



HIGHWAYS DEPARTMENT

HIGHWAYS ( HONG KONG ) REGION

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Executive Summary

16 July 1997

The Design & Construction of the Interchange at Pok Fu Lam Road and Sassoon Road Junction

Agreement No. CE 30/95  
The Design & Construction of the Interchange at Pok Fu Lam Road and Sassoon Road Junction



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ARUP  
in association with  
ERM & URBIS

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## 1 INTRODUCTION

Ove Arup & Partners (OAP) have been commissioned by the Highways Department (HyD) Hong Kong Government to undertake the Design and Construction of the Interchange at the Junction of Pok Fu Lam Road and Sassoon Road (Agreement No. CE 30/95) (hereafter called the Roadworks). ERM-Hong Kong, Ltd (ERM) are the environmental consultants to undertake the Environmental Impact Assessment (EIA) for the Roadworks.

A Preliminary Environmental Review (PER) was carried out under the Preliminary Project Feasibility Study (PPFS) for the junction improvement works. Following the recommendations of the PER, this EIA study has been undertaken as part of the Design Review Phase, mainly to assess potential noise impacts arising from the operation and construction of the Roadworks and to recommend noise control requirements for incorporation into the Preliminary Design to meet Government noise standards.

## 2 PROJECT DESCRIPTION

Pok Fu Lam Road is a primary distributor for the Southern District. The road serves, together with Aberdeen Tunnel, as the two major links between the Aberdeen area and other districts. Pok Fu Lam Road and its junctions with Sassoon Road currently provides two lanes in each direction. Taking into account the potential development in Aberdeen and the traffic demand generated or attracted by the opening of the Western Harbour Crossing, the existing signalized junction is unlikely to accommodate the increased traffic flow and therefore the need for the proposed Roadworks to alleviate the congestion at the Pok Fu Lam Road/Sassoon Road junction.

Having considered the engineering, site and traffic management constraints, the "Flyover Scheme" recommended in the PPFS has been replaced by the "Depressed Carriageway Scheme" (Scheme) during the Design Review phase. The Scheme as shown in Figures A & B comprises the 2-lane southbound and 3-lane northbound traffic running along the toe of existing retaining wall along Pok Fu Lam Road. There will be a bridge over that links both the existing junction of Pok Fu Lam Road with the northbound depressed carriageway. The existing Bisney Road will be re-aligned and the existing Pok Fu Lam Road will become the 2-lane southbound carriageway. Peak hour traffic flows on Pok Fu Lam Road are expected to increase from the present 2000 vehicles/hr to approximately 5500 vehicles/hr by the year 2011.

## 1. 導言

奧雅納工程顧問公司受香港政府路政署委託，進行土木工程顧問合約編號 30/95 薄扶林道與沙宣道立體交匯處之設計及建築工程（以下簡稱本道路工程）。本道路工程需作的環境影響評估（環評），則交由香港環境資源管理顧問有限公司進行。

本道路工程曾於「初步工程可行性研究」期間進行「初步環境檢討」，建議在設計檢討階段進行環評，就本道路工程在施工及運作時可能引起的噪音影響進行研究，制定需融入工程初步設計的噪音管制措施，以符合政府噪音法例所訂定的標準。

## 2. 工程簡介

薄扶林道是港島南區的主幹道路，跟香港仔隧道同為連接香港仔與其他地區的兩條主要通道。薄扶林道及其與沙宣道的交匯，現只提供雙線雙程行車，但交通需求則隨著香港仔未來之發展和西區海底隧道全面通車而增加，故預料現設有以交通燈運作的交匯處將無法應付激增的交通流量。為了紓緩薄扶林道與沙宣道交匯的擠塞情況，擬建的本道路改善工程實是必須的。

考慮到工程、地盤及交通管理各方面的限制，原在「初步工程可行性研究」內提議的「天橋方案」已在設計檢討階段被「低陷路塹式行車道方案」所取代。如圖 A 及 B 所示，此方案包括新建的兩條南行及三條北行線，沿薄扶林道現有之護土牆底部，另有一條天橋將連接現存薄扶林道之交匯與低陷路塹式行車道之北行線。而舊薄扶林道會作為可供兩線南行的道路。至於碧荔道則會重建。預計到 2011 年繁忙時段的交通流量將由目前每小時 2000 架次增至每小時大約 5500 架次。

The main construction activities associated with the Roadworks will comprise:

- Bridge work;
- At-grade road widening;
- Road pavement; and
- Retaining wall.

