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Territory Development
Department, Hong Kong
新界東拓展處
NEW TERRITORIES EAST
DEVELOPMENT OFFICE

Sha Tin Newtown Stage II
Road D15 Linking
Lok Shun Path & Tai Po Road

ENVIRONMENTAL IMPACT ASSESSMENT
EXECUTIVE SUMMARY

March 1997

MAUNSELL CONSULTANTS ASIA LTD

in association with

Consultants in Environmental Sciences (Asia) Ltd
Hassell Ltd

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Road D15 Linking Lok Shun Path and Tai Po Road

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1. INTRODUCTION

1.1 Background

1.1.1 The project was initiated by Transport Department in 1993, with the intention of providing an alternative link between Fo Tan Area and external Trunk Roads such as Tai Po Road. It is considered that such a link will alleviate the traffic congestion at Fo Tan Industrial Area and Fo Tan Interchange, provide an alternative vehicular access in case of emergencies, and possibly reduce the travelling time to/from Fo Tan Area. The location of the said project is shown in Figure 1.

1.1.2 The new road link is about 0.5 km long, extending from the existing roundabout at Lok Shun Path to the Elevated Access Road at the northern extremity of the KCRC Development over the Ho Tung Lau Depot (Royal Ascot). As this access road joins the Old Tai Po Road some 300 metres further north, a direct link between Old Tai Po Road and Lok Shun Path will be available upon the completion of this Project. The proposed road alignment, locations of Noise Sensitive Receivers and proposed barriers are indicated in Figure 2.

1.1.3 Maunsell Consultants Asia Ltd (MCAL) in association with Consultants in Environmental Sciences (Asia) Ltd and Hassell Ltd have been commissioned by New Territories East Development Office of the Territory Development Department to undertake an Environmental Impact Assessment of the proposed District Road D15 in Sha Tin.

1.2 Study Objectives

1.2.1 The purpose of this EIA Study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed project and all related activities taking place concurrently.

1.2.2 The proposed roadworks are located between industrial and village developments, and pass through a woodland area. The ecology of the woodland area will be affected by the road and associated slopeworks. The village housing adjacent to the proposed alignment will be exposed to noise and air quality impacts. In this connection, the representative of Lok Lo Ha Village has formally objected to the road improvements works as the *'fung shui'* of the village will be affected.

Hence the specific environmental impacts that were addressed by the study include:

- Noise impacts
- Air quality impacts
- Ecological impacts
- Landscape and visual impacts
- Requirements of Environmental Monitoring & Audit

2 NOISE IMPACT ASSESSMENT

2.1 Identification of Noise Sensitive Receivers

2.1.1 The identification of representatives noise sensitive receivers (NSRs) follows the procedure as outlined in the Hong Kong Planning Standards and Guidelines (HKPSG). The locations of the representative NSRs are indicated in Figure 2 which comprise of residential developments in Lok Lo Ha Village and Royal Ascot.

2.1.2 It is understood that there are no other noise sensitive developments that will be built within the Study Area in the future although pockets of residential developments may still occur within Lok Lo Ha Village. However the worst locations closest to the proposed road alignment have been considered in this Study.

2.2 Assessment Criteria

2.2.1 The assessment of construction noise impact is based on the criteria and procedures set out in the relevant Technical Memoranda associated with the Noise Control Ordinance (NCO).

For works carried out during restricted periods, the contractor is required to obtain a Construction Noise Permit (CNP) to carry out works involving powered mechanical equipment (PME) and Prescribed Construction Works.

There is no statutory control on construction noise (other than percussive piling) over the daytime (i.e. between 0700 hours - 1900 hours) on normal weekdays. However, EPD's Practice Note for Professions Persons PN 2/93 sets a non-statutory daytime noise limit of 75 dB(A) L_{eq} (30 min) at residential dwellings.

2.2.2 The assessment of noise impact during the operation phase follows the guidelines and noise limits as stipulated in the HKPSG. The calculation of traffic noise is based on the methodology given in the Calculation of Road Traffic Noise, DoT/UK 1988.

2.3 Construction Noise Impact & Mitigation Measures

2.3.1 The major construction works that contribute to noise comprise of earthworks, drainage, road pavements, retaining walls and bridges.

