

INFORMATION TECHNOLOGY AND BROADCASTING BUREAU
THE HONG KONG SAR GOVERNMENT

**Infrastructural Works for the Proposed Development at Telegraph Bay
Engineering Feasibility Study**

Environmental Impact Assessment Study
Executive Summary

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TABLE OF CONTENTS

	Page
1 INTRODUCTION.....	1
2 BACKGROUND	1
3 PROJECT DESCRIPTION.....	2
4 OBJECTIVES OF THE STUDY.....	3
5 SUMMARY OF POTENTIAL IMPACTS	4
5.1 Air Quality Impacts	4
5.2 Noise Impacts.....	6
5.3 Sewage Impacts.....	8
5.4 Water Quality Impacts.....	8
5.5 Wastes Impacts.....	10
5.6 Ecological Impacts	12
5.7 Landscape and Visual Impacts.....	14
5.9 Environmental Monitoring and Audit (EM&A)	15
6 CONCLUSIONS	16

List of Figures

Figure 1	Site Location
Figure 2a	Proposed Property Layout
Figure 2b	Proposed Future Property Layout (2 Schools at G/IC Site)
Figure 3	Noise Mitigation Measures (Option 2)
Figure 4	Master Layout Plan of Proposed Cyber Port Development
Figure 5a	Proposed Noise Mitigation Measures – Depressed Route 7
Figure 5b	Proposed Noise Mitigation Measures – At Grade Route 7

1 INTRODUCTION

This executive summary outlines the findings and recommendations of the Environmental Impact Assessment Study for the Infrastructural Work for the Proposed Development at Telegraph Bay. The executive summary is structured as follows:

- Background
- Project Description
- Objectives of the Study
- Potential Impacts and mitigation measures
- Environmental monitoring and audit requirements
- Conclusions

2 BACKGROUND

Telegraph Bay was reclaimed in 1989 but development was delayed due to the lack of infrastructure (water supply, sewerage, drainage) and road access onto the site, as well as the Pok Fu Lam moratorium (which was implemented to control the amount of traffic generated within the area). A comprehensive study is required for the development of Telegraph Bay to ensure that the proposed development is acceptable in aspects of environmental, transport and engineering.

Telegraph Bay (Kong Sin Wan) is located on the western side of Hong Kong Island and is to be developed with luxury housing which is compatible with existing private development in this area. This forms part of the Government's commitment regarding Flats Production Efforts as well as the policy under the Territory Development Strategy Review.

In March 1998 the Hong Kong Island and Islands Development Office, Territory Development Department of the Government of the Hong Kong Special Administrative Region commissioned Pypun Engineering Consultants Ltd/Parsons Brinckerhoff (Asia) Ltd Joint Venture (in association with Enviros Hong Kong Ltd, Mott Connell Ltd, ACLA Limited, MVA Asia, Urbis Ltd and Cheung Macpherson Company Limited) to carry out the Engineering Feasibility Study for the infrastructural works for housing development at Telegraph Bay (hereinafter called "the Housing Development" or "Scheme 1"). The study site location is indicated in Figure 1.

While the EIA Study (volume 1 report) for the above development was in progress, an alternative development scheme for Telegraph Bay (hereinafter called "Cyber Port" or "Scheme 2") was proposed by Information Technology and Broadcasting Bureau. This scheme comprises commercial & office development, hotel development, Government, Institution & Community development and residential development on the reclamation and the hinterland. The project also includes almost the same infrastructural works as required in Scheme 1. The two district distributor roads (D1 and D2), a sewage treatment plant and submarine outfall, are classified as Designated Projects under Schedule 2 of the EIAO. The proposed Cyber Port Development will be a world class location for information services

companies which apply the latest information technology in their businesses. The Development will provide sustained, long term economic benefits to Hong Kong, and also contribute significantly in the areas of education, the environment, culture and entertainment. It will also enhance Hong Kong' position as the premier telecommunication and broadcasting hub in Asia. As a result, the Cyber Port development has also been included in this EIA study, as the Scheme 2 development. The Scheme 2 EIA study (Volume 2 report) has been carried out by Maunsell Environmental Management Consultants Limited.

3 PROJECT DESCRIPTION

3.1 The Housing Development (Scheme 1)

Telegraph Bay occupies a reclaimed bay with high landscape quality comprising wooded valleys, slopes, streams and armoured sea frontage. The site consists of two areas; the larger northern section (proposals for 3 housing sites and 1 G/IC site) is located at the foot of the western slopes of Hong Kong Island, on the reclaimed site of Telegraph Bay; the southern section (1 housing site) occupies the prominent spur of headland between Waterfall Bay and Telegraph Bay. The four housing sites are intended to provide approximately 2,600 flats of luxury housing, with an average flat size of about 200m². The initial development proposal for the G/IC sites is to accommodate a school and a sewage treatment works (STW). The proposed development layout is presented in Figure 2a. The Chemically Enhanced Primary Treatment (CEPT) part which forms as part of the STW initially, will be demolished once the SSDS project is commenced in 2006/2007. The land will then be converted into a new school site. Figure 2b shows the development layout with the CEPT replaced by the new school site.

The housing development project components of this scheme comprise:

- Advance works –site formation, ground improvement works and stormwater drains construction for the northern site (i.e. the reclaimed bay);
- Construction of access roads comprising district distributor road D1 (including a Northern Access Road, Southern Access Road) and district distributor road D2 linking Road D1 with the Route 7 Telegraph Bay Interchange;
- Stream training
- Construction of a sewage treatment facility with a submarine outfall and a school in the G/IC site;
- Housing development to provide 2600 luxury flats
- Construction of the Public Transport Interchange within the site and
- Associated geotechnical, drainage and environmental abatement works.

The preliminary schedule indicates that the infrastructural works are anticipated to commence in January 2001 (the commencement date of the advance work will be in October 1999) and the intake of population will be around 2004/2005.

3.2 The Cyber Port Development (Scheme 2)

The proposed Cyber Port Development will be a world class location for information services companies which apply the latest information technology in their businesses. The Development will provide sustained, long term economic benefits to Hong Kong, and also contribute significantly in the areas of education, the environment, culture and entertainment. It will also enhance Hong Kong' position as the premier telecommunication and broadcasting hub in Asia.

