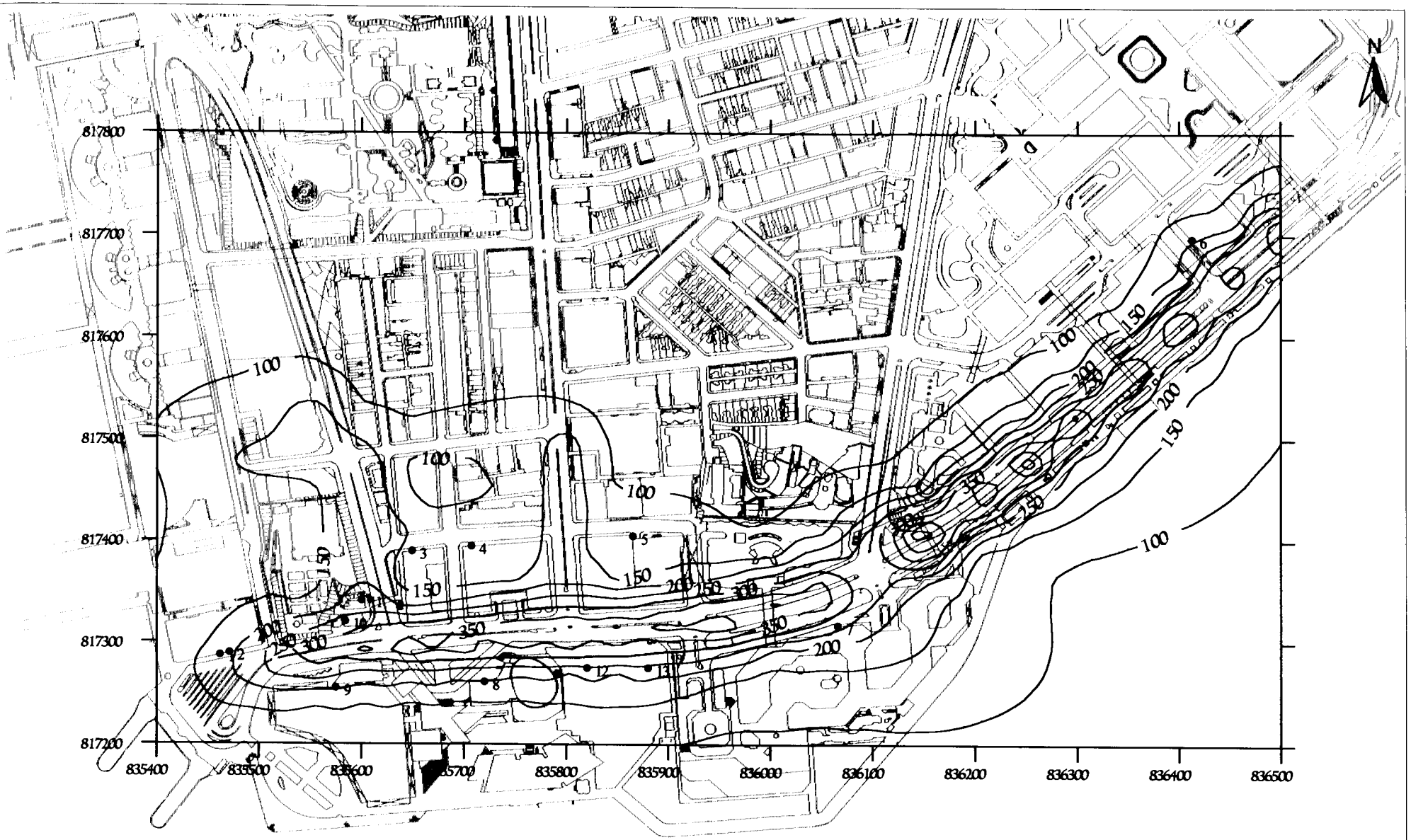
PROJECT NO.	C440	DATE	Sept. 1998
DESIGNED	Fanny Lau	DRAWING NO.	Figure 7.2



Reproduced from figure 1, produced by MVA Asia Ltd

Peak PM flows in Veh/hour

Maunsell	TITLE: Traffic Flows for Year 2011	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD	
		PROJECT NO: C440	DATE: January 1998
		DESIGNED: Suki Chung	DRAWING NO: Figure 7.3



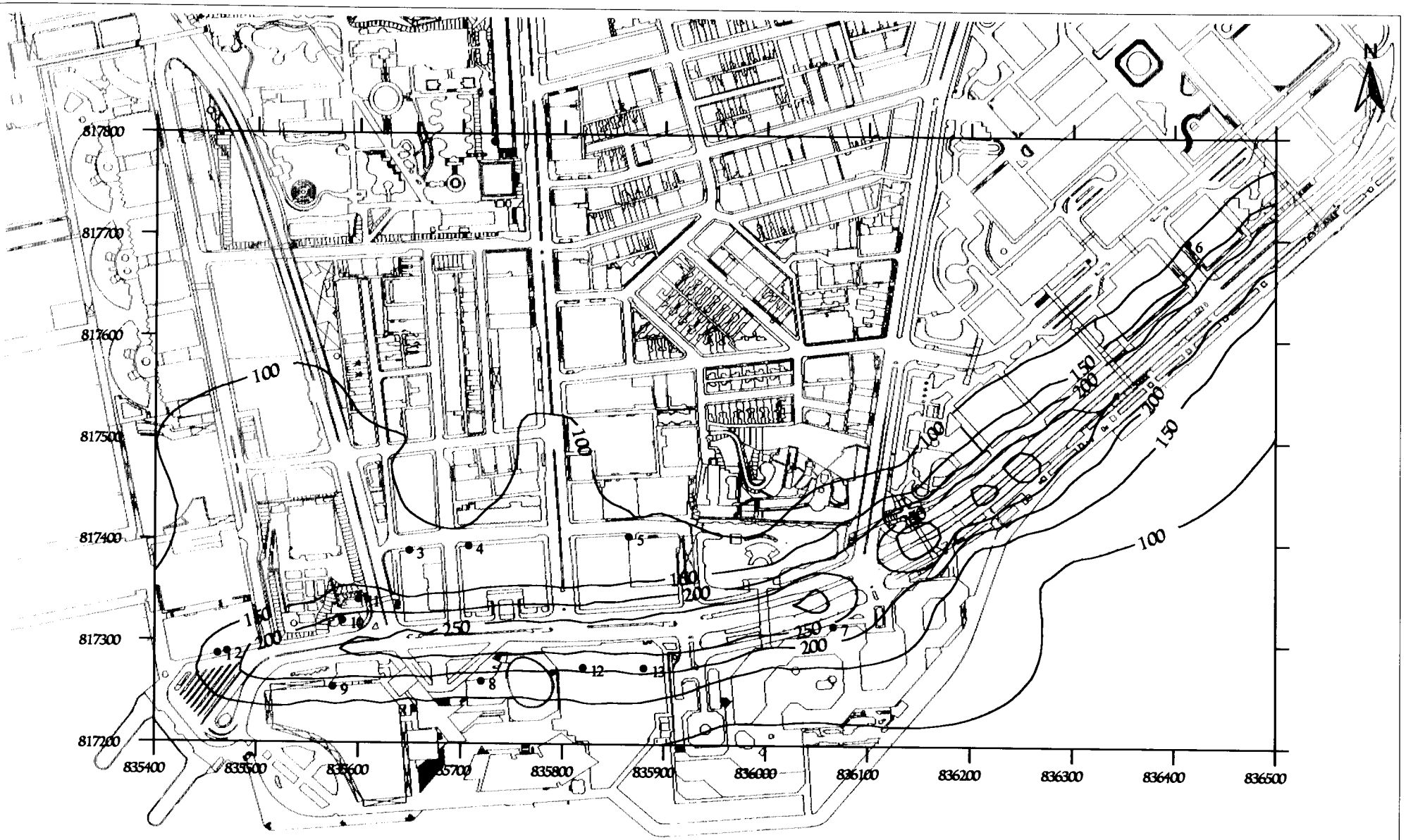
Maunsell

TITLE

Predicted Worst-case One Hour Average Nitrogen Dioxide Concentration Contours (1.5m Height)

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO.	C440	DATE	Sept. 1998
DESIGNED	Fanny Lau	DRAWING NO.	Figure 7.4

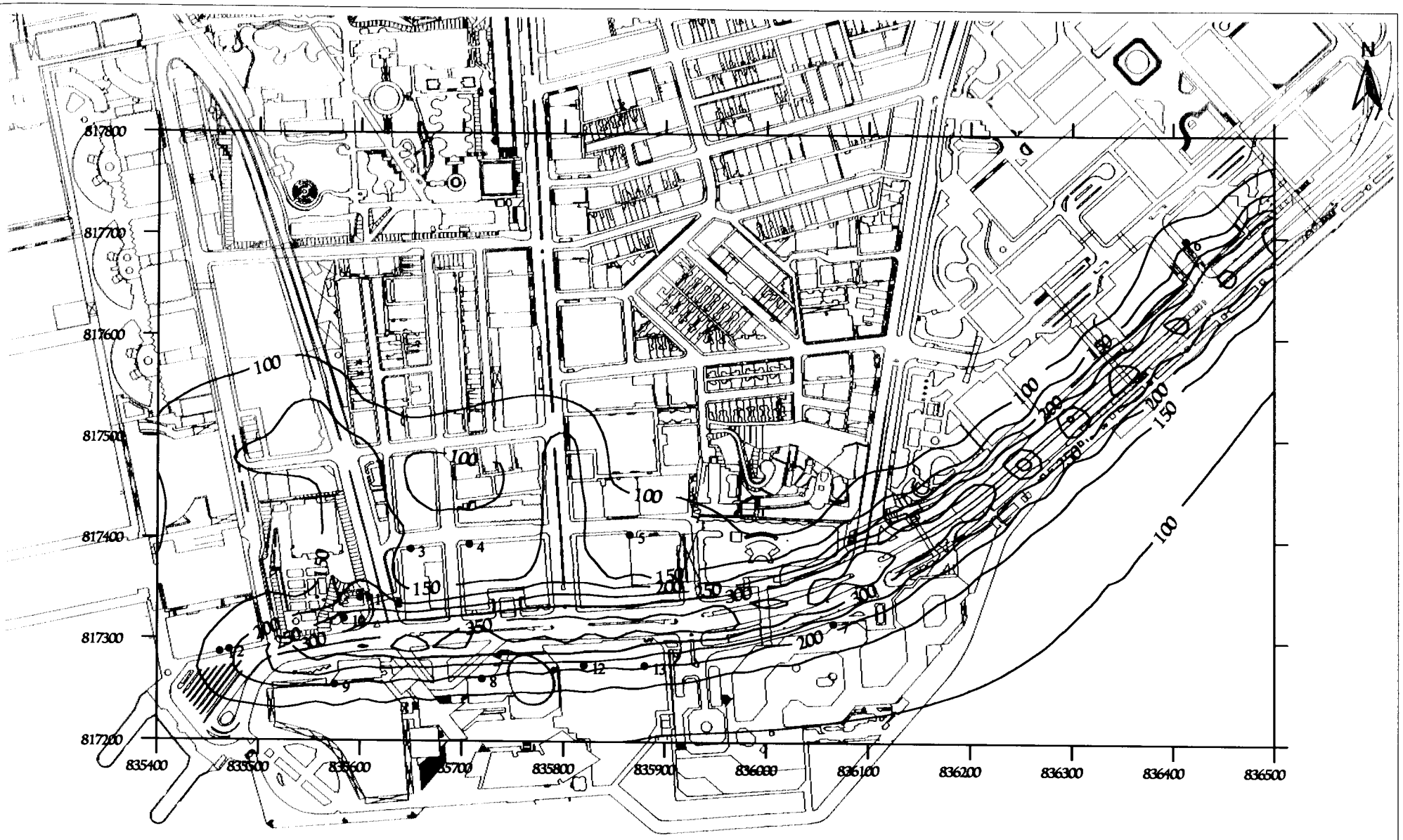


Maunsell

TITLE

Predicted Worst-case One Hour Average Nitrogen Dioxide Concentration Contours (5m Height)

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
PROJECT NO.	C440	DATE	Sept. 1998
DESIGNED	Fanny Lau	DRAWING NO.	Figure 7.5



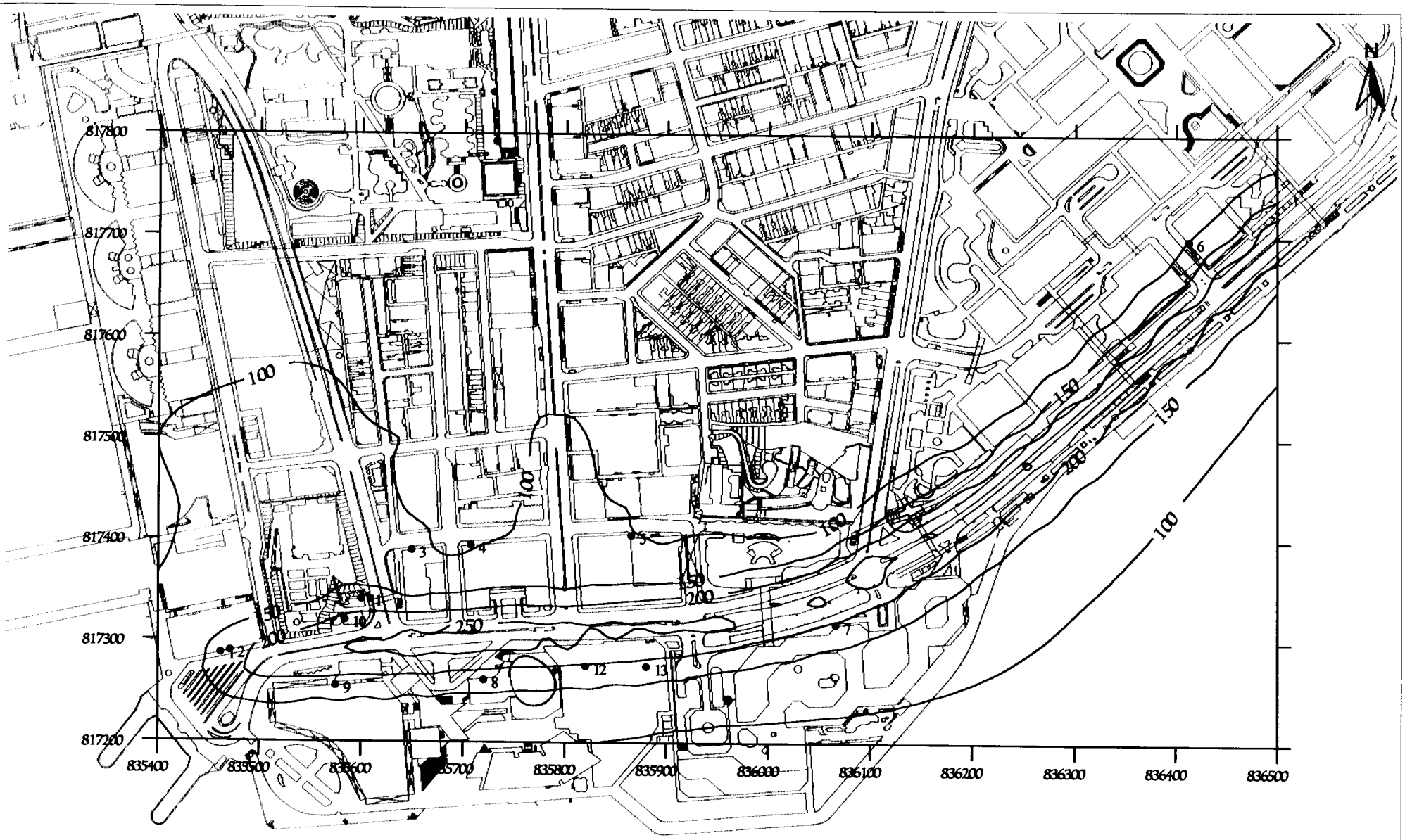
Maunsell

TITLE

Predicted Worst-case One Hour Average Nitrogen Dioxide Concentrations Contours (1.5m Height) (No Underpass Scenario)

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO.	C440	DATE	Sept. 1998
DESIGNED	Fanny Lau	DRAWING NO.	Figure 7.6



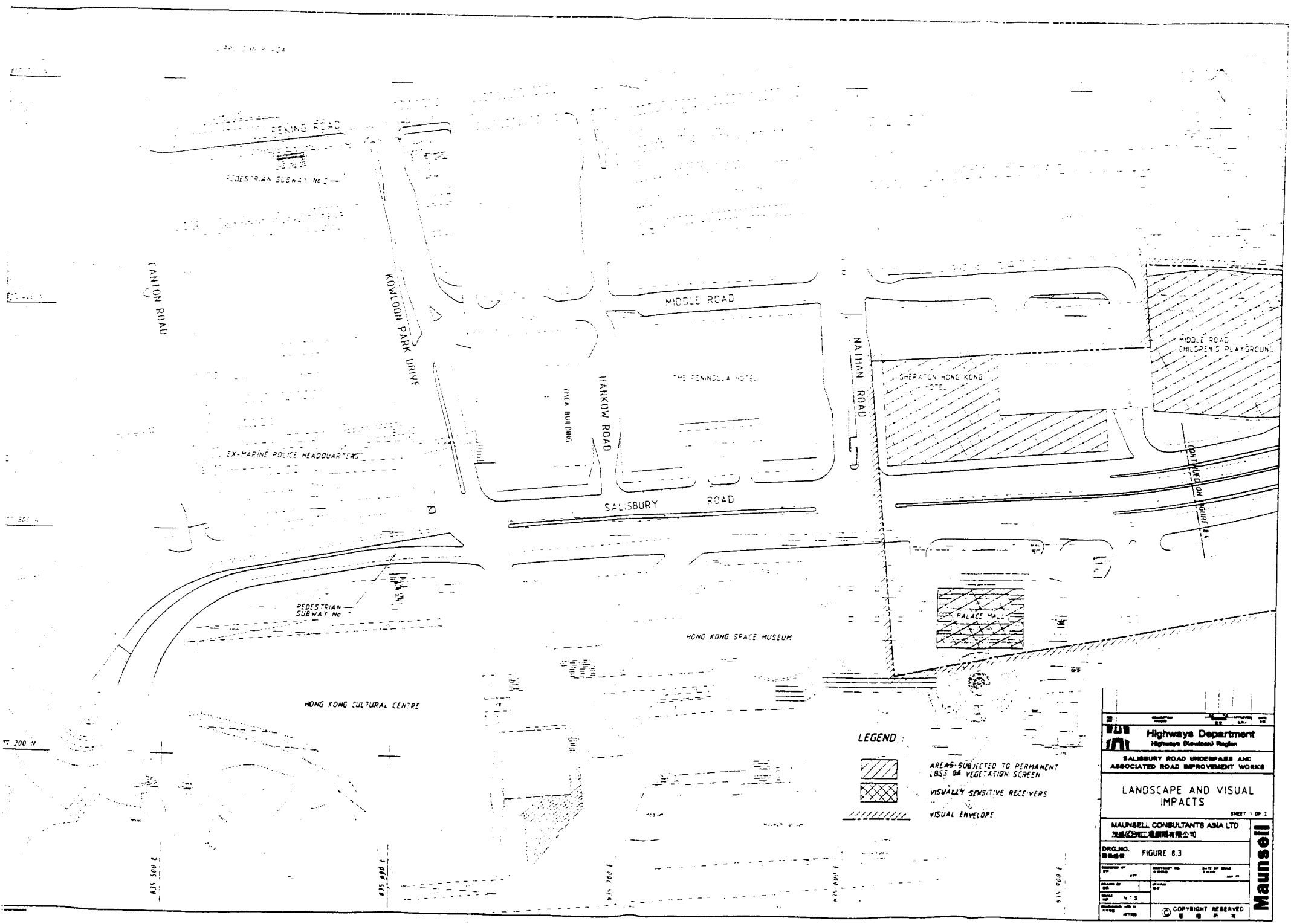
Maunsell

TITLE

Predicted Worst-case One Hour Average Nitrogen Dioxide Concentrations Contours (5m Height) (No Underpass Scenario)

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO.	C440	DATE	Sept.1998
DESIGNED	Fanny Lau	DRAWING NO.	Figure 7.7