2.3.2 Road construction and drainage works are found to have the greatest impact on the identified NSRs. This is primarily due to the proximity of the dwellings to the construction activities. Noise levels of up to 88 dB(A) has been calculated for Facade F11, which lies about 10 metres from the roadway.

2.3.3 Noise arising from bridge construction is predicted to exceed the daytime limit for facades close to the bridge site at Royal Ascot. Similarly Facade F25 is likely to experience noise levels exceeding the daytime limits from the adjacent retaining wall and stairway constructions.

2.3.4 To minimise the noise impact during the construction phase, the following noise control measures are recommended, and noise levels at the NSRs are expected to be within the established guideline with the adoption of thee measures :-

(i) All construction work are restricted to 0700 - 1900 hours on weekdays and Saturdays.

(ii) Temporary purposed-built barriers should be installed along the roadworks boundary fronting the NSRs at the onset of construction to screen the anticipated high construction noise.

(iii) Quietened equipment for the construction work should be employed.

(iv) The number of equipment, procedure and sequence of construction should be arranged in such a way that the noise generated from the plants are kept to a minimum.

2.4 Operation Phase Noise Impact Assessment & Mitigation Measures

2.4.1 Traffic noise assessment indicated that most NSRs are expected to experience noise levels within the HKPSG limits. Only facades in the vicinity of the roundabout will be adversely affected by traffic noise. The cluttered residential developments are fully exposed to traffic noise with the road at ground level. Worst affected facades are F10 and F11, located approximately 10 metres from the roadway. Predicted noise levels calculated for the top floors are in the order of 74 dB(A). For another Facade F17, noise levels of up to 73 dB(A) are predicted.

For facade F25 located further up the northern slope of the village, noise levels of up to 79 dB(A) are predicted at the upper floor. This facade is about 7 metres from the roadway.

All the noise levels of the NSRs at Royal Ascot are expected within the established standard except for facade F19. A maximum noise levels of 71 dB(A) are predicted at the 20th to 25th floors of the said facade.

2.4.2 In order to achieve noise levels to within the HKPSG limits for the affected facades, vertical barriers are proposed as effective mitigation measures. The proposed height of the barriers are moderately low, ranging from 1.5 metres to 3.5 metres. The lengths, heights and locations of the proposed barriers are indicated in Figure 2.

3 AIR QUALITY IMPACT ASSESSMENT

3.1 Legislation and Guidelines

The Air Pollution Control Ordinance (Cap. 311, 1983) provides powers for controlling air pollutants from stationary and mobile sources, including fugitive dust emissions from construction sites. It encompasses a number of Air Quality Objectives (AQOs) which stipulate concentration limits for a variety of pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), respirable suspended particulates (RSP) and total suspended particulates (TSP). The predicted air quality impacts of the proposed project are compared against the AQO standards.

3.2 Selected Sensitive Receptors

Twenty-six representative air quality sensitive receptors were selected for this assessment. They are existing buildings located in the proximity of the proposed road alignment. The receiver heights used for the analysis were 1.5, 5, 10 and 15 metres above local ground level, 1.5 metres being the average height of human breathing zone.

3.3 Impact Assessment

3.3.1 Construction Phase

The major potential air quality impact during the construction phase of the project will result from dust generated during road construction and during cut and fill operations. Vehicle and plant exhaust emissions from the site are not considered to constitute a significant source of air pollutants.

Dispersion modelling was undertaken using multiple runs of USEPA approved Fugitive Dust Model (FDM) to assess potential dust impacts from the construction activities. Predicted maximum 1-hour average and maximum 24-hour average TSP concentrations for the worst affected air quality sensitive receptors are found to be 69% and 83% of the guideline level and the AQO respectively. No exceedance of the guideline level or the AQO for TSP would be expected at the selected air quality sensitive receptors.

In order to further reduce the impact from the construction activities during the construction phase, the following measures are recommended :

(i) Effective dust suppression equipment and other measures should be installed to ensure the concentration of air borne dust at the site boundary and any nearby sensitive receiver is within the established standard.

(ii) The construction site should be monitored to minimise the fugitive dust emission. Wheel washing facilities should be installed and used by all vehicles leaving the construction site.