### **3 OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT**

Based on the Study Brief requirements, the objective of the EIA is to demonstrate the environmental acceptability of the proposed Roadworks based on the Selected Scheme in terms of potential noise impacts during construction and operation phases. Noise control measures are recommended for incorporation into the Preliminary Design and Contract Specifications where required to minimise environmental impacts to within the relevant standards. Construction waste management and ecological impact are also addressed in this report. The EIA also identifies Environmental Monitoring and Audit requirements for implementation during construction phase to ensure efficacy of environmental control measures.

The main findings of the EIA, during both the construction and operational stages, are summarised below. A summary from the separate Landscape and Visual Impact Assessment Report as part of the Review Phase Report is also provided below.

### **4 NOISE IMPACTS**

#### **4.1 Construction Phase**

This assessment has predicted that unmitigated construction activities, such as at-grade road widening and road pavement construction activities, would cause exceedances of the daytime noise criteria at the nearby noise sensitive receivers (NSRs) including HKU - Wei Lun Hall and R C Lee Hall, and some residential buildings along Bisney Road and Consort Rise. For all NSRs, the construction noise impacts could be mitigated to within the noise criteria by standard mitigation measures including use of quiet plant and on-site moveable barriers, except for some of the units of the HKU - Wei Lun Hall facing Pok Fu Lam Road. As indirect technical remedies are recommended for Wei Lun Hall for the protection of road traffic noise (see *Section 4.2*), it is recommended that the provision of noise insulation to Wei Lun Hall should be advanced prior to the construction of the Roadworks for redressing the residual construction noise impact at Wei Lun Hall. Noise monitoring should be carried out during the construction period of the Roadworks to ensure compliance with the noise criteria.

本道路工程的主要建築項目將包括：

- 天橋工程；
- 地面道路擴闊；
- 路面鋪設；以及
- 護土牆建造。

### 3. 環境影響評估之目的

根據研究摘要的要求，本環評的主要目的是研究已揀選的方案會否在施工及運作期帶來不可接受的噪音影響。環評建議把噪音管制措施融入初步設計和合約規格內，務求將不良影響降至最低，以符合政府指定的相關標準。建築廢物的管理和生態影響亦在本報告中記述。另外，環評亦建議執行環境監察及審核計劃的各項要求，以確保環境管制措施有效。

本環評就道路工程施工及運作期所作的研究結果，簡述如下。而包含在「檢討階段報告」內的獨立「景觀及視覺影響評估報告」亦在此摘要概述。

## 4. 噪音影響

### 4.1 施工期

本環評預測在未經緩解的情況下，建築噪音會影響香港大學偉倫堂和利銘澤堂，及部份沿碧荔道和金粟街一帶的住宅樓宇，超逾日間噪音指標。但在實施標準噪音緩解措施下，如採用較寧靜機動設備及地盤流動隔音屏障，除了偉倫堂部份面對薄扶林道的單位外，大部份樓宇的建築噪音影響會減至噪音標準之內。由於環評已建議採用間接緩解措施保護偉倫堂免受交通噪音滋擾，故此建議在道路工程施工前，先為這些單位裝設隔音設施以減低殘餘的建築噪音影響。為確保本道路工程在施工期間能依循噪音指標，噪音監察務須執行。

## 4.2 Operation Phase

The existing traffic noise levels at the NSRs facing Pok Fu Lam Road (ie residential along Northcote Close, Bisney Road and Consort Rise, Dor Fook Mansion and Kai Ming Temple and HKU-Student Residence Halls at 6 Sassoon Road) are generally high with noise levels in the region of 71 to 81 dB(A), exceeding the Hong Kong Planning Standards and Guidelines (HKPSG) 70 dB(A) traffic noise criteria.