The proposed Cyber Port Development comprises the following:

- Office development
- Hotel development
- Residential development, i.e. houses, mid-rise residential and service apartments.
- Cyber Mall development
- A marina and associated shoreline marine facilities may also be considered at a later stage, but the feasibility of constructing such facilities will be subject to a separate detailed assessment

The preliminary schedule of the infrastructural works is similar to that for Scheme 1. Building construction would commence in mid 2000 and the intake of population would be around the end of 2001. A package sewage treatment plant will be provided at the end of 2001 to treat the sewage from the early phases of the proposed development up to the end of 2002, prior to the commissioning of the new sewage treatment plant and the submarine outfall.

Figure 4 shows the Cyber Port development layout.

4 OBJECTIVES OF THE STUDY

Under the Environmental Impact Assessment Ordinance operated in April 1998, the Telegraph Bay EIA, with a study area covering more than 20 ha, is considered to be a Designated Project under Schedule 3 Item 1. The proposed sewage treatment works, the submarine outfall, the construction of Roads D1 and D2 and the advance works (surcharging works) have also been identified as Designated Projects under Schedule 2. This Environmental Impact Assessment Study has been carried out in accordance with the Technical Memorandum on Environmental Impact Assessment Process (EIA Ordinance Cap. 499, S/16) and the Study Brief. Both the depressed and at- graded options of Route 7 have been included.

This study has also evaluated the noise and air quality impacts related to the construction and operation of Route 7 upon the proposed Telegraph Bay Development as per the requirement of the Study Brief.

5 SUMMARY OF POTENTIAL IMPACTS

An Environmental Impact Assessment (EIA) has been prepared to provide information on the nature of environmental impacts likely to arise from the construction and operation of both the proposed housing development and Cyber Port development projects. The EIA has also assessed the acceptability of the identified environmental impacts on representative sensitive receivers (SRs) following the implementation of proposed mitigation measures.

The assessment methodologies adopted for the study follow the guidelines as outlined in the Technical Memorandum on Environmental Impact Assessment Process. Quantitative assessments have been carried out with the use of computer models and standards theoretical principles which are generally accepted by the Environmental Protection Department. The environmental assessment findings accurately reflects the potential environmental impacts associated with the proposed developments.

The findings are presented below:

5.1 Air Quality Impacts

5.1.1 Construction Phase

The Housing Development

Dust is expected to be the major air quality pollutant during the advance works, the main Telegraph Bay Development (TBD) construction works and the Route 7 construction work. The modelling results indicate that without mitigation measures, the 1-hr TSP criterion of $500 \mu\text{g}/\text{m}^3$ would be exceeded at Stanley Ho Sports Hall, HKU Staff Quarters, Lui Ming Choi Secondary School, Precious Blood Primary School, Tsui Ching Tong School, Baguio Villa, the Boarding and Veterinary Clinic, village houses at Kong Sin Wan Tsuen, Telegraph Bay Playground, as well as the future sensitive receivers within Site 2, 3 and 4 of Telegraph Bay Development.

However, through the implementation of dust suppression measures such as increased road watering of unpaved roads and a reduction in vehicle speed on the access roads, a significant reduction in dust generation (Total Suspended Particulates (TSP) concentration) is attainable. Consequently, the re-modelled results, which include mitigation, indicate that compliance with the 1-hr limit for TSP would be achieved at all sensitive receivers.

The Cyber Port Development

The construction phase air quality impacts due to infrastructural works would be similar to those for the Housing Development and therefore similar mitigation measures as described above would be required. These works should have been largely completed before the intake of population at the end of 2001. Potential dust impacts due to building construction on the earlier phases of the proposed development would be minimized by careful sequencing of works so that relatively dusty activities in adjacent areas would be completed before the intake of population. Also, a comprehensive dust monitoring and audit programme would be implemented to ensure that cumulative construction dust impacts on the subsequent phases of the development are minimized.

5.1.2 Operational Phase

The Housing Development

There are two major types of air quality impacts from the operation of infrastructural works for the proposed housing development. These include the vehicular emissions from the road traffic and the odour emissions from the proposed sewage treatment work.

The major pollutants in the vehicular emissions are the nitrogen dioxides (NO₂) and respirable suspended particulates (RSP). The assessment results indicate that the NO₂ and RSP concentration levels at all sensitive receivers meet the Hong Kong Air Quality Objectives (AQO).

The proposed Sewage Treatment Works is to be equipped with a deodorization system with a removal efficiency of 99.5% at 5ppm of hydrogen sulphide (H₂S) or less than 25ppb discharge concentration. The air quality impact assessment has shown that the criterion of 5 odour units over a 5-second averaging period, as stipulated in the EIA-TM, will be complied with at all the identified sensitive receivers.

The Cyber Port Development

An assessment of the likely air quality impacts arising from road traffic has been carried out using the same assessment methodology as for Scheme 1. In particular, the same emission factors and background concentrations of NO₂ and RSP have been adopted in the calculations, apart from the traffic flows which have been revised as a result of a minor change in the road configuration and the development intensity and population. For both options of depressed and at grade Route 7, the concentrations of NO₂ and RSP at the air sensitive receivers would be within the AQO.

Similar to the Housing Development, the odour impact from the new sewage treatment plant would be mitigated to within 5 odour units over 5-second averaging period through odour control measures at the sewage treatment plant.

No adverse residual impacts are identified with the adoption of the mitigation measures

identified for Scheme 1.

5.2 Noise Impacts

5.2.1 Construction Phase

The Housing Development

The noise impact assessment has predicted that the unmitigated construction noise levels associated with the construction work (including cumulative impacts arising from advance works and Route 7 construction) would cause adverse noise impacts at certain noise sensitive receivers (NSRs). Several mitigation measures or combination of measures have been evaluated to reduce the identified impacts including:

- silenced Powered Mechanical Equipment (PME);
- a 3m high temporary noise barrier along the northern site boundary of Site 1 during the construction work; and
- good site practices.

With the implementation of the suggested mitigation measures, the predicted noise levels at the nearby residential sensitive receivers, as well as the school (during the school normal teaching period), will comply with the criteria. However, “minor” residual impacts would affect some schools (including Pok Fu Lam Training Centre, Lui Ming Choi Secondary School, Pui Ying Secondary School and the future school at Site 2) during the school examination periods (i.e. when the guideline is 65 dB(A)). It is anticipated that the residual noise impacts identified during the examination periods can be effectively controlled with the use of portable acoustic barriers. With this additional measure, compliance can be achieved during examination periods of these schools.

