路政署
Highways Department

**合約編號 CE 36/94**
**Agreement No. CE 36/94**

# 屯門第38區特殊工業區的填海及基本建設工程 道路改善工程 環境影響評估研究： 行政撮要

# Reclamation and Servicing of Tuen Mun Area 38 for Special Industries - Improvement to Roads and Junctions within Tuen Mun Environmental Impact Assessment: *Executive Summary*

一九九六年四月
April 1996

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FINAL REPORT

Highways Department

# Agreement No. CE 36/94 Reclamation and Servicing of Tuen Mun Area 38 for Special Industries - Improvement to Roads and Junctions within Tuen Mun Environmental Impact Assessment : *Executive Summary*

April 1996

Reference C1304

For and on behalf of ERM-Hong Kong, Ltd

Approved by: _____

Position: Technical Director

Date: 15 April 1996

## 1 *INTRODUCTION*

ERM-Hong Kong, Ltd (ERM), in association with Scott Wilson Kirkpatrick and Townland Consultants Ltd, was commissioned by the Hong Kong Government Highways Department (HyD) to undertake an Environmental Impact Assessment (EIA) for the Improvement to Roads and Junctions within Tuen Mun in relation to the Reclamation and Servicing of Tuen Mun Area 38 for Special Industries (Agreement No. CE 36/94) which comprises the Special Industries Area (SIA) and the River Trade Terminal (RTT). *Figure A* shows the location of the highway improvement works (Roadworks) and the Study Area. This report presents a summary of the main findings and recommendations of the EIA Study which has been endorsed by the Study Management Group.

In mid 1990, TDD completed the Expanded Development Study of Tuen Mun Area 38 for Special Industries (EDS) which confirmed the engineering and environmental feasibility of the development. The EDS identified that highways improvement works would be required to overcome the anticipated traffic problems on Lung Mun Road and the junction of Wong Chu Road/Tuen Mun Road which provide the main access for external traffic to and from Area 38. These highways improvement works, which are scheduled to commence in early 1998 for completion by 2001, include:

- construction of a bypass (to be named as the Foothills Bypass) from Tuen Mun Area 45 to Wong Chu Road along the foothills of Castle Peak to divert the traffic and to mitigate the environmental impact on Lung Mun Road; and

- improvement to the slip road right turn from Wong Chu Road (P3) to Tuen Mun Road (P1) to provide additional capacity.

The EDS recommended noise mitigation measures, including the erection of an enclosure, along the primary access route along the existing Wong Chu Road to Tuen Mun west due to the anticipated noise impacts generated by the increased traffic associated with the Tuen Mun Area 38 development. The EDS also recommended a more detailed EIA study to be carried out to determine areas prone to high noise levels followed by detailed design to remedy the noise problems identified prior to the construction works of the Area 38 development.

Subsequently this EIA Study was undertaken, covering the Foothills Bypass Northern Section and Wong Chu Road, as shown in *Figure A*. It is expected that the environmental impact due to the construction of the Foothills Bypass Southern Section will be small. Nevertheless, further EIA Study covering the Foothills Bypass southern section will be carried out in mid 1996.

The financial cost of the noise mitigation measures along Wong Chu Road is estimated to be $186M, compared to the estimated overall engineering cost of $3000–4000M to develop the SIA and RTT.

# 行政撮要

## 1. 引言

香港環境資源管理顧問有限公司，聯同史偉高（香港）有限公司及城市規劃顧問有限公司，受香港政府路政署委托，就與屯門第 38 區特殊工業區的填海及基本建設工程（合約編號 CE 36/94）（包括特殊工業區及內河貨運碼頭）有關的區內道路改善工程，進行了環境影響評估（以下簡稱環評）。圖 A 顯示了道路改善工程（以下簡稱「道路工程」）的位置及研究地域的範圍。本報告將簡述環評研究的主要結果及建議，而這些結果及建議均已獲政府的研究管理小組認可。

一九九零年中，拓展署完成《屯門第 38 區特殊工業區擴展研究》（以下簡稱「擴展研究」）。「擴展研究」確定了特殊工業區發展計劃在工程施工及環境方面的可行性。該項研究亦確認有需要進行道路改善工程，以克服進出第 38 區交通要道龍門路及皇珠路/屯門路交匯處可預見的交通問題。這些道路改善工程計劃在一九九八年初展開，至二零零一年完成，其中包括：

- 沿青山山麓興建一條由屯門第 45 區伸延至皇珠路的繞道（將稱為青山山麓繞道），以疏導龍門路的交通及紓緩有關的環境影響；及
- 改善由皇珠路（即 P3 路）右轉入屯門路（即 P1 路）的連接道路，以提供額外的交通容量。

由於預期與屯門第 38 區發展有關的交通增長會帶來噪音影響，故此「擴展研究」建議了噪音緩解措施，包括在往屯門西的主要道路皇珠路上加設隔音上蓋。「擴展研究」亦建議須在第 38 區發展計劃的建築工程展開前進行更詳盡的環評研究，確定易受噪音影響的地方和在詳細設計中加入補救噪音問題的措施。

本環評研究期後展開，研究範圍幅蓋如圖 A 所示的青山山麓繞道北段及皇珠路。預計青山山麓繞道南段建築工程引起的環境影響只屬輕微；不過，包括青山山麓繞道南段的環評仍會在一九九六年中進行。

發展特殊工業區和內河貨運碼頭的整體工程成本預計為 30 至 40 億，而皇珠路一帶的噪音緩解措施的成本則預計為 1 億 8 千 6 百萬。

## 2 *OBJECTIVE OF THE EIA*

The main objective of this EIA Study was to assess the potential air quality and noise impacts associated with the construction and operation of the Roadworks due to the development of Tuen Mun Area 38. Particular attention was drawn to noise sensitive receivers along Wong Chu Road where the residents of On Ting and Yau Oi Estates are already exposed to high road traffic noise. Conceptual noise mitigation measures were developed and evaluated on environmental, engineering, visual and cost grounds. An optimum mitigation package was recommended for implementation to ensure that the proposed development in Tuen Mun would not cause unacceptable additional environmental impacts to sensitive receivers. A review of the potential ecological impact associated with the highway improvement works was also conducted. The recommendations from this Study will be taken on board in the detailed design of the Roadworks scheduled to be commenced in April this year.