With the Roadworks in place, the predicted noise levels by the worst case scenario year 2011 indicate that the Queen Mary Hospital's Professorial Block & Sister Quarters, Northcote Close No. 13-15, Ebenezer School, residential buildings along Bisney Road and Consort Rise, Dor Fook Mansion, Kai Ming Temple, Roylton, Patrick Mansion Building and Dexter H C Man Building (NSRs 1d, 1e, 3, 4, 6a, 6b, 7, 8, 9, 11 and 12) would experience traffic noise levels in the region of 74 to 85 dB(A). However, assessment results indicated that noise levels at these NSRs are dominated by road traffic noise from the existing road network (Pok Fu Lam Road, Bisney Road and Sassoon Road) rather than by the Roadworks. Therefore, provision of direct mitigation measure on the Roadworks to alleviate the traffic noise impacts on these NSRs is considered ineffective. For NSRs that are further away from the Roadworks, ie Northcote College of Education and the HKU - Estate Building (NSRs 5 & 13) the predicted noise levels at these NSRs are within the HKPSG criteria. The existing insulation of centrally air-conditioned Queen Mary Hospital including Pathology Building, Block K and Radiology Block (NSR 1a, 1b and 1c) has been evaluated and find capable of providing adequate protection against the predicted traffic noise. Location of the NSRs are shown in Figure C. The area most affected by the Roadworks will be the HKU Student Residence Halls at 6 Sassoon Road (NSR 2) and Li Shu Fan Building (NSR 10).

Due to the civil and traffic engineering and safety constraints, the practicable mitigation measure is limited. The only practicable direct mitigation measures are roadside noise barriers which extent and height are also restricted. As a result, the achievable noise reduction at the most affected HKU-Student Residence Halls at 6 Sassoon Road was predicted to be within 1 dB(A). Hence, they are considered ineffective and not recommended. In addition, the use of noise barriers will greatly increase the visual impacts on the key visually sensitive views and the landscape character of the area around the Sassoon Road junction.

In order to mitigate the traffic noise impact, indirect technical remedies in the form of window insulation and air-conditioning system are recommended as a last resort. From the assessment results, it is found that the sensitive facades of the residence halls facing Pok Fu Lam Road will meet the criteria for insulation. It is recommended that a Detailed Noise Insulation Works Study be carried out at the Detailed Design Stage to identify the extent of and exact requirements on window insulation work.

## 4.2 運作期

現時在面向薄扶林道的噪音敏感受體(即沿羅富國徑,碧荔道和金粟街一帶的住宅、多福大廈、啓明廟和沙宣道6號的香港大學學生宿舍)噪音程度普遍偏高,介乎71至81分貝之間,超逾《香港規劃標準與準則》70分貝的標準。預料在2011年時,即新道路工程完成後的最壞假設情況下,瑪麗醫院教授樓及護士宿舍、羅富國徑13至15號,心光盲人學校、碧荔道及金粟街一帶的住宅樓宇,多福大廈,啓明廟、豪峰、醫院圖書館及文洪磋樓(噪音敏感受體1d、1e、3、4、6a、6b、7、8、9、11及12)將承受介乎74至85分貝之間的交通噪音。不過,研究結果顯示上述噪音敏感受體所承受的交通噪音,主要來自現有的道路網絡(薄扶林道、碧荔道及沙宣道),而非新道路。因此,研究認為興建路旁噪音屏障以減少交通噪音對噪音敏感受體的效用不大。至於在距離新道路較遠的噪音敏感受體即羅富國教育學院及香港大學物業處(噪音敏感受體5及13),預料噪音水平將在《香港規劃標準及準則》所訂的上限之下。現時瑪麗醫院有中央空調的病理大樓、K座及放射大樓(噪音敏感受體1a、1b及1c)的隔音設施已經評估,結果顯示這些設施已足以保障上述敏感受體不受預計中的交通噪音影響,噪音敏感受體的位置如圖C所示。最受新道路影響之處將為沙宣道6號的香港大學學生宿舍(噪音敏感受體2)及李樹芬樓(噪音敏感受體10)。