(iii) All motorized vehicles should be restricted to a maximum speed of 8 km per hour. Haulage and delivery vehicles should be confined to designated roadway inside the site.

(iv) In the process of material handling, any material which has the potential to create dust should be treated with water or sprayed with wetting agent.

3.3.2 Operational Phase

Air quality impacts during the operational phase of the project results from vehicle emissions arising from traffic on the new road network as well as on existing roads. Dispersion modelling was undertaken using USEPA approved CALINE4 dispersion model assuming the worst-case meteorological condition.

The highest maximum 1-hour average NO_2 concentration was predicted to be 46% of the AQO. No exceedance of the 1-hour average AQO for NO_2 would be expected at the selected air quality sensitive receptors.

4 ECOLOGY IMPACT ASSESSMENT

4.1 Assessment Methodology

4.1.1 Field surveys were carried out to establish the existing ecological conditions of the project site. Analysis of maps, and site survey were undertaken to provide a description of the physical environmental background and a habitat characterisation. Botanical surveys were conducted by walking the study site to develop a species list with a non-quantitative estimate of relative abundance (common, locally common, rare). Local abundance was compared with Territory-wide and regional abundance estimates to determine which species are of conservation importance based on relative rarity. Attention was given to the location and identification of species that are rare, endangered, or protected under local regulation or international convention. The Hong Kong Government legislation and guidelines relevant to ecological assessment were referred to.

4.1.2 Potential impacts were identified where possible of any direct/indirect and onsite/offsite impacts that could potentially lead to destruction, displacement or adverse effects on flora and fauna (including loss of shelter or food, reduced species diversity, loss of breeding grounds, species extraction, loss of carrying capacity). Evaluation was made of the impacts and proposals suggested for mitigation measures.

4.2 Impact Assessment

4.2.1 Habitats/Vegetation

All the habitats found in the project area were of poor degraded habitat quality. They are considered to be of low ecological value and the habitat loss would not be a significant impact.

The area of woodland that falls within the project site boundary is approximately 0.39 ha. The road alignment will also bisect the remaining woodland area that falls outside the project site boundary. However, the woodland is a small isolated fragment, that appears to be relatively immature and of low species diversity.

Approximately 0.24 ha of shrubland, 0.16 ha of horticulture and 0.1 ha of marsh area will be lost. These habitats are impoverished and highly disturbed.

The stream length within the project site boundary is 40 m. The stream quality at this point is poor due to channelisation. No works area anticipated to the stream, however it is adjacent to the contractors work's area. It is recommended that the stream bank top has a temporary barrier to prevent accidental dumping/spillage of materials into the stream course during construction.

The large specimen of *Ficus elastica* is of interest due to its considerable size. The tree is not in the direct path of the alignment and with care its integrity could be maintained. It is recommended that the tree be cordoned off during construction works to minimise any potential damage.

4.2.2 Fauna

Impacts to avifauna will result from loss of upland woodland habitat and orchard habitats and therefore foraging and potential nesting habitat for avifauna. This would impact birds which feed on insects (prinias and magpie robins), and fruits (bulbuls), and tree or shrub nesters. All the species recorded on the survey area are common and widely distributed throughout the Territory.

Due to the small size of the project area and the high levels of existing human activity, the area is not likely to be important habitat for wild mammals. The impact of the project on mammalian fauna is expected to be minimal.

Invertebrate fauna such as Odonata and Lepidoptera were found mainly in the stream area. This habitat will not be lost therefore the impact is expected to be minimal.

4.3 Mitigation & Habitat Enhancement Measures

As the stream is adjacent to the contractors work's area, it is recommended that the stream bank top has a temporary barrier to prevent accidental dumping/spillage of materials into the stream course during construction.

It is also recommended that the large specimen of *Ficus elastica* tree be cordoned off during construction works to minimise any potential damage.

A planting scheme is proposed to mitigate the ecological impact of the loss of woodland by providing native species of vegetation to the disturbed hillside.

5. LANDSCAPE AND VISUAL ASSESSMENT

5.1 Identification of Sensitive Receiver

5.1.1 Landscape Sensitive receivers

Sensitive landscape areas are identified by assessing the natural elements of the existing Landscape which collectively form the Landscape 'quality' of a site.