PEKING ROAD
PEDESTRIAN SUBWAY No 2
CANTON ROAD
KOWLOON PARK DRIVE
MIDDLE ROAD
HANKOW ROAD
NATHAN ROAD
THE PENINSULA HOTEL
FINA BUILDING
SHERATON HONG KONG HOTEL
MIDDLE ROAD CHILDREN'S PLAYGROUND
EX-MARINE POLICE HEADQUARTERS
SALISBURY ROAD
CUT/FILL SECTION (FIGURE 8.4)
PEDESTRIAN SUBWAY No 1
PALACE HALL
HONG KONG SPACE MUSEUM
HONG KONG CULTURAL CENTRE
LEGEND :
AREAS SUBJECTED TO PERMANENT LOSS OF VEGETATION SCREEN
VISUALLY SENSITIVE RECEIVERS
VISUAL ENVELOPE
Highways Department
Highways (Kowloon) Region
SALISBURY ROAD UNDERPASS AND ASSOCIATED ROAD IMPROVEMENT WORKS
LANDSCAPE AND VISUAL IMPACTS
SHEET 1 OF 2
MAUNSELL CONSULTANTS ASIA LTD
DRG.NO. FIGURE 8.3
N.T.S
COPYRIGHT RESERVED
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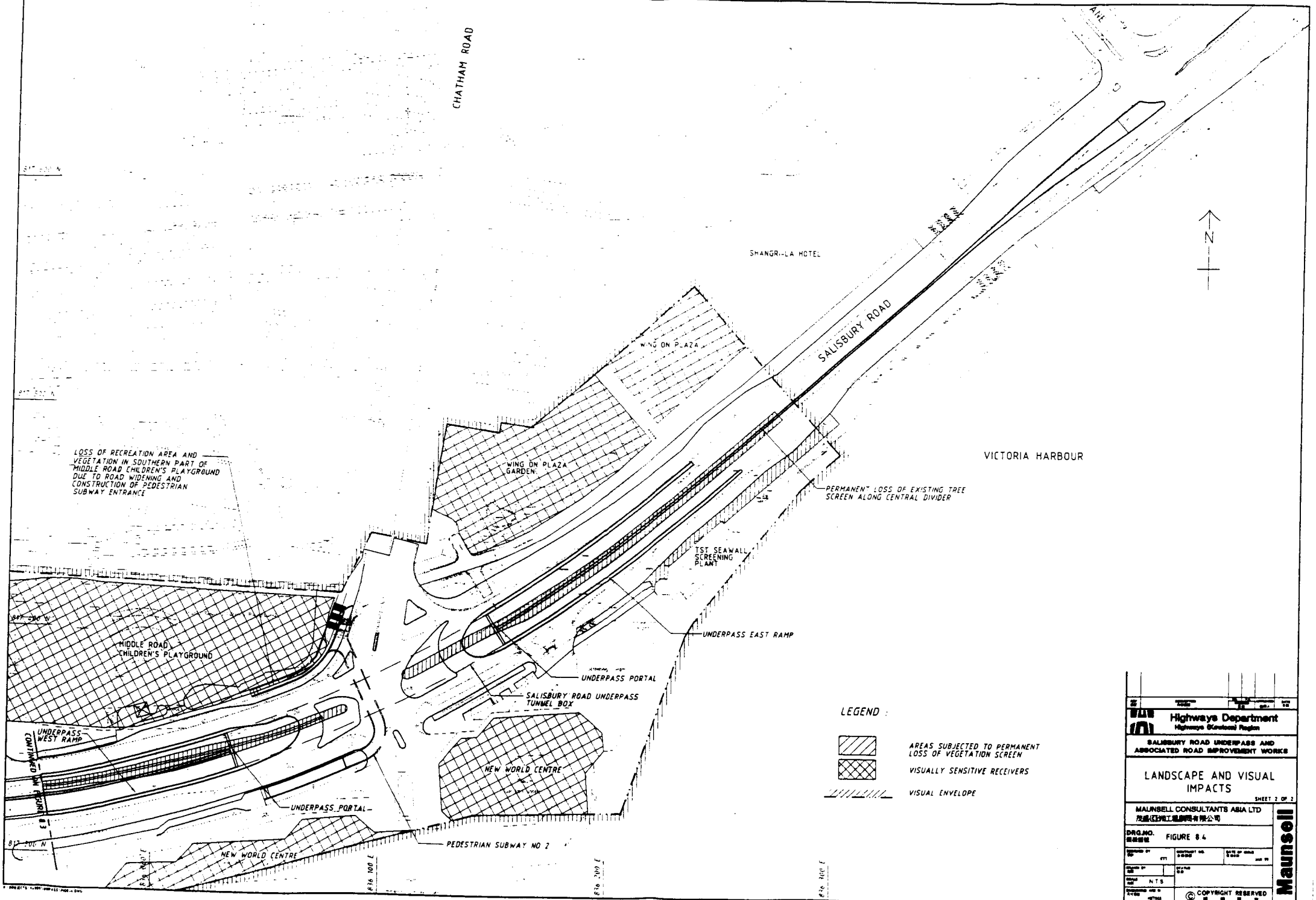
CHATHAM ROAD
SHANGRI-LA HOTEL
SALISBURY ROAD
WING ON PLAZA
WING ON PLAZA GARDEN
VICTORIA HARBOUR
N
LOSS OF RECREATION AREA AND VEGETATION IN SOUTHERN PART OF MIDDLE ROAD CHILDREN'S PLAYGROUND DUE TO ROAD WIDENING AND CONSTRUCTION OF PEDESTRIAN SUBWAY ENTRANCE
PERMANENT LOSS OF EXISTING TREE SCREEN ALONG CENTRAL DIVIDER
TST SEAWALL SCREENING PLANT
MIDDLE ROAD CHILDREN'S PLAYGROUND
UNDERPASS EAST RAMP
UNDERPASS PORTAL
SALISBURY ROAD UNDERPASS TUNNEL BOX
UNDERPASS WEST RAMP
CONTINUED ON FIGURE 8.3
NEW WORLD CENTRE
UNDERPASS PORTAL
PEDESTRIAN SUBWAY NO 2
NEW WORLD CENTRE
LEGEND :
AREAS SUBJECTED TO PERMANENT LOSS OF VEGETATION SCREEN
VISUALLY SENSITIVE RECEIVERS
VISUAL ENVELOPE
Highways Department
Highways (Kowloon) Region
SALISBURY ROAD UNDERPASS AND ASSOCIATED ROAD IMPROVEMENT WORKS
LANDSCAPE AND VISUAL IMPACTS
SHEET 2 OF 2
MAUNSELL CONSULTANTS ASIA LTD
DRG.NO. FIGURE 8.4
N.T.S
© COPYRIGHT RESERVED
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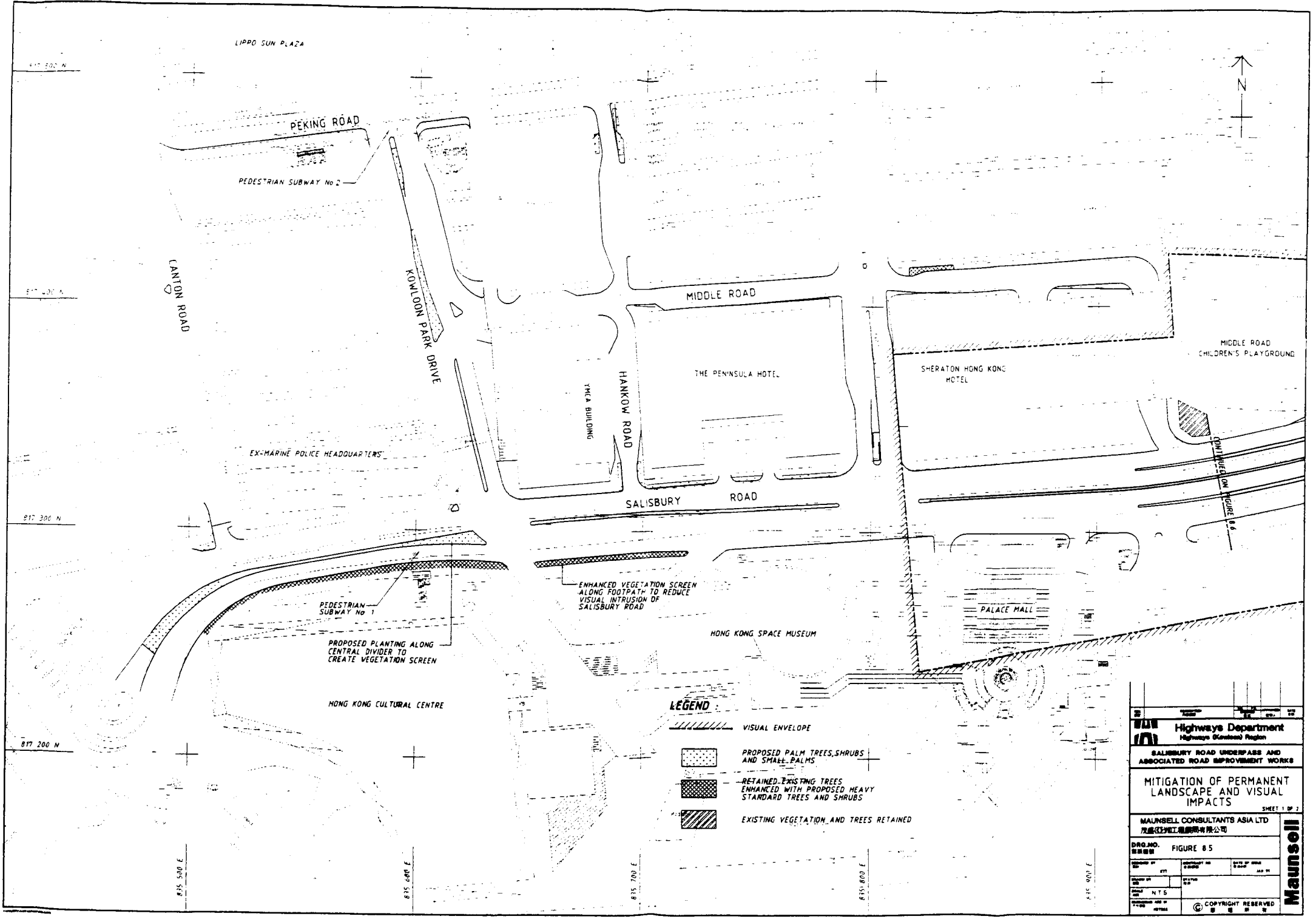

Highways Department
Highways (Kowloon) Region

SALISBURY ROAD UNDERPASS AND ASSOCIATED ROAD IMPROVEMENT WORKS

MITIGATION OF PERMANENT LANDSCAPE AND VISUAL IMPACTS

SHEET 1 OF 2

MAUNSELL CONSULTANTS ASIA LTD
元盛(亞洲)工程顧問有限公司

DRG.NO. FIGURE 8.5

N.T.S

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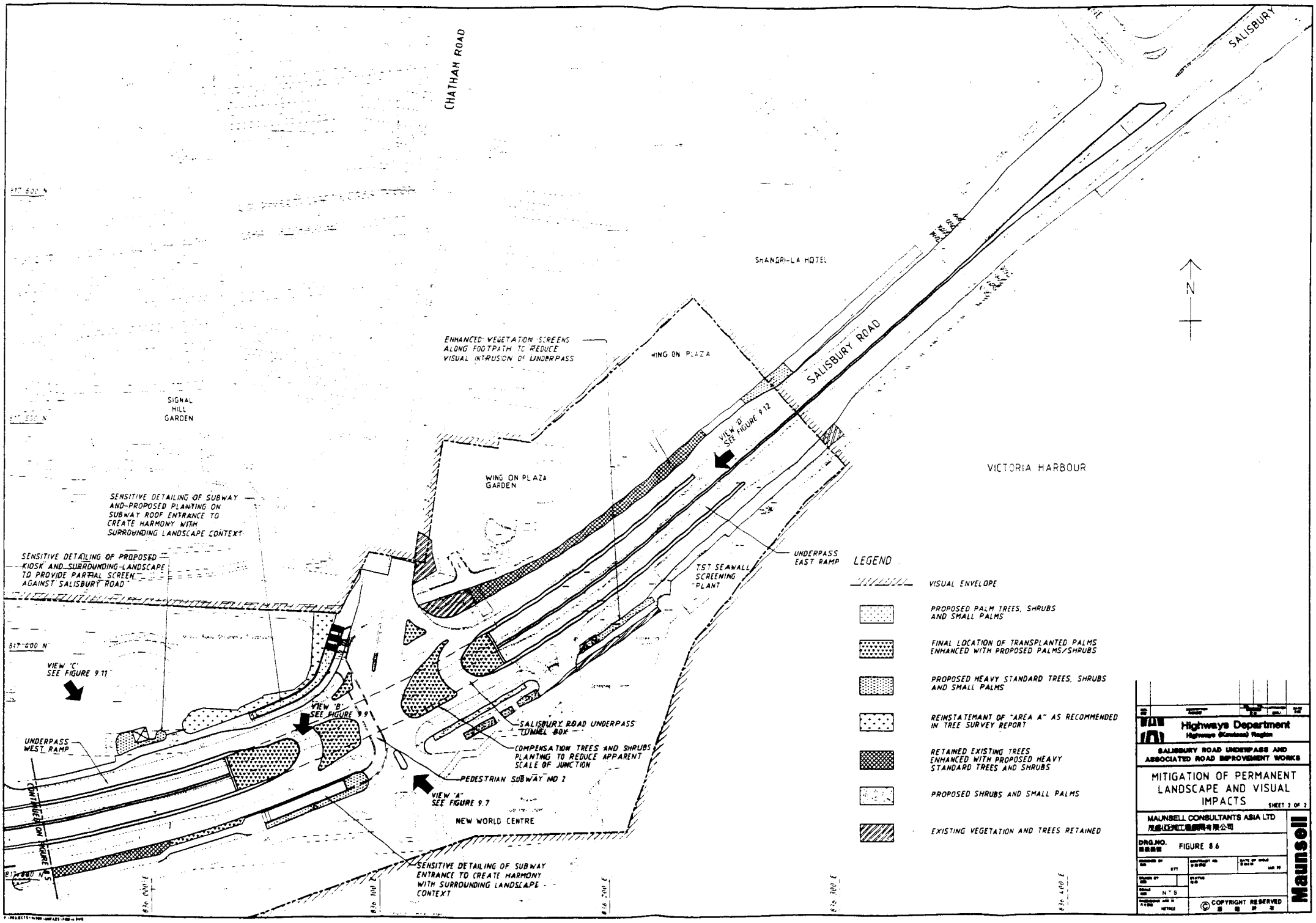

Highways Department
Highways (Eastern) Region

SALISBURY ROAD UNDERPASS AND ASSOCIATED ROAD IMPROVEMENT WORKS

MITIGATION OF PERMANENT LANDSCAPE AND VISUAL IMPACTS

SHEET 2 OF 2

MAUNSELL CONSULTANTS ASIA LTD

DRG.NO. FIGURE 8.6

N.T.S

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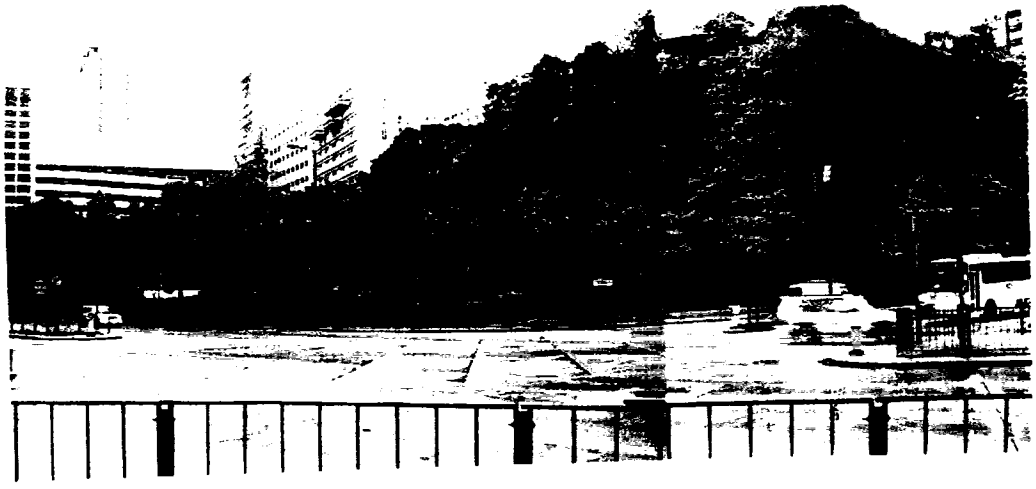
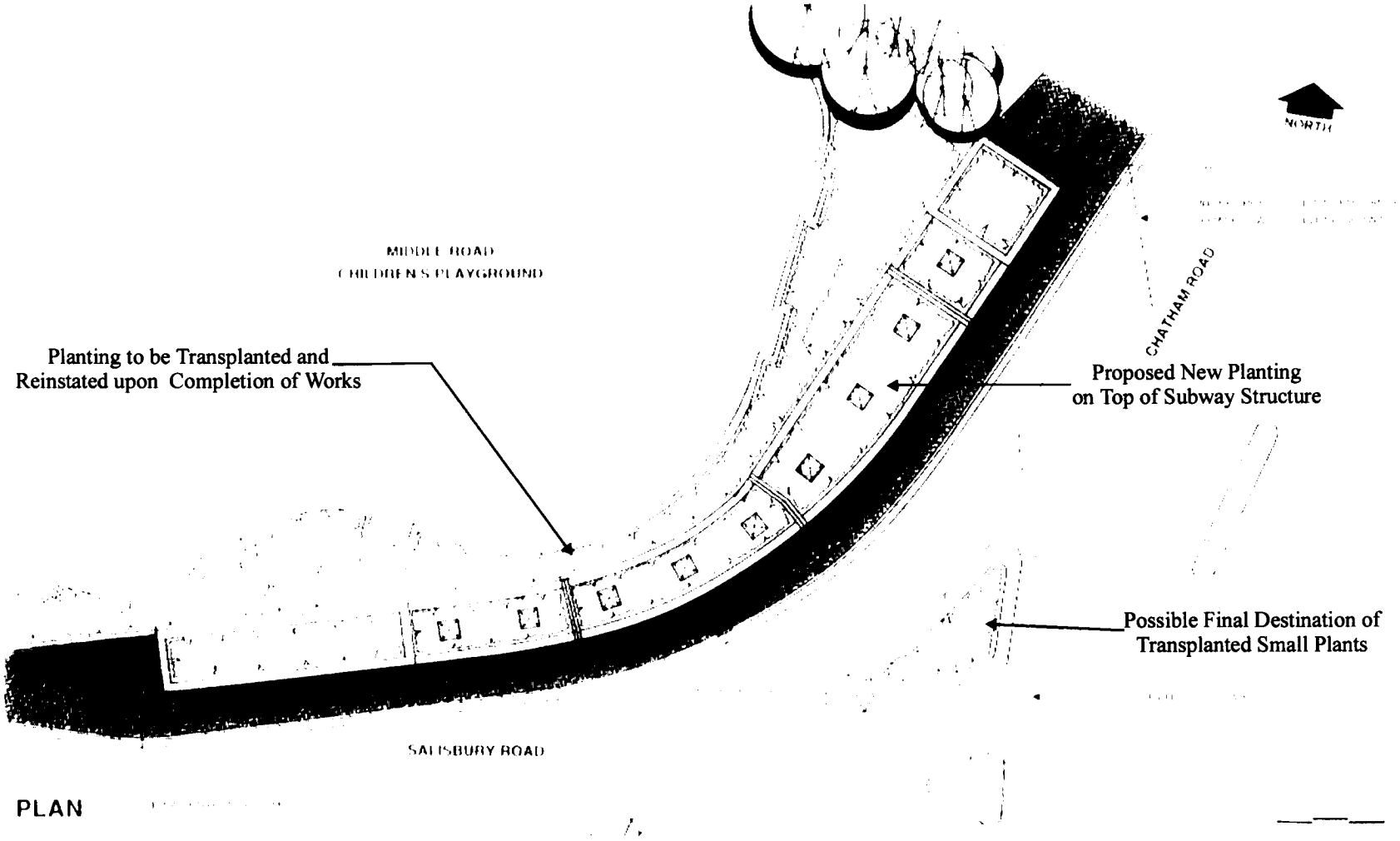


Photograph of Existing Site Conditions

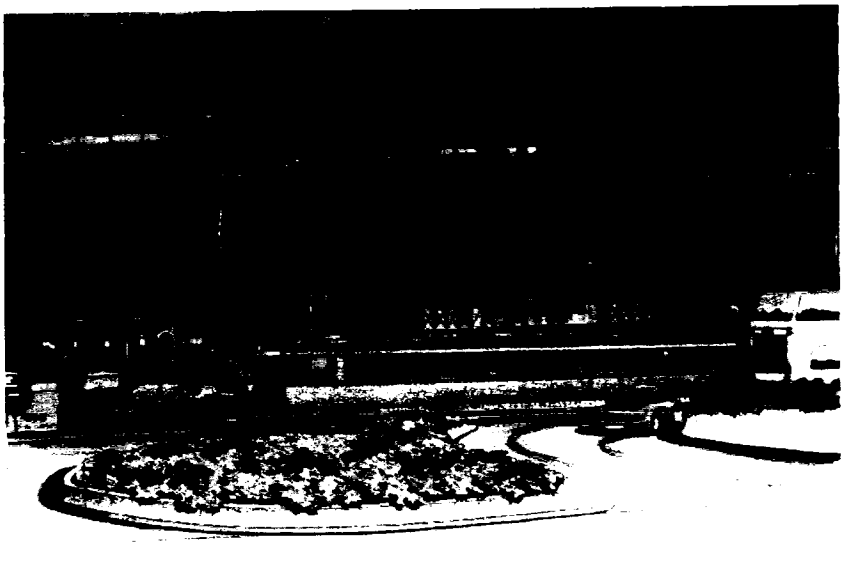
Photomontage of Proposed Scheme

	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
	Pedestrian Subway No. 2 - Northern Entrance	PROJECT NO	C440	DATE	Nov. 1998
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.7



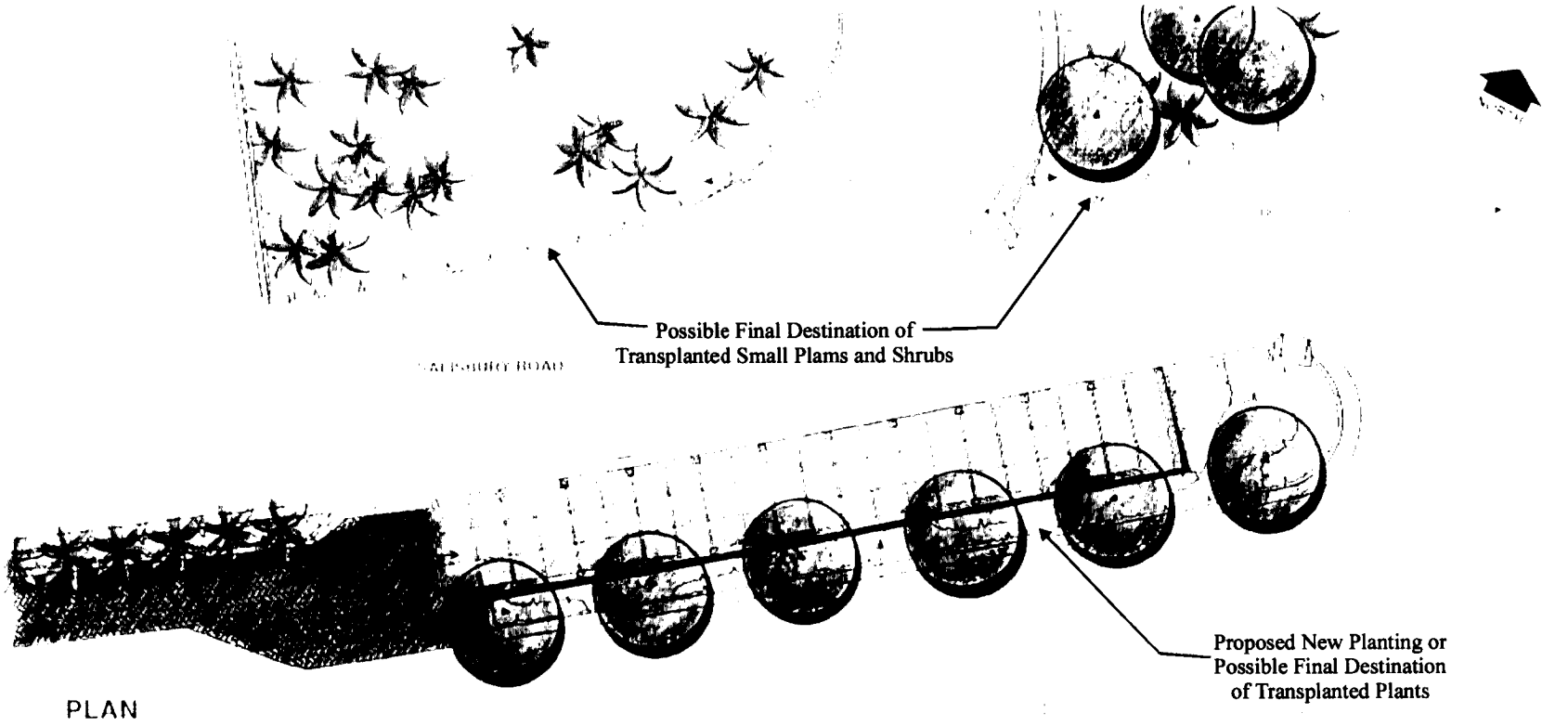
	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD		
	Pedestrian Subway No. 2 - Northern Entrance, Conceptual Landscape Plan	PROJECT NO	C440	DATE	Nov. 1998
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.8