由於土木及交通工程和安全方面的各種限制,可供選用的緩解措施,亦受制肘。研究發現唯一可用的直接緩解措施為路旁隔音屏障,但其長度及高度均受限制,故此預計在最受影響的沙宣道6號的香港大學學生宿舍,交通噪音只會減低約1分貝,而研究亦認為路旁噪音屏障的效用不大及不可取。此外,若興建路旁隔音屏障,將會對沙宣道一帶的視覺及景觀構成不良的影響。

在沒有其他更好的選擇下,本環評建議裝置隔音窗及冷氣系統,以紓緩交通噪音造成的滋擾。噪音評估的結果顯示,受影響的學生宿舍應可符合安裝隔音設備的指標。本環評亦建議在工程詳細設計階段進行一項詳細的噪音評估,以確定實際需要裝置隔音窗的類別、數量和位置。



Although Li Shu Fan Building will be eligible for indirect technical remedies, it is understood that Li Shu Fan Building and the Patrick Mansion Building are scheduled to be reprovisioned to the new medical faculty complex at Northcote College in the year 2001, ie similar period as when the Roadworks commence operation. Hence, Li Shu Fan Building is considered unnecessary to provide noise insulation. It is recommended that the new development should take account of noise constraints of the Roadworks in their design in accordance with HKPSG to mitigate the road traffic impact if the future use is noise sensitive.

## **5 CONSTRUCTION WASTE MANAGEMENT**

It is expected that only small quantities of excavated materials and small volumes of construction, demolition and chemical wastes will be generated. Measures as part of good site practice have been recommended to ensure that environmental nuisance is avoided and that opportunities for waste minimisation and recycling are followed.

## **6 ECOLOGICAL ISSUES**

The key ecological issues associated with the Roadworks are related to the potential loss of the woodland habitat on the down-slope side of Pok Fu Lam Road. The ecological value of the woodland is established as low with reference to the Government evaluation criteria. Direct habitat loss resulted from land taking is regarded as the major source of impact, but the severity is not considered to be high due to the poor ecological value of the woodland. The extensive on-site tree replanting scheme and good construction practice recommended are considered to be adequate to mitigate the impact and adverse residual impacts are not expected.

## **7 LANDSCAPE AND VISUAL ISSUES**

The new road structures would be of the same nature as the existing road, and in the context of the surrounding high rise residential developments, Cemetery and the Queen Mary Hospital. There is likely to be a high impact during construction, and a low level landscape impact in the long term, that is the direct consequence of the works. Due considerations have been given to keep the impact to landscape and loss of trees to a minimum during the road works construction. The landscape impact of the scheme is considered to be acceptable with the proposed mitigation measures such as tree transplant and extensive replanting.

雖然李樹芬樓符合裝置間接緩解措施的要求，但據瞭解李樹芬樓及醫學院圖書館行將拆卸，並於2001年(即新道路啓用時)遷往現時羅富國教育學院的位置，重建為新醫學院大樓。研究因此認為無須為李樹芬樓提供隔音設施。不過，若該處的新發展易受噪音影響，其設計應根據《香港規劃標準與準則》考慮新道路引致的交通噪音影響，並且加以適當的緩解。

## 5. 建築廢物管理

本道路工程將產生少量的挖掘物料，一般的建築廢物，清拆廢物及化學廢物。環評建議承建商應採取良好的地盤管理，避免工程對環境造成滋擾，並盡量減少製造廢物，落實執行物料回收及循環再用。

## 6. 生態

本道路工程主要涉及的生態問題是影響薄扶林道山坡的部份林地生境。根據政府的生態評估指引考慮，該林地的生態價值不高。道路工程及鞏固斜坡所需土地而直接導致的林地喪失將會是影響的主要來源，但基於該林地的生態價值偏低，預計對生態影響並不嚴重。環評認為如能實踐建議的廣泛重植樹木計劃及良好的建築作業手法，將足夠紓緩這方面的影響。

## 7. 景觀及視覺問題

新的道路架構與現存的道路性質相同，並能配合周圍環境包括高層住宅發展、墳場和瑪麗醫院的整體景觀。景觀方面，工程在施工期間將造成較大影響，但長遠而言影響卻不大。為了將施工期間引致的景觀及損毀樹木的影響減至最低，有關方面已作出周詳考慮。只要實行建議的樹木移植及廣泛重植等緩解措施，本工程所帶來的景觀影響應可接受。