The landscape quality is assessed upon elements such as designated landscape classification, e.g. 'Green Belt', the landform vegetation, historical and cultural components, built structures, aesthetic quality and amenity value. High quality landscape areas are considered to be more sensitive to impact.

The Sensitive Landscape areas in this study are the densely vegetated established woodland slopes beside the village of Lok Lo Ha.

5.1.2 Visual Sensitive Receivers

Visual sensitive receivers are those areas within or around the study site with clear views toward the affected areas of the proposed route, and those which will suffer visual intrusion as a consequence of the proposed works.

The main Visually Sensitive Receivers within this study area, are the high rise housing development; 'Royal Ascot', the village housing at Lok Lo Ha Village, and the small village houses within the woodland areas.

5.2 Impact Assessment

5.2.1 Construction Phase

Landscape

Within the established woodland slopes of this study site, the extensive engineering works required for the cutting of slopes and construction of elevated road structures will generate severe disruption to the existing Landscape character. Temporary slope stabilisation methods and the felling of areas of mature woodland vegetation will incur significant severe adverse impact to the landscape at construction phase. The landscape Impact for this area has been identified as severe.

Within the village area of Lok Lo Ha, the construction of the elevated road and new roundabout will generate moderate landscape impact, resulting in the loss of marshland, village amenity land and some semi-ornamental garden areas of relatively low landscape value. The general disruption and generation of dust at construction stage will be relatively low, being directly adjacent to the Royal Ascot housing development upon which construction has only recently been completed. The Landscape Impact for this area has been identified as slight to moderate.

Visual

The disruption to existing views caused by the construction of the new road will be high for those Visually Sensitive Receivers within, or overlooking the woodland slopes. The loss of dense woodland vegetation and the engineering works associated with slope cutting, and elevated road construction will be severely detrimental to existing high quality views of the broadleaf woodland. The Visual Impact for this area has been identified as severe.

Within the village area, the construction works for the elevated road and roundabout will not constitute detrimental visual intrusion, as the village already overlooks the KCRC and high rise housing development, of low visual quality. Short term visual intrusion from contractors' works areas within the village will be moderate. The Visual Impact for this area has been identified as slight to moderate.

5.2.2 Operational Phase and Mitigation Measure

Landscape

Loss of established woodland vegetation and long term alteration to the existing profile and topography of the site will incur long term adverse impact. to the existing landscape character of the site. The significant loss of woodland and the use of retaining walls and cut slopes will require mitigation works including extensive re-establishment planting and slope re-instatement planting in order to avoid any use of shotcrete or tunam treatment. The long term landscape impact to this area will be moderate to severe.

The encroachment of the elevated road structure within the village area will constitute slight long term landscape impact to an existing landscape of low value, however, opportunities for mitigating planting measures will be rare in this section of the route due to lack of available space, and subsequently, the lost marshland and semi-ornamental planting at the edges of the village will not be replaced. The landscape will be noticeably more urban in its character. The introduction of noise barriers within sections of this route will also contribute to this change in landscape character. The long term landscape impact to this area will be moderate.

Visual

The loss of established woodland will effectively remove the existing screen to the road for the Visual Sensitive Receivers overlooking, and adjacent to the route. The cut slopes, retaining structures and proposed noise barriers part way along the route within the woodland area will contribute to a detrimental alteration in visual quality. Mitigation measures including re-establishment woodland planting and landscape treatment to cut slopes are required to help to ameliorate the long term effect on existing views. The long term visual impact to this area will be moderate to severe.

As the quality of existing views from Lok Lo Ha village is low, the long term visual impact of the road and roundabout will not be major. However, due to the lack of land available for planting, the opportunity to instate a vegetated border between the village and the road is not feasible. Quality hardworks and finishes treatment to the bridge structure, new footpath, cycletrack and noise barriers within this section are therefore very important in order to visually integrate the new road with its surroundings. Opportunities for off site planting within the village areas should be looked at, in order to create long term visual screens between the housing and the road. The long term visual impact to this area will be moderate.

