

HIGHWAYS DEPARTMENT/MW

Agreement No. CE 29/96  
EIA and TIA Studies  
Flyover at Tai Chung Kiu Road/  
Siu Lek Yuen Road

Environmental Impact Assessment  
Executive Summary

March 1998

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It is the Company's objective to provide services which meet the required specification and are produced on time in a cost-effective manner.

In pursuit of these objectives, the Directors have implemented Quality Systems which have achieved Third Party Certification to BS EN ISO 9001:1994 Standard. All employees of the Company have a responsibility for quality.

The quality procedures are under continual review by Senior Management to ensure that the changing needs of the Company's Clients are met.

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# CONTENTS

Page

1	INTRODUCTION	1
1.1	Background to the Study	1
1.2	Environmental Impact Assessment Study	1
2	IDENTIFICATION OF SENSITIVE RECEIVERS	4
2.1	Air, and Noise Impacts	4
2.2	Landscape Impacts	4
2.3	Visual Impact	4
3	CONSTRUCTION PHASE IMPACTS	5
3.1	Construction Noise Impacts	5
3.2	Construction Dust Impacts	5
4	OPERATIONAL PHASE IMPACTS	6
4.1	Noise Impacts	6
4.2	Landscape Impacts	6
4.3	Visual Impacts	7
	Figures	
Figure 1.1	Works Layout	3

124 567

## 1 INTRODUCTION

### 1.1 Background to the Study

1.1.1 Tai Chung Kiu Road is a major traffic link between Sha Tin and Ma On Shan. It carries traffic from the Ma On Shan area to the Lion Rock Tunnel/Shing Mun Tunnel and other major traffic generators in Sha Tin such as railway stations and the New Town Plaza.

1.1.2 With the developments in Ma On Shan and the natural growth of traffic, it is anticipated that the existing junction of Tai Chung Kiu Road and Siu Lek Yuen Road will be operating over capacity at approximately 20% and 28% in the AM peak and PM peak respectively in the year 2001.

1.1.3 The construction of a single 2-lane flyover across the junction was identified in the Ma On Shan Area 77, 86B and 90B Potential Development Traffic Impact Study in June 1995 as a means to improve the junction capacity to cater for the growth in traffic.

1.1.4 The flyover will be located across the junction of Tai Chung Kiu Road and Siu Lek Yuen Road. The works layout is shown in Figure 1.1. The Study Area includes the existing urban development alongside a portion of the Shing Mun River and Siu Lek Yuen Nullah concentrated at the junction of Tai Chung Kiu Road and Siu Lek Yuen Road.

1.1.5 The proposed flyover comprises a 260m long section of elevated carriageway in the centre lane of Tai Chung Kiu Road. The deck of the flyover structure will be at a maximum height of around 9.5m above the existing road level at the centre of the junction. The construction project will involve provision of:

- a single 2-lane flyover of about 260m in length along Tai Chung Kiu Road over the junction with Siu Lek Yuen Road;
- local road widening on both sides of Tai Chung Kiu Road near the junction to accommodate the flyover;
- widening of a portion of the existing nullah bridge;
- modification to road junction layout and improvement to the signal control arrangement;
- noise mitigation measures, including noise barrier along the southern edge of the flyover facing Sha Tin City One Estate, the extent and scope of which is subject to review; and
- ancillary drainage works.

### 1.2 Environmental Impact Assessment Study

1.2.1 The Environmental Impact Assessment (EIA) identifies Sensitive Receivers (SRs) within the study area, defines environmental parameters and features likely to be affected by the proposed project, and sets out the criteria and methodology on which the assessments are based.