There would be a high visual impact during construction on the residents of HKU Wei Lun Hall, through loss of existing screen vegetation, and a medium impact on the low rise houses on Consort Rise and Bisney Road, users of the Queen Mary Hospital and the Chinese Christian Cemetery, and on Pedestrians and Motorists around the junction. Mitigation measures such as architectural detailing of the retaining walls and elevated road structures, and planting of disturbed slopes and roadside areas would reduce the level of the visual impacts upon completion of the works to an acceptable level.

## 8 CONCLUSION

The EIA has assessed the potential environmental impacts associated with the construction and operation of the proposed Roadworks. The findings demonstrate that whilst varying levels of construction noise impacts have been predicted, provided that the recommended mitigation measures are undertaken, unacceptable impacts are not expected to arise.

Adverse operational noise impacts from the Roadworks are predicted at the student residence halls facing Pok Fu Lam Road of the University of Hong Kong at 6 Sassoon Road. Due to the civil and traffic engineering and safety constraints, the practicable mitigation measure is limited. The only practicable direct mitigation measures are roadside noise barriers which extent and height are also restricted. As a result, the achievable noise reduction at the most affected HKU-Student Residence Halls at 6 Sassoon Road was predicted to be 1 dB(A). Hence, they are considered ineffective and not recommended. In order to mitigate the noise impact, indirect technical remedies are recommended as a last resort to mitigate the traffic noise impact. Construction waste impacts are expected to be minimal with the adoption of good site practice. The extensive replanting programme should adequately mitigate the loss of the woodland habitat with low ecological value. The landscape and visual impact is considered acceptable with the implementation of the proposed mitigation measures.

由於失去現存的植物作為屏障，本工程在施工期間將對香港大學偉倫堂的學生造成較高的視覺影響，而對金粟街和碧荔道的低層樓宇住戶、瑪麗醫院使用者、基督教華人墳場和附近一帶的行人和駕車者的影響則會較低。如能對護土牆及架空道路結構的建築式樣作出適當設計，並在受影響斜坡及路旁位置多加種植樹木，便可把工程完工後遺留下來的視覺影響降低至合理水平。

## 8. 結論

本環評就本道路工程在施工及運作期間可能引起的環境影響作出了評估。研究結果顯示，儘管工程將造成不同程度的建築噪音，只要實行本環評所建議的緩解措施，預料不會帶來難以接受的影響。

新道路運作時，預料會對面向薄扶林道的沙宣道6號香港大學學生宿舍構成負面噪音影響。由於土木及交通工程和安全方面的各種限制，可供選用的緩解措施，亦受制肘。研究發現唯一可用的直接緩解措施為路旁隔音屏障，但其長度及高度均受限制，故此預計在最受影響的沙宣道6號的香港大學學生宿舍，交通噪音只會減低約1分貝，而研究亦認為路旁噪音屏障的效用不大及不可取。此外，若興建路旁隔音屏障，將會對沙宣道一帶的視覺及景觀構成不良的影響。在沒有其他更好的選擇下，環評建議採納隔音窗及冷氣裝置，以紓緩交通噪音造成的滋擾。另外，只要採取良好的地盤管理，建築廢料的影響應極為輕微。因受影響的林地生境的生態價值偏低，廣泛的重植計劃應足以彌補這方面的短暫損失。而在實行建議的緩解措施後，工程對景觀及視覺的影響應可達至合理水平。

Legend:



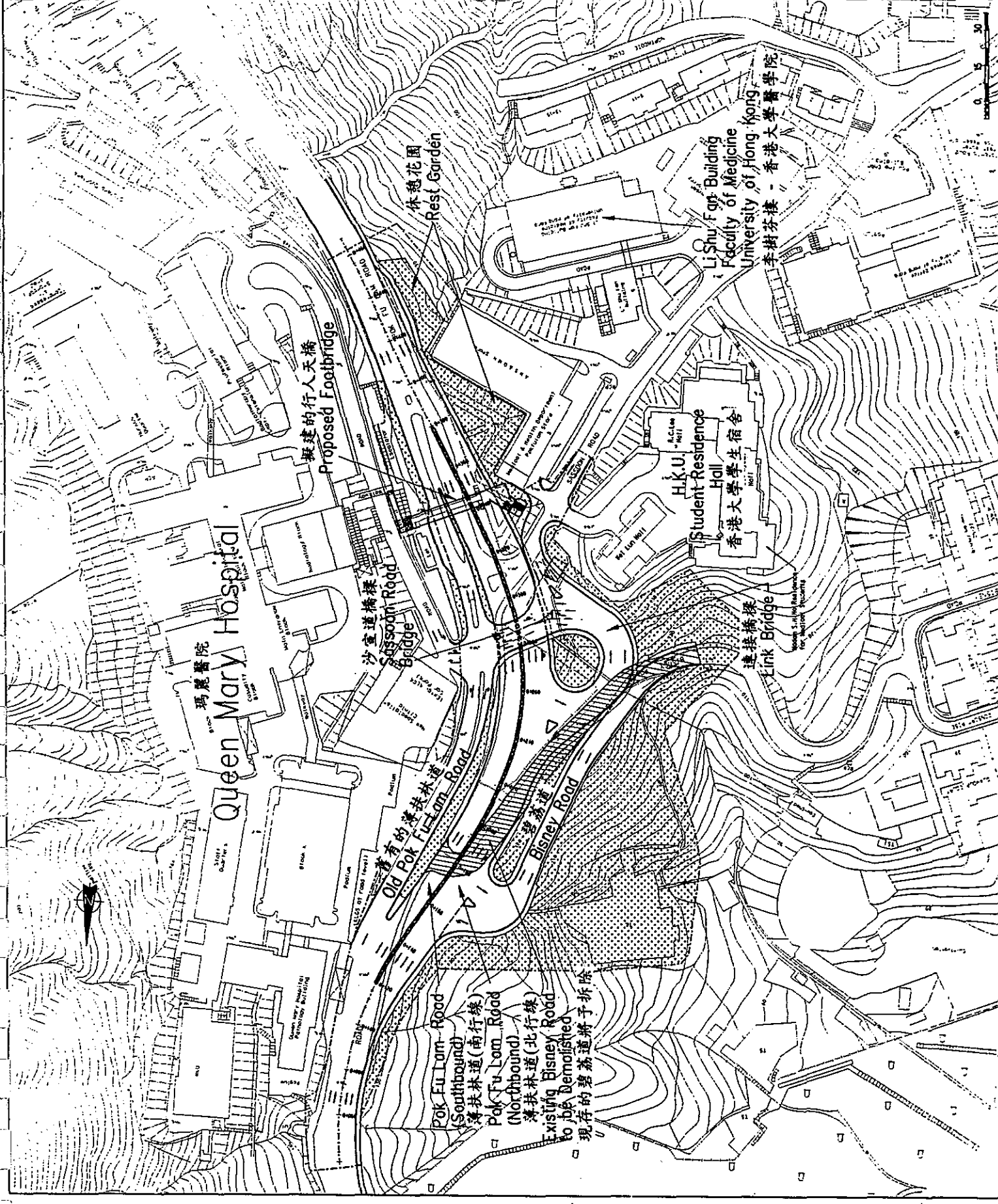
Landscape Area  
景觀美化地帶



Demolition of Bisney  
將予拆除的碧荔道橋



Project Limit  
道路工程範圍



MARK	REVISION	BY	DATE
<b>ARUP</b>			
Project Title Design and Construction of Flyover at the Junction of Pok Fu Lam Road and Sassoon Road			
Client The Arup & Partners Hong Kong Limited			
Project No. Agreement No. CE 30/95			
Drawing Title Figure A GENERAL LAYOUT PLAN 圖 A - 概覽			
Drawing No.			
Scale			
Author			
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FIGURE B - A SKETCH OF THE ROADWORKS

ERM-Hong Kong, Ltd  
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9 Chatham Road  
Tsimshatsui, Kowloon  
Hong Kong