Given the limited number of the vehicle, boat and barge trips per day and the activities to be carried out at the Off Site Works Area (OSWA), as well as the physical separations between the sites and the nearby sensitive receivers, no noise impacts are anticipated for the OSWA operation.

The Cyber Port Development

The Main Construction Works in Scheme 2 are slightly different to Scheme 1. For example, the disposition of buildings and the building heights are different from those in Scheme 1. In general, there should be no significant difference in the level of noise impacts for the existing receivers, which are located outside the reclamation and beyond. The mitigation measures as identified for Scheme 1 apply to Scheme 2.

Potential noise impacts from building works on the earlier phases of the development would be minimized by careful sequencing of the works so that relatively noisy activities, i.e. foundation works, at adjacent areas would be completed before the intake of population.

Noise calculations have shown that with careful sequencing of the work and the use of temporary noise barriers, quiet type of equipment and other general noise control measures, no adverse construction noise impacts are anticipated.

Noise impacts from construction of Route 7 are expected to be less severe than those for Scheme 1 because buildings along Route 7 alignment are low-rise. With a temporary noise barrier of 3m high for general building construction works and the use of other general noise control measures as identified in Scheme 1, no adverse construction noise impacts are identified.

No adverse residual impacts are identified with the adoption of the mitigation measures identified for Scheme 1.

5.2.2 Operation Phase

The Housing Development

The Housing Development is subjected to the traffic noise impacts from the existing Victoria Road, the proposed new roads for Telegraph Bay Development as well as the future Route 7 and its associated slip roads. The noise impacts arising from Route 7 have been assessed based on the conforming alignment i.e. Route 7 section along the Telegraph Bay will be at grade with two interchanges, namely Telegraph Bay and Waterfall Bay. The Telegraph Bay Interchange and its associated slip roads (including D2) will be elevated.

Without the noise mitigation measures, approximately 31.2% of the total 2600 residential flats as well as the future school at Site 2 will exceed the noise criteria stipulated in EIA-TM (i.e., L10(1 hr) 70 dB(A) for residential and 65 dB(A) for school).

In order to achieve full compliance with the noise criteria, a package of noise mitigation measures was recommended as shown in Figure 3. The proposed measures help achieve full compliance of the noise criteria for the housing development and the schools.

The Cyber Port Development

The proposed development would also be subject to similar road traffic noise impacts from Road D1, Road D2, Northern Access Road, Southern Access Road, Victoria Road, Route 7 and its associated slip roads during the operation phase. With no noise mitigation measures, approximately 53% of around 3000 residential flats would exceed the noise criteria stipulated in EIA-TM (i.e., L10(1 hr) 70 dB(A)) for residential dwelling. On the other hand, noise levels at the two possible schools and the medium-rise buildings at Kong Sin Wan Village comply with the relevant noise criteria

Noise mitigation measures have also been recommended for the proposed development after taking into account the layout and forms of noise sensitive buildings. Figures 5a and 5b show the proposed mitigation measures for depressed Route 7 and at-grade Route 7 respectively. These measures include application of the noise reducing road surface material on level section of Road D1 and Route 7; vertical roadside barriers; cantilever type roadside

barriers; and vertical barrier on the medium strip of Route 7. With the implementation of these measures, full compliance with the noise criteria can be achieved, except for three existing schools near Wah Fu Estate. To address the residual impact, sound insulation would need to be provided or reprovided and a further Noise Insulation Work Study would be carried out to identify details of the works required.

Fixed noise sources from the proposed sewage treatment plant and the salt water pumping station not expected to cause a noise problem. Noise from the electricity substation is not expected to cause noise problem as evidence from some similar electricity substations in urban areas. A detailed Noise Impact Assessment for the substation will be carried out once the design details of the substation becomes available. Boat noise from the proposed piers and marina is also not expected to impose an insurmountable noise problem, though the extent and nature of the problem will be further investigated in a detailed EIA study once a more definitive proposal for the piers and marina becomes available.

5.3 Sewage Impacts

The Housing Development

The present circumstances are such that the only feasible proposal is to provide a Sewage Treatment Works (STW) with preliminary treatment/screening and Chemically Enhanced Primary Treatment (CEPT) at ground level within the G/IC area. Disposal of effluent from this STW in the interim period will be via a 300m long temporary submarine outfall. Upon commissioning of the Strategic Sewage Disposal Scheme (SSDS) Stage III/IV scheme (2006/7) the submarine outfall can be abandoned and the CEPT facility should be removed, with the CEPT site earmarked for use as a future elementary school site.

The Cyber Port Development

Similar to Scheme 1, a sewage treatment plant (STP) with preliminary treatment, CEPT and disinfection will be installed to treat the sewage arising from the Cyber Port Development before discharged into the East Lamma Channel via a submarine outfall 300m offshore. The STP and the submarine outfall will be commissioned at the end of 2002. By the end of year 2001 prior to the commissioning of the STP, a package secondary sewage treatment plant will be provided at the to treat the sewage flow from the proposed development up to the end of 2002.

5.4 Water Quality Impacts

5.4.1 Construction Phase

The Housing Development

Construction activities which may have water related impacts include surcharging, construction of the temporary quay decks, dredging of the submarine outfall for the STW, stream training and site runoff generated from the general construction work.

The construction of the temporary quay decks, surcharging and dredging of marine mud for the submarine outfall may result in short-term localized impacts upon marine water quality. However, the adoption of the proper mitigation measures will minimize any potential impacts.

The training of stream in the Waterfall Bay, prior to the commencement of the Southern Access Road will eliminate the silt deposition problems.

Potential construction phase water quality impacts will be characterized by the discharge of site runoff, which may have a high suspended solids content. This, however, can be controlled by implementing good site management practices and mitigation measures. Construction of the site drainage and sewage system will ensure that future site facilities will operate in accordance with applicable regulatory requirements. The water quality impacts are therefore anticipated to be temporary and minor.

In order to prevent/minimize the potential for accidental spills, proper handling and storage procedures will be required. Consequently, a spill response action plan should be compiled by the contractor and made available for dealing with spills.