Apart from the development of Area 38, the extent and degree of impacts that must be addressed within this Study may hinge upon the proposed Tuen Mun Port Development (TMPD) for which the proposed Southern Relief Road is assumed. Two scenarios, one with the TMPD and the other without it, were therefore assessed within the present Study for the operation phase. The two scenarios were found to have similar noise and air quality impacts due to the similar traffic flows on the road network within the Study Area in both scenarios as additional roads outside the Study Area would be built if the TMPD went ahead.

## 3 *PROJECT DESCRIPTION*

The Roadworks concerned within this Study involve the Foothill Bypass Northern Section, the junctions between Lung Mun Road and Wong Chu Road and the junctions between Wong Chu Road and Tuen Mun Road (see *Figure A*). These Roadworks involve:

- construction of new carriageway, bridge, footpath and cycle track;
- demolition of existing bridge and replacement with a widened new structure; and
- demolition and reconstruction of existing roads.

A tentative construction programme was developed for the purpose of the air quality and noise assessment in this EIA study. The sequence of activities was designed to minimise the number of traffic diversions and traffic management measures during construction to retain traffic movements at all time. The programme is subject to change at the detailed design stage.

## 4 *CONSTRUCTION IMPACT*

### 4.1 *NOISE*

Noise modelling indicates that unmitigated construction activities of the Roadworks, mainly associated with road structure construction and demolition, will result in high noise levels of up to 87 dB(A). This will cause exceedance of the Environmental Protection Department (EPD) noise criteria (75 dB(A) for residences and 70 dB(A) for schools) at most of the nearby noise sensitive

## 2. 環評研究目的

本環評研究的主要目的是評估可能會由屯門第 38 區發展所需的「道路工程」施工及運作時引起的空氣質素及噪音影響。本研究尤其關注「道路工程」對皇珠路一帶「噪音感應強的地方」的影響，其中包括安定及友愛邨內現已受嚴重道路交通噪音影響的居民。本研究就環境、工程、景觀及成本等因素考慮了噪音緩解措施，建議了一套最佳的噪音緩解方案以肯定建議中的屯門區道路改善工程不會對這些敏感地點造成更多難以接受的環境影響。本研究亦覆核了「道路工程」可能引起的生態影響。本研究的建議將在本年四月展開的「道路工程」詳細設計中落實執行。

除屯門第 38 區的發展外，本研究亦顧及建議中的屯門港口發展的影響。若屯門港口發展落實，將有需要在本研究地域外興建額外的「南部紓緩道路」。由於上述原因，所以本研究為運作期而進行的評估，亦分別考慮了有屯門港口發展及無此項發展的兩種情況。但是，本研究發現，無論屯門港口發展落實與否，在本研究地域內的交通流量預料將會相若，而有關的噪音和空氣質素影響亦會相似。

## 3. 工程項目內容

本研究涉及的「道路工程」包括青山山麓北段、龍門路及皇珠路交匯處和皇珠路及屯門路交匯處。這些「道路工程」包括：

- 興建新的行車路、橋樑、行人路和單車徑；
- 拆卸原有橋樑及以增闊的新結構取代；及
- 拆卸及重新興建現有道路。

為進行本環評研究中的空氣質素及噪音評估，一套初步的施工計劃經已訂定。這套計劃中的施工次序經特別安排，務求盡量減少施工期間的改道和其他交通管理措施以保持交通在所有時間都可流通。此計劃在詳細設計階段時可能會有所改動。

## 4. 施工期影響

### 4.1 噪音

噪音模擬研究顯示，未經緩解的「道路工程」建築活動，尤其是道路結構的興建及拆卸有關的活動將引致高達 87 分貝的噪音水平。這些噪音將令鄰近大部份「噪音感應強的地方」，在平日日間（0700 至 1900時）超越環境保護署（以下簡稱環保署）訂下的噪音準則（住宅為 75 分貝及學校為 70 分貝）。

receivers (NSRs) during weekday daytime hours (0700-1900 hours).

Therefore adequate mitigation measures will be required for the works to meet the criteria, such as the use of silenced equipment and installation of mobile noise barriers close to particularly noisy plant. Should the mitigated construction noise impact still exceed the noise criteria, additional measures should be implemented based on the actual site situation such as avoidance of simultaneous noisy activities and reduction in number of operating plants. These mitigation measures should be incorporated into contract documents and checked by noise monitoring and audit procedures during the construction works for compliance with the appropriate noise criteria. In addition any construction activities involving the use of powered mechanical equipment during restricted hours (ie 1900-0700 hours on weekdays and all day on Sundays) will require a Construction Noise Permit.

Both the Lui Cheung Kwong Primary School and Morning Light School that may be affected by the construction noise are under the Education Department's noise insulation programme. It is recommended that the programme for the two schools be brought forward prior to the construction work commencement in early 1998.

### 4.2 *AIR QUALITY*

The likely air quality impact from the Roadworks construction is related to dust nuisance, mainly arising from excavation, filling, bulldozing and material handling. Computer modelling of the worst case scenario indicates that air sensitive receivers (ASRs) including the planned Siu Lun Street community facilities and soccer pitch, the Nam Fung Industrial City and the planned Area 18 housing development are likely to be subjected to dust impact with levels up to 800 ug/$m^3$, exceeding EPD's recommended TSP hourly guideline of 500 ug/$m^3$. However with the implementation of standard dust suppression measures as incorporated into contract documents, and with checking by dust monitoring and audit procedures, the dust criterion will be satisfied at the ASRs.

### 4.3 *ECOLOGY*

The Roadworks alignment does not impinge on the San Shek Wan Tsuen water course referred to in the Brief, although the associated construction work may affect the initial section of the water course. However this part of the water course area has been channelised and the riparian areas already disturbed, therefore very low ecological impact is anticipated. Good construction site practices are recommended to minimise any impact on the upstream area, such as fenced off work sites and regular checks to ensure work site boundary is not exceeded.

## 5 *OPERATIONAL IMPACT*

### 5.1 *ROAD TRAFFIC NOISE IMPACT*

Recent noise surveys of the Study Area indicate that the existing environment is already noisy, with peak hour traffic noise levels in the range of 72–79 dB(A).