Photograph of Existing Site Conditions



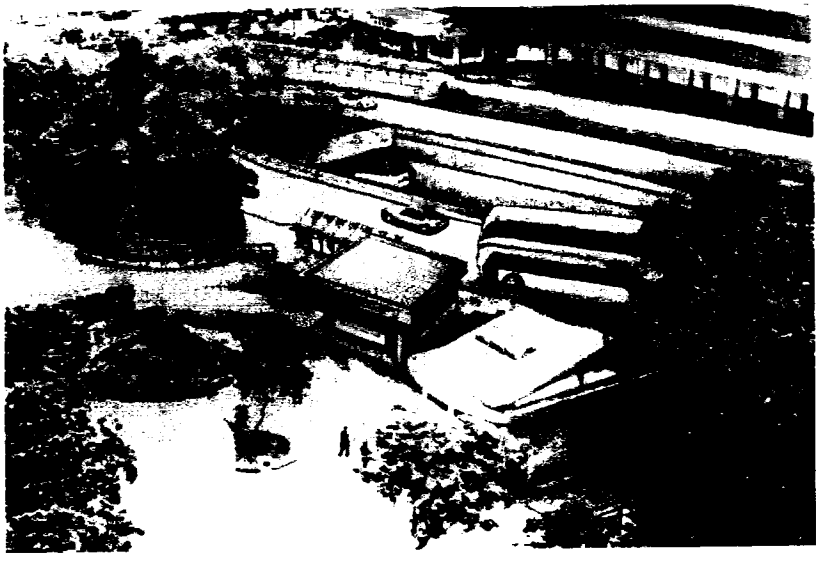
Photomontage of Proposed Scheme

	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
	Pedestrian Subway No. 2 - Southern Entrance	PROJECT NO	C440	DATE	Nov. 1998
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.9



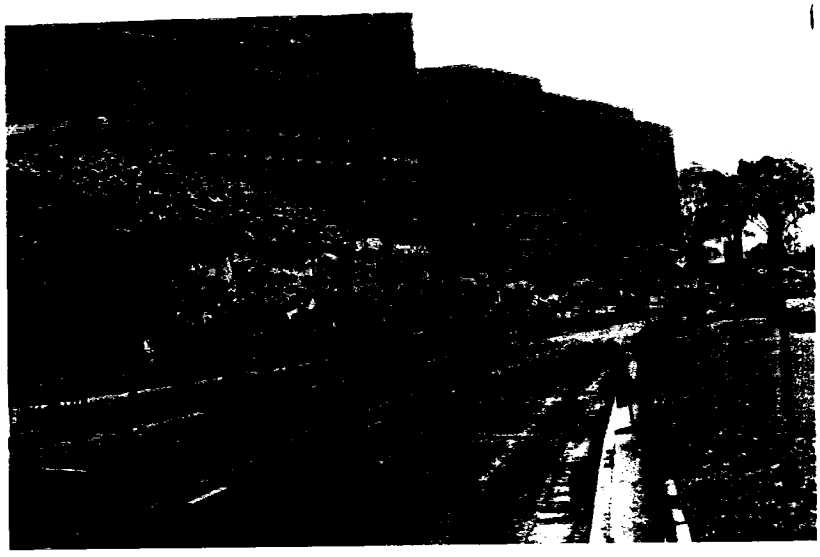
	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
	Pedestrian Subway No. 2 - Southern Entrance, Conceptual Landscape Plan	PROJECT NO	C440	DATE	Nov. 1998
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.10

Photograph of Existing Site Conditions

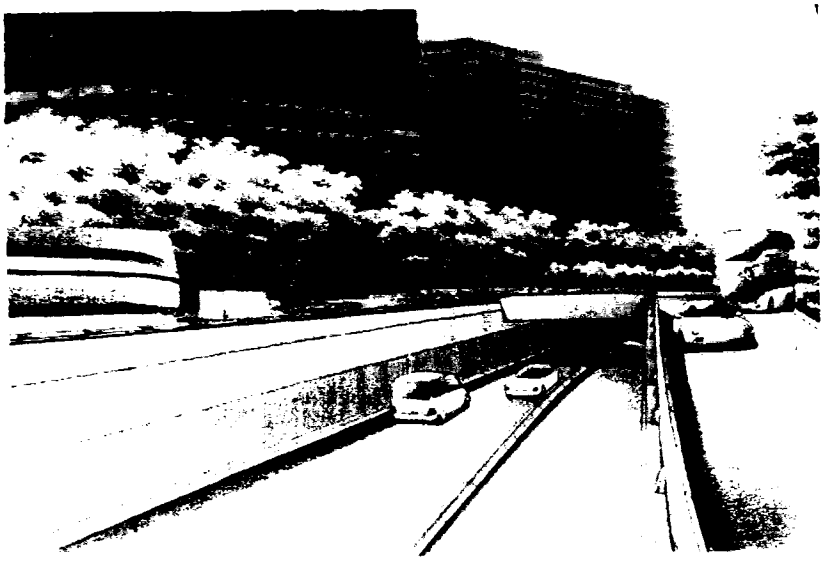


Photomontage of Proposed Scheme

	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
	Salisbury Road Underpass - Western Entrance	PROJECT NO	C440	DATE	Nov. 1998
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.11



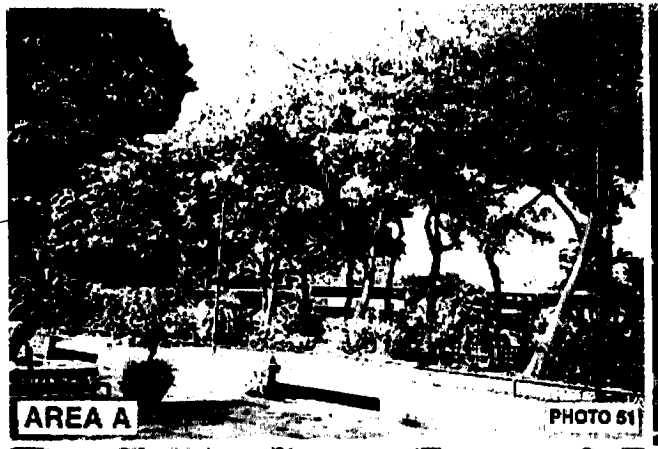
Photograph of Existing Site Conditions



Photomontage of Proposed Scheme

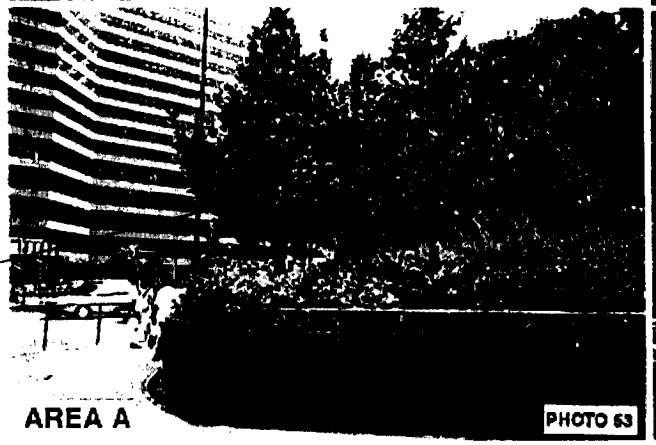
	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
	Salisbury Road Underpass - Eastern Entrance	PROJECT NO	C440	DATE	Nov. 1998
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.12

1 No. Thevetica Peruviana



2 No. Thevetica Peruviana

1 No. Juniperus Chinensis



Note : Remaining 2 Nos. Of Juniperus Chinensis are within the dense foilage shown in the photographs. All trees to be felled will be positively identified and labelled by an experienced horiculturist prior to their removal

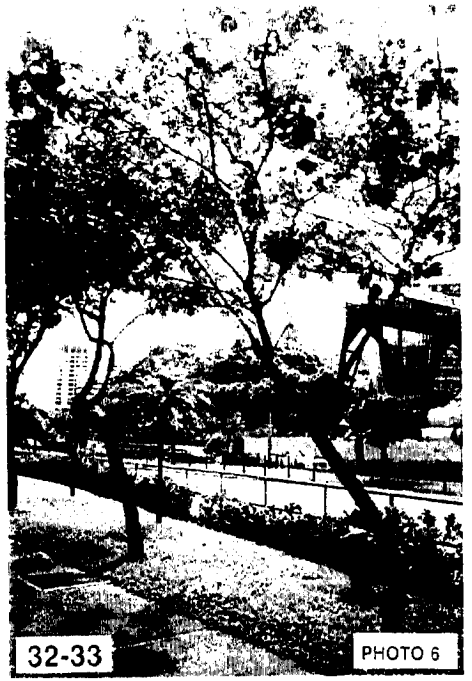
	TITLE	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
	Tree Survey Photographs of Proposed Felled Trees	PROJECT NO	C440	DATE	Jan. 1999
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.13

4 Nos. Of Schefflera Octophylla located adjacent to the proposed bus bay along Salisbury road to be felled

	TITLE Tree Survey Photographs of Proposed Felled Trees	MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD		
		PROJECT NO	C440	DATE	Jan. 1999
		DESIGNED	Fanny Lau	DRAWING NO	Figure 8.14

20-27 PHOTO 4

28-31 PHOTO 5



32-33 PHOTO 6

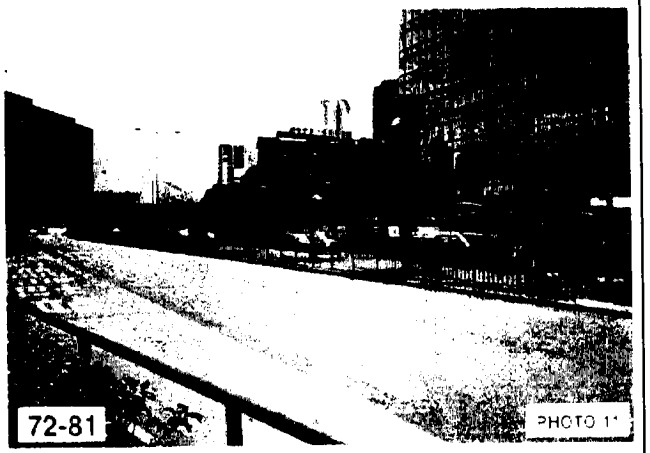
34-37 PHOTO 7

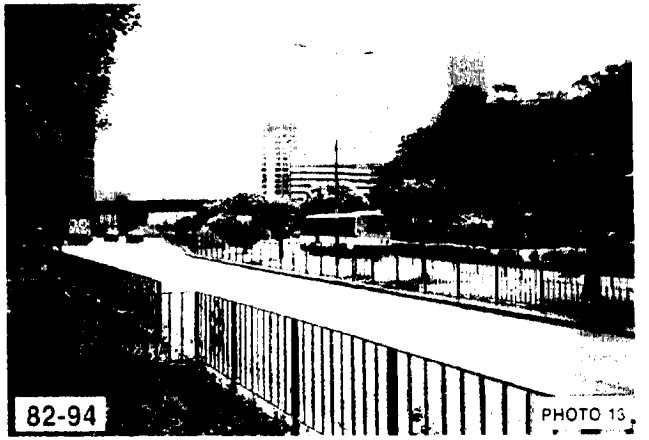
TITLE

Tree Survey Photographs - Sheet 1 of 7

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.15



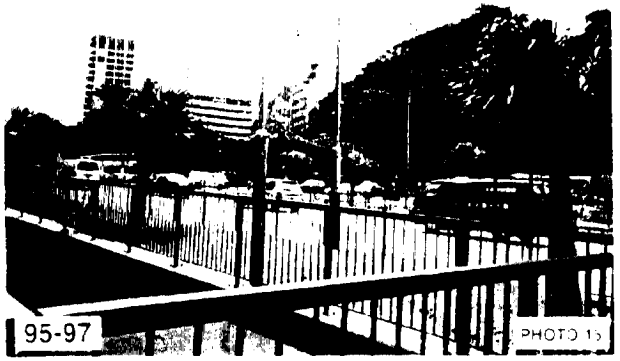


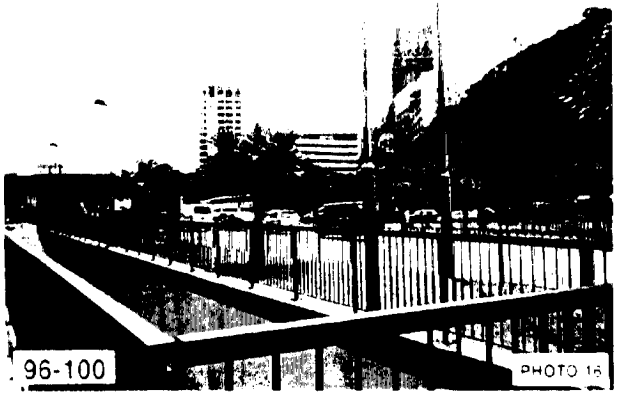
TITLE

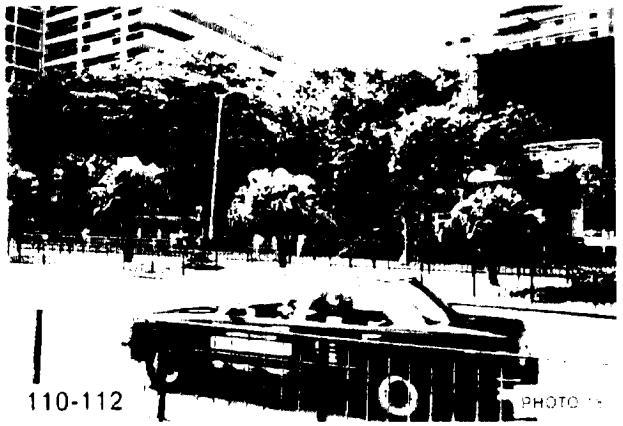
Tree Survey Photographs - Sheet 2 of 7

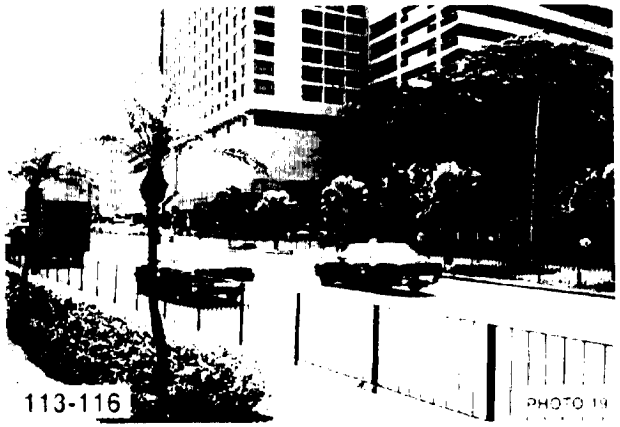
MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.16







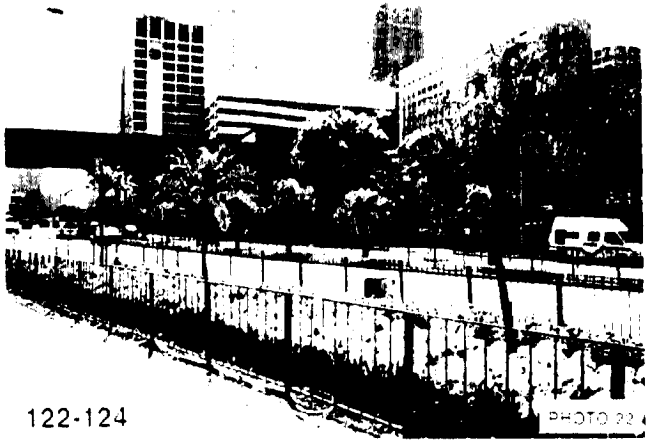


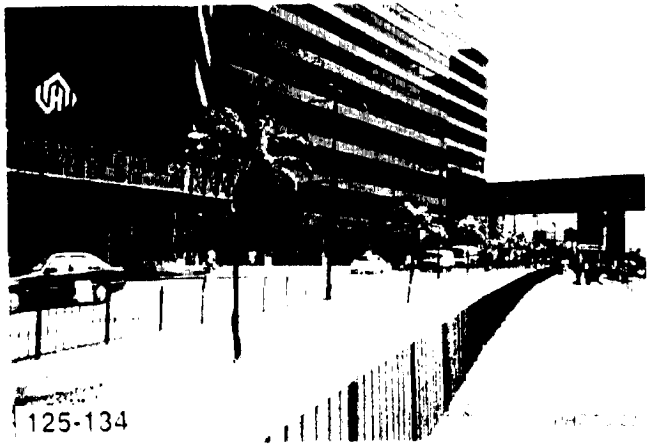
TITLE

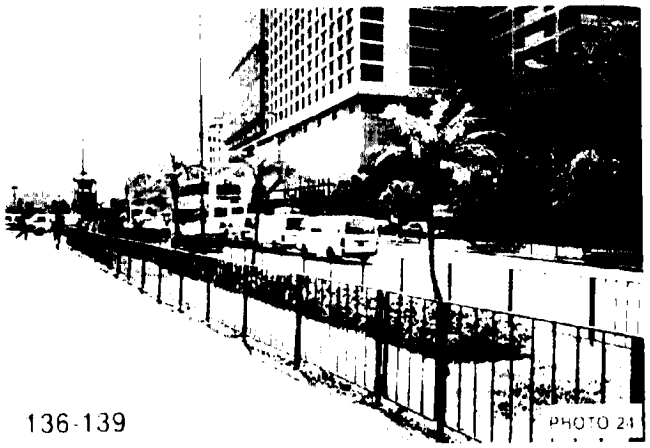
Tree Survey Photographs - Sheet 3 of 7

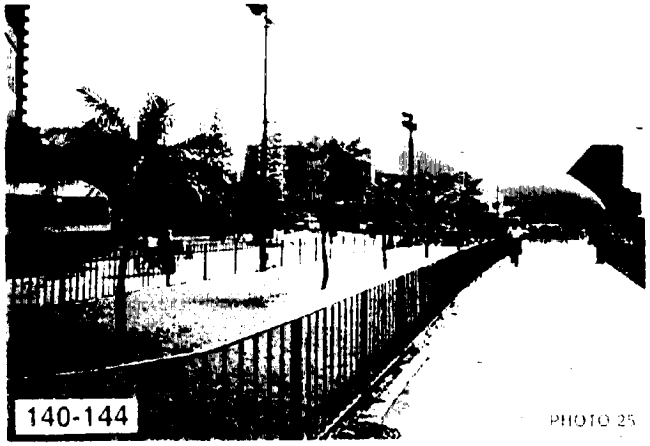
MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

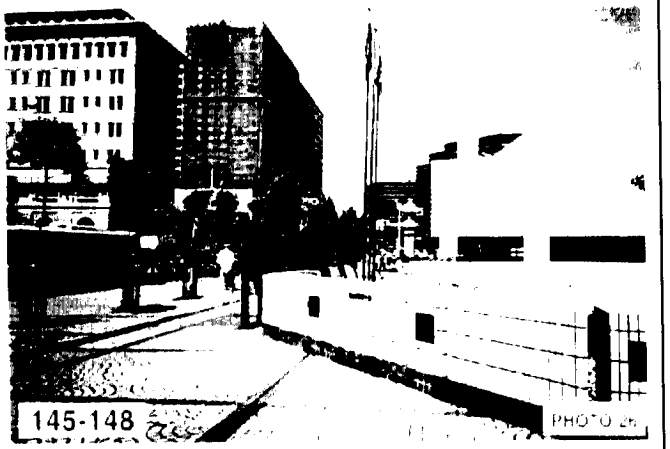
PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.17











TITLE

Tree Survey Photographs - Sheet 4 of 7

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

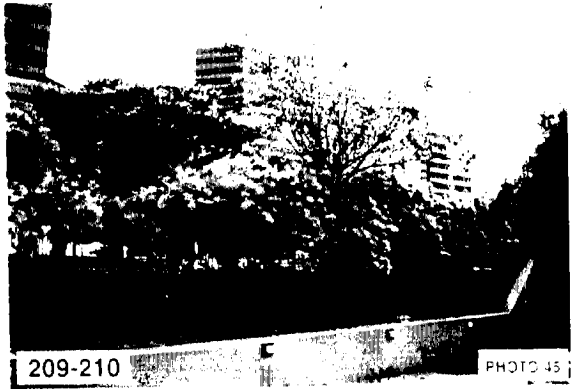
PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.18