1.2.2 The Executive Summary summarises the following findings of the EIA:

Construction Phase Impacts

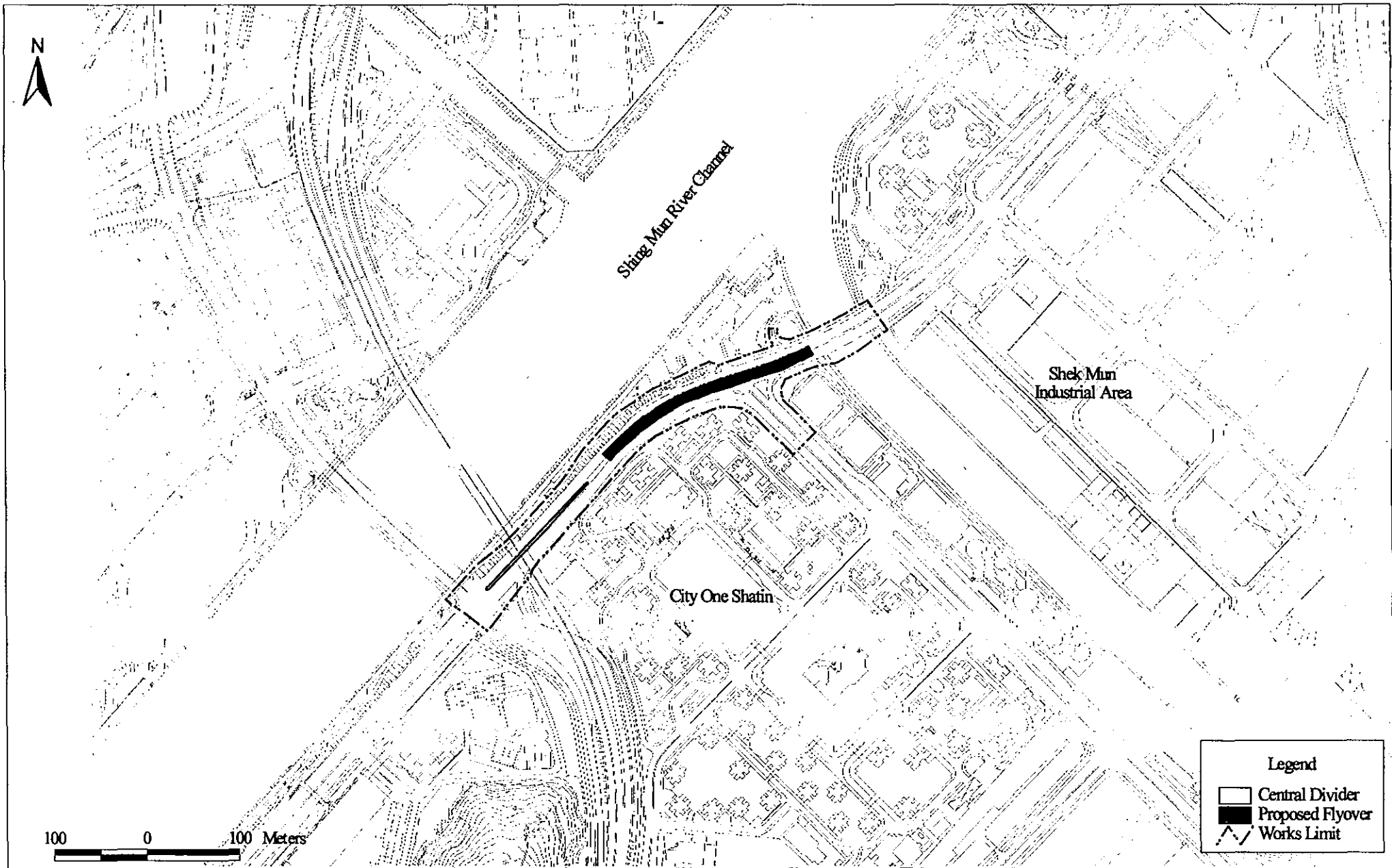
- construction noise; and
- construction dust.

Operation Phase Impacts




- traffic noise; and
- landscape and visual.

1.2.3 The EIA describes the impacts arising from the proposed project, and recommends measures to mitigate them.

1.2.4 Preliminary construction monitoring and audit programmes and details are provided under separate report.



**Legend**

-  Central Divider
-  Proposed Flyover
-  Works Limit



TITLE

**Works Layout**

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PROJECT NO.	B180	DATE	September 1997
DESIGNED	Fanny Lau	DRAWING NO.	Figure 1.1

## 2 IDENTIFICATION OF SENSITIVE RECEIVERS

### 2.1 Air, and Noise Impacts

2.1.1 Sensitive receivers along the existing Tai Chung Kiu Road/ Siu Lek Yuen Road alignment have been identified in accordance with the definitions given in the Hong Kong Planning Standards and Guidelines (HKPSG).