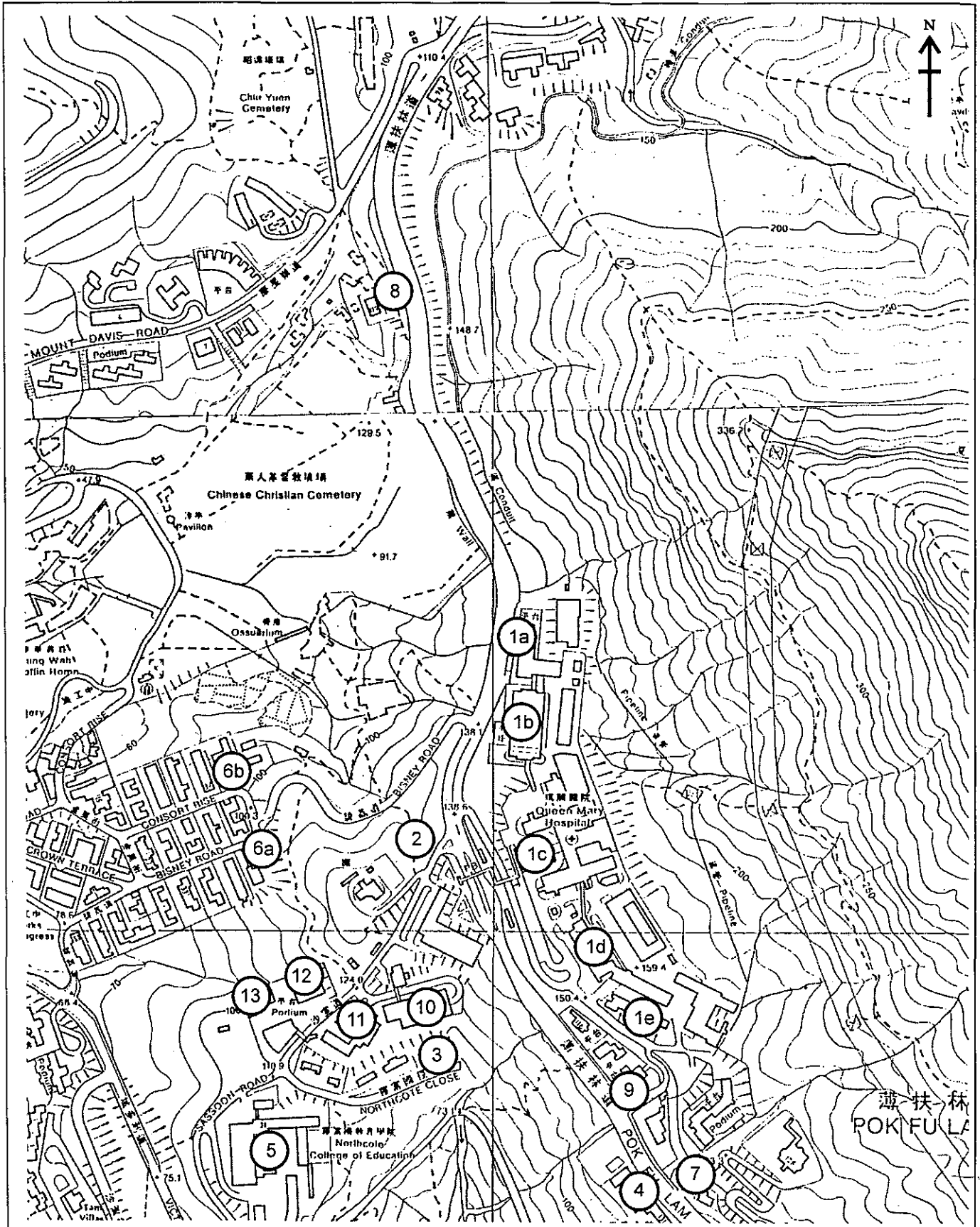


圖 C - 噪音敏感受體位置

FIGURE C - LOCATION OF NSRS

KEY  
 ⑤ NSRS

ERM-Hong Kong, Ltd

6th Floor  
 Heony Tower  
 9 Chatham Road  
 Tsimshatsui, Kowloon  
 Hong Kong