Overall, any impacts upon the water quality during the construction phase is considered to be minor and temporary if the identified mitigation measures are properly applied and no significant impacts upon the existing sensitive receivers is anticipated.

The Cyber Port Development

The construction phase water quality impacts are very similar to those for Scheme 1. The jetties and piers of the marina will be constructed on piles to minimize the dredging during construction. Limited dredging and filling works may be carried out for the construction of the possible breakwater, the total length of which is expected to be less than 1 km. The potential impact arising from the construction of the marina and breakwater will be further investigated in a detailed EIA study once a more definitive proposal for the marina and breakwater become available. For the other construction phase water quality impact, the mitigation measures recommended for Scheme 1 are applicable to Scheme 2. With the implementation of the recommended mitigation measures, no unacceptable residual impacts are expected.

5.4.2 Operation Phase

The Housing Development

The major source of impact during the operation phase will be related to the sewage submarine outfall of the proposed STW. The proposed STW will be designed with enough capacity to treat the sewage generated from the proposed development as well as from

Baguio Villa and Kong Sin Wan Tsuen. The proposed STW consists of a three-stage treatment, which includes primary settling, CEPT and disinfection systems. Initial dilution modelling results indicate the largest mixing zone (for inorganic nitrogen) is predicted to be 96m x 210m in size. These results indicate that the mixing zone is unlikely to extend to any of the identified water sensitive receivers. Therefore, the impacts upon the identified water sensitive receivers are anticipated to be minimal.

Other minor discharge sources include runoff (washwater) from the Public Transport Interchange (PTI) and covered car-park areas of the proposed development. This runoff water may entrain fuel / oil and any dirt and rubbish from the ground surface. However, given that the drainage for the PTI / car-park areas are to be equipped with petrol interceptors and grit traps, majority of the contaminants will be removed and hence no impacts from these discharges are anticipated.

Surface runoff (stormwater runoff) from the open car-parking spaces of the proposed school site and sewage treatment works is unlikely to be contaminated.

The Cyber Port Development

The key additional water quality issues with Scheme 2 will be the sewage treatment discharge and shoreline facilities. The flows from the proposed sewage treatment plant for Scheme 2 will be larger than those in Scheme 1 because of more working population. The potential impacts have been assessed and the influence of the discharged effluent from the proposed outfall has been examined using a mixing zone model. The assessment results indicate that the mixing zone of 107m by 274m will not impact on the sensitive receivers. The shoreline facilities including jetties, piers, a marina and possibly breakwaters are unlikely to cause any significant adverse impacts on the flow and marine water quality outside the enclosed waters. Within the enclosed water, the jetties and piers will be constructed on piles to facilitate water flow. No significant adverse impacts would be expected. Water quality impacts arising from the marina and breakwater will be quantified in a separate EIA study once detailed information are available.

Before the end of 2002 and the completion of the sewage treatment plants and the submarine outfall, the sewage from the earlier phase of the development will be treated by a package secondary treatment plant. The effluent will be at the standards specified in accordance with the TM on Effluent Standards.

Overall, no unacceptable adverse water quality impacts are expected.

5.5 Wastes Impacts

5.5.1 Construction Phase

The Housing Development

The infrastructure work for the housing development at Telegraph Bay will involve the

excavation and removal of 330,000m³ of imported surcharge material and other excavated soils from the advance works and construction phase of the development (approximately 156,400m³). The exact volumes of waste generated will be determined by the contractor's working practice and site procedures. In addition, wastes generated on site will also comprise top soil/vegetation (from initial site clearance), general construction waste (e.g. wood, scrap metal, concrete), marine muds (from dredging operations), chemical wastes (from general site practices) and sewage / municipal wastes generated by site workers.

Provided that there is strict management and control of all wastes generated on site during the works, and that material is collected, handled, stored, transported and disposed of in an appropriate manner, no significant adverse environmental impacts are anticipated. Wherever practicable the volumes of wastes to be generated during site formation will be minimized through recycling and reuse. A reduction in the volume of material to be disposed to public filling areas may be achieved by optimizing the re-use of suitable material on site such as on Route 7 surcharge works (approximate 300,000m³); Road D1/D2 embankment construction (approximate 29,500m³); and general landscaping areas (approximate 28,920m³). Potential restrictions however may apply due to timing and possible delays between when excavated materials are available for re-use and when the materials may be utilised on site as part of the site formation works. Consent from the District Lands Office will be required to allow any temporary stockpiling, with agreement from other relevant parties.

Solid materials that cannot be recycled or reused will need to be disposed of at public filling areas or, if necessary, landfills. Chemical wastes requiring treatment prior to discharge will be sent to the chemical waste treatment plant. Liquid wastes may need treating prior to discharge.

In view of the inert nature of construction waste materials, its disposal is unlikely to cause long-term environmental concern.

The Cyber Port Development

The nature and types of waste materials, which will be generated during construction and operational phases of Scheme 2 are very similar to Scheme 1. During construction phase, the activities for Scheme 2 are very similar to Scheme 1. Although the phasing of the development would be different, the total wastes generated during construction phase would be similar. As the piers, jetties and marina will be constructed on piles, the wastes generated and any impacts will be minimal.

It is concluded that, with the provision of adequate waste collection, treatment and disposal facilities, and implementation of the recommended mitigation measures, there will not be any unacceptable residual waste management impacts.

5.5.2 Operation Phase

The Housing Development

The proposed end use for the site comprises residential housing and associated infrastructure. Wastes generated following site occupation should therefore be restricted to sewage and municipal wastes.

Sludge material (estimated at 4m³/day) will be generated from the operation of the sewage treatment plant located on site. The sludge material generated will be disposed to landfill. No major environmental impacts are anticipated provided proper handling procedures are followed.

The Cyber Port Development

During operational phase, Scheme 2 will accommodate more non-residential population, adequate waste collection and disposal facilities will be provided to ensure no unacceptable environmental impacts. The sewage arising from Scheme 2 will be subject to CEPT and disinfection treatment prior to disposal. The Cyber Port project is not expected to generate any industrial solid and liquid wastes.