Future traffic flows on the improved road network have the potential to impact adjacent NSRs. A noise model of the road network was used to predict the traffic noise levels for the worst case scenario in year 2011. It is estimated that some 4800 number of dwellings along Wong Chu Road will

為了符合噪音準則，工程須充分實施緩解措施，包括採用低噪音型機動設備和在特別嘈吵的設備旁裝設可移動的隔音屏障。若經緩解的建築噪音仍然超出噪音標準，就需根據工地的實際情況而實施額外的措施，如避免同時進行噪音量大的工程，或減低開動工程機械的數目。這些措施將會包括在建築合約條文內，同時會有噪音監測程序確定工程合符噪音準則。此外，在受限制時間（即平日 1900時 至 0700 時及星期日全日）內使用機動設備進行的任何建築工程，均需申領「建築噪音許可證」。

可能受施工噪音影響的呂祥光小學及晨光學校均已在教育署的學校隔音工程計劃的名單上，本研究建議需在建築工程於一九九八年動工前，提前為這兩間學校進行隔音工程。

### 4.2 空氣質素

道路工程施工可能引起的空氣質責影響將來自主要由挖土、填土、推土及搬運泥土引起的塵埃滋擾。根據最壞情況而進行的電腦模擬顯示，部份「空氣質素感應強的地方」會明顯地受高達 800 微克／立方米的塵埃水平影響，超越環保署訂下 500 微克／立方米的塵埃水平準則，這些地點包括已策劃的兆麟街社區設施及足球場內、第18區住屋發展及南豐工業城。不過，一經實施合約條文內的標準壓抑塵埃措施，再以塵埃監測程序加以審查，則預料在上述「空氣質素感應強的地方」的塵埃水平將合符準則。

### 4.3 生態影響

雖然「道路工程」的建築工程可能影響散石灣村附近小河的開端一段，但是建議中的道路取向並不會侵擾小河的生態環境。由於此段河流經已開闢，而河岸生態亦已受滋擾，因此預期生態影響將極度輕微。研究建議採取良好的工地管理措施，如將工地加上圍板及定期檢查以確定並無超越指定工作邊界，以盡量減低對散石灣小河上游的影響。

## 5. 運作期影響

### 5.1 道路交通噪音影響

近期在研究地域內進行的噪音測量顯示該處的環境已屬嘈吵，繁忙時間的交通噪音水平達 72 至 79 分貝。

在道路改善後流通的交通，有可能會對附近「噪音感應強的地方」造成影響。研究使用了道路網絡噪音模擬，推算了在二零一一年最壞情況下的交通噪音水平；估計沿皇珠路大概會有 4,800 户受到超越《香港規劃標準及準則》（以下簡稱《規劃標準》）噪音水平的影響。

be adversely affected by traffic noise exceeding the levels stipulated in the Hong Kong Planning Standards and Guidelines (HKPSG).

As confirmed by the Education Department (ED), all the affected primary and secondary schools within the Study Area will have insulation installed for existing traffic noise protection under the Noise Abatement Measures in Schools Programme (NAMISP), prior to the operation of the Roadworks. It is recommended that the programmed insulation work for some of the affected schools be upgraded to redress the future traffic noise impact associated with the Roadworks, through liaison with ED and Architectural Services Department.

Four types of noise mitigation measures were considered, including (1) low noise road surfaces that absorb part of road traffic noise; (2) roadside noise barrier walls that are effective to screen low rise NSRs from noise source; (3) cantilever barriers that are similar to barriers but with an extension from the top slightly over the road to improve their effectiveness; and (4) full enclosures that are most effective in protecting high rise NSRs by completely covering the road.

Taking into account of site constraints and engineering requirements, and to follow up with the recommendations in the EDS, a package of noise mitigation measures which comprises noise enclosures, 3m noise barriers, 5m cantilever noise barriers and low noise road surface, is recommended as the best practicable means to mitigate the potential traffic noise problem. *Figure B* illustrates the extent of the recommended mitigation package and the benefits provided to the residents along Wong Chu Road in terms of the extent of noise reduction.

The conceptual design drawing of the recommended barriers is shown in *Figure C*. In order to fulfill fire fighting and emergency operation requirements to permit unrestricted passage of dangerous goods vehicles, the recommended full enclosure along Wong Chu Road has been designed as shown in *Figures D & E*, with two enclosure sections each not exceeding 230m in length, separated by a 5m high cantilever barrier placed within the 60m break where NSRs are farthest away. Openings are provided along the two sides of the enclosures to allow natural ventilation. These openings will be acoustically treated to increase the effectiveness of the enclosures.

It is estimated that, with the implementation of the recommended noise mitigation package, 99% of the 4800 number of dwellings along Wong Chu Road would benefit with noise reduction from 1 to 16 dB(A).

There are residual noise impacts at some of the NSRs that do not benefit from the noise mitigation package due to the engineering constraints to the extent of the mitigation and the noise contribution from surrounding roads such as Hoi Wong Road and Tsing Wun Road. However the residual impacts from the Roadworks will contribute less than 1 dB(A) increase to the prevailing traffic noise levels.

5.2 *ROAD TRAFFIC EMISSION IMPACT*

Potential vehicular emission impact associated with the traffic from the Roadworks and the surrounding major roads was predicted using an air dispersion computer model, based on the emission factors provided by EPD and the worst case traffic forecasts for 2011.

Modelling results indicate that the vehicular emission impacts even with the proposed enclosures arrangement will comply with the statutory Air Quality Objectives (AQOs) requirements at all ASRs.

教育署確定在研究地域內所有受影響的中小學校均會在「道路工程」投入運作前，根據該署的「學校噪音消減措施計劃」，裝設隔音設施，以保障此等學校不受現有的交通噪音影響。本研究建議透過教育署及建築署互相聯絡協調，將部份學校原先計劃的隔音工程升級，以應付「道路工程」將來會引起的交通噪音。

本研究曾考慮了四種抒緩噪音的措施，包括（1）可以將部份交通噪音吸收的低噪音路面；（2）可有效地將噪音源與低矮「噪音感應強的地方」隔離的路旁隔音屏障；（3）與隔音屏障相似，但頂端加長和輕微折入覆蓋路面，以改善隔音效果的懸臂式隔音屏障；及（4）完全覆蓋路面，最能為高層「噪音感應強的地方」提供保護的完整隔音上蓋。

考慮到地點的限制及工程的要求，和跟進「擴展研究」的建議，本研究建議了一套可行的最佳噪音緩解方案。方案中包括在適當地方選用完整隔音上蓋、5 米高懸臂式隔音屏障、3 米高隔音屏障和低噪音路面。圖 B 顯示了該方案的範圍及其為沿皇珠路一帶居民在減低噪音方面帶來的益處。

圖 C 顯示了建議中的隔音屏障設計。為了讓盛載危險品的車輛可在皇珠路通行，沿皇珠路一帶的隔音上蓋的設計，必須符合消防及處理緊急事故的要求。如圖 D 及 E 所示，此隔音上蓋將分成兩段，每段的長度不超過 230 米；該兩段上蓋在距離「噪音感應強的地方」最遠之處將留有長 60 米的間隙，而該處將會裝置 5 米高的懸臂式屏障。上蓋側壁約會留有百分之十面積的空隙供通風之用，空隙處會有吸音處理增加上蓋的隔音效率。