6. ENVIRONMENTAL MONITORING & AUDIT REQUIREMENTS

6.1 General

Monitoring and auditing procedures are required as a check during the construction and operation of a development that the specified control criteria and standards are being complied with. This EIA Study has highlighted potential environmental impacts associated with the project and identified possible mitigation measures. However, the assumptions used in the assessment may differ from actual conditions arising from different work methods employed by the contractor and therefore environmental monitoring would be necessary to confirm that the required standards and criteria are being met.

A standalone Environmental Monitoring and Audit (EM&A) Manual will be produced for this particular construction project. The intention of this EM&A Manual is to guide the set up of an EM&A Programme to ensure compliance with the Environmental Impact Assessment (EIA) Study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. It aims to provide systematic procedures for monitoring, auditing and minimising of the environmental impacts associated with the construction works.

6.2 Environmental Monitoring

Monitoring shall focus on construction noise which is assessed to have significant impact on sensitive receivers. Monitoring of air quality during construction is also important although predicted TSP levels are within AQO limits.

Monitoring of traffic noise and pollutants during the operation phase are not considered to be essential as the predicted impacts are low with the recommended noise mitigation measures.

6.3 Monitoring/Auditing Requirements of Construction Noise and Air Quality

The scope of monitoring and auditing of construction noise and air quality should include the following aspects:

(i) Noise levels and air quality should be measured in recommended parameters. Noise Levels shall be measured in terms of A-weighted equivalent continuous sound pressure level Leq. Air quality measurements for TSP shall be in terms of average concentration levels over one hour or 24 hours in units of μgm^{-3};

(ii) Noise monitoring equipment should be those specified in the Technical Memorandum issued under the NCO;

(iii) Selection of suitable monitoring locations should be close to sensitive receivers and site boundary and free from local obstructions or shelters;

(iv) Baseline Monitoring prior to the commencement of construction works to establish the ambient conditions;

(v) Impact Monitoring during construction to detect exceedance of baseline levels or the case of non-compliance with the relevant standards and criteria; and

(vi) Auditing Procedures that include Event and Action plans for non-compliance situations as monitored during the construction phase.

7. SUMMARY AND CONCLUSIONS

7.1 Noise Impact

Significant noise impact during construction phase is predicted and that substantial noise mitigation would be required to counter excessive construction noise for facades close to the roadway. The use of quietened equipment for the construction, temporary noise barriers and good site practice procedure are proposed for noise screening.

During operation phase, impact of traffic noise is confined to facades closest to the roadway. Vertical noise barriers are proposed to mitigate noise levels and ensure compliance with the HKPSG limits.

7.2 Air Quality Impact

It is predicted that the statutory Air Quality Objectives (AQO) will not be exceeded during both construction and operation stages. For the construction phase, the maximum 1-hour and 24-hour average TSP concentrations at the worst affected sensitive receptor are 69% and 83% of the respective guideline levels of AQO. During the operation phase, the predicted maximum NO_2 concentration at the worst affected sensitive receptor is found to be 46% of the AQO. Hence the air quality impact for this proposed project is considered to be acceptable and no mitigation measures are required. However, good dust control practice should be followed during the construction phase.

7.3 Ecology Impact

The impact of the proposed project on the habitat is considered to be minimal. The predicted loss of woodland, scrubland, horticulture and marsh are confined to small areas. All are low in species diversity which are common and widespread within the Territory. Some tree species within the project site boundary have been identified as worthy for conservation.