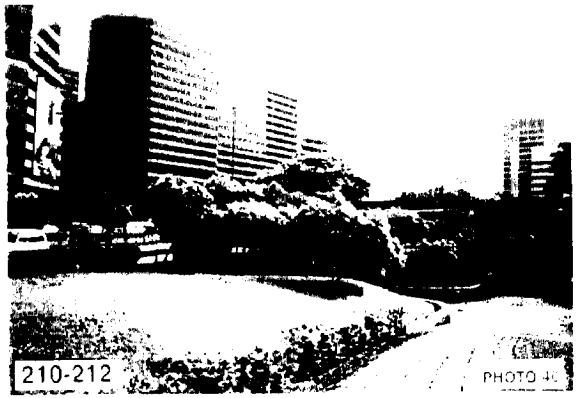
TITLE

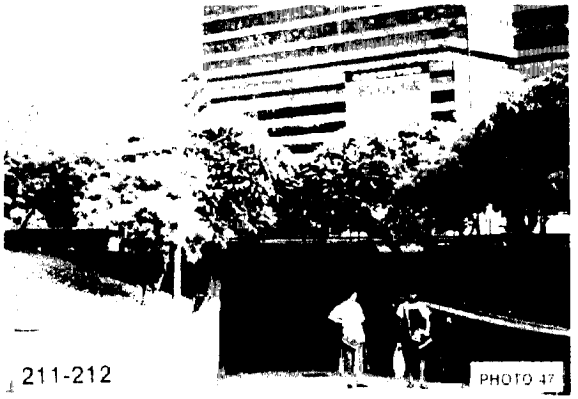
Tree Survey Photographs - Sheet 5 of 7

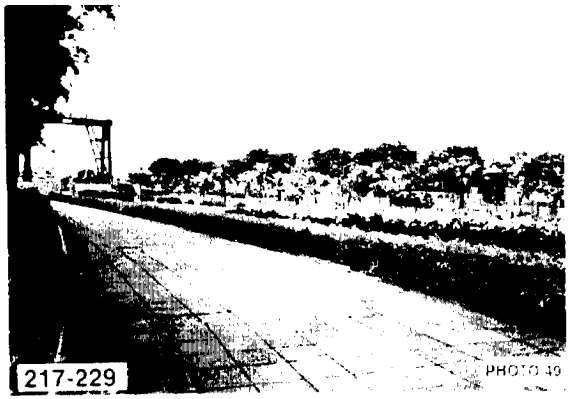
MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.19









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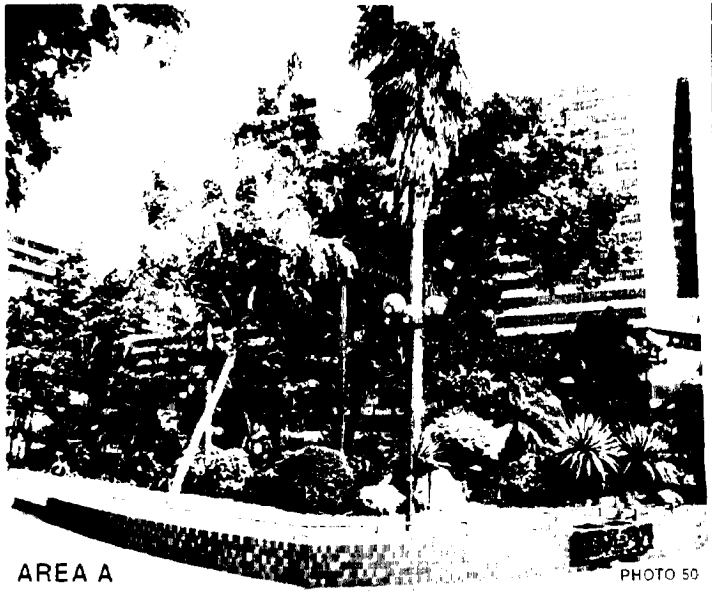
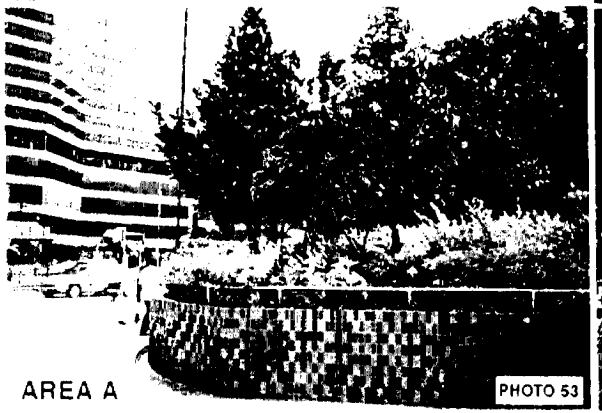
TITLE

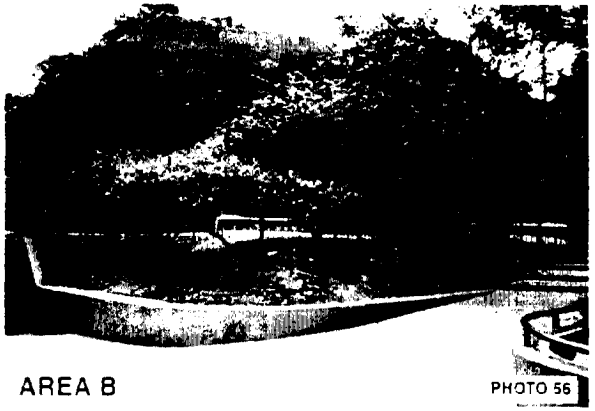
Tree Survey Photographs - Sheet 6 of 7

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.20





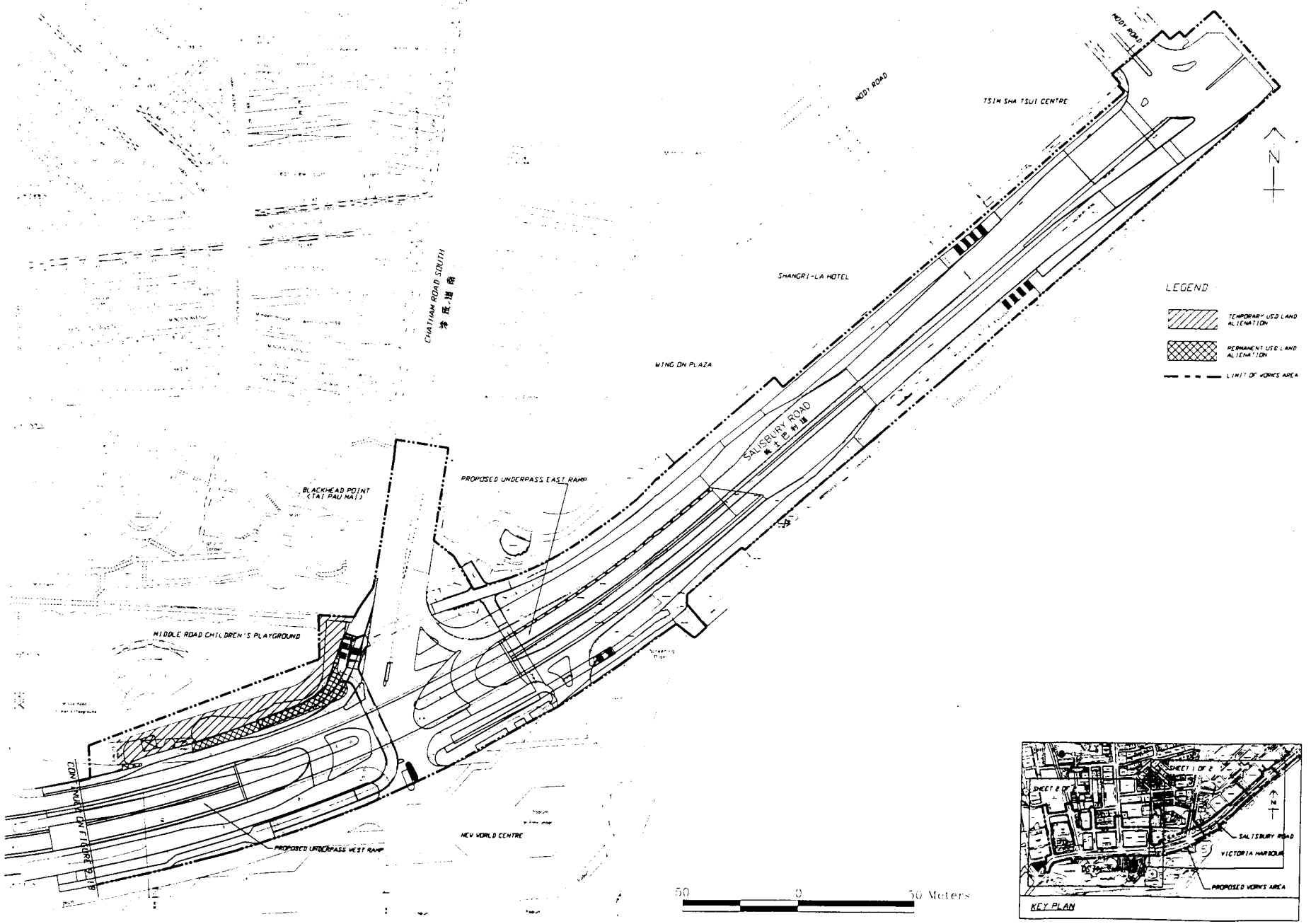


TITLE

Tree Survey Photographs - Sheet 7 of 7

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

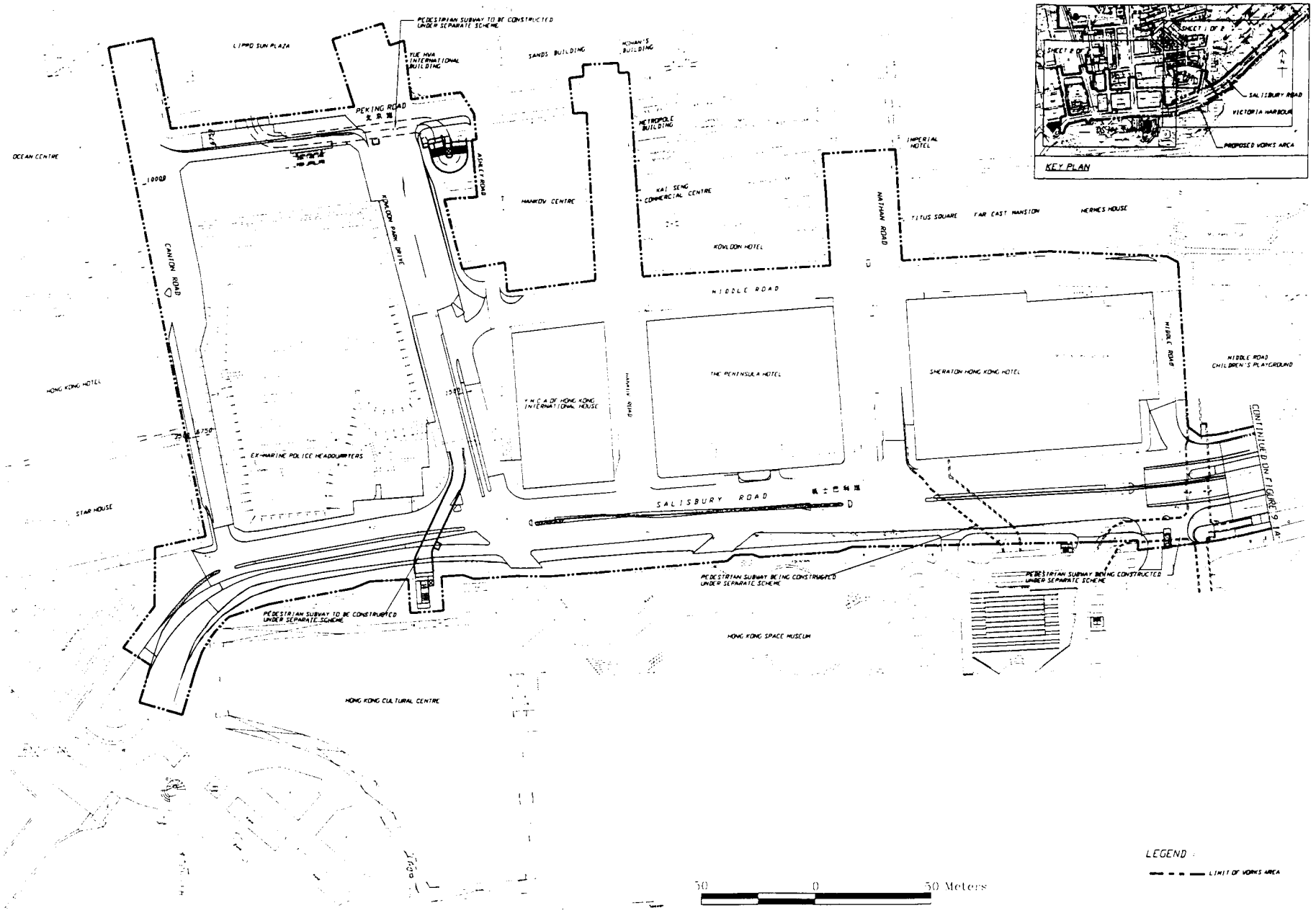
PROJECT NO	C440	DATE	Mar. 1999
DESIGNED/ CHECKED	Urbis Limited	DRAWING NO	Figure 8.21



TITLE

Land Requirement Plan

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
PROJECT NO	C440	DATE	June 1999
DESIGNED	Anna Chung	DRAWING NO	Figure 9.1(a)

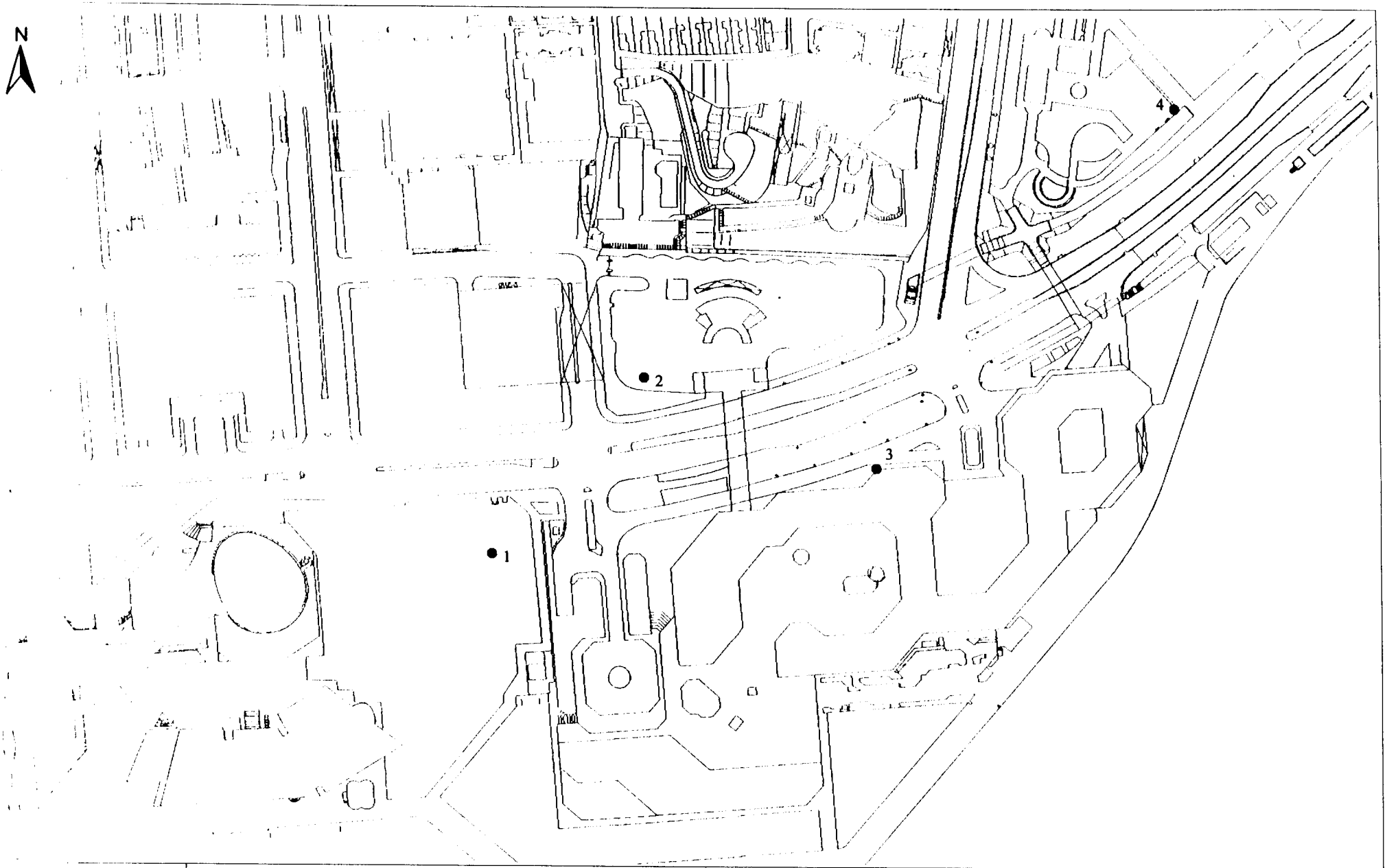


TITLE

Land Requirement Plan

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

PROJECT NO	C440	DATE	June 1999
DESIGNED	Anna Chung	DRAWING NO	Figure 9.1(b)



Maunsell

TITLE

Dust Monitoring Locations

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD			
PROJECT NO.	C440	DATE	Jan. 1999
DESIGNED	Fanny Lau	DRAWING NO.	Figure 10.1

APPENDIX A

RESPONSES TO COMMENTS RECEIVED

Reference	Comments	Response
2	Please refer to annex A for our technical comments on the above report.	Noted.
3	DPO/K and DUS have raised adverse comments on the landscape and visual impact assessments in the above report, and DPO/K has also indicated that the EIA report cannot meet the requirements in the "Technical Memorandum on the Environmental Impact Assessment Process" (TM). To resolve this issue effectively, the consultants are advised to provide 1 to 1000 scale plans detailing the mitigation of (i) permanent visual impacts and (ii) permanent landscape impacts DPO/K and DUS's approval before incorporating in the EIA report. (Note: The similar plans in the EIA Report for "Flyover and Footbridge Schemes at Junction of Austin Road, Chathan Road & Cheong Wan road" are attached in Annex B for reference).	Noted. The 1 to 1000 scale plans will be submitted to DPO/K and DUS.
4	To ensure that the Final EIA Report could meet the requirements of the TM and the EIA study brief before the submission under the EIA Ordinance, the consultants are advised to provide DPO/K, DUS and ourselves a Final EIA Report (Advance Copy) for our further consideration.	Noted.
Annex A		
A	**General**	
A.1.	Since the TM requires an EIA Executive Summary (in both English and Chinese) for submission under the EIA Ordinance, the consultants are advised to prepare the Chinese version as earlier as possible. To make the Executive Summary (ES) comprehensive and self-explanatory, the relevant tables/charts/figures in the Final EIA Report should also be placed in the ES.	Noted. Relevant tables/charts/figures will be included in the ES if appropriate.
A.2.	Executive Summary	
(i)	For clarity, please add "and no environmental monitoring & audit requirements and further assessment for construction dust impact are required" after the first para under the sub-head "Air Quality Impact".	Noted. Text will be amended accordingly.
(ii)	For clarity, please add "No mitigation measures and further assessment are required for the operational air quality impact" after the last para under the sub-head "Air Quality Impact".	Noted. Text will be amended accordingly.
(iii)	For clarity, please add "and no environmental monitoring & audit	Noted. Text will be amended accordingly.

Reference	Comments	Response
	requirements and further assessment for construction noise impact are required" after the first para under the sub-head "Noise Impact".	
(iv)	For clarity, please add "No mitigation measures and further assessment for operational traffic noise impact are required" after the last para under the sub-head "Noise Impact".	Noted. Text will be amended accordingly.
(v)	For clarity, please add "and no environmental monitoring & audit requirements and further assessment for water quality impact are required" after the para under the sub-head "Water Quality Impact".	Noted. Text will be amended accordingly.
(vi)	The handling of construction waste during the construction of the underpass is also a concern. It is advised to add a para in the ES, suggested as follows: "The contractor is required to sort the construction waste into construction & demolition (C&D) waste and public fill (inert waste) fraction in accordance with the New Disposal Arrangements for Construction Waste (1992). The constructor is also required to minimize and recycle their waste as far as possible. Waste management proposals including Good Site Practice for waste handling should be worked out. The standard contract, and no environmental monitoring & audit requirements and further assessment are required."	Noted. Text will be amended accordingly.
B.	**A New Chapter for Construction Waste Management:** For the reasons stated in the above A.2. (iv), it is advised to incorporate a new chapter in the Final EIA Report, suggested as follows: "The waste arising from construction work will comprise different kind of wastes. Handling and disposal of these wastes should be addressed individually. Construction waste generated during the construction please should be sorted on site into construction & demolition (C&D) waste and public fill fraction for reuse and recycling as far as practical. C&D waste can be disposed of at landfills, whilst the public fill fraction should be delivered to public filling areas or other reclamation sites. (Note: Public fill means soil, rock, asphalt, concrete, brick, cement plaster/mortar, building debris, aggregates, etc.) When considering the disposal options for various types of wastes, opportunities for reducing waste generation shall be fully evaluated, including avoidance/minimization, reuse and recycling through changing the design	Noted. A new chapter for construction waste management will be incorporated in the Final EIA Report according to your suggestion.