採用建議中的噪音緩解方案，預計可令沿皇珠路兩旁受影響的 4,800 戶中百分之九十九的住戶受惠，噪音水平會降低 1 至 16 分貝。

由於工程限制和附近其他道路（如海皇路及青雲路）的噪音影響，故此小部份的「噪音感應強的地方」未能因建議的噪音緩解方案而受惠。不過，由「道路工程」引起的噪音影響不會令該區已有的交通噪音水平多出 1 分貝。

## 5.2 道路交通廢氣影響

改善後道路及其附近道路的交通可能引起的汽車廢氣影響,已根據環保署提供的廢氣排放系數及二零一一年最壞情況的交通預測，用空氣擴散電腦模擬推算。

模擬結果顯示甚至在有道路隔音上蓋的情況下，在所有「空氣質素感應強的地方」的汽車廢氣水平都會合符法定《空氣質素指標》的要求。

With the provision of natural openings along the two sides of the full enclosures with a break in between, it is predicted that the air quality inside the enclosures will comply with EPD's tunnel air quality guidelines on pollutant concentrations.

However should there be changes to the assumed preliminary design parameters at the detailed design stage, the overall acceptability of the air quality impact, particularly on Oi Shun House and Oi Lai House at ground level, may need to be re-assessed in liaison with EPD.

## 6 *CONCLUSION*

This EIA has assessed the potential environmental impacts associated with the construction and operation of the proposed Roadworks, both under the With and Without TMPD scenarios. The two scenarios are found to have similar impacts.

The construction works are expected to result in exceedances of the noise and dust criteria at certain sensitive receivers. With the implementation of the recommended control measures, the impacts will be reduced to within the established standards, checked by environmental monitoring and audit procedures detailed in the Environmental Schedule. The Roadworks will not impinge on the concerned San Shek Wan Tsuen watercourse and good construction site practices are recommended to avoid impact on the upper part of the watercourse and the associated riparian habitats.

Modelling of the potential traffic noise from the Roadworks and surrounding roads indicates exceedances of the HKPSG noise criteria at most of the NSRs. A noise mitigation package comprising noise enclosures, barriers, cantilever barriers and low noise road surface has been recommended as it provides the best practicable mitigation at source to benefit residents in the Study Area and is feasible from environmental, engineering and visual considerations. The mitigation package will achieve the HKPSG noise limit at approximately 1500 dwellings, out of the total affected 4800 dwellings along Wong Chu Road.

Air quality modelling indicates that the vehicular emission impacts from the traffic on the Roadworks and surrounding roads, with the implementation of the recommended noise mitigation package, will comply with air quality criteria.

Should there be any changes to the design parameters assumed in this EIA study at the following detailed design stage, the acoustic performance of the enclosures and the air quality impact may need to be reviewed in liaison with EPD.

由於在兩段分隔開的隔音上蓋兩側已留有空隙作空氣流通，因此在上蓋內的空氣質素將合符環保署的隧道空氣質素指引。

不過若在詳細設計階段時對本環評研究使用的初步設計數據作出更改，則空氣質素的整體可接受程度（尤其是友愛邨的愛信樓及愛禮樓地面水平的空氣質素）可能需與環保署協調加以重新評估。

## 6. 結論

本環評研究評估了在有及無屯門港口發展的兩種情況下，建議中的「道路工程」施工及運作時可能造成的環境影響，並顯示兩種情況下的影響將會相似。

在某些易受影響的地點，建築工程將引致超出噪音及塵埃標準的情況。實施建議的緩解措施後，加上「環境手冊」內詳列的環境監測及審核程序加以查核，環境影響將可減至既定的標準。「道路工程」不會侵擾散石灣村附近的河流，而研究亦已建議採用良好的工地措施，以免影響河流上游及其河岸生態環境。

電腦模擬顯示，在大部份「噪音感應強的地方」，來自「道路工程」及其他附近道路的交通噪音將超出《規劃標準》的噪音標準。研究建議了一套噪音緩解措施，其中包括隔音上蓋、懸臂式隔音屏障、隔音屏障和低噪音路面。此等措施在環境、工程和景觀各種考慮方面都可行，並且提供了在噪音源進行緩解的最有效可行方案，使研究地域內的居民受惠。這套措施令皇珠路一帶受影響的 4,800 户中有約莫 1,500 户可享受符合《規劃標準》噪音標準水平的環境。