7.4 Landscape and Visual Impacts

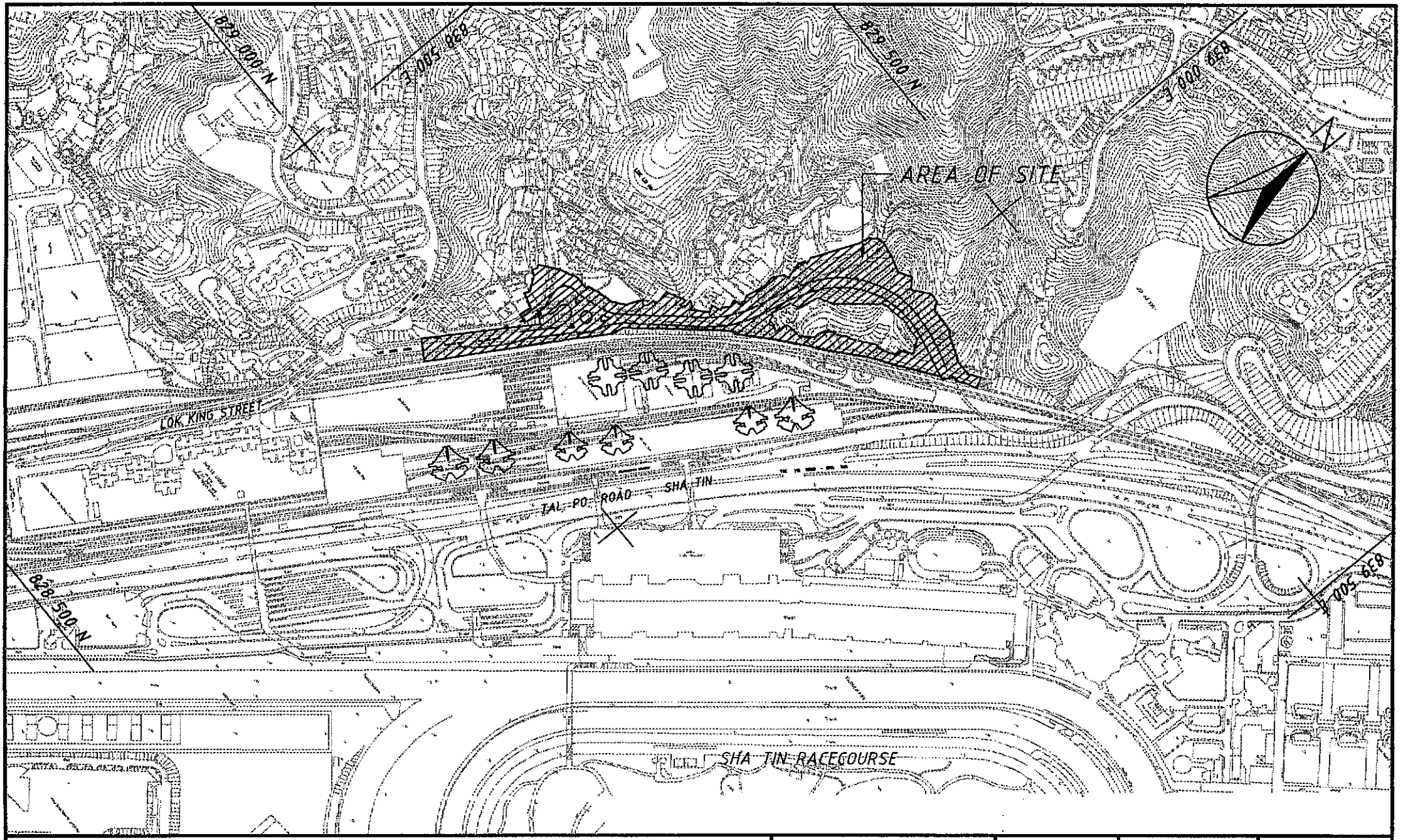
The proposed road will have a significant impact upon the existing landscape and visual quality of the woodland portion of the site and will be visually prominent against the backdrop of woodland slopes. Extensive re-vegetation and re-planting of engineered slopes are required to soften the visual impact and to compensate for loss of established woodland vegetation.

Being mainly an elevated structure, the road will be visually prominent within the village areas and opportunities for planting are scarce. However, when viewed in context with the prominent KCR and high rise developments next to the village, the impact of the road will be relatively minor.

7.5 Conclusions

Overall, the potential environmental impacts of the proposed project is not considered to be significant. With the implementation of the proposed mitigation measures, the environmental impacts should be brought down to the established environmental guidelines and standards. Monitoring of noise and air quality during construction is proposed as part of Environmental Monitoring and Audit requirements of the proposed project.