Reference	Comments	Response
	approach in the project planning stage and proper waste management practices on site. Waste management proposals including Good Site Practice for waste handling should be worked out. The proposed waste management measures shall be developed according to the Criteria for Evaluating Waste management Implication stipulated in Annex 7 of the TM and follow the Guidelines for Assessment of Waste Management Implication as stated in Annex 15 of the TM as appropriate. For implementation, the standard construction waste management clause should be included in the construction contract, and no environmental monitoring & audit requirements and further assessment are required."	
C.	**Construction Water Quality** Since this EIA Report will be submitted under the EIA Ordinance and open for the inspection of the public, it is advised to beef-up the section 5.4 "Mitigation of Adverse Environmental Impacts" for comprehensiveness. The consultants are advised to extract the relevant details in the PrePECC PN 1/94 concerning the construction activities, environmental impacts and the mitigation measures, and incorporate in the above section.	Noted. Section 5.4 will be revised.
D. (i)	**Operational Air Quality Impact** Table 6.2 "Tunnel Air Quality Criteria". Page 9: Besides CO and NO, the Tunnel Air Quality Guidelines stipulated in EPD's Practice Note on Control of Air Pollution in Vehicle Tunnels also include the 5-minutes average Sulphur Dioxide (SO_2) limit of 1,000 $\mu g/m^3$ which is also expressed at the reference condition of 298K and 101.325kPa. Please include the above Tunnel Air Quality Guidelines for SO_2 in the Table.	Noted. The table will be amended.
(ii)	Sections 6.5.1. & 6.5.2. pages 12~13: The emission factors and traffic flow for the year 2011 were used for the vehicular emission impact assessment. As the emission factors for years preceding 2011 are in general higher than those in year 2011, the consultants should clarity whether the combined effects of traffic flow and emission factors are taken into account to work out the worst impact scenario.	Year 2011 will be the worst impact scenario after the combined effects of traffic flow and emission factors. Please see annex A for the calculation.
(iii)	4th line in the para under Table 6.4: There is a type in the above line: "Table 4.4" should read "Table 6.4".	Noted. The text will be amended.

Reference	Comments	Response
E.	Noise	
(i)	Section 4.3.2. "General Construction Works": We have no strong view that the development equipped with central air-conditioning systems are less sensitive to noise impacts. However, the consultants should note that these developments should not be classified as non-noise sensitive. Please revise this para.	Noted. Text will be revised.
(ii)	Please indicate in the section 4 that sheet piling are under the control of Construction Noise Permit, and there is no requirement in the TM to assess sheet piling. Therefore, there is no need to assess the impact in the consultants may delete the concerned para.	Noted. Text will be revised.
F.	**Schedule of Recommended Mitigation Measures** The content and the format of the above schedule are different from the TM requirements. The consultants are advised to follow the Implementation Schedule shown in the attached Annex C, and incorporate in the Final EIA Report (Advance Copy) for our further consideration. Two sample pages from the "Yuen Long Bypass Floodway Feasibility Study" are attached at Annex D for reference.	Noted. The content and the format of Implementation Schedule will be amended accordingly.

Comments from
Environmental Protection Department
Director of Environmental Protection

Ref: ( ) in EP1/K1/TST/145(II)
24 December 1998

Reference	Comments	Response
A. Environmental Impact Assessment (EIA) Ordinance:		
(a)	Executive Summary – The Proposed Scheme For clarity, please add the following at the end of this section: " The underpass is a designated project under the schedule 2 item A9 of the Environmental Impact Assessment Ordinance (i.e. a road fully enclosed by decking above and by structure on the sides for more than 100 m), and it is necessary to obtain the environmental permit prior to the construction and operation of the underpass."	Noted. The text would be amended accordingly.
(b)	4 th para in section 1.14 "Background". For accuracy, please replace the para "According to … for this project "by the para in the above item (a)	Noted. The text would be amended accordingly.
(c)	1st para under section 1.3 "The Approach" For accuracy, please revise the first sentence as "this report is compiled in accordance with the requirements of Annexes 11, 20 and 21 of the Technical Memorandum on the Environmental Impact Assessment Process".	Noted. The text would be revised.
B. Noise		
(d)	It has been concluded in para 3 of section 1.1 of the report that there is no longer necessary to conduct the traffic noise assessment. In this connection, please:	
(i)	Delete the assessment in Chapter 8 regarding traffic noise impacts from this EIA study and	Noted. This traffic noise chapter would be deleted.
(ii)	amend the report as follows: Executive Summary para 5 "The PER also recommended…" This para should be revised as "The PER also …. Circulation System. In the design review stage, it was confirmed that Middle Road would not be widened. Therefore, the traffic noise assessment for the project was not necessary.	Noted. The text would be amended accordingly.
	Executive Summary para 15 "A marginal increase …" Please delete this para.	Noted. This paragraph would be deleted.

Reference	Comments	Response
	Chapter 1 para 3 on page 1 "A preliminary ..." Please delete the 5 th sentence "Assessment may be required ... to higher traffic flow."	Noted. This sentence would be deleted.
	Chapter 12 para 7 on page 29 "Traffic noise ..." Please delete this para.	Noted. This paragraph would be deleted.
	Chapter 12 para 6 on page 29 "Assessment for piling ..." Please revise the second sentence as "General construction noise assessment has not been undertaken as all the NSRs closest to the boundary of the works area are provided with ..."	Noted This sentence would be revised accordingly.
C. Air Quality		
(e)	Penultimate line in 2nd para under section 7.3 "Baseline Environmental Conditions" Please amend the typo "Table 6.3" to "Table 7.3".	Noted. The text would be amended.
(f)	It is noted that there is no Environmental Monitoring & Audit (EM&A) requirement for the project. Whilst we agree that the project should have no adverse construction dust impact when adopting appropriate dust control measures, we consider that it is appropriate to include construction dust in the EM&A requirement. Please revise the concerned paras, and provide the EM&A chapter for our consideration before submitting the report for approval under the EIA Ordinance.	Noted. Please find attached revised chapters for your information.

Comments from
Planning Department
District Planning Officer / Kowloon

Ref: ( ) in K-1/74 XIII
5 January 1999

Reference	Comments	Response
(I) Comments from Kowloon District Planning Office		
(a)	Chapter 2 (last paragraph) I wonder if the proposed project of the KCR East Rail Extension from Hung Hom to Tsim Sha Tsui really does not have any implication on this project, in particular when both projects which have similar construction programme, need to occupy the Middle Road Children's Playground temporarily and/ or permanently. Presumably, CE/Railway could provide input on this possible interface issue.	Please refer to attached Memo from EPD dated 20 January 1999.
(b)	Figures 2.2A & 2.2B The proposed landscaped area as identified in the figures appear to have some discrepancies with the gazettal drawings of the same project which I have recently received. The Consultants is requested to clarify and amend the figures accordingly.	Noted. Please find attached revised Figure 2.2 A and 2.2 B for your information.
(c)	Para. 10.2.2 Government/Institution/Community Uses The public open space with underground commercial complex and car park is an annotation of the "OU" zone. It is not falling within the G/IC zone. It is the YMCA Building which falls within the "G/IC" zone. Please amend the text accordingly.	Noted. Please refer to revised Land Use Impact Assessment enclosed.
(d)	Para. 10.2.2 Other Specified Use Pursuant to (c) above, the YMCA Building should be deleted from the text.	Noted. Please refer to revised Land Use Impact Assessment enclosed.
(II) Comments from Landscape Planning and Urban Design Units		
(a)	My previous comment as contained in my earlier letter dated 16.10.1998 regarding the landscape and visual impact assessment in Chapter 9 of the report has not been addressed. It does not follow the guidelines set out in Annes 18 of the Technical Memorandum on Environmental Impact Assessment Process. For example, there is no description of the study process, no reference to the stages of the project life-cycle, no baseline study and no quantification of impacts.	Noted. Please refer to revised Visual. Landscape and Townscape Impact Assessment enclosed.
(b)	The assessment of landscape and visual impacts in sections 9.2 and 9.3 should be supported by reference to figures 9.3, 9.4, 9.7, 9.9, 9.11 and 9.12.	Noted. Please refer to revised Visual. Landscape and Townscape Impact Assessment enclosed.

Reference	Comments	Response
(c)	I paragraph 9.3.1, the detailed information obtained by the tree survey should be presented. Trees to be felled, transplanted and retained should be clearly identified on figures 9.1 and 9.2, and shown on figures 9.5, 9.6, 9.8 and 9.10. The tree photos in the previous report, which have been omitted, should be included.	Noted. Please refer to revised Visual, Landscape and Townscape Impact Assessment enclosed.
(d)	In chapter 13., tables 13.4 and 13.5 do not identify the funding, management and maintenance agencies for the mitigation works. In both tables, all permanent mitigation measures should be completed in the construction stage, not the operational stage.	Noted. Please refer to revised Visual, Landscape and Townscape Impact Assessment enclosed.
(e)	My previous comment as contained in my earlier letter dated 18.10.1998 regarding co-ordination with KCRC's East Rail Extension proposals from Hung Hom to Tsim Sha Tsui is still relevant.	The EIA for "Salisbury Road Underpass and Associated Road Improvement Works" addresses the environmental impacts pertaining form the construction of the proposed underpass and associated road improvement works and does not consider environmental impacts resulting from other projects. While we acknowledge that during the detailed design stage, some coordination work will be required between the Underpass project and the proposed KCRC East Rail Extension, we believe it is outside the scope of this report. Furthermore, EPD has indicated in a memo (ref no. (7) in EP1/K1TST/145 (II), dated 20 January 1999) that is a matter which should be reviewed / resolved by the Highways Department during the detailed design stage. A copy of the memo has been enclosed for your reference.

Comments from
Urban Services Department
For Director of Urban Services

Ref: L/M(1) in USDP 44/402/86X
12 January 1999

Reference	Comments	Response
	I refer to DEP's memo ref. (67) in EP/K1/TST/145 dated 23.9.98 addressed to me amongst others requested us to forward our comments in respect of the captioned report to you.	
2.	We have the following comments on the draft EIA Report:	
(a)	Para.8.3 Landscape and Townscape Impact Please confirm if the trees in TST Promenade, Central reserve and the roadside trees along Salisbury Road will be affected by the project. If YES, they should be covered in the report. As over 130 trees are proposed to be removed in these areas, the visual impact, as a result of the trees removal is considered significant and should be well covered in the report.	Noted. Please refer to revised Visual. Landscape and Townscape Impact Assessment enclosed.
(b)	Para. 8.5 Mitigation Measures of Landscape and Townscape Impact - To ensure that all transplantable trees are returned to the area upon completion of works, the locations for these transplanted trees should be indicated on the proposed landscape plan. - Detailed planting proposals / compensatory planting proposals should be forwarded to this Department for comment and agreement. - Planting of flowering trees and shrubs etc., should be considered so as to create colour impacts and strong sense of seasonal changes. - Mass planting should be adopted to give good instant effect.	Noted. Please refer to revised Visual. Landscape and Townscape Impact Assessment enclosed.

Reference	Comments	Response
3	Comments on EM & A Chapter	
(a)	Page 27 With reference to the Draft EIA Report enclosed in your earlier document transmittal from ref C440 dated 1.12.98, this EM & A chapter should be in section 11 instead of section 10 of the EIA Report. Please check and amend the index.	In accordance with your comments dated 24.12.1998, Chapter 8 (Traffic Noise Assessment) was suggested to be deleted, therefore, the chapters have be renumbered.
(b)	Page 28, penultimate sentence of 2nd para; For clarity, please add "independent checker" before the abbreviation "IC(E)".	Noted. The text would be amended accordingly.
(c)	Page 31, Table 11.1 "Action and Limit Levels for Air Quality" The action level in this table is different from that in the "Generic Environmental Monitoring and Audit Manual" (copy attached). Please amend this table.	The action level in this table is in accordance with the reference document "The Environmental Monitoring and Audit (EM&A) Guidelines for Development Projects in Hong Kong " published in February 1998.
4	As discussed today, please provide a draft EIA Executive Summary (both English & Chinese) for our consideration. Since the Executive Summary (ES) should be self-explanatory, figure 2.1, 2.2A and 2.2B of the EIA Reports should be provided in the ES. As such, please also add the labels, including " Salisbury Road", "Chatham Road" and "Nathan Road", on these figures for clarity.	Noted.

Comments from
Planning Department
District Planning Officer / Kowloon

Ref: ( ) in K-I/74 XIII
5 February 1999

Reference	Comments	Response
Comments on Land Use Impact referring to document transmittal form dated 26.1.1999		
(a)	Para 9.2.2 The Salisbury Garden is not located within an area zoned "Open Space" on the approved Tsim Sha Tsui Outline Zoning Plan (OZP) No. S/K/1/11. The Development, together with the Palace Mall and the underground car park is zoned "Other Specified Uses" annotated "Public Open Space With Underground Commercial Complex and Car Park" on the said OZP. Please amend the text accordingly.	Noted. This para would be amended.
(b) (i)	(b)Para. 9.3 For the sake of consistency in presentation, please consider to add a paragraph regarding the impact on "Comprehensive Development Area" ("CDA") zone.	Noted.
(ii)	The land requirement plan as shown on Figure 9.1(a) & (b) are not attached for reference. Presumably, the extent of land requirement is the same as that shown on Figures 10.1(a) & (b) of the previous draft EIA report (November 1998). As such, you are advised to seek the agreement from Director of Urban Services since the project requires the temporary occupation of some open spaces such as the Middle Road Children's Playground and the Sitting-out are in Peking Road.	Noted.
(c)	Para. 9.4, bullet one Please add "CDA" zone into the text in order to be consistent with the conclusion at para.11.6.	Noted.
(d)	Figure 2.2A & B Some discrepancies are still noted between the figures and the gazettal drawings. According to the gazettal drawing, the traffic island at the junction of Chatham Road and Salisbury Road is a landscaped area, not forming part of road as shown on figure 2.2A. Moreover, a number of other discrepancied regarding the width and alignment of the pavement /road as shown on the figures are different from the gazettal drawings.	Noted. Figure 2.2A & B would be amended.

Comments from
Planning Department
District Planning Officer / Kowloon

Ref: ( ) in K-1/74 XIII
26 February 1999

Reference	Comments	Response
	Comments on revised chapters on 'Visual, landscape and townscape impact assessment' referring to document transmittal form dated 26.1.1999	
	Comments on the revised Chapter 8 of Draft EIA Report	
(a)	Para. 8.7.2 Table 8.1 appears to be missing.	This para has been amended. Please see amended text.
(b)	Para 8.7.1 & 8.7.3 Reference should be made to the detailed mitigation measures listed in Table 12.5.	Noted.
(c)	Para. 8.7.2 and 8.7.4 The anticipated impacts are graded as "high, medium or low", but there are references in the text to negligible impacts. Is this the same as "low"? Since there is reference to "no impact", it presumably implies some impact. The gradation should be consistent and clear.	Noted. These paragraphs would be amended.
(d)	Table 12.4 & 12.5 Director of urban Services should be asked to confirm that his department will take up all operation stage maintenance responsibilities as listed. Would Director of Highways not be responsible for maintenance of the pedestrian subway, and Director of Architectural Services responsible for maintenance of the planters?	To be responded shortly.
(e)	Figures 8.1 , 8.2, 8.8 & 8.10 Trees to be retained/felled/transplanted should be shown on the tree location plans.	Noted. Trees to be retained/felled/transplanted would be shown on the tree location plans
(f)	Figures 8.8 & 8.10 Trees to be retained/transplanted should be indicated on the Conceptual Landscape Plans.	Noted.
	Comments on Appendix F of Draft Final Report The photographs referred to in the existing tree assessment schedule are no included in the appendix. Although photographs of the trees to be felled are provided, it would be preferable if photographs of all trees surveyed were included, since they are referred to in the schedule	Noted. The relevant photographs of the trees would be included in the report.

Comments from
Urban Services Department
For Director of Urban Services

Ref: L/M(1) in USDP 44/402/86X
9 February 1999

Reference	Comments	Response
	Comments on the revised visual, landscape & townscape impact assessment (Ref. C440\dan90127.01 dated 27.1.99)	
(A)	**Tree issue** It is noticed that a row of pavement tree planting in front of the Hong Kong Culture Centre and Space Museum is still missing in the report. According to figure 8.5, the existing pavement will be set back and it is expected that retention of trees on site would be impracticable, therefore, the visual impact as the result of tree removal and the mitigation measures should be included in the report. To facilitate our assess the possible impact on existing trees, the Tree Survey Report should be forwarded for our comment as early as possible.	Noted. The text would be amended.
(B) (a) (i)	**Landscape issue** Para. 8.7.3 1st point of mitigation measures In order to restore/improve the loss if existing trees in the affected areas, compensatory tree planting should not limit to footpaths only. To allow the planting of dense flowering trees to soften these areas and to provide a buffer planting for the busy roads, the provision of deeper soil, say more than 1,000 mm deep, with good drainage system on deck area of underpass portal should be considered;	Noted. The para would be amended.
(ii)	3rd point of mitigation measures Trees to be planted on the pavement should not only create flowering effect, but also provide shade for pedestrians;	Noted. The text would be amended.
	(b)Others	
(i)	To achieve better attraction, the proposed landscape features should be placed at the conspicuous locations;	Noted.
(ii)	Should the soft work of the newly formed roadside amenities be maintained by this Department, the detailed soft landscaping proposal and plans should be forwarded for our comment and agreement before the commencement of works.	Noted.

Reference	Comments	Response
2	**Comments on Final EIA Report :**	
(a)	3rd para under section 2 "Description of the Project": The underpass should be "130m" instead of "310m" in length. Please amend the first sentence	Noted. The text would be amended.
(b)	Project Timetable under section 2 "Description of the Project": The figures in the timetable are outdated. Please update.	Noted. The timetable would be updated. Please see the attached amended page.
(c)	section 6 "Construction Waste Management":	
(i)	For clarity, prior to section 6.3 "Mitigation Measures", please provide information on the types of waste, the quantity, quality and timing of the waste arising during the construction phase. The impacts caused by handling (including labeling, packaging & storage), collection, and disposal of wastes shall be addressed in details, and appropriate mitigation measures should be developed accordingly.	Noted. Please see attached amended section 6.
(ii)	For comprehensiveness, please add the following in section 6.3 "Mitigation Measures": "On-site waste separation of both municipal solid waste (MSW) and C&D waste should be conducted as far as possible in order to minimize the amount of solid waste requiring disposal at landfills. In order to monitor the disposal of solid waste at the landfills and control fly-tipping, it is recommended to apply a trip-ticket system on all solid waste transfer/disposal operations. At present, EPD has arranged with the TDD to implement a trip-ticket system on two contracts at Tung Chung and CED will implement a similar system in public filling operation in 1999. The trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team. Independent Checker (Environment) should be responsible for auditing the result of the system. Also, records of quantities of wastes generated, recycled and disposed (locations) should be properly kept."	Noted. Please see attached amended Section 6.
(d)	5th para under section 8.8 "Conclusions – Landscape and Visual Environment": To ensure the concerns from the ACE and the public can be fully addressed,	Noted. Section 8.8 would be revised.

Reference	Comments	Response
	please revise the para as follows: "Existing vegetation will be retained / transplanted to other locations within the site where possible to retain the landscape and visual context of the area. As recommended in the Tree Survey Report, *X1 nos. (i.e. X2%), Y1 nos. (i.e. Y2%) and Z1 nos. (i.e. Z2%)* of trees will be retained, transplanted and felled respectively. *ZZ nos.* of trees will be planted at the Cultural Centre to compensate the loss from tree-felling."	
(e)	Table 12.1 "Summary of Proposed Mitigation Measures for Construction Dust Impact": Please update the table to reflect the requirements as detailed in the above paras 2(c)(ii) and 2(d).	Noted. The relevant tables would be updated.
(f)	item D in Appendix A "Responses to Comments Received": Please amend the typo from "SO" to "SO_2".	Noted. The word would be amended.
(g)	Figure 2.1 "Salisbury Road Underpass and Associated Works": As discussed, to avoid confusing the ACE or the public, please add the major road and street names on this figure.	Noted. The major road and street names would be added in figure 2.1.
3.	We have the following comments on the Executive Summary (ES):	
(a)	A new 2nd para under section 1 "The Proposed Scheme": To make the need of the project more convincing to the ACE and the public, please copy the amended para as mentioned in the above para 2(a) to this section.	Noted. The amended paragraph as mentioned in the above para 2(a) would be added to section 1.
(b)	3rd para under section 1 "The Proposed Scheme": For clarity, please revise the last sentence as "Without the underpass, actue traffic congestion .....".	Noted. The text would be revised accordingly.
(c)	Last sentence in 1st para under section 3 "Air Quality Impact": Please delete "to ensure compliance with EPD standard" which is inappropriate.	Noted. The sentence would be deleted.
(d)	A New Paragraph at the end of section 3 "Air Quality Impact": The section 7.2 of the EIA Report has mentioned that there are 4 parameters (CO, NO_2, RSP and TSP) relevant to this study. For comprehensiveness,	Noted.

Reference	Comments	Response
	please add a conclusion that all these parameters will not exceed the limits in the concerned technical memorandum or guidelines.	
(f)	A New Paragraph in section 7 "Visual, Landscape and Townscape Impacts": For the reason stated in the above para 2(d), please copy the amended paragraph as mentioned in the above para 2(d) to this section.	The amended paragraph as mentioned in the above para 2(d) would be added to this section
(g)	Figure 1 "Salisbury Road Underpass and Associated Works": The comment in the above para 2(g) is also applicable to this figure.	Noted. Figure 1 would be amended.

Reference	Comments	Response
2	**Comments on Final EIA Report :** As discussed today, we would be grateful if you could revise the last sentence of the last paragraph in section 7.4 "Air Sensitive Receivers" as "Additional modelling was undertaken at the average first floor level of 5m above ground, which was the height of the fresh air-intake points of most commercial buildings in the vicinity (e.g. <<*name of building*>>)."	Noted. The sentence would be revised accordingly.

Reference	Comments	Response
2	**Comments on Final EIA Report :**	
	With reference to the 33rd Advisory Council on the Environment (ACE), Environmental Impact Assessment Subcommittee Meeting on another road project entitled "Kennedy Road Improvement and Queen's Lines Link", the ACE members have raised grave concern on the maintenance of the trees after planting/transplanting. The concerned minutes of meeting is attached in Annex A for your reference. To address ACE members'' concerns, please amend the 5th para of section 8.8 "Conclusions – Landscape and Visual Environment" of the EIA Report as follows, and incorporate this as a last para in section 7 "Visual, Landscape and Townscape Impacts" of the EIA Executive Summary:	Noted. The text would be amended accordingly.
	As recommended in the Tree Survey Report, existing vegetation will be transplanted to other locations within the site where possible to retain the landscape and visual context of the area. HyD will take up a normal maintenance period of 12 months after the completion of the planting and transplanting works, and USD will take up the maintenance responsibility after expiry of the normal maintenance period." Please also supplement the "Maintenance Agent" in Table 12.5 "Summary of Proposed Mitigation Measures for Landscape and Townscape Impacts" as follows: "Contractor (during construction phase), HyD (first 12 months after planting / transplanting), USSD (afterwards).	Noted. Table 12.5 would be amended.
	Technical Comments on the Amendment Pages to the EIA Report	
1	**Project Timetable under section 2 "Description of the Project"** In accordance with the normal PWSC procedures, the detailed design of the road works should not have been started, and the duration "January 1999 to August 1999" is therefore not reasonable. Please confirm with HyD the actual duration and amend this item.	Noted.
2	**Last sentence in the 1st para under section 6.4.1 "Excavated Materials"** Further to our today's discussion (Chung/Ho), you may amend the last sentence as "The majority of the material to be excavated should be suitable for re-use in public filling areas."	Noted. The last sentence would be amended.