5.6 Ecological Impacts

5.6.1 Construction Impacts

The Housing Development

Terrestrial

The potential impacts from the proposed development at Telegraph Bay will largely result in the loss of woodland/shrubland and grassland habitats within the reclaimed area. However, this reclaimed area is regarded as having little ecological value because although the shrub and grassland habitats have colonised naturally, they are species-poor, at an early successional stage and found commonly in Hong Kong. No mitigation measures with regard to the reclaimed area are therefore necessary. Hoarding, however, has been recommended as a form of dust/site activity protection to the remaining secondary woodland habitats. Impacts from increased noise levels from construction are expected to be of a limited duration and would likely result in only minor impacts.

There will also be some woodland/shrubland/stream loss of habitat resulting from the construction of the proposed access roads. 20m of stream in Waterfall Bay will be lost. The total woodland habitat loss will be 1ha (from woodlands at Telegraph Bay and Waterfall Bay) as well as 1ha of shrubland from Waterfall Bay. It is estimated that 2.2 ha will be available for compensatory woodland planting.

Marine

The development will not result in any loss of marine intertidal habitat. However, there is potential for adverse effects from the piling works associated with the initial stages of the

quay construction. This will result in disturbance to the surrounding seabed and will cause some loss of habitat along with its associated fauna. It should be noted that the immediate coastal area, adjacent to the proposed development site has not been identified as a significant location for coral communities.

Dredging activities for the construction of the submarine outfall are not expected to have a significant impact on the marine environment due to the proposed mitigation measures, as well as extent of the proposed dredging works.

With proper site management, minimal impacts related to the site runoff on the surrounding water quality and sensitive marine fauna are expected. The distance between the site and the nearest soft coral communities is sufficient to ensure that they are not affected by the development.

The Cyber Port Development

The construction stage ecological impacts for Scheme 2 is very similar to Scheme 1. The marine facilities under the Scheme 2 will be located at the artificial shoreline of Telegraph Bay. Along this shoreline, marine species diversity and abundance of flora and fauna are relatively low compared with the natural shorelines. The marine facilities will be constructed on piles to minimize disturbance to the seabed during construction and to maintain current flow through these structures. It is expected that the ecological impacts due to the marine structures will be minimal.

Two species of plants protected by the Forests and Countryside Ordinance were identified at Telegraph Bay. The *Lagerstroemia indica* plants located at Telegraph Bay are outside the proposed development area. The plant species, *Michelia alba* is located within the Kong Shin Wan Village. This introduced species is commonly found planted around village houses. It appears to be cultivated by local villagers and is considered to have low conservation value. Any impacts would be considered to be minor.

Habitats affected by the proposed schools and residential development in Kong Shin Wan Village are the stream and the village area. The section of the stream within the village has been modified by man and can be considered as having low ecological value. The impact of the schools and residential development within Kong Shin Wan Village will have minimal impact on the stream and the village area in terms of habitat changes. In view of the close proximity of the *Fung Shui* wood to the proposed schools and residential development, hoarding is recommended as a form of dust/site activity protection to minimise impact to the habitat.

Habitat affected by the electricity substation is 0.26 ha of secondary woodland. Impact is considered to be moderate. Compensatory planting will be carried out.

5.6.2 Operational Impacts

The Housing Development

Terrestrial

Fencing and dust tolerant species are recommended during the operational stage as a form of continued protection against dust from increased traffic. This will also reduce other potential impacts as a result from increased human activity, illegal waste disposal, increased surface water runoff, the introduction of dogs and other non-indigenous species, which could affect the remaining woodland habitat for birds and mammals.

Marine

The additional sewage output from the housing development will increase the amount of treated sewage disposed within the coastal region. The sewage impact assessment has shown that the sewage plume is very small and it is not expected to have an impact on any sensitive receivers.

The Cyber Port Development

The ecological impacts during operational phase of Scheme 2 will be very similar to Scheme 1. The assessment results and mitigation measures recommended for Scheme 1 are applicable to Scheme 2.

5.7 Landscape and Visual Impacts

For both the Housing Development and the Cyber Port Development, a number of impacts are likely to occur due to the schemes. These include the loss of local woodland at the base of the existing surrounding hill and major visual impacts to residents in close proximity to the site, such as those at Baguio Villa. However, the visual impacts have been proactively considered and designed out where possible, such as the retention of view corridors and restriction of building heights in front of Baguio Villa. The adverse visual impacts has, therefore, been carefully considered and minimise by proactive mitigation measures and strategies.

The most significant difference in landscape terms between the two schemes is the proposed 25 storey residential blocks and two schools to the Kong Sin Wan Valley in Scheme 2. The Cyber Port development as a whole however will create a new landscape and visual character to the area. The landscape master plan aims to complement the urban layout and arrangement of the blocks and create a quality urban and landscape design.

5.8 Cultural and Heritage Impacts

The importance of the pillbox at Telegraph Bay, the bunker at Waterfall Bay, the waterfall and its natural landscape and the archaeological potential of Kong Sin Wan Village and the historical structures at Telegraph Bay have been identified during the study. These key cultural and heritage sites are outside both the Housing Development and the Cyber Port development.

For the two school sites and some mid rise residential developments at Kong Sin Wan Village, the project proponent is required to carry out a separate study to the satisfaction of the Antiquities and Monument Office. The study should be carried out during the preliminary design stage to address the impacts of these proposed development at Kong Sin Wan Village on sites of cultural heritage which include both historic buildings and structures and potential archaeological sites nearby so that the mitigation measures can be incorporated into the contract documents.

5.9 Environmental Monitoring and Audit (EM&A)

For both the Housing Development and Cyber Port Development, adverse impacts have been identified during the construction and operation phases of the project in the EIA report. The recommended measures will help to minimise the impacts. In order to ensure the mitigation measures are properly implemented and the works are conducted in an environmentally controlled manner, an environmental monitoring and audit program has been developed. Noise, dust (TSP) and marine water monitoring throughout the whole construction activities (including TBD construction work as well as Route 7 construction) are recommended. In addition, fresh water monitoring at the Southern Stream shall also be carried out during the construction phase. Regular site inspections shall also be conducted during the whole construction period to check the contractor's compliance with the relevant work specifications and ensure the trees (which are to be conserved and protected) are unaffected by the work.