Figures



ROAD D15 LINKING LOK SHUN PATH & TAI PO ROAD -
ENVIRONMENTAL IMPACT ASSESSMENT

SITE LOCATION

Maunsell
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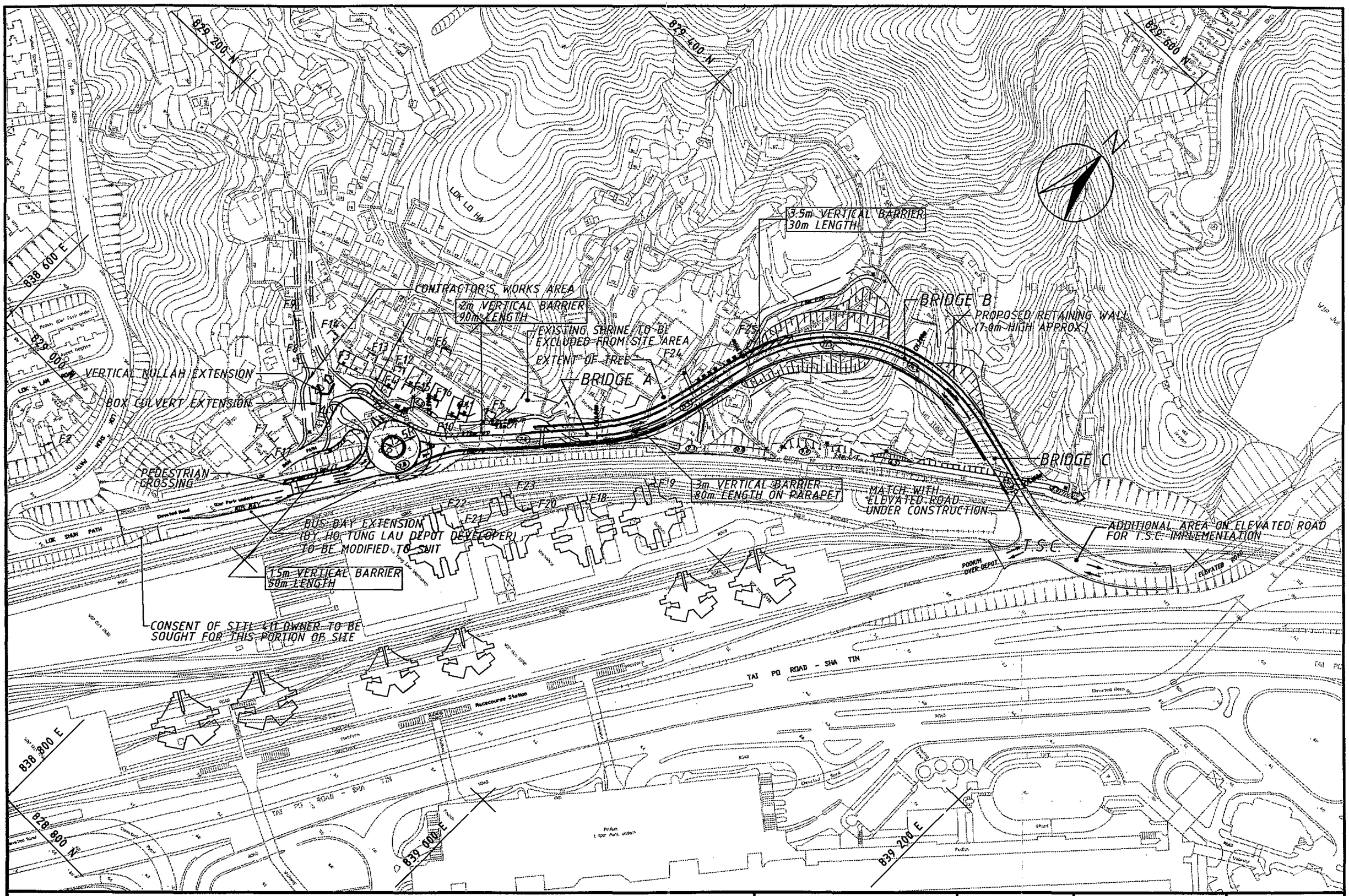

ROAD D15 LINKING LOK SHUN PATH & TAI PO ROAD - ENVIRONMENTAL IMPACT ASSESSMENT

PROPOSED ROAD ALIGNMENT, LOCATIONS OF NOISE SENSITIVE RECEIVERS AND PROPOSED BARRIERS

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