2.1.2 The study area accommodates the following sensitive landuses:

- high rise developments at City One Shatin, Ravana Garden and Belair Garden;
- two schools (Baptist Lui Ming Choi Primary School (2 Tak Wing Street City One Shatin), and Leung Kui Kau Lutheran Primary School (5 On King Street Shatin)) ; and
- (air quality only) outdoor recreational uses at the Siu Lek Yuen Playground and the Floating Restaurant garden.

### 2.2 Landscape Impacts

2.2.1 The quality and character of the existing landscape is assessed by considering the aesthetic quality and amenity value of landform, vegetation and built structures as well as historical and cultural components. The landscape impacts are identified by assessing direct impacts on specific landscape elements, the significance and degree of change to the overall landscape quality and character as well as the ability of the landscape to accommodate change. The only direct impact predicted is the loss of roadside trees due to the proposed widening of Tai Chung Kiu Road.

### 2.3 Visual Impact

2.3.1 Visually sensitive receivers are those within the study area with clear views toward the proposed flyover that will suffer adverse visual intrusion as a consequence of the proposed works. The main receiver groups include; road users, pedestrians and cyclists on the promenade and residents of adjacent housing developments.

### 3 CONSTRUCTION PHASE IMPACTS

Construction phase impacts will be regulated by an Environmental Monitoring and Audit (EM&A) programme, which will monitor air, noise, and water quality impacts. A Preliminary EM&A Manual has been prepared (under separate report), and outlines the monitoring requirements of the programme.

#### 3.1 Construction Noise Impacts

3.1.1 Due to the linear nature of the improvement works, and the close proximity of dwellings to the proposed flyover, exceedances of the recommended daytime construction noise limit (75 dB(A)  $L_{eq}$ ) are predicted. Noise mitigation is recommended to minimise nuisance at the NSRs. Recommendations are that the contractor should use quieter equipment, and that screening of plant should be provided where practical. In addition, the following measures are also recommended:

- Noisy equipment and activities should be sited by the contractor as far from sensitive receivers as is practical.
- Intermittent noisy activities should be scheduled to minimise exposure of nearby NSRs to high levels of construction noise.
- Idle equipment should be turned off or throttled down.
- Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided.
- Construction plant should be properly maintained and operated.

#### 3.2 Construction Dust Impacts

3.2.1 With the adoption of normal site dust suppression measures, predicted construction dust concentrations will be below the relevant criteria at all assessed sensitive receiver locations.



## 4 OPERATIONAL PHASE IMPACTS

### 4.1 Noise Impacts

4.1.1 The traffic noise assessment was based on projected morning peak hour traffic flows for the year 2016 (i.e. 15 years after the proposed commissioning date of the flyover).

4.1.2 The locations of the sensitive receivers are in close proximity to the proposed flyover and therefore, predicted traffic noise levels will exceed Hong Kong Planning Standards and Guidelines (HKPSG) at many sensitive facades, and noise mitigation measures will be required. The flyover itself will contribute only a small increase in traffic flows (less than 10% of the total), as some drivers will select this as an alternative route to avoid other congested roads. Mitigation in the form of noise barriers, including cantilever type barriers, and enclosures were considered and the resultant effect on NSRs were tested.

4.1.3 The recommended mitigation option developed is as follows:-

- 6m barrier with a cantilever to within 1m of the flyover centreline on the City One Estate side of the flyover; and reduction to a 4m vertical barrier after the road junction, up to the Siu Lek Yuen Playground
- 4.5 m barrier on ground level roads

4.1.4 Once the proposed refined mitigation is in place, there will still be exceedance of 70 dB(A) at the majority of receivers facing Tai Chung Kiu Road, but these exceedances are attributable to the noise levels on the existing ground levels roads. Tests to determine eligibility with the ExCo criteria for provision of indirect technical remedies show that no flats will meet the criteria. These mitigation measure have been endorsed by the 'Advisory Council on the Appearance of Bridges and Associated Structures' (ACABAS).