Reference	Comments	Response
3	<u>Last sentence in the 3rd para under section 6.4.2 "C&D Materials"</u> To avoid ambiguity, please delete this sentence "At present, EPD has arranged ..... Public filling operation in 1999."	Noted. This sentence would be deleted.
4	<u>2nd sentence in the 1st para under 6.4.4 "Municipal and Sewage Wastes"</u> For accuracy, please amend the term "temporary refuse collection facility" to "temporary refuse collection point".	Noted. The term would be amended.
5	<u>Last sentence in the 4th para under section 7.4 "Air Sensitive Receivers"</u> For comprehensiveness, please amend the last sentence as : "Additional modelling was undertaken at the average first floor level of 5m above ground. Which was the height of the fresh air-intake points of most commercial buildings in the vicinity (e.g. YMCA building – one of the worst scenario in the study area)".	Noted. The last sentence would be amended accordingly.
6	<u>Penultimate sentence in the 5th para under section 8.8 "Conclusions"</u> For clarity, please amend the sentence as "The remaining 6 nos. are common varieties (juniperus chinensis and thevetia peruviana) and were chosen .....".	Noted. The sentence would be amended accordingly.
7	<u>Last para under section 7 "Visual, Landscape and Townscape Impacts"</u> For consistency, please amend this para for the reason mentioned in the above item 6.	Noted. The para would be amended.

APPENDIX B

CALCULATIONS OF IN-TUNNEL AIR QUALITY

APPENDIX B
CALCULATIONS OF IN-TUNNEL AIR QUALITY

Underpass dimensions

Length	=	130 m
Width	=	16.35 m
Height	=	5.65 m
Perimeter	=	43.3

Normal Traffic Conditions
Taking the 2011 PM peak hour traffic flow worst case one direction:

One-way total flow

$= 1730\ veh/hr$

$= 1730\ veh/hr \times \frac{1\ hr}{3600\ \text{sec}}$

$= 0.48\ vehicle/\text{sec}$

Given speed limit in the underpass is 50 km/hr,

Time for a vehicle to pass through the underpass

$= \frac{130\ m}{50 \times 1000 \times \frac{1}{3600}\ m/\text{sec}}$

$= 9.36\ \text{sec}$

Therefore, number of vehicles in the underpass assuming uniform traffic flow of 1730 v/hr at 50 km/hr

$=0.48\ vehicle/\text{sec} \times 9.36\ \text{sec}$

$=4.5\ vehicle$

Using the formula for traffic induced air draught in a one-way road tunnel from the MERL Report No.64,

Induced air draught, v

$= \frac{u}{1 + \sqrt{s}\sqrt{\frac{k A_t + C_t P_t L}{C_v A_v L}}} - C_1\ m/\text{min}$

$= 191\ m/\text{min}\ or\ 3.19\ m/\text{sec}$

where	A_t	*Cross-sectional area of tunnel*	=	*92.37 m²*
	A_v	*Vehicle frontal area*	=	*5.5 m²*
	C_1	*Velocity correction constant*	=	*(small enough to be usually ignored)*
	C_t	*Tunnel wall drag coefficient*	=	*0.0155*
	C_v	*Vehicle drag coefficient*	=	*0.645*
	k	*End loss coefficient*	=	*1.0 for sharp entry and exit*
	L	*Length of tunnel*	=	*130 m*
	P_t	*Perimeter of tunnel*	=	*43.3 m*
	s	*Vehicle spacing*	=	*28.9*

Induced air draught, v

$$= \frac{u}{1 + \sqrt{s}\sqrt{\frac{k A_t + C_t P_t L}{C_v A_v L}}} - C_1 \ m/\min \quad \textit{(tunnel length / no. of vehicle)}$$

$= 191 \ m/\min \ or \ 3.19 \ m/\sec$

u *Vehicle speed (average)* = *833.33 m/min*

The composite emission factor of NO_x for the Underpass was calculated from the sum of all NO_x emissions from different kinds of vehicles. Referring to Table E.1 of Appendix E, the total NO_2 emission is 2.87 g/vehkm.

∴ Total NO_2 Emission Rate (based on 1750 v/h moving vehicles) =

g/vkm * v/h *tunnel length* NO_2 Conversion factor (1) /seconds/hour
=2.87*1730*0.130*0.125/3600

= 0.0224 g/s

(1) 12.5% including tailpipe NO_2 emission (taken as 7.5% of NO_x) plus 5% NO_2/NO_x for tunnel air

Total NO_2 emission from stationary vehicles:

Congested Traffic Conditions

Worst case conditions were simulated with the tunnel congested with vehicles in one direction and vehicles in the congested underpass were stationary with engine idling. Idle emission rates were estimated using data provided by EPD.

Assuming 95% of the length of the underpass will be filled with vehicles of an average length of 4.0 m, therefore, number of vehicles in the tunnel

$$= \frac{130 \times 0.95}{4.0}$$

≅31

Calculation of Idling emission

The % of vehicles of the Underpass is shown as following table :

Direction	Flow	P.V.	G.V.	Bus
WB	1730	55	45	0
EB	2750	58	42	0

According to the previous EIA study, the following idling emissions for different kinds of vehicles were approved by EPD:

NOx Emission	P.V.	G.V.	Bus
(gv/s)	0.0125	0.0333	0.0333

Therefore, the composite idling emission factor for NO_x

= 55%*0.0125 + 45%*0.0333 + 0%*0.0333

= 0.02186 g/vs (the higher one)

Emissions are: Idling emission (g/vs)*vehicles in tunnel (v)*NOx/NO2 conversion

= 0.02186*12.5%*31

=0.00273*31 = 0.085 g/s NO_2

TOTAL EMISSIONS IN TUNNEL = 0.085+0.0224 = 0.1074 g/s

Therefore maximum in-tunnel concentration will be:

$$= \frac{\textit{emission rate}}{\textit{traffic induced air draught volume}} + \textit{background pollutant level}$$

$$= \frac{\textit{emission rate}}{\textit{induced air draught} \times \textit{tunnel cross-sectional area}} + \textit{background pollutant level}$$

$$= \frac{0.1074}{3.19 \times 92.37} + 60*10^{-6}$$

$$= 424\ \mu gm^{-3}$$

APPENDIX C

SAMPLE MODEL INPUT AND OUTPUT FILES

SAMPLE MODEL INPUT FILE

```
"Study of Salisbury Road Underpass, Year 2011, link1-50"
4Nitrogen Dioxide
  200.0000   1.0000      .0000      .0000   1 50   1.0000  0  0 0
835880.0  817275.0  2.2
  1  835479.1   817470.9   835514.2   817298.1   0.0  14.4     0.00     0.00   0
  1  835514.0   817286.6   835631.0   817309.3   0.0  16.0     0.00     0.00   0
  1  835520.3   817275.6   835642.5   817293.5   0.0  13.0     0.00     0.00   0
  1  835487.1   817470.2   835583.6   817482.5   0.0  12.8     0.00     0.00   0
  1  835577.1   817484.4   835565.4   817523.4   0.0  16.0     0.00     0.00   0
  1  835589.2   817486.3   835576.0   817528.0   0.0  16.0     0.00     0.00   0
  1  835579.9   817477.7   835605.7   817376.4   0.0  12.8     0.00     0.00   0
  1  835607.1   817376.6   835621.0   817319.7   0.0  19.0     0.00     0.00   0
  1  835591.7   817479.1   835616.7   817394.0   0.0  19.5     0.00     0.00   0
  1  835617.1   817393.4   835634.4   817323.0   0.0  12.8     0.00     0.00   0
  1  835624.3   817394.9   835688.1   817402.7   0.0  19.0     0.00     0.00   0
  1  835583.6   817482.8   835679.9   817493.9   0.0  12.8     0.00     0.00   0
  1  835629.8   817308.8   835696.3   817314.0   0.0  16.0     0.00     0.00   0
  1  835642.0   817294.1   835803.0   817305.0   0.0  20.9     0.00     0.00   0
  1  835803.0   817305.0   835889.5   817310.9   0.0  19.5     0.00     0.00   0
  1  835696.8   817314.0   835802.5   817320.6   0.0  17.6     0.00     0.00   0
  1  835679.7   817485.9   835688.0   817412.5   0.0  12.8     0.00     0.00   0
  1  835690.3   817393.4   835694.9   817321.1   0.0  12.8     0.00     0.00   0
  1  835688.3   817402.4   835782.1   817408.7   0.0  16.0     0.00     0.00   0
  1  835795.1   817499.0   835800.4   817411.0   0.0  16.0     0.00     0.00   0
  1  835800.4   817410.7   835807.3   817330.2   0.0  16.0     0.00     0.00   0
  1  835789.3   817409.5   835795.7   817330.0   0.0  14.4     0.00     0.00   0
  1  835784.2   817498.4   835789.2   817410.0   0.0  16.0     0.00     0.00   0
  1  835802.3   817320.5   835889.4   817325.9   0.0  19.3     0.00     0.00   0
  1  835888.5   817330.0   835932.7   817335.0   0.0  12.7     0.00     0.00   0
  1  835933.0   817335.2   836030.9   817358.2   0.0  12.7     0.00     0.00   0
  1  836030.8   817358.5   836096.5   817386.4   0.0  12.7     0.00     0.00   0
  1  835889.7   817306.0   835957.9   817311.7   0.0  12.7     0.00     0.00   0
  1  835810.3   817410.3   835919.0   817412.9   0.0  14.4     0.00     0.00   0
  1  835919.2   817413.3   835930.9   817341.3   0.0  14.4     0.00     0.00   0
  1  835679.9   817494.0   835788.6   817505.2   0.0  12.8     0.00     0.00   0
  1  836097.8   817386.7   836276.1   817515.5   0.0  12.7     0.00     0.00   0
  1  836104.9   817362.2   836209.0   817428.0   0.0  12.7     0.00     0.00   0
  1  836209.0   817428.0   836298.4   817506.9   0.0  12.7     0.00     0.00   0
  1  836092.9   817392.5   836099.8   817442.8   0.0  16.0     0.00     0.00   0
  1  836105.3   817395.8   836112.1   817444.5   0.0  16.0     0.00     0.00   0
  1  836279.2   817513.6   836393.5   817616.8   0.0  19.5     0.00     0.00   0
  1  836296.3   817509.3   836404.6   817604.3   0.0  16.0     0.00     0.00   0
  1  836424.4   817655.6   836392.9   817690.2   0.0  12.8     0.00     0.00   0
  1  836430.7   817661.4   836399.5   817695.4   0.0  12.8     0.00     0.00   0
  1  835957.1   817309.1   836039.0   817333.0   0.0  12.7     0.00     0.00   0
  1  836039.3   817333.3   836104.3   817361.4   0.0  12.7     0.00     0.00   0
  1  836394.1   817617.4   836548.8   817750.9   0.0  16.0     0.00     0.00   0
  1  836404.6   817606.2   836557.6   817742.2   0.0  16.0     0.00     0.00   0
  2  835889.3   817322.3   835954.3   817329.9  -1.7   6.7     0.00     0.00   0
  2  835953.7   817329.3   836033.2   817350.1  -5.1   6.7     0.00     0.00   0
  2  836148.8   817408.2   836280.2   817511.2  -3.4   6.7     0.00     0.00   0
  2  835889.7   817314.1   835956.0   817322.2  -1.7   6.7     0.00     0.00   0
  2  835954.9   817320.5   836036.3   817342.4  -5.1   6.7     0.00     0.00   0
  2  836153.6   817400.0   836294.2   817510.4  -3.4   6.7     0.00     0.00   0
11111NO2
750
2860
1950
860
2040
600
1380
1900
1680
840
1460
1000
2960
3110
2450
3180
660
220
575
870
780
420
510
3320
570
1280
1280
```

720
710
710
1080
400
420
420
400
730
3150
2150
770
1290
720
720
3150
2150
2750
2750
2750
1730
1730
1730
0.86
0.82
0.83
0.8
0.83
0.83
0.88
0.82
0.82
0.82
0.73
0.8
0.95
0.86
0.96
0.95
0.74
0.66
0.73
1.13
1.25
2.05
1.58
0.91
1.01
0.8
0.8
1.07
0.62
0.62
0.84
0.65
1.07
1.07
1.15
1.25
0.85
0.75
0.62
0.66
0.99
0.99
0.85
0.75
0.88
0.88
0.88
0.92
0.92
0.92
0.0 1.0 6 500.0 18.0 0.0 25.00

SAMPLE MODEL OUTPUT FILE

```
            CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                     JUNE 1989 VERSION
                     PAGE   1

"                JOB: ""Study of Salisbury Road Underpass, Year"
                 RUN: NO2
          POLLUTANT: Nitrogen Dioxide
          (NOTE: OUTPUT IN MICRO-GRAMS/METER**3. IGNORE PPM LABEL)

    I.  SITE VARIABLES

          U=   1.0 M/S              Z0= 200. CM              ALT=     0. (M)
        BRG=    .0 DEGREES          VD=   .0 CM/S
       CLAS=     6 (F)              VS=   .0 CM/S
       MIXH=  500. M                AMB=  .0 PPM
      SIGTH=   18. DEGREES          TEMP= 25.0 DEGREE (C)


   II.  LINK VARIABLES

        LINK          *  LINK COORDINATES (M)    *                    EF      H      W
     DESCRIPTION      *   X1     Y1     X2     Y2  * TYPE  VPH    (G/MI)   (M)    (M)
 -----------------*-------------------------------*-------------------------------------
  AA. LINK AA      * ***** ***** ***** ***** *  AG     750     .9      .0   14.4
  AB. LINK AB      * ***** ***** ***** ***** *  AG    2860     .8      .0   16.0
  AC. LINK AC      * ***** ***** ***** ***** *  AG    1950     .8      .0   13.0
  AD. LINK AD      * ***** ***** ***** ***** *  AG     860     .8      .0   12.8
  AE. LINK AE      * ***** ***** ***** ***** *  AG    2040     .8      .0   16.0
  AF. LINK AF      * ***** ***** ***** ***** *  AG     600     .8      .0   16.0
  AG. LINK AG      * ***** ***** ***** ***** *  AG    1380     .9      .0   12.8
  AH. LINK AH      * ***** ***** ***** ***** *  AG    1900     .8      .0   19.0
  AI. LINK AI      * ***** ***** ***** ***** *  AG    1680     .8      .0   19.5
  AJ. LINK AJ      * ***** ***** ***** ***** *  AG     840     .8      .0   12.8
  AK. LINK AK      * ***** ***** ***** ***** *  AG    1460     .7      .0   19.0
  AL. LINK AL      * ***** ***** ***** ***** *  AG    1000     .8      .0   12.8
  AM. LINK AM      * ***** ***** ***** ***** *  AG    2960     .9      .0   16.0
  AN. LINK AN      * ***** ***** ***** ***** *  AG    3110     .9      .0   20.9
  AO. LINK AO      * ***** ***** ***** ***** *  AG    2450    1.0      .0   19.5
  AP. LINK AP      * ***** ***** ***** ***** *  AG    3180     .9      .0   17.6
  AQ. LINK AQ      * ***** ***** ***** ***** *  AG     660     .7      .0   12.8
  AR. LINK AR      * ***** ***** ***** ***** *  AG     220     .7      .0   12.8
  AS. LINK AS      * ***** ***** ***** ***** *  AG     575     .7      .0   16.0
  AT. LINK AT      * ***** ***** ***** ***** *  AG     870    1.1      .0   16.0
  AU. LINK AU      * ***** ***** ***** ***** *  AG     780    1.3      .0   16.0
  AV. LINK AV      * ***** ***** ***** ***** *  AG     420    2.0      .0   14.4
  AW. LINK AW      * ***** ***** ***** ***** *  AG     510    1.6      .0   16.0
  AX. LINK AX      * ***** ***** ***** ***** *  AG    3320     .9      .0   19.3
  AY. LINK AY      * ***** ***** ***** ***** *  AG     570    1.0      .0   12.7
  AZ. LINK AZ      * ***** ***** ***** ***** *  AG    1280     .8      .0   12.7
  BA. LINK BA      * ***** ***** ***** ***** *  AG    1280     .8      .0   12.7
  BB. LINK BB      * ***** ***** ***** ***** *  AG     720    1.1      .0   12.7
  BC. LINK BC      * ***** ***** ***** ***** *  AG     710     .6      .0   14.4
  BD. LINK BD      * ***** ***** ***** ***** *  AG     710     .6      .0   14.4
  BE. LINK BE      * ***** ***** ***** ***** *  AG    1080     .8      .0   12.8
  BF. LINK BF      * ***** ***** ***** ***** *  AG     400     .6      .0   12.7
  BG. LINK BG      * ***** ***** ***** ***** *  AG     420    1.1      .0   12.7
  BH. LINK BH      * ***** ***** ***** ***** *  AG     420    1.1      .0   12.7
  BI. LINK BI      * ***** ***** ***** ***** *  AG     400    1.1      .0   16.0
  BJ. LINK BJ      * ***** ***** ***** ***** *  AG     730    1.3      .0   16.0
  BK. LINK BK      * ***** ***** ***** ***** *  AG    3150     .9      .0   19.5
  BL. LINK BL      * ***** ***** ***** ***** *  AG    2150     .8      .0   16.0
  BM. LINK BM      * ***** ***** ***** ***** *  AG     770     .6      .0   12.8
  BN. LINK BN      * ***** ***** ***** ***** *  AG    1290     .7      .0   12.8
  BO. LINK BO      * ***** ***** ***** ***** *  AG     720    1.0      .0   12.7
  BP. LINK BP      * ***** ***** ***** ***** *  AG     720    1.0      .0   12.7
  BQ. LINK BQ      * ***** ***** ***** ***** *  AG    3150     .9      .0   16.0
  BR. LINK BR      * ***** ***** ***** ***** *  AG    2150     .8      .0   16.0
  BS. LINK BS      * ***** ***** ***** ***** *  DP    2750     .9    -1.7    6.7
  BT. LINK BT      * ***** ***** ***** ***** *  DP    2750     .9    -5.1    6.7
  BU. LINK BU      * ***** ***** ***** ***** *  DP    2750     .9    -3.4    6.7
  BV. LINK BV      * ***** ***** ***** ***** *  DP    1730     .9    -1.7    6.7
  BW. LINK BW      * ***** ***** ***** ***** *  DP    1730     .9    -5.1    6.7
  BX. LINK BX      * ***** ***** ***** ***** *  DP    1730     .9    -3.4    6.7


  III.  RECEPTOR LOCATIONS

              *    COORDINATES (M)
    RECEPTOR  *    X       Y       Z
 -------------*---------------------
   1. RECPT   1 * 835880 817275   2.2
```

IV. MODEL RESULTS (PRED. CONC. INCLUDES AMB.)

RECEPTOR	* PRED CONC (PPM) *	CONC/LINK (PPM) AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1. RECPT 1	* 95.4 *	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