空氣質素模擬顯示，在實施緩解措施後，由「道路工程」及鄰近道路交通引起的車輛廢氣影響將符合空氣質素標準。

若在詳細設計階段中，對本環評研究使用的設計數據有任何更改，則有可能需和環保署聯絡，以覆核隔音上蓋的隔音效果及空氣質素。

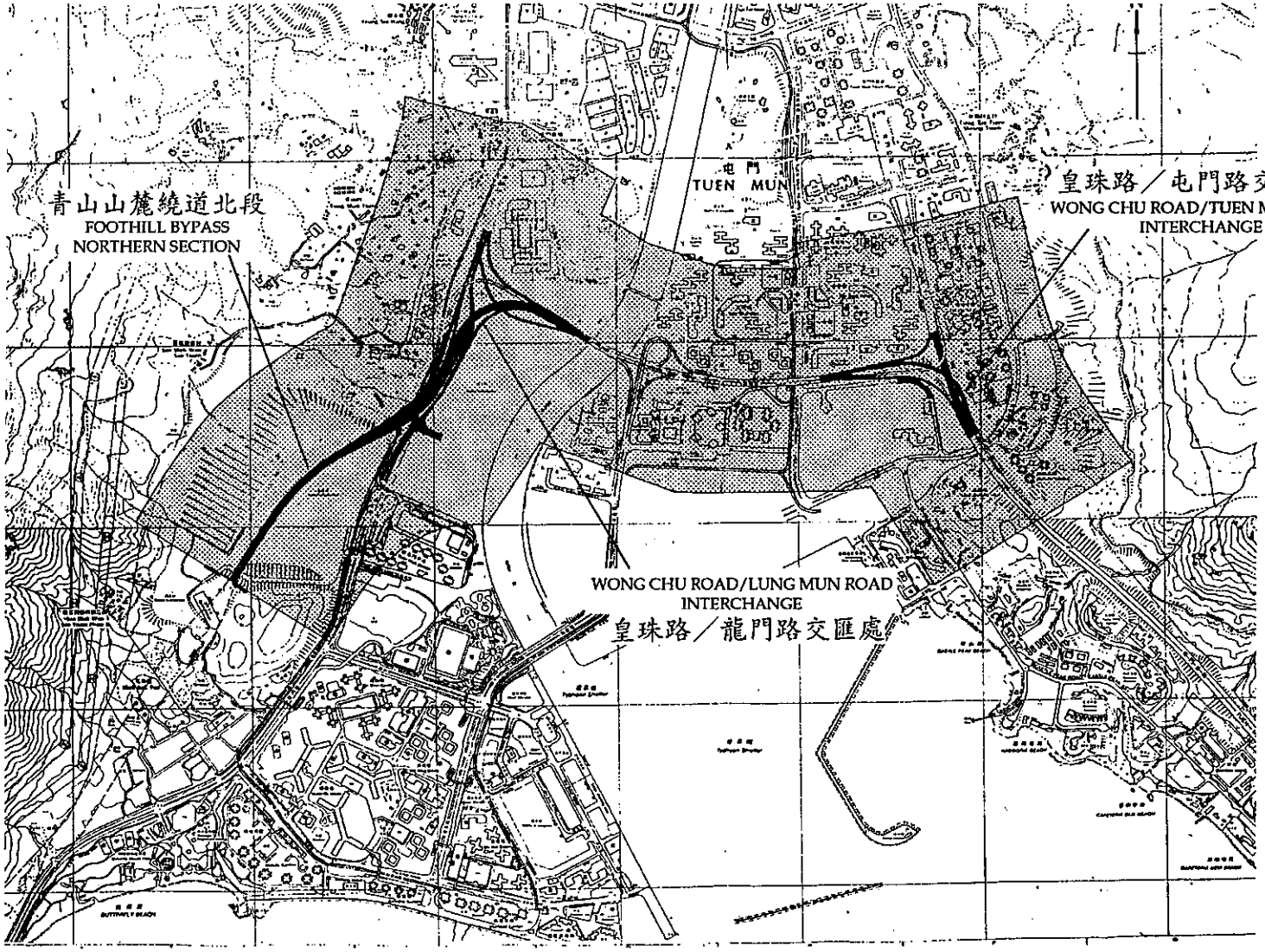


圖 A 環境影響評估研究地域
FIGURE A - ENVIRONMENTAL IMPACT ASSESSMENT STUDY AREA

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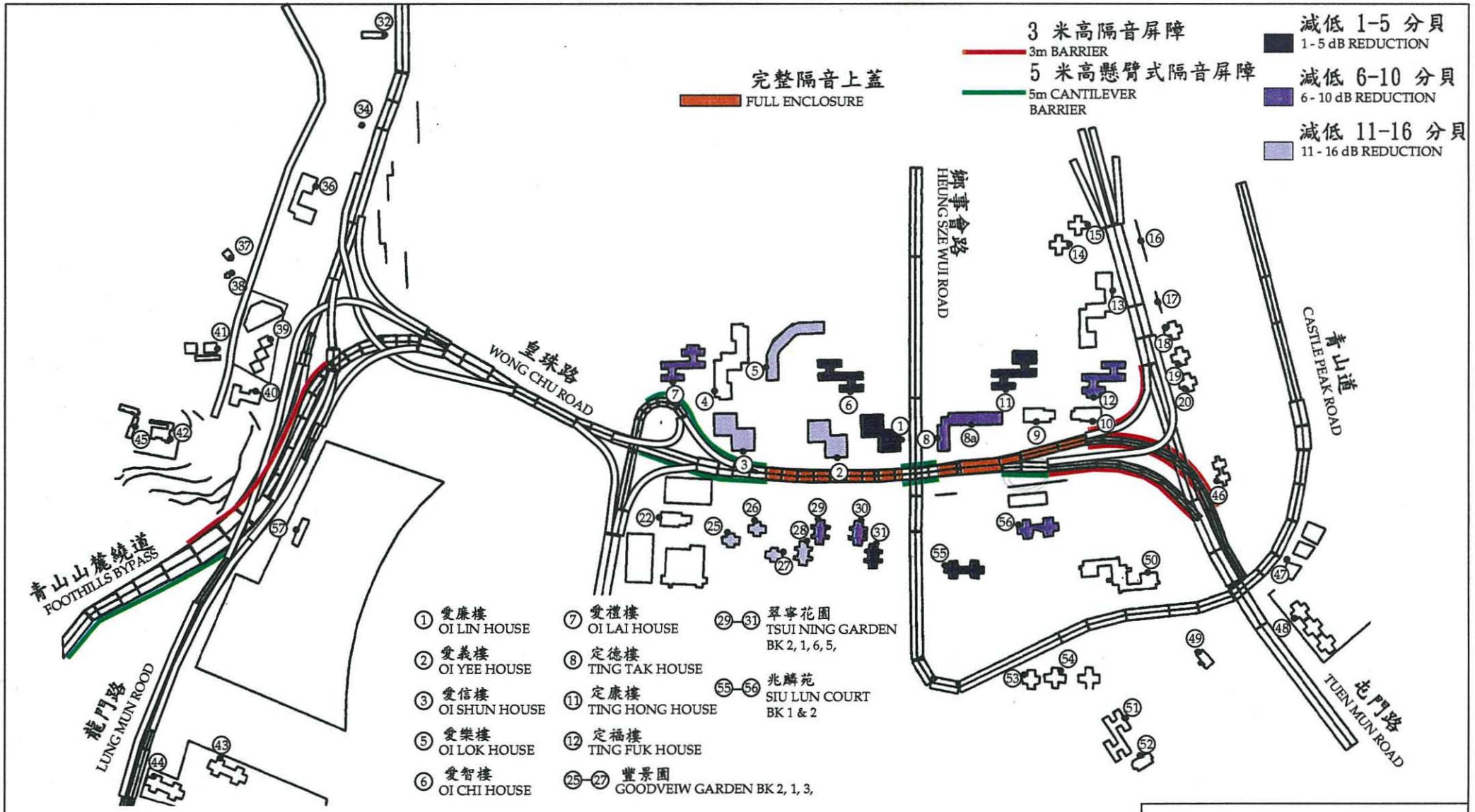