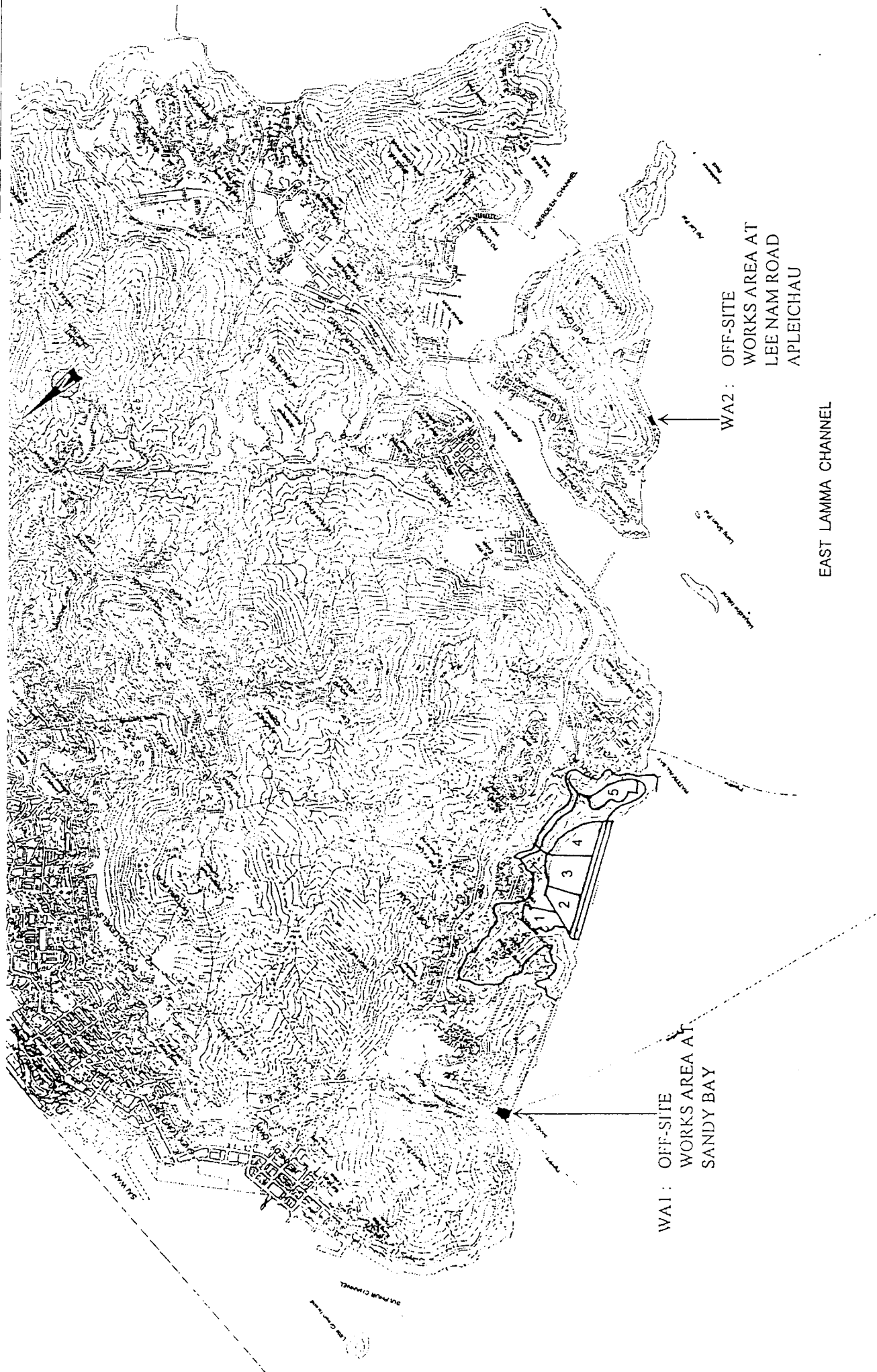
Sewage outfall monitoring is also recommended to monitor the impact of the discharge on the aquatic environment and to validate the dilution modelling results.

Baseline monitoring as well as impact monitoring for the above aspects will also be required to provide data on the initial ambient condition for the future assessment. A standalone EM&A manual which specifies the objectives and responsibilities of monitoring and audit, together with protocols for undertaking these activities has been prepared. The EM&A manual outlines the requirements for monitoring air quality (dust), noise, water, waste management, ecology, site inspections, auditing, as well as complaints handling procedures.

6 CONCLUSIONS

The EIA has assessed the potential environmental impacts on sensitive receivers during the construction and operation phases of both development schemes. This assessment has been based on the best available information. A separate EIA study will be conducted for the proposed marina and breakwater once more detailed information is available.

Some adverse impacts have been identified during both the construction and operation phases of each project. However, with the implementation of the recommended mitigation measures, the residual impacts will be controlled to an acceptable level. The EM&A requirements and the proposed mitigation measures shall be incorporated into the Environmental Permits or contract specifications, where appropriate, to monitor / minimize the environmental impacts.