1

RUN ENDED ON AT

SAMPLE MODEL OUTPUT FILE

```
CO STARTING

"CO TITLEONE Salisbury Road, Underpass portals emission"
CO MODELOPT  CONC  URBAN GRDRIS NOSTD
CO AVERTIME 1
CO POLLUTID NO2
CO DCAYCOEF 0.0
CO TERRHGTS ELEV
CO FLAGPOLE 0.0
CO RUNORNOT RUN
CO ERRORFIL ERRORS.OUT
CO FINISHED

SO STARTING

**Source Location Cards:

**       SRCID  SRCTYP   XS        YS        ZS

SO LOCATION 1 VOLUME  836151.7000  817409.2000  5.0000
SO LOCATION 2 VOLUME  836157.1000  817413.7000  5.0000
SO LOCATION 3 VOLUME  836162.5000  817418.2000  5.0000
SO LOCATION 4 VOLUME  836167.8000  817422.7000  5.0000
SO LOCATION 5 VOLUME  836173.2000  817427.1000  5.0000
SO LOCATION 6 VOLUME  836178.6000  817431.6000  5.0000
SO LOCATION 7 VOLUME  836184.0000  817436.1000  5.0000
SO LOCATION 8 VOLUME  836189.4000  817440.6000  5.0000
SO LOCATION 9 VOLUME  836194.8000  817445.0000  5.0000
SO LOCATION 10 VOLUME  836200.1000  817449.5000  5.0000
SO LOCATION 11 VOLUME  836205.5000  817454.0000  5.0000
SO LOCATION 12 VOLUME  836210.9000  817458.4000  5.0000
SO LOCATION 13 VOLUME  836216.3000  817462.9000  5.0000
SO LOCATION 14 VOLUME  836221.7000  817467.4000  5.0000
SO LOCATION 15 VOLUME  836033.6000  817341.2000  5.0000
SO LOCATION 16 VOLUME  836026.8000  817339.5000  5.0000
SO LOCATION 17 VOLUME  836020.0000  817337.8000  5.0000
SO LOCATION 18 VOLUME  836013.2000  817336.1000  5.0000
SO LOCATION 19 VOLUME  836006.4000  817334.4000  5.0000
SO LOCATION 20 VOLUME  835999.6000  817332.7000  5.0000
SO LOCATION 21 VOLUME  835992.9000  817331.0000  5.0000
SO LOCATION 22 VOLUME  835986.1000  817329.3000  5.0000
SO LOCATION 23 VOLUME  835979.3000  817327.6000  5.0000
SO LOCATION 24 VOLUME  835972.5000  817325.9000  5.0000
SO LOCATION 25 VOLUME  835965.7000  817324.2000  5.0000
SO LOCATION 26 VOLUME  835958.9000  817322.5000  5.0000
SO LOCATION 27 VOLUME  835952.1000  817320.8000  5.0000
SO LOCATION 28 VOLUME  835945.3000  817319.1000  5.0000

**Source Parameter Cards:

**Volume: SRCID   QS    HS   SYINT   SZINT

SO SRCPARAM  1  0.005202  5.000 3.2558 4.6512
SO SRCPARAM  2  0.005202  5.000 3.2558 4.6512
SO SRCPARAM  4  0.005202  5.000 3.2558 4.6512
SO SRCPARAM  5  0.005202  5.000 3.2558 4.6512
SO SRCPARAM  6  0.005202  5.000 3.2558 4.6512
SO SRCPARAM  7  0.005202  5.000 3.2558 4.6512
SO SRCPARAM  8  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  9  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  10  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  11  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  12  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  13  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  14  0.002601  5.000 3.2558 4.6512
SO SRCPARAM  15  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  16  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  17  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  18  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  19  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  20  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  21  0.003391  5.000 3.2558 4.6512
SO SRCPARAM  22  0.001696  5.000 3.2558 4.6512
SO SRCPARAM  23  0.001696  5.000 3.2558 4.6512
SO SRCPARAM  24  0.001696  5.000 3.2558 4.6512
SO SRCPARAM  25  0.001696  5.000 3.2558 4.6512
SO SRCPARAM  26  0.001696  5.000 3.2558 4.6512
SO SRCPARAM  27  0.001696  5.000 3.2558 4.6512
SO SRCPARAM  28  0.001696  5.000 3.2558 4.6512

SO CONCUNIT 1.0E6 GRAMS/SEC MICROGRAMS/M**3
```

```
SO DEPOUNIT 1.0E6 GRAMS/SEC MICROGRAMS/M**3
SO SRCGROUP ALL
SO FINISHED

RE STARTING
**13TH RECEPTOR
RE DISCCART 835880.0  817275.0  0.000000  2.2
RE FINISHED

ME STARTING
ME INPUTFIL ARW93P.BIN UNFORM
ME ANEMHGHT 10.000 METERS
ME SURFDATA 99999 1993  ARW93P
ME UAIRDATA 99999 1993  RO93
ME FINISHED

OU STARTING
OU RECTABLE 1 FIRST
OU POSTFILE 1 ALL PLOT T_ISC.PLT
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

" *** ISCST3 - VERSION 95250 ***    *** Salisbury Road, Underpass portals emission
      ***        05/15/98"
                                           ***

     ***        09:15:12

                PAGE   1
**MODELOPTs: CONC                        URBAN  ELEV   FLGPOL        GRDRIS NOSTD

                                                ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - -

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses URBAN Dispersion.

**Model Uses User-Specified Options:
          1. Gradual Plume Rise.
          2. Not Use Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR

**This Run Includes:   28 Source(s);      1 Source Group(s); and      1 Receptor(s)

**The Model Assumes A Pollutant Type of:  NO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs External File(s) of Concurrent Values for Postprocessing (POSTFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.00 ;    Decay Coef. =   0.0000      ;   Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                 ;  Emission Rate Unit
Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Input Runstream File: T_ISC.DAT                                ;  **Output Print File: T_ISC.LST
```

**MODELOPTs: CONC URBAN ELEV FLGPOL GRDRIS NOSTD

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
1	0	0.52020E-02	836151.7	817409.2	5.0	5.00	3.26	4.65	
2	0	0.52020E-02	836157.1	817413.7	5.0	5.00	3.26	4.65	
3	0	0.52020E-02	836162.5	817418.2	5.0	5.00	3.26	4.65	
4	0	0.52020E-02	836167.8	817422.7	5.0	5.00	3.26	4.65	
5	0	0.52020E-02	836173.2	817427.1	5.0	5.00	3.26	4.65	
6	0	0.52020E-02	836178.6	817431.6	5.0	5.00	3.26	4.65	
7	0	0.52020E-02	836184.0	817436.1	5.0	5.00	3.26	4.65	
8	0	0.26010E-02	836189.4	817440.6	5.0	5.00	3.26	4.65	
9	0	0.26010E-02	836194.8	817445.0	5.0	5.00	3.26	4.65	
10	0	0.26010E-02	836200.1	817449.5	5.0	5.00	3.26	4.65	
11	0	0.26010E-02	836205.5	817454.0	5.0	5.00	3.26	4.65	
12	0	0.26010E-02	836210.9	817458.4	5.0	5.00	3.26	4.65	
13	0	0.26010E-02	836216.3	817462.9	5.0	5.00	3.26	4.65	
14	0	0.26010E-02	836221.7	817467.4	5.0	5.00	3.26	4.65	
15	0	0.33910E-02	836033.6	817341.2	5.0	5.00	3.26	4.65	
16	0	0.33910E-02	836026.8	817339.5	5.0	5.00	3.26	4.65	
17	0	0.33910E-02	836020.0	817337.8	5.0	5.00	3.26	4.65	
18	0	0.33910E-02	836013.2	817336.1	5.0	5.00	3.26	4.65	
19	0	0.33910E-02	836006.4	817334.4	5.0	5.00	3.26	4.65	
20	0	0.33910E-02	835999.6	817332.7	5.0	5.00	3.26	4.65	
21	0	0.33910E-02	835992.9	817331.0	5.0	5.00	3.26	4.65	
22	0	0.16960E-02	835986.1	817329.3	5.0	5.00	3.26	4.65	
23	0	0.16960E-02	835979.3	817327.6	5.0	5.00	3.26	4.65	
24	0	0.16960E-02	835972.5	817325.9	5.0	5.00	3.26	4.65	
25	0	0.16960E-02	835965.7	817324.2	5.0	5.00	3.26	4.65	
26	0	0.16960E-02	835958.9	817322.5	5.0	5.00	3.26	4.65	
27	0	0.16960E-02	835952.1	817320.8	5.0	5.00	3.26	4.65	
28	0	0.16960E-02	835945.3	817319.1	5.0	5.00	3.26	4.65	

**MODELOPTs: CONC URBAN ELEV FLGPOL GRDRIS NOSTD

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,
	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28,

```
*** ISCST3 - VERSION 95250 ***     *** Salisbury Road, Underpass portals emission
    ***         05/15/98"
                                   ***
    ***         09:15:12

                PAGE   4
**MODELOPTs: CONC                         URBAN  ELEV   FLGPOL        GRDRIS NOSTD

                                            *** DISCRETE CARTESIAN RECEPTORS ***
"                                              (X-COORD, Y-COORD, ZELEV, ZFLAG)"
                                                          (METERS)

"   ( 835880.0,  817275.0,         0.0,        2.2);      "
"*** ISCST3 - VERSION 95250 ***    *** Salisbury Road, Underpass portals emission
    ***         05/15/98"
                                   ***
    ***         09:15:12

                PAGE   5
**MODELOPTs: CONC                         URBAN  ELEV   FLGPOL        GRDRIS NOSTD

                                          *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                              (1=YES; 0=NO)

           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1
1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1

               NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN
THE DATA FILE.

                                 *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                       (METERS/SEC)

"                                               1.54,    3.09,    5.14,    8.23,   10.80,"


                                              *** WIND PROFILE EXPONENTS ***
```

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.15000E+00	. .15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

```
                                       *** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
                                                  (DEGREES KELVIN PER METER)
```