圖B1　採用方案四後沿皇珠路兩旁受惠(噪音減低)的住宅

FIGURE B1 - DWELLINGS ALONG WONG CHU ROAD BENEFITED (NOISE REDUCTION) FROM OPTION 4


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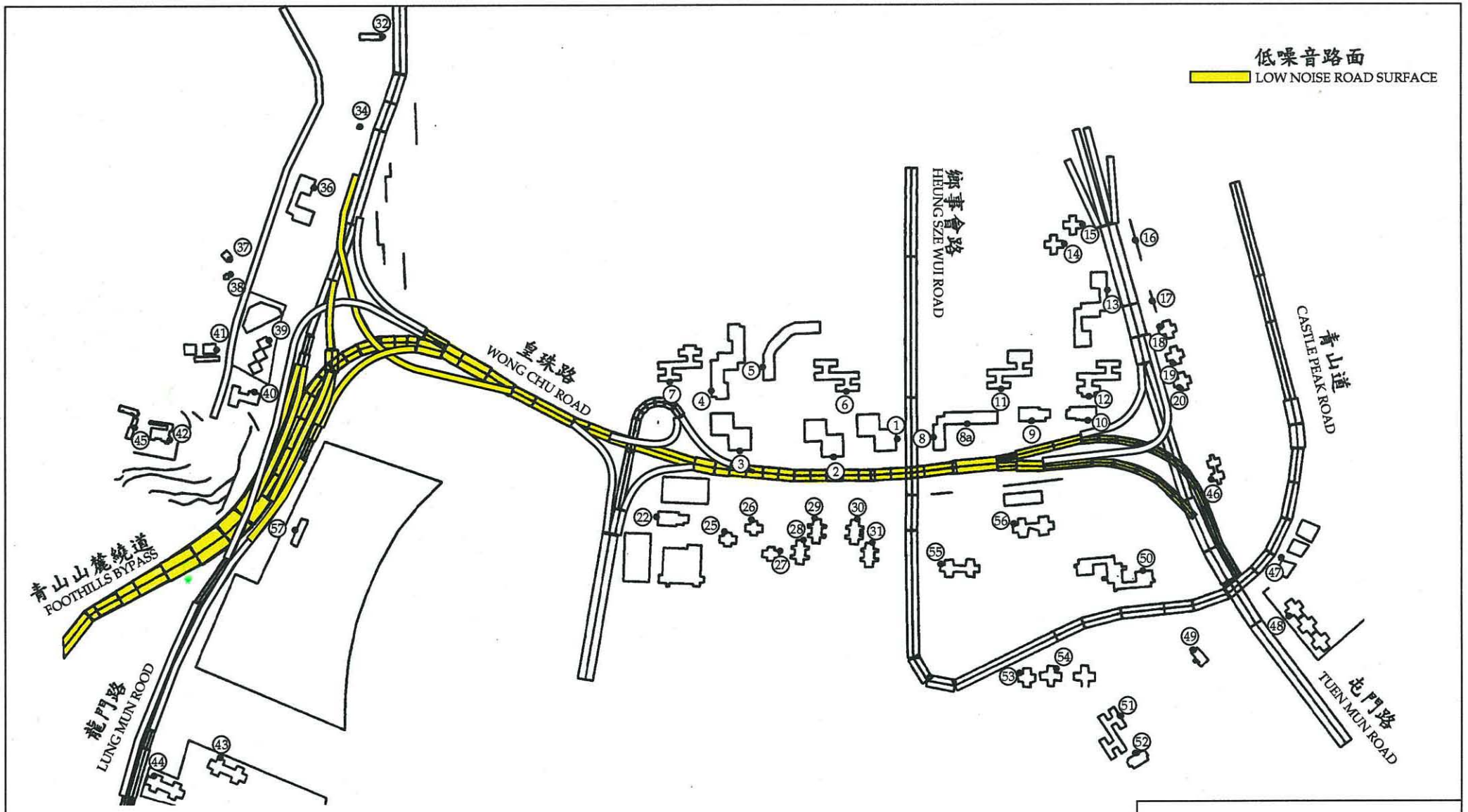


圖 B2 - 方案四的低噪音路面範圍

FIGURE B2 - EXTENT OF LOW NOISE ROAD SURFACING FOR OPTION 4

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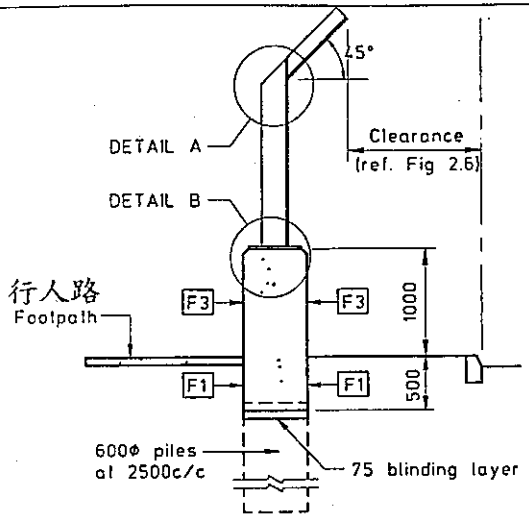
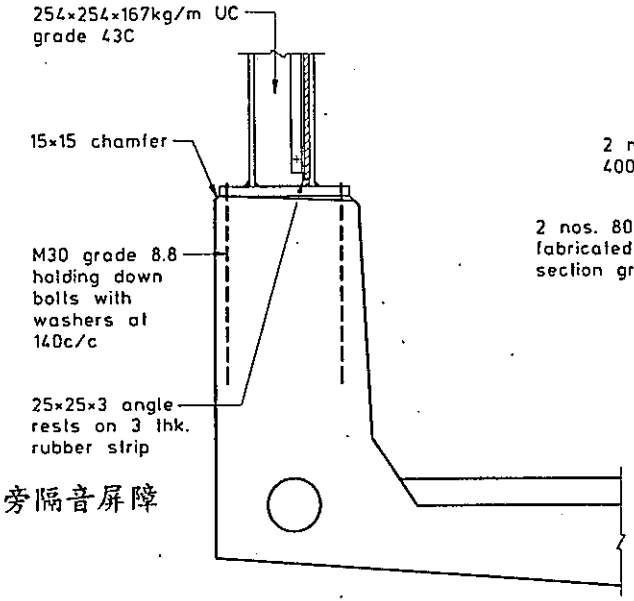
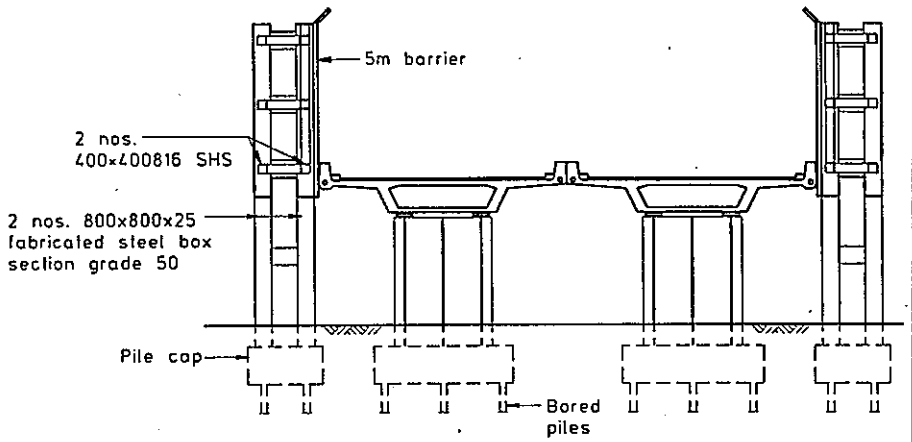