4.1.5 The mitigated noise levels indicate that there is no significant benefit in increasing the extent of mitigation beyond the recommended option, as even with an enclosure noise levels will not be reduced by more than 1 dB(A) at the receivers.

4.1.6 Other mitigation measures were tested including the construction of a full enclosure. It was found that the full enclosure provided no additional benefit compared to the cantilever barrier system proposed. Furthermore, the enclosure option is constraint by negative impacts such as poor air quality, and structural/safety implications. Further details can be found in the EIA Final Report.

4.1.7 Additionally, the EIA Study tested whether a traffic management system of prohibiting heavy vehicles from using the flyover would reduce noise levels at sensitive receivers. It was found that the noise levels would in fact increase due to the noisier traffic relocating to the existing road where no noise mitigation measures are provided.

4.1.8 The total cost of the noise mitigation package is about \$9 million. Sketches of the proposed flyover are provided in Figure 4.1 and 4.2.

### 4.2 Landscape Impacts

4.2.1 Although, the existing overall landscape character of the Tai Chung Kiu Road / Siu Lek Yuen Road junction will continue to be dominated by traffic, highway structures and City One high-rise blocks,

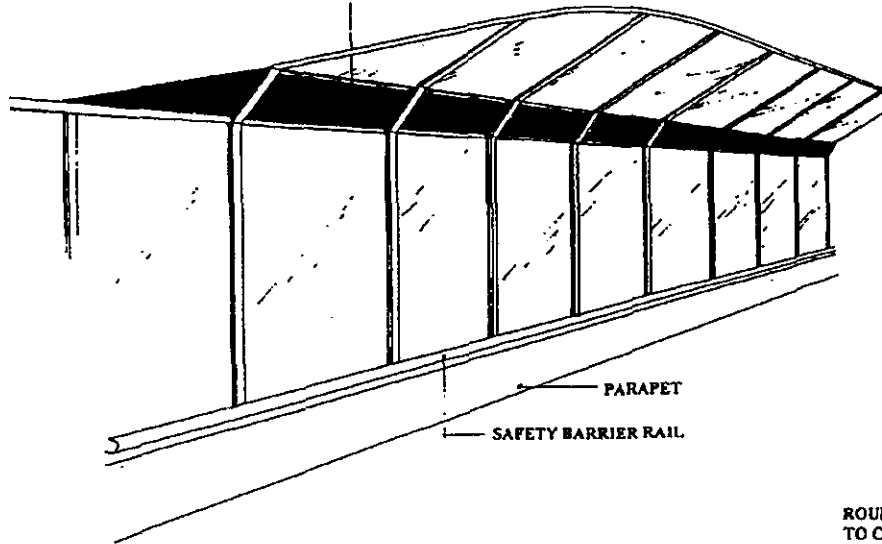
the specific landscape impacts resulting from loss of the roadside trees on particular user groups, i.e. cyclists and pedestrians using the promenade will be relatively high. The degree of overall landscape impact will vary significantly depending upon the position and proximity of the viewer. For example, when viewed against the background of the City One tower blocks the proposed flyover is expected to have relatively low impact on the surrounding landscape. However, when viewed from close range in the opposite direction, the proposed elevated structure of the flyover will contrast starkly with the low-lying, smaller-scale, lush landscape of the river promenade and the landscape impacts will be relatively high. Details of impacts on specific areas are presented in the EIA Report.

### 4.3 Visual Impacts

4.3.1 Due to the tight alignment of the proposed flyover, there is little space for landscape or visual impact mitigation by means of earth mounding or screen planting. Providing raised planters beneath portions of the flyover is possible to soften the form of the flyover although these will not screen the overhead structure. Where the road widening of Tai Chung Kiu Road encroaches on the promenade planting, new tree planting should be provided upon completion in the remaining, narrower planting strip wherever possible to replace this strategic screen. As a result, the majority of the visual impacts, unless otherwise noted in the EIA Report, are predicted to be permanent.