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01

```
                F          .35000E-01     .35000E-01     .35000E-01     .35000E-01     .35000E-01
 .35000E-01
"*** ISCST3 - VERSION 95250 ***     *** Salisbury Road, Underpass portals emission
     ***         05/15/98"
                                    ***
     ***         09:15:12

                PAGE   6
**MODELOPTs: CONC                          URBAN  ELEV   FLGPOL        GRDRIS NOSTD

                *** THE FIRST  24 HOURS OF METEOROLOGICAL DATA ***

           FILE: ARW93P.BIN                                  FORMAT: UNFORM

           SURFACE STATION NO.:  99999                       UPPER AIR STATION NO.:  99999
                         NAME: ARW93P                                      NAME: RO93

                         YEAR:   1993                                      YEAR:   1993

                                                FLOW    SPEED   TEMP     STAB    MIXING HEIGHT (M)     USTAR  M-O
LENGTH   Z-0 IPCODE PRATE
           YEAR  MONTH  DAY  HOUR    VECTOR    (M/S)    (K)     CLASS    RURAL     URBAN      (M/S)
(M)        (M)        (mm/HR)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

           93     1     1     1      301.0    1.03    289.3      6        766.8     682.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1     2      178.0    1.00    289.8      6        781.9     682.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1     3      314.0    3.09    289.3      5        797.0     682.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1     4      263.0    2.57    289.3      5        812.1     682.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1     5      263.0    1.54    288.7      6        827.2     682.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1     6      322.0    2.57    288.7      5        842.3     682.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1     7        5.0    1.00    289.3      4         83.1     706.3      0.0000
 0.0  0.0000   0   0.00
           93     1     1     8      303.0    3.60    290.4      4        208.8     742.9      0.0000
 0.0  0.0000   0   0.00
           93     1     1     9      277.0    5.66    292.0      4        334.5     779.6      0.0000
 0.0  0.0000   0   0.00
           93     1     1    10      291.0    6.17    293.2      4        460.2     816.3      0.0000
 0.0  0.0000   0   0.00
           93     1     1    11      284.0    4.63    294.3      3        585.9     853.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1    12      276.0    4.63    293.7      3        711.6     889.6      0.0000
 0.0  0.0000   0   0.00
           93     1     1    13      313.0    6.17    293.7      4        837.3     926.3      0.0000
 0.0  0.0000   0   0.00
           93     1     1    14      319.0    5.66    293.2      4        963.0     963.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1    15      282.0    4.12    293.7      3        963.0     963.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1    16      324.0    5.14    292.6      4        963.0     963.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1    17      301.0    3.09    291.5      5        962.9     962.7      0.0000
 0.0  0.0000   0   0.00
           93     1     1    18      277.0    2.57    290.9      6        945.4     862.1      0.0000
 0.0  0.0000   0   0.00
           93     1     1    19      324.0    1.03    289.8      7        927.8     761.6      0.0000
 0.0  0.0000   0   0.00
           93     1     1    20      337.0    2.06    290.9      6        910.2     661.1      0.0000
 0.0  0.0000   0   0.00
           93     1     1    21      360.0    1.00    289.8      7        892.7     560.6      0.0000
 0.0  0.0000   0   0.00
           93     1     1    22      302.0    1.00    290.9      7        875.1     460.0      0.0000
 0.0  0.0000   0   0.00
           93     1     1    23      320.0    1.00    290.4      7        857.5     359.5      0.0000
 0.0  0.0000   0   0.00
           93     1     1    24      310.0    1.03    288.7      7        840.0     259.0      0.0000
 0.0  0.0000   0   0.00


"*** NOTES:  STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F."
           FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.
"*** ISCST3 - VERSION 95250 ***     *** Salisbury Road, Underpass portals emission
     ***         05/15/98"
                                    ***
     ***         09:15:12

                PAGE   7
```

```
**MODELOPTs: CONC                    URBAN  ELEV   FLGPOL       GRDRIS NOSTD

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE
GROUP:  ALL      ***
"                                  INCLUDING SOURCE(S):      1       , 2       , 3       , 4       , 5
     , 6       , 7       , "
"         8       , 9       , 10      , 11      , 12      , 13      , 14      , 15      , 16      ,
17       , 18      , 19      , "
"         20      , 21      , 22      , 23      , 24      , 25      , 26      , 27      , 28      , "

                                        *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                     ** CONC OF NO2      IN MICROGRAMS/M**3
**

     X-COORD (M)  Y-COORD (M)        CONC      (YYMMDDHH)              X-COORD (M)  Y-COORD (M)
CONC      (YYMMDDHH)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -
       835880.00    817275.00       52.08356  (93011420)
"*** ISCST3 - VERSION 95250 ***    *** Salisbury Road, Underpass portals emission
     ***        05/15/98"
                                   ***
     ***        09:15:12

                PAGE   8
**MODELOPTs: CONC                    URBAN  ELEV   FLGPOL       GRDRIS NOSTD

                                          *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***

                                     ** CONC OF NO2      IN MICROGRAMS/M**3
**

                                                    DATE
               NETWORK
"GROUP ID                          AVERAGE CONC     (YYMMDDHH)              RECEPTOR  (XR, YR, ZELEV,
ZFLAG)     OF TYPE  GRID-ID"
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

"ALL       HIGH  1ST HIGH VALUE IS      52.08356  ON 93011420: AT (  835880.00,   817275.00,
0.00,       2.20)  DC       NA    "


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY
"*** ISCST3 - VERSION 95250 ***    *** Salisbury Road, Underpass portals emission
     ***        05/15/98"
                                   ***
     ***        09:15:12

                PAGE   9
**MODELOPTs: CONC                    URBAN  ELEV   FLGPOL       GRDRIS NOSTD

*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            0 Warning Message(s)
A Total of           59 Informational Message(s)

A Total of           59 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
              *** NONE ***
    ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

APPENDIX D

TRAFFIC FLOW DATA - YEAR 2011

Table D.1 2011 Traffic Flow Data

Road	Direction	Location	Flow	Percentage of Vehicles							
				Motor Cycle	Petrol Car	Diesel Taxi	Light Goods Petrol	Light Goods Diesel	HGV Diesel	Public Bus	Private Bus
Salisbury Road	WB	East of Underpass	2150	3	48	15	2	11	16	2	2
Salisbury Road	WB	Adjacent to Underpass	420	3	43	13	2	6	8	2	23
Salisbury Road	WB	Chatjam Rd-Nathan Rd	720	2	41	13	2	8	12	2	20
Salisbury Road	WB	Nathan Rd-Kowloon Park Dr	3110	3	46	14	2	11	17	2	8
Salisbury Road	WB	Kowloon Park Dr-Canton Rd	1980	3	48	15	2	9	13	2	8
Salisbury Road	WB	West of Canton Rd	1330	2	42	13	2	15	22	2	0
Salisbury Road	EB	West of Canton Rd	2510	3	46	14	2	9	13	2	10
Salisbury Road	EB	Canton Rd-Kowloon Park Dr	2860	3	47	14	2	10	15	2	6
Salisbury Road	EB	Kowloon Park Dr-Hankow Rd	2960	3	43	13	2	11	17	2	12
Salisbury Road	EB	Hankow Rd-Nathan Rd	3180	3	43	13	2	11	17	2	12
Salisbury Road	EB	Nathan Rd-Middle Rd	570	3	44	14	2	6	9	2	20
Salisbury Road	EB	Middle Rd-Chatham Rd	1280	3	44	14	2	6	9	2	20
Salisbury Road	EB	Adjacent to Underpass	400	3	44	14	2	12	18	2	5
Salisbury Road	EB	East of Underpass	3150	3	44	14	2	12	18	2	5
Underpass	WB		1730	2	37	12	2	18	27	2	0
Underpass	EB		2750	2	39	12	2	17	25	2	0
Mody Lane	NB	Mody Rd-Salisbury Rd	770	3	54	17	2	8	12	2	0
Mody Lane	SB	Mody Rd-Salisbury Rd	1290	3	52	16	2	9	14	2	0
Chatham Rd S	NB	Salisbury Rd-Mody Rd	400	2	38	12	2	8	13	2	23
Chatham Rd S	SB	Salisbury Rd-Mody Rd	730	2	34	11	2	10	15	2	25
Nathan Rd	NB	Salisbury Rd-Middle Rd	420	1	12	4	1	7	10	1	65
Nathan Rd	SB	Salisbury Rd-Middle Rd	780	2	34	11	2	10	15	2	25
Hankow Rd	SB	Salisbury Rd-Middle Rd	220	3	54	17	2	7	10	2	3
Kowloon Park Dr	NB	Salisbury Rd-Middle Rd	1900	3	43	13	2	13	19	2	5
Kowloon Park Dr	SB	Salisbury Rd-Middle Rd	840	3	44	14	2	13	20	2	2
Canton Rd	SB		750	2	41	13	2	16	24	2	0
D1 Slip Rd	NB		920	3	51	16	2	6	9	2	10
Peking Rd	EB	Canton Rd-Kowloon Park Dr.	860	3	44	14	2	14	21	2	0
Kowloon Park Dr	NB	Peking Rd-Haiphong Rd	2040	3	44	14	2	13	19	2	3
Kowloon Park Dr	SB	Peking Rd-Haiphong Rd	600	3	48	15	2	9	13	2	8
Kowloon Park Dr	NB	Peking Rd-Middle Rd	1380	3	43	13	2	13	19	2	5
Kowloon Park Dr	SB	Peking Rd-Middle Rd	1680	3	44	14	2	13	20	2	2
Middle Rd	EB	Kowloon Park Dr-Hankow Rd	1460	3	50	15	2	10	15	2	2
Peking Rd	WB	Kowloon Park Dr-Hankow Rd	1000	3	44	14	2	14	21	2	0
Hankow Rd	NB	Peking Rd-Middle Rd	660	3	48	15	2	12	18	2	0
Middle Rd	EB	Hankow Rd-Nathan Rd	575	3	50	15	2	10	15	2	2
Nathan Rd	SB	Peking Rd-Middle Rd	870	2	37	12	2	10	15	2	20
Nathan Rd	NB	Peking Rd-Middle Rd	510	1	24	7	1	10	15	1	40
Middle Rd	SB		710	3	44	14	2	6	9	2	20
Peking Rd	WB	Nathan Rd-Hankow Rd	1080	3	44	14	2	14	21	2	0

APPENDIX E

VEHICLE EMISSION FACTORS

Table E.1 Fleet Average Emission Factors - EURO2 Model provided by EPD for Year 2011

	Motor Cycle	Petrol Car	Diesel Taxi	Light Goods Petrol	Light Goods Diesel	HGV Diesel	Public Bus	Private Bus
Emission of NO_x (g veh/km)	0.55	0.9	1.45	1.42	1.71	7	8.21	6.94

Table E.2 Nitrogen Dioxide Emissions from Different Kinds of Vehicles

			NO_x Emission								Emmission (g/vehkm)	
Road	Direction	Location	Motor Cycle	Petrol Car	Diesel Taxi	Light Goods Petrol	Light Goods Diesel	HGV Diesel	Public Bus	Private Bus	2011 NO_x	2011 NO_2
Salisbury Road	WB	East of Underpass	1.562	43.452	21.620	3.025	18.468	113.400	17.487	13.880	2.329	0.466
Salisbury Road	WB	Adjacent to Underpass	1.386	38.556	19.184	2.684	9.576	58.800	15.517	159.620	3.053	0.611
Salisbury Road	WB	Chatjam Rd-Nathan Rd	1.320	36.720	18.270	2.556	13.680	84.000	14.778	138.800	3.101	0.620
Salisbury Road	WB	Nathan Rd-Kowloon Park Dr	1.474	41.004	20.402	2.854	19.152	117.600	16.502	55.520	2.745	0.549
Salisbury Road	WB	Kowloon Park Dr-Canton Rd	1.540	42.840	21.315	2.982	15.048	92.400	17.241	55.520	2.489	0.498
Salisbury Road	WB	West of Canton Rd	1.364	37.944	18.879	2.641	25.308	155.400	15.271	0.000	2.568	0.514
Salisbury Road	EB	West of Canton Rd	1.496	41.616	20.706	2.897	15.048	92.400	16.748	69.400	2.603	0.521
Salisbury Road	EB	Canton Rd-Kowloon Park Dr	1.518	42.228	21.011	2.939	17.100	105.000	16.995	41.640	2.484	0.497
Salisbury Road	EB	Kowloon Park Dr-Hankow Rd	1.386	38.556	19.184	2.684	19.152	117.600	15.517	83.280	2.974	0.595
Salisbury Road	EB	Hankow Rd-Nathan Rd	1.386	38.556	19.184	2.684	19.152	117.600	15.517	83.280	2.974	0.595
Salisbury Road	EB	Nathan Rd-Middle Rd	1.430	39.780	19.793	2.769	10.260	63.000	16.010	138.800	2.918	0.584
Salisbury Road	EB	Middle Rd-Chatham Rd	1.430	39.780	19.793	2.769	10.260	63.000	16.010	138.800	2.918	0.584
Salisbury Road	EB	Adjacent to Underpass	1.430	39.780	19.793	2.769	20.520	126.000	16.010	34.700	2.610	0.522
Salisbury Road	EB	East of Underpass	1.430	39.780	19.793	2.769	20.520	126.000	16.010	34.700	2.610	0.522
Underpass	WB		1.210	33.660	16.748	2.343	30.780	189.000	13.547	0.000	2.873	0.575
Underpass	EB		1.276	35.496	17.661	2.471	28.728	176.400	14.285	0.000	2.763	0.553
Mody Lane	NB	Mody Rd-Salisbury Rd	1.760	48.960	24.360	3.408	13.680	84.000	19.704	0.000	1.959	0.392
Mody Lane	SB	Mody Rd-Salisbury Rd	1.694	47.124	23.447	3.280	15.732	96.600	18.965	0.000	2.068	0.414
Chatham Rd	NB	Salisbury Rd-Mody Rd	1.232	34.272	17.052	2.386	14.364	88.200	13.793	159.620	3.309	0.662
Chatham Rd	SB	Salisbury Rd-Mody Rd	1.100	30.600	15.225	2.130	17.100	105.000	12.315	173.500	3.570	0.714
Nathan Rd	NB	Salisbury Rd-Middle Rd	0.396	11.016	5.481	0.767	11.628	71.400	4.433	451.100	5.562	1.112
Nathan Rd	SB	Salisbury Rd-Middle Rd	1.100	30.600	15.225	2.130	17.100	105.000	12.315	173.500	3.570	0.714
Hankow Rd	SB	Salisbury Rd-Middle Rd	1.760	48.960	24.360	3.408	11.628	71.400	19.704	20.820	2.020	0.404
Kowloon Park Dr	NB	Salisbury Rd-Middle Rd	1.386	38.556	19.184	2.684	21.888	134.400	15.517	34.700	2.683	0.537
Kowloon Park Dr	SB	Salisbury Rd-Middle Rd	1.430	39.780	19.793	2.769	22.572	138.600	16.010	13.880	2.548	0.510
Canton Rd	SB		1.320	36.720	18.270	2.556	27.360	168.000	14.778	0.000	2.690	0.538
D1 Slip Rd	NB		1.650	45.900	22.838	3.195	10.260	63.000	18.473	69.400	2.347	0.469
Peking Rd	EB	Canton Rd-Kowloon Park Dr.	1.430	39.780	19.793	2.769	23.940	147.000	16.010	0.000	2.507	0.501
Kowloon Park Dr	NB	Peking Rd-	1.430	39.780	19.793	2.769	21.888	134.400	16.010	20.820	2.569	0.514
Kowloon Park Dr	SB	Peking Rd-	1.540	42.840	21.315	2.982	15.048	92.400	17.241	55.520	2.489	0.498
Kowloon Park Dr	NB	Peking Rd-Middle Rd	1.386	38.556	19.184	2.684	21.888	134.400	15.517	34.700	2.683	0.537
Kowloon Park Dr	SB	Peking Rd-Middle Rd	1.430	39.780	19.793	2.769	22.572	138.600	16.010	13.880	2.548	0.510
Middle Rd	EB	Kowloon Park Dr-Hankow Rd	1.606	44.676	22.229	3.110	17.100	105.000	17.980	13.880	2.256	0.451
Peking Rd	WB	Kowloon Park Dr-Hankow Rd	1.430	39.780	19.793	2.769	23.940	147.000	16.010	0.000	2.507	0.501
Hankow Rd	NB	Peking Rd-Middle Rd	1.540	42.840	21.315	2.982	20.520	126.000	17.241	0.000	2.324	0.465
Middle Rd	EB	Hankow Rd-Nathan Rd	1.606	44.676	22.229	3.110	17.100	105.000	17.980	13.880	2.256	0.451
Nathan Rd	SB	Peking Rd-Middle Rd	1.210	33.660	16.748	2.343	17.100	105.000	13.547	138.800	3.284	0.657
Nathan Rd	NB	Peking Rd-Middle Rd	0.770	21.420	10.658	1.491	17.100	105.000	8.621	277.600	4.427	0.885
Middle Rd	SB	Peking Rd-Middle Rd	1.430	39.780	19.793	2.769	10.260	63.000	16.010	138.800	2.918	0.584
Peking Rd	WB	Nathan Rd-Hankow Rd	1.430	39.780	19.793	2.769	23.940	147.000	16.010	0.000	2.507	0.501

Note:

NO_x concentration = % of vehicles x emission rate (g veh/km)

Total NO_x emission is the sum of all NOx concentration from different kinds of vehicles

Total NO_2 emission = 20 % of Total NO_x concentration

APPENDIX F

EXISTING TREES ASSESSMENT SCHEDULE

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

Job No : MCA41

Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
20	Phoenix roebelenii	0.1	2	1.5		*			*		4	Retain
21	Phoenix roebelenii	0.1	2	1.5		*			*		4	Retain
22	Phoenix roebelenii	0.1	2	1.5		*			*		4	Retain
23	Hibiscus tiliaceus	0.1	3	2		*			*		4	Retain
24	Hibiscus tiliaceus	0.3	6	6		*			*		4	Retain
25	Hibiscus tiliaceus	0.3	6	6		*			*		4	Retain
26	Hibiscus tiliaceus	0.3	6	6		*			*		4	Retain
27	Hibiscus tiliaceus	0.3	6	5		*			*		4	Transplant
28	Hibiscus tiliaceus	0.3	6	5		*			*		5	Transplant
29	Hibiscus tiliaceus	0.3	6	2		*			*		5	Transplant
30	Hibiscus tiliaceus	0.1	3	4		*			*		5	Transplant
31	Hibiscus tiliaceus	0.3	5	4		*			*		5	Transplant
32	Hibiscus tiliaceus	0.3	5	2		*			*		6	Transplant
33	Hibiscus tiliaceus	0.1	3	4		*			*		6	Transplant
34	Hibiscus tiliaceus	0.3	5	4		*			*		7	Transplant
35	Hibiscus tiliaceus	0.3	5	4		*			*		7	Transplant
36	Hibiscus tiliaceus	0.1	5	4		*			*		7	Transplant
37	Hibiscus tiliaceus	0.3	5	4		*			*		7	Transplant
38	Hibiscus tiliaceus	0.1	5	4		*			*		8	Transplant
39	Hibiscus tiliaceus	0.3	5	4		*			*		8	Transplant
40	Hibiscus tiliaceus	0.1	5	4		*			*		8	Transplant
41	Hibiscus tiliaceus	0.3	5	4		*			*		8	Transplant
42	Hibiscus tiliaceus	0.1	5	4		*			*		8	Transplant

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

Job No : MCA41

Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
43	Hibiscus tiliaceus	0.3	5	4.5		*			*		8	Transplant
44	Hibiscus tiliaceus	0.1	3.5	3		*			*		8	Transplant
45	Hibiscus tiliaceus	0.3	5	4.5		*			*		9	Transplant
46	Hibiscus tiliaceus	0.3	5	4.5		*			*		9	Transplant
47	Hibiscus tiliaceus	0.3	5	4.5		*			*		9	Transplant
48	Hibiscus tiliaceus	0.3	5	4.5		*			*		10	Transplant
49	Hibiscus tiliaceus	0.35	5	4.5		*			*		10	Transplant
50	Hibiscus tiliaceus	0.35	5	4.5		*			*		10	Transplant
51	Hibiscus tiliaceus	0.32	5	4.5		*			*		10	Transplant
52	Hibiscus tiliaceus	0.3	5	4.5		*			*		10	Transplant
53	Hibiscus tiliaceus	0.3	5	4.5		*			*		10	Transplant
54	Phoenix roebelenii	0.1	2	1		*			*		-	Transplant
55	Phoenix roebelenii	0.1	2	1		*			*		-	Transplant
56	Phoenix roebelenii	0.1	2	1		*			*		-	Transplant
57	Phoenix roebelenii	0.1	2	1.5		*			*		-	Transplant
58	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
59	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
60	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
61	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
62	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
63	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
64	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
65	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

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Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
66	Phoenix roebelenii	0.1	2	1.5		*			*		8	Transplant
67	Phoenix roebelenii	0.1	2	1.5		*			*		10	Transplant
68	Phoenix roebelenii	0.1	2	1.5		*			*		10	Transplant
69	Phoenix roebelenii	0.1	2	1.5		*			*		10	Transplant
70	Phoenix roebelenii	0.1	2	1.5		*			*		10	Transplant
71	Phoenix roebelenii	0.1	2	1.5		*			*		10	Transplant
72	Livistona chinensis	0.3	2.2	1.5		*			*		11	Transplant
73	Livistona chinensis	0.3	2.2	1.5		*			*		11	Transplant
74	Livistona chinensis	0.3	2.2	1.5		*			*		11	Transplant
75	Livistona chinensis	0.3	2.2	1.5		*			*		11	Transplant
76	Livistona chinensis	0.3	2.2	1.5		*			*		11	Transplant
77	Livistona chinensis	0.3	2.2	1.5		*			*		11, 12	Transplant
78	Livistona chinensis	0.3	2.2	1.5		*			*		11, 12	Transplant
79	Livistona chinensis	0.3	2.2	1.5		*			*		11, 12	Transplant
80	Livistona chinensis	0.3	2.2	1.5		*			*		11, 12	Transplant
81	Livistona chinensis	0.3	2.2	1.5		*			*		11, 12	Transplant
82	Livistona chinensis	0.3	2.2	1.5		*			*		12, 13	Transplant
83	Livistona chinensis	0.3	2.2	1.5		*			*		12, 13	Transplant
84	Livistona chinensis	0.3	2.2	1.5		*			*		12, 13	Transplant
85	Livistona chinensis	0.3	2.2	1		*			*		12, 13	Transplant
86	Livistona chinensis	0.3	2.2	1		*			*		13	Transplant
87	Livistona chinensis	0.3	2.2	1		*			*		13	Transplant
88	Livistona chinensis	0.3	2.2	1		*			*		13	Transplant

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

Job No : MCA41

Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
89	Livistona chinensis	0.3	2.2	1		*			*		13, 14	Transplant
90	Livistona chinensis	0.3	2.2	1		*			*		13, 14	Transplant
91	Livistona chinensis	0.3	2.2	1		*			*		13, 14	Transplant
92	Livistona chinensis	0.3	2.2	1		*			*		13, 14	Transplant
93	Livistona chinensis	0.3	2.2	1		*			*		13, 14	Transplant
94	Livistona chinensis	0.3	2.2	1		*			*		13, 14	Transplant
95	Livistona chinensis	0.3	2.2	1		*			*		15	Transplant
96	Livistona chinensis	0.3	2.2	1		*			*		15	Transplant
97	Livistona chinensis	0.3	2.2	1		*			*		15	Transplant
98	Livistona chinensis	0.3	2.2	1		*			*		16	Transplant
99	Livistona chinensis	0.3	2.2	1.5		*			*		16	Transplant
100	Livistona chinensis	0.3	2.2	1.5		*			*		16	Transplant
101	Livistona chinensis	0.3	2.2	1.5		*			*		17	Transplant
102	Livistona chinensis	0.3	2.2	1.5		*			*		17	Transplant
103	Livistona chinensis	0.3	2.2	1.5		*			*		17	Transplant
104	Livistona chinensis	0.3	2.2	1.5		*			*		17	Transplant
105	Livistona chinensis	0.3	2.2	1.5		*			*		17	Transplant
106	Livistona chinensis	0.3	2.2	1.5		*			*		-	Transplant
107	Livistona chinensis	0.3	2.2	1.5		*			*		-	Transplant
108	Livistona chinensis	0.3	2.2	1.5		*			*		-	Transplant
109	Livistona chinensis	0.3	2.2	1.5		*			*		-	Transplant
110	Livistona chinensis	0.3	2.2	1.5		*			*		18	Transplant
111	Livistona chinensis	0.3	2.2	1.5		*			*		18	Transplant

EXISTING TREES ASSESSMENT SCHEDULE

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Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
112	Livistona chinensis	0.3	2.2	1.5		*			*		18	Transplant
113	Livistona chinensis	0.3	2	1		*			*		19	Transplant
114	Livistona chinensis	0.3	2	1		*			*		19	Transplant
115	Livistona chinensis	0.3	2	1		*			*		19	Transplant
116	Livistona chinensis	0.3	2	1		*			*		19	Transplant
117	Hibiscus tiliaceus	0.3	5	5		*			*		20	Retain
118	Hibiscus tiliaceus	0.3	5	5		*			*		20	Retain
119	Acacia confusa	0.2	5	3			*			*	20	Retain
120	Hibiscus tiliaceus	0.1	5	2			*		*		21	Retain
121	Hibiscus tiliaceus	0.3	5	2		*			*		21	Retain
122	Phoenix roebelenii	0.1	2	1.5		*			*		22	Transplant
123	Phoenix roebelenii	0.1	2	1.5		*			*		22	Transplant
124	Phoenix roebelenii	0.1	2	1.5		*			*		22	Transplant
125	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
126	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
127	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
128	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
129	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
130	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
131	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
132	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
133	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant
134	Phoenix roebelenii	0.1	2	1.5		*			*		23	Transplant

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

Job No : MCA41

Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
135	Phoenix roebelenii	0.1	2	1.5		*			*		-	Transplant
136	Phoenix roebelenii	0.1	2	1.5		*			*		24	Transplant
137	Phoenix roebelenii	0.1	2	1.5		*			*		24	Transplant
138	Phoenix roebelenii	0.1	2	1.5		*			*		24	Transplant
139	Phoenix roebelenii	0.1	2	1.5		*			*		24	Transplant
140	Phoenix roebelenii	0.1	2	1.5		*			*		25	Retain
141	Phoenix roebelenii	0.1	2	1.5		*			*		25	Retain
142	Phoenix roebelenii	0.1	2	1.5		*			*		25	Retain
143	Phoenix roebelenii	0.1	2	1.5		*			*		25	Retain
144	Phoenix roebelenii	0.1	2	1.5		*			*		25	Retain
145	Juniperus chinensis	0.1	2	2		*			*		26	Retain
146	Juniperus chinensis	0.1	2	2		*			*		26	Retain
147	Juniperus chinensis	0.1	2	2		*			*		26	Retain
148	Juniperus chinensis	0.1	2	2		*			*		26	Retain
149	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
150	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
151	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
152	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
153	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
154	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
155	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
156	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant
157	Ficus microcarpa	0.08	3	1.5		*			*		27	Transplant

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

Job No : MCA41

Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
158	Ficus microcarpa	0.08	3	1.5		*			*		27, 28	Transplant
159	Aleurites moluccana	0.95	7	5		*			*		28, 29	Transplant
160	Aleurites moluccana	1	7	6		*			*		29	Transplant
161	Toona sinensis	0.07	3	1		*			*		30	Retain
162	Toona sinensis	0.07	3	1		*			*		30	Retain
163	Toona sinensis	0.07	3	1		*			*		30, 31	Transplant
164	Toona sinensis	0.07	3	1		*			*		31	Transplant
165	Toona sinensis	0.07	3	1		*			*		31	Transplant
166	Toona sinensis	0.07	3	1		*			*		31	Transplant
167	Toona sinensis	0.07	3	1		*			*		31	Retain
168	Aleurites moluccana	0.9	7	5		*			*		31	Retain
169	Roystonea regia	0.11	1.5	1		*			*		32	Retain
170	Roystonea regia	0.11	1.5	1		*			*		32	Retain
171	Roystonea regia	0.11	1.5	1		*			*		32	Retain
172	Roystonea regia	0.11	1.5	1		*			*		32	Retain
173	Roystonea regia	0.11	1.5	1		*			*		32	Retain
174	Roystonea regia	0.11	1.5	1		*			*		32	Retain
175	Roystonea regia	0.11	1.5	1		*			*		32	Retain
176	Roystonea regia	0.11	1.5	1		*			*		32	Retain
177	Roystonea regia	0.11	1.5	1		*			*		32	Retain
196	Archontophoenix alexandrae	0.2	5	2		*			*		41	Retain
197	Roystonea regia	0.2	6	2		*			*		41	Transplant
198	Archontophoenix alexandrae	0.2	6	2		*			*		42	Retain

EXISTING TREES ASSESSMENT SCHEDULE

Planning, Urban Design, Landscape, Golf & Environmental Consultants

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

Job No : MCA41

Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
199	Livistona chinensis	0.3	3	2		*			*		42	Transplant
200	Celtis sinensis	0.3	6	2		*			*		43	Retain
201	Bauhinia spp	0.1	4	3		*			*		43	Retain
202	Eucalyptus spp	0.15	4	3		*				*	43	Retain
203	Ficus elastica	0.3	5	6		*			*		43	Retain
204	Bauhinia spp	0.1	4	3		*			*		43	Retain
205	Schefflera octophylla	0.1	2.5	1			*		*		44	Fell
206	Schefflera octophylla	0.1	2.5	1			*		*		44	Fell
207	Schefflera octophylla	0.1	2.5	1			*		*		44	Fell
208	Schefflera octophylla	0.1	2.5	1			*		*		44	Fell
209	Ficus microcarpa	0.3	5	5		*			*		45	Retain
210	Erythrina indica	0.1	4	3		*			*		45, 46	Retain
211	Plumeria rubra	0.15	4	4		*			*		46, 47	Retain
212	Plumeria rubra	0.12	4	3		*			*		46, 47	Retain
213	Phoenix roebelenii	0.1	15	2		*			*		48	Retain
214	Phoenix roebelenii	0.1	15	2		*			*		48	Retain
215	Phoenix roebelenii	0.1	15	2		*			*		48	Retain
216	Phoenix roebelenii	0.1	15	2		*			*		48	Retain
217	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
218	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
219	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
220	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
221	Phoenix roebelenii	0.1	15	2		*			*		49	Retain

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

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Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
222	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
223	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
224	Phoenix roebelenii	0.1	15	2		*			*		49	Retain
225	Phoenix roebelenii	0.1	12.5	2		*			*		49	Retain
226	Phoenix roebelenii	0.1	12.5	2		*			*		49	Retain
227	Phoenix roebelenii	0.1	12.5	2		*			*		49	Retain
228	Phoenix roebelenii	0.1	12.5	2		*			*		49	Retain
229	Phoenix roebelenii	0.1	12.5	2		*			*		49	Retain
230	Cassia surattensis	0.2	5	2	*			*			57	Retain
231	Thevetia peruviana	0.1	2.5	2	*				*		57	Retain
232	Thevetia peruviana	0.1	2.5	2	*				*		57	Retain

EXISTING TREES ASSESSMENT SCHEDULE

Project Name : Salisbury Road Underpass and Associated Road Improvement Works

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Date : 27 September 1997

TREE NO	BOTANICAL NAME	SURVEY SIZE (Metres)			EXISTING CONDITION			SURVIVAL RATE AFTER TRANSPLANT			PHOTO NO.	RECOMMENDATIONS
		DIA.	HEIGHT	SPREAD	GOOD	FAIR	BAD	HIGH	MEDIUM	LOW		
Area A	Ficus microcarpa (14no.)	0.15	4	3		*		*			50-55	Transplant
	Bombax malabaricum (4 no.)	2	4	3		*		*			50-55	Transplant
	Pruns persica (4 no.)	0.1	3	2		*		*			50-55	Transplant
	Juniperus chinensis (3 no.)	0.1	3	2		*				*	50-55	Fell
	Magnolia denudata (2 no.)	0.15	4	3		*		*			50-55	Transplant
	Thevetia peruviana (3 no.)	0.09	3	2		*				*	50-55	Fell
	Ficus virens (1 no.)	0.9	3	2		*		*			50-55	Transplant
	Ficus benjamina (3 no.)	0.1	5	3		*		*			50-55	Transplant
	Washingtonia robusta (1 no.)	0.3	4	2		*			*		50-55	Transplant
	Syzygium jambos (1 no.)	0.1	4	3		*			*		50-55	Transplant
	Mascarena verschaffeltii (1 no.)	0.3	3	2		*			*		50-55	Transplant

APPENDIX G

ENVIRONMENTAL MONITORING DATA RECORDING SHEET

Data Sheet for TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti (°C)	
	Hi (in.)	
	Qsi (Std. m^3)	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf (°C)	
	Hf (in.)	
	Qsf (Std. m^3)	
Average Flow Rate (Std. m^3)		
Total Volume (Std. m^3)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final Wt. of Filter (g)		
Measured TSP Level ($\mu g/m^3$)		

	Name & Designation	Signature	Date
Field Operator :	_____	_____	_____
Laboratory Staff :	_____	_____	_____
Checked by :	_____	_____	_____

Water Quality Monitoring Data Record Sheet

Location				
Date				
Start Time (hh:mm)				
Weather				
Sea Conditions				
Tidal Mode				
Water Depth (m)				
Monitoring Depth		Surface	Middle	Bottom
Salinity				
Temperature	(°C)			
DO Saturation	(%)			
DO	(mg/l)			
Turbidity	(NTU)			
SS Sample Identification				
SS	(mg/l)			
Observed Construction Activities	<100m from location			
	>100m from location			
Other Observations				

	Name & Designation	Signature	Date
Recorded By :	_____	_____	_____
Checked By :	_____	_____	_____

Note: The SS results are to be filled up once they are available from the laboratory.

APPENDIX H

STANDARD NOISE POLLUTION CONTROL CLAUSE

APPENDIX H STANDARD NOISE POLLUTION CONTROL CLAUSE

(a) The Contractor shall comply with and observe the Noise Control Ordinance and its subsidiary regulations in force in Hong Kong.

(b) The Contractor shall provide an approved integrating sound level meter to IEC 651:1979 (Type 1) and 804:1985 (Type 1) and the manufacturer's recommended sound level calibrator for the exclusive use of the Engineer at all times. The Contractor shall maintain the equipment in proper working order and provide a substitute when the equipment are out of order or otherwise not available.

The sound level meter including the sound level calibrator shall be verified by the manufactures every two years to ensure they perform the same levels of accuracy as stated in the manufacturer's specifications. That is to say at the times of measurements, the equipment shall have been verified within the last two years.

(c) In addition to the requirements imposed by the Noise Control Ordinance, to control noise generated from equipment and activities for the purpose of carrying out any construction work other than percussive piling during the time period from 07:00 to 19:00 hours on any day not being a general holiday (including Sundays), the following requirements shall also be complied with:

(i) The noise level measured at 1 m from the most affected external facade of the nearby noise sensitive receivers from the construction work alone during any 30 minute period shall not exceed an equivalent sound level (L_{eq}) of 75 dB(A).

(ii) The noise level measured at 1 m from the most affected external facade of the nearby schools from the construction work alone during any 30 minute period shall not exceed an equivalent sound level (L_{eq}) of 70 dB(A) [65 dB(A) during school examination periods].

The Contractor shall liaise with the schools and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

(iii) Should the limits stated in the above sub-clauses (i) and (ii) be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented.

Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or to any additional costs whatsoever.

(d) Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing intended to be used on the Site to be made available for inspection and approval to ensure that they are suitable for the project.

(e) The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.

The noise reduction methods shall include, but not be limited to, scheduling of works; Siting of facilities; selection of quiet equipment; and use of purpose-built acoustic panels and enclosures.

(f) The Contractor shall ensure that all plant and equipment to be used on site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers.

(g) Notwithstanding the requirements and limitations set out in clause (c) above and subject to compliance with clauses (e) and (f) above, the Engineer may, upon application in writing by the Contractor, allow the use of any equipment and the carrying out of any construction activities for any duration provided that he is satisfied with the application which, in his opinion, to be of absolute necessity and adequate noise insulation has been provided to the educational institutions to be affected, or of emergency nature, and not in contravention with the Noise Control Ordinance in any respect.

(h) No excavator mounted breaker shall be used within 125 m from any nearby noise sensitive receivers. The Contractor shall use hydraulic concrete crusher wherever applicable.

(i) The only equipment that shall be allowed on the Site for rock drilling works will be quiet drilling rigs with a sound power level not exceeding 110 dB(A). Conventional pneumatically driven drilling rigs are specifically prohibited.

(j) For the purposes of the above clauses, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, or performing arts centre or office building shall be considered a noise sensitive receiver.

(k) The Contractor shall, when necessary, apply as soon as possible for a construction noise permit in accordance with the Noise Control (General) Regulations, display the permit as required and copy to the Engineer.