NOISE BARRIER ALONG ROADSIDE路旁隔音屏障
1 : 50

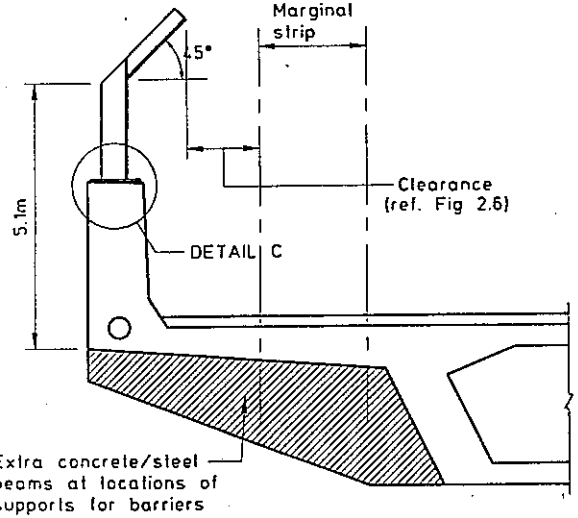



DETAIL C 細節 C
1 : 20

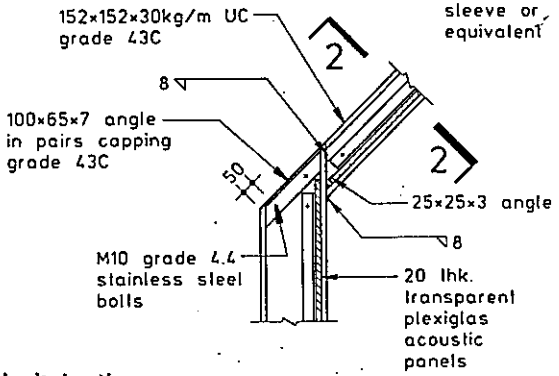



隔音屏障獨立支撐的可能安排 POSSIBLE OPTION FOR NOISE BARRIERS ON EXISTING STRUCTURES REQUIRING INDEPENDENT SUPPORT

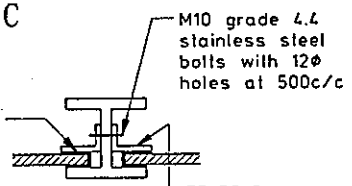
1 : 250



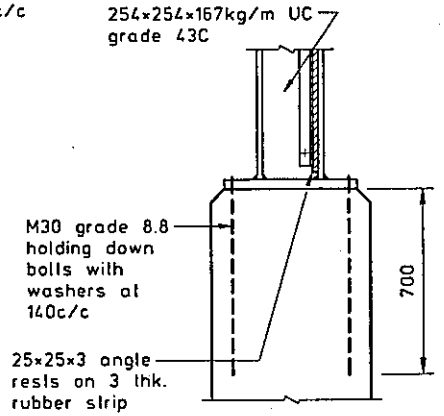

NOISE BARRIER ON PROPOSED ELEVATED STRUCTURES 建議中高架道路之隔音屏障
1 : 50




DETAIL A 細節 A
1 : 20




2 - 2
1 : 10




DETAIL B 細節 B
1 : 20

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圖 C 隔音屏障／懸臂式隔音屏障之設計概念圖則
FIGURE C - BARRIERS/CANTILEVER BARRIERS CONCEPTUAL DESIGN DRAWING