WAI 1 : OFF-SITE WORKS AREA AT SANDY BAY

WAI 2 : OFF-SITE WORKS AREA AT LEE NAM ROAD APLEICHAU

EAST LAMMA CHANNEL

AGREEMENT NO. CE 92/97 INFRASTRUCTURAL WORKS FOR HOUSING DEVELOPMENT AT TELEGRAPH BAY
 - ENGINEERING FEASIBILITY STUDY

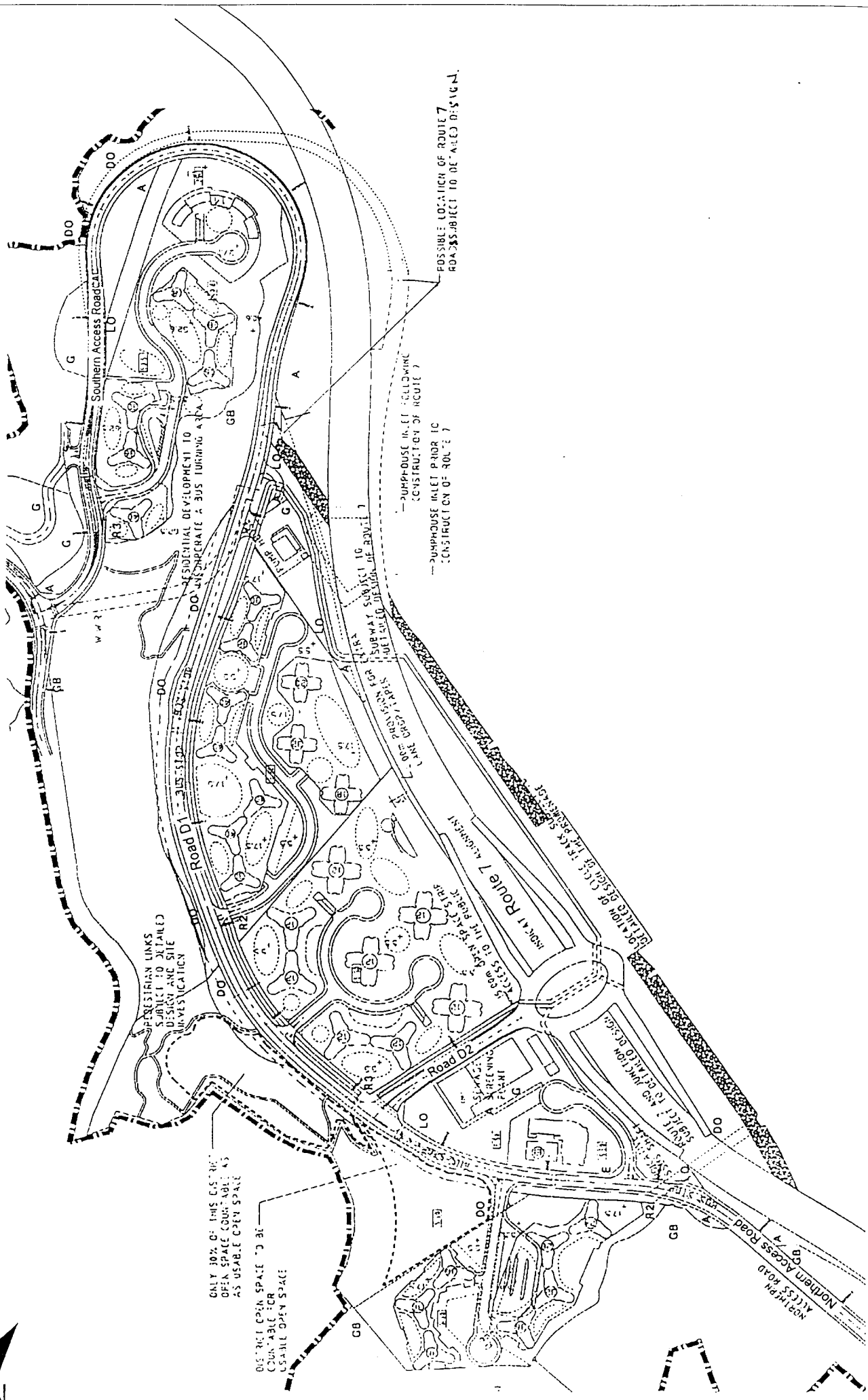
TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG
 HONG KONG ISLAND AND ISLANDS DEVELOPMENT OFFICE

PYPUN / PBA JOINT VENTURE
 PYPUN PARSONS BRINCKERHOFF (ASIA) LTD

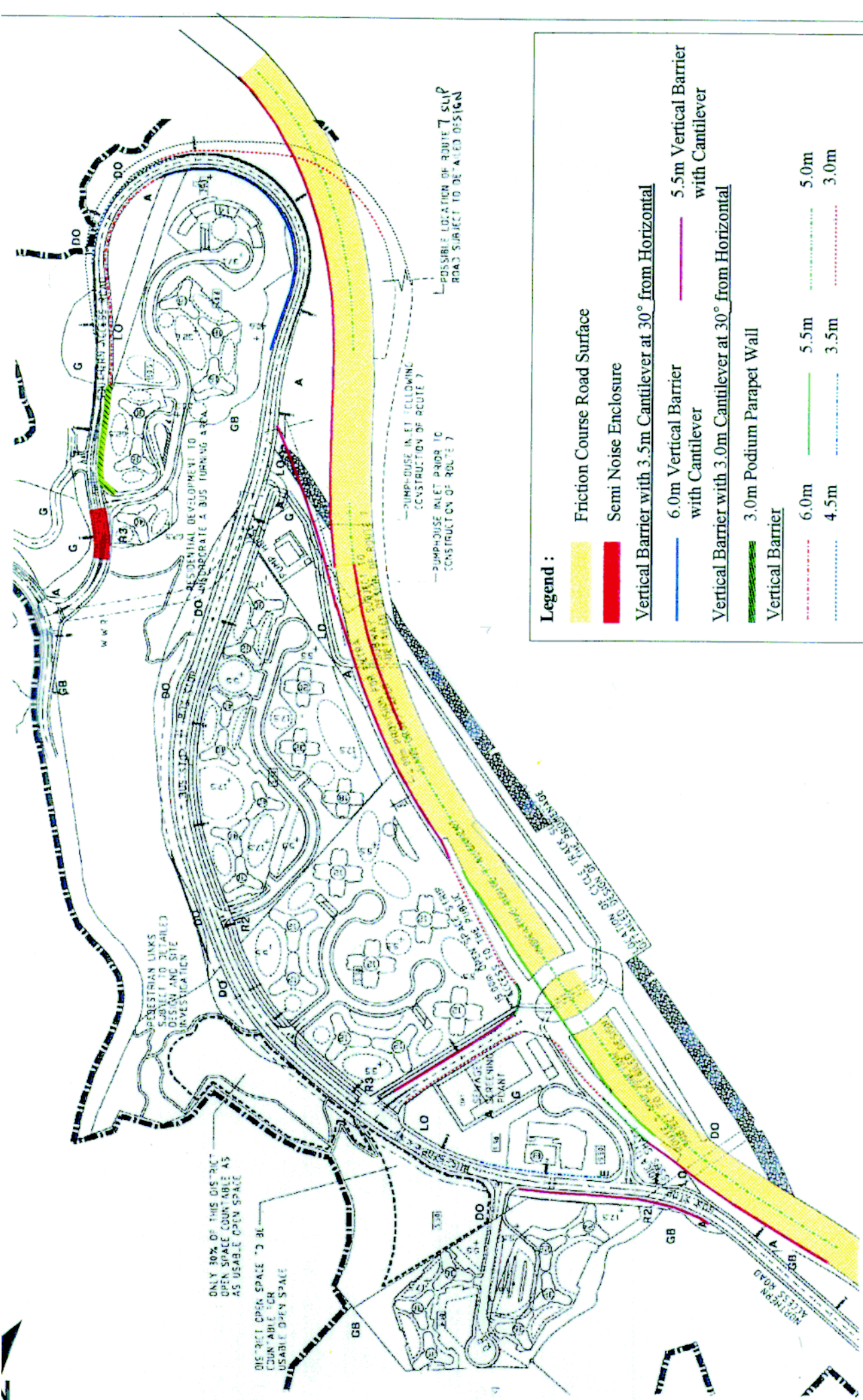
Figure No.	1	Rev.	
Designed By		Scale	N.T.S.
Checked By		Date	Feb 99