4.3.2 It is therefore important to ensure that the design of the flyover structure and noise barrier is as sympathetic to the surrounding landscape as possible. To this end the structure and noise barrier will have rounded forms and smooth curves in profile and section, avoiding abrupt, angular detailing. In particular, the noise barrier will comprise a lightweight steel frame with transparent 'Plexiglas' panels to reduce the visual mass of the flyover elevation. It is proposed that a neutral tone similar to the amber tinted 'Plexiglas' is used for the barrier framing with a highlight colour used on the cantilever flashing to emphasise the horizontal and play down the vertical scale of the barrier. The proposed treatment of the structure and noise barrier is illustrated in the EIA Report.

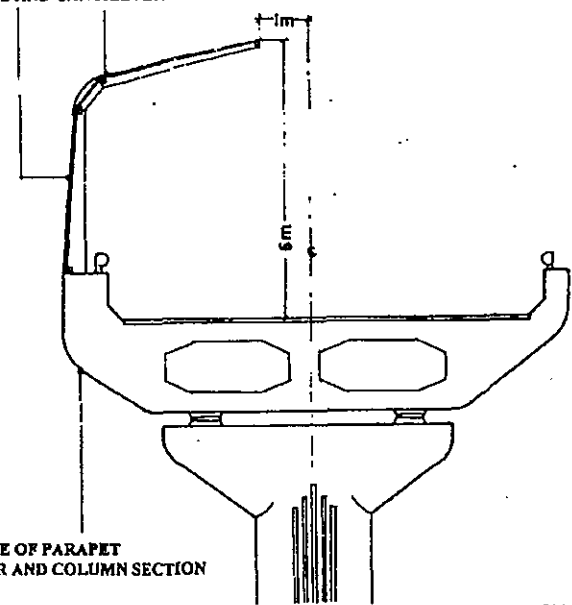
FLASHING PANEL IN ANGLE OF CANTILEVER  
ALSO SERVES TO CONCEAL LIGHT MOUNTING/DUCTING



AXONOMETRIC VIEW OF CANTILEVER  
AND VERTICAL NOISE BARRIER JUNCTION

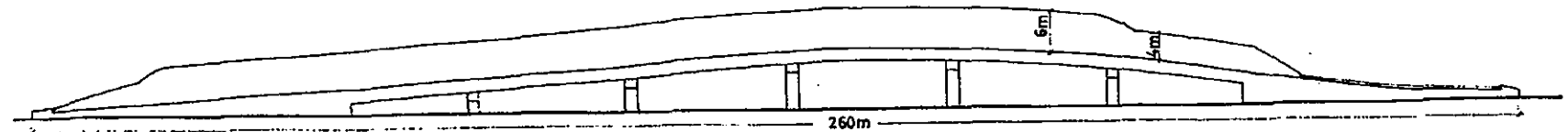
PARAPET MOUNTED CANTILEVER REFLECTIVE BARRIER  
IN 'PLEXIGLAS' PANELS BETWEEN GMS 'T' SECTION POSTS.  
CURVED STEEL FLASHING BETWEEN UPRIGHT AND  
CANTILEVER 'PLEXIGLAS' PANELS.

BARRIER PANELS TO BE 'PLEXIGLAS XT SOUNDSTOP'  
18MM THICK, 2M WIDTH X 3.5M AND 3M LENGTHS  
FOR VERTICAL AND CANTILEVER SECTIONS RESPECTIVELY.