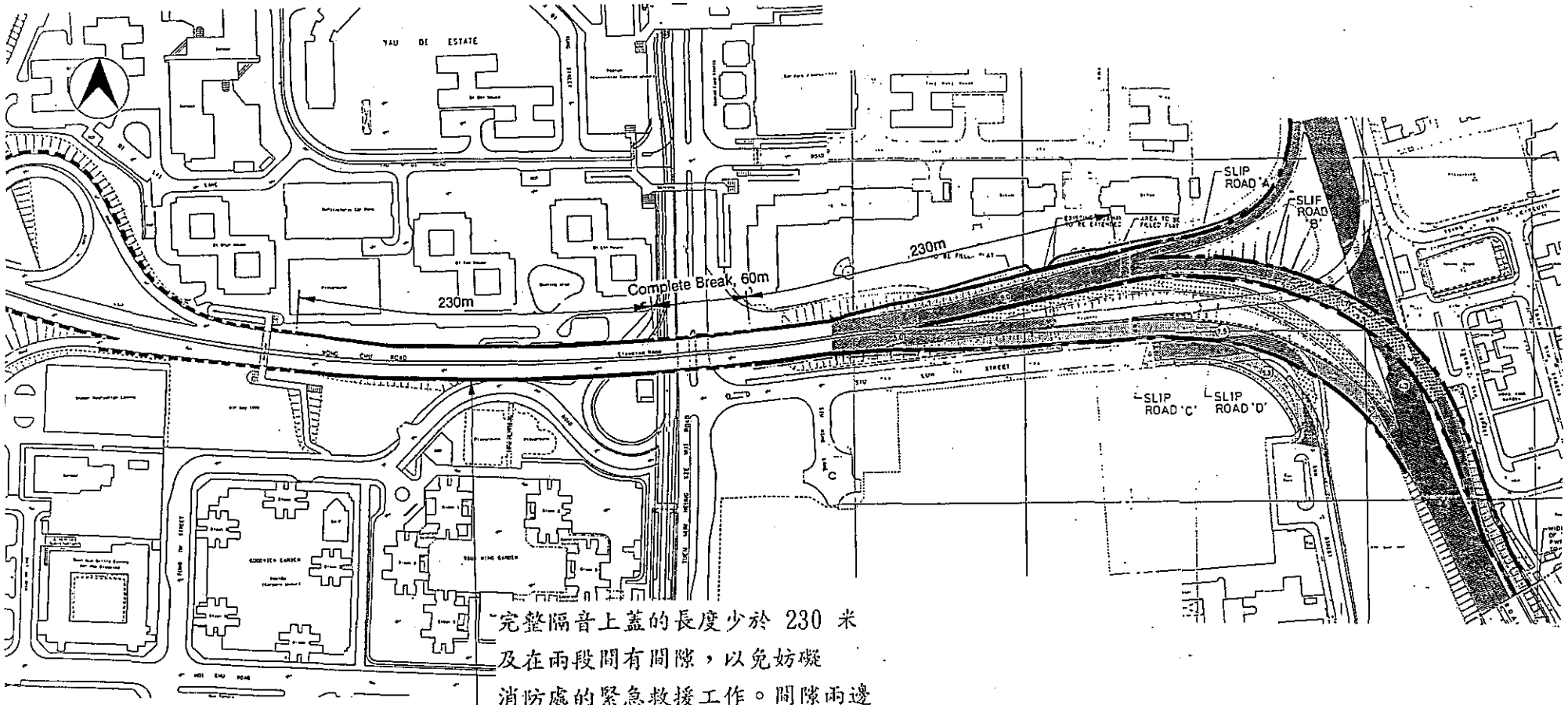


圖 D 隔音上蓋安排－皇珠路

FIGURE D - NOISE ENCLOSURE ARRANGEMENT - WONG CHU ROAD

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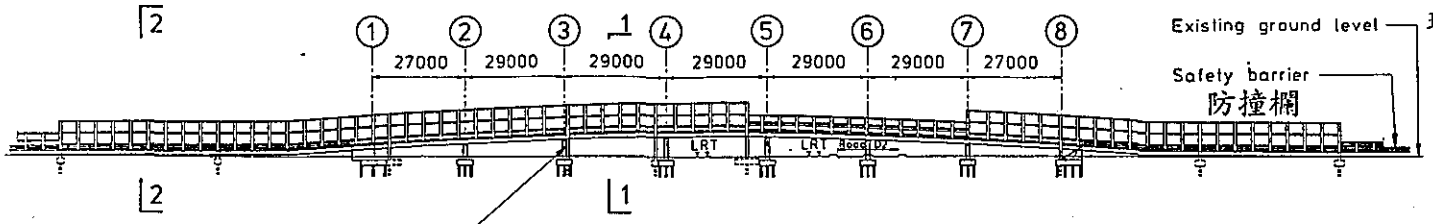
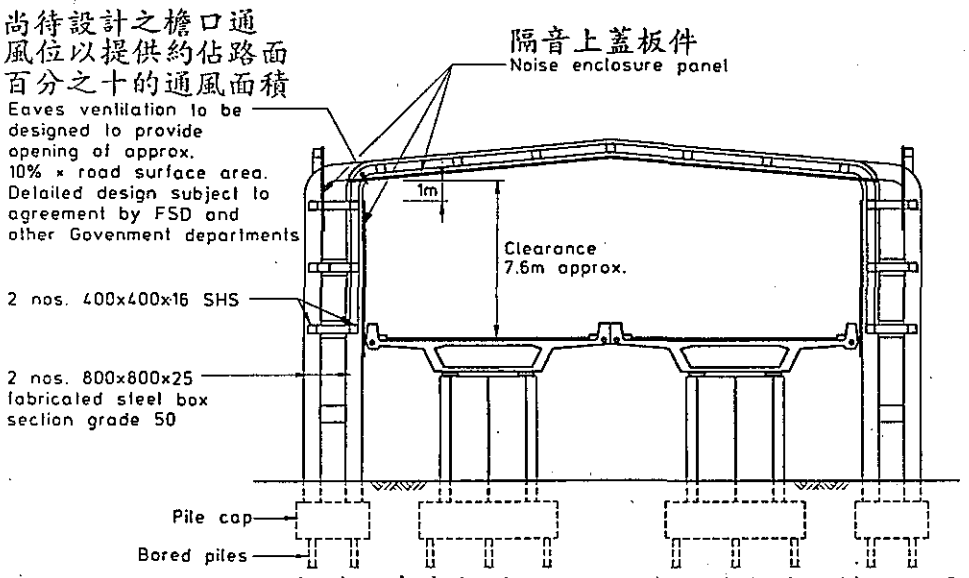



皇珠路隔音屏障南面立視圖

SOUTH ELEVATION OF NOISE BARRIERS ALONG WONG CHU ROAD

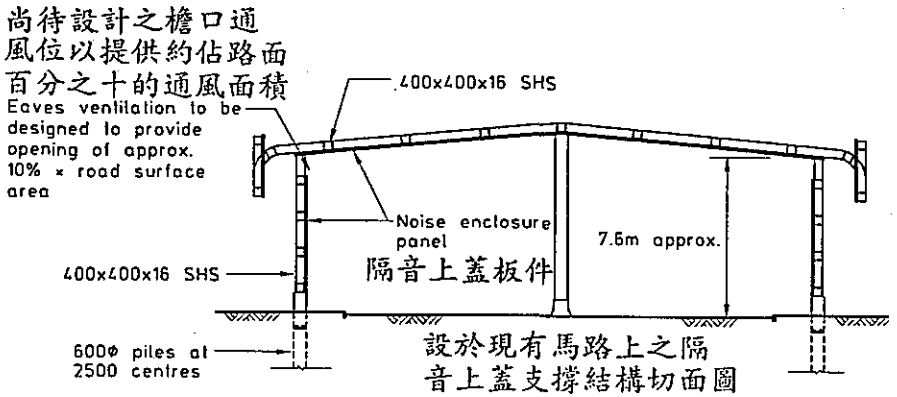
1 : 1500




設於現有高架道路上之隔音上蓋支撐結構切面圖

TYPICAL ARRANGEMENT OF NOISE ENCLOSURE SUPPORT ON EXISTING ELEVATED STRUCTURE

1 : 250




設於現有馬路上之隔音上蓋支撐結構切面圖

TYPICAL SECTION OF NOISE ENCLOSURE SUPPORT ALONG EXISTING CARRIAGEWAY

1 : 250

圖 E 建議中隔音屏障之細節

FIGURE E - PROPOSED NOISE ENCLOSURE DETAILS

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