ROUNDED PROFILE TO UNDERSIDE OF PARAPET  
TO COMPLEMENT NOISE BARRIER AND COLUMN SECTION

TYPICAL SECTION  
NOT TO SCALE



FLYOVER ELEVATION  
NOT TO SCALE

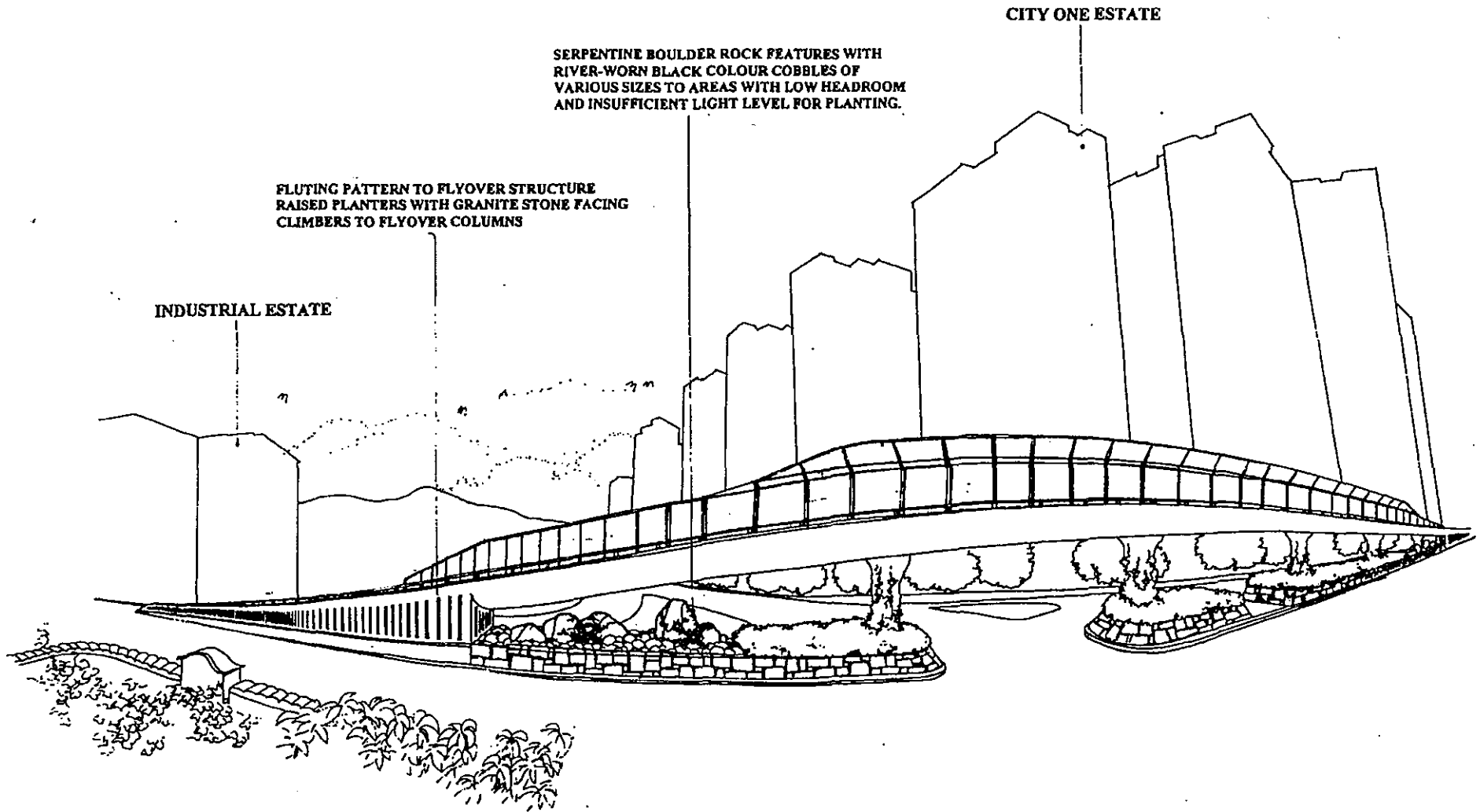
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Axonometric View of Cantilever and Vertical Barrier Junction

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PROJECT NO	B180	DATE	August 1997
DESIGNED	Suki Chung	DRAWING NO	Figure 4.1



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Illustrative Sketch of Flyover Structure and Noise Barriers View From Floating Restaurant

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PROJECT NO	B180	DATE	August 1997
DESIGNED	Suki Chung	DRAWING NO	Figure 4.2