Site Location

Rev.	Description	Approved	Date



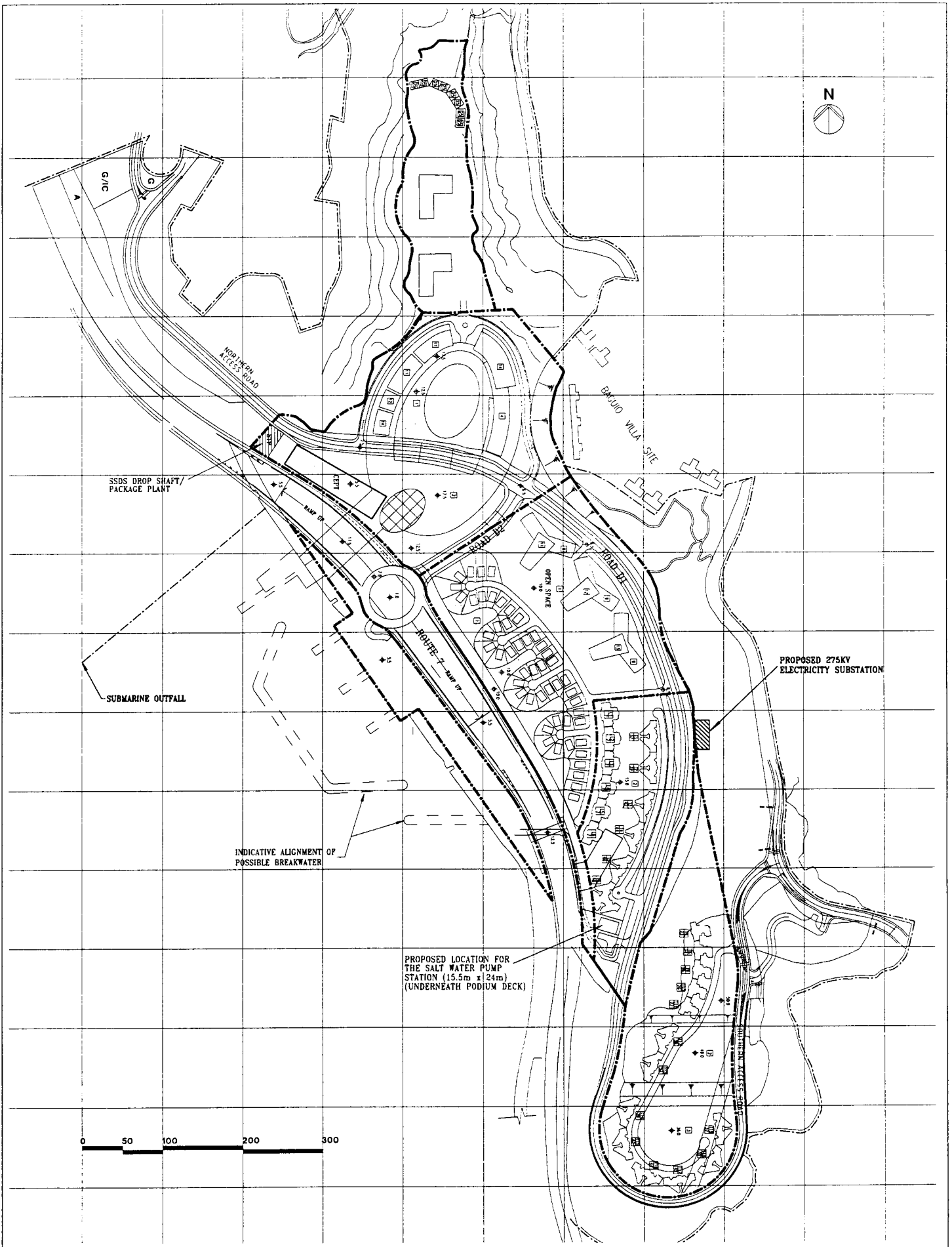
Rev	Figure No.	2a	Scale	NTS	Date	Feb 99
Rev	Designed By		Checked By			
PYPUN / PBA JOINT VENTURE				TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG HONG KONG ISLAND AND ISLANDS DEVELOPMENT OFFICE		
AGREEMENT NO. CE 9287 INFRASTRUCTURAL WORKS FOR HOUSING DEVELOPMENT AT TELEGRAPH BAY - ENGINEERING FEASIBILITY STUDY						
Proposed Property Layout						
Rev	Description	Approved	Date			



Legend :

- Friction Course Road Surface
- Semi Noise Enclosure
- Vertical Barrier with 3.5m Cantilever at 30° from Horizontal
- 6.0m Vertical Barrier with Cantilever
- Vertical Barrier with 3.0m Cantilever at 30° from Horizontal
- 3.0m Podium Parapet Wall
- Vertical Barrier
- 6.0m
- 4.5m
- 5.5m
- 3.5m
- 5.0m
- 3.0m

Rev.	Description	Approved	Date				
<p>AGREEMENT NO. CE 92/97 INFRASTRUCTURAL WORKS FOR HOUSING DEVELOPMENT AT TELEGRAPH BAY - ENGINEERING FEASIBILITY STUDY</p> <p style="font-size: 1.2em; font-weight: bold;">Noise Mitigation Measures (Option 2)</p>							
<p>TERRITORY DEVELOPMENT DEPARTMENT, HONG KONG HONG KONG ISLANDS AND ISLANDS DEVELOPMENT OFFICE</p>				<p>PYPUN / PBA JOINT VENTURE</p> <p>PARSONS BRINCKERHOFF (ASIA) LTD.</p>			
Figure No. 3		Designed By		Scale		Rev.	
				NTS		b	
		Checked By		Date		Feb 99	



Project
CYBER PORT DEVELOPMENT AT TELEGRAPH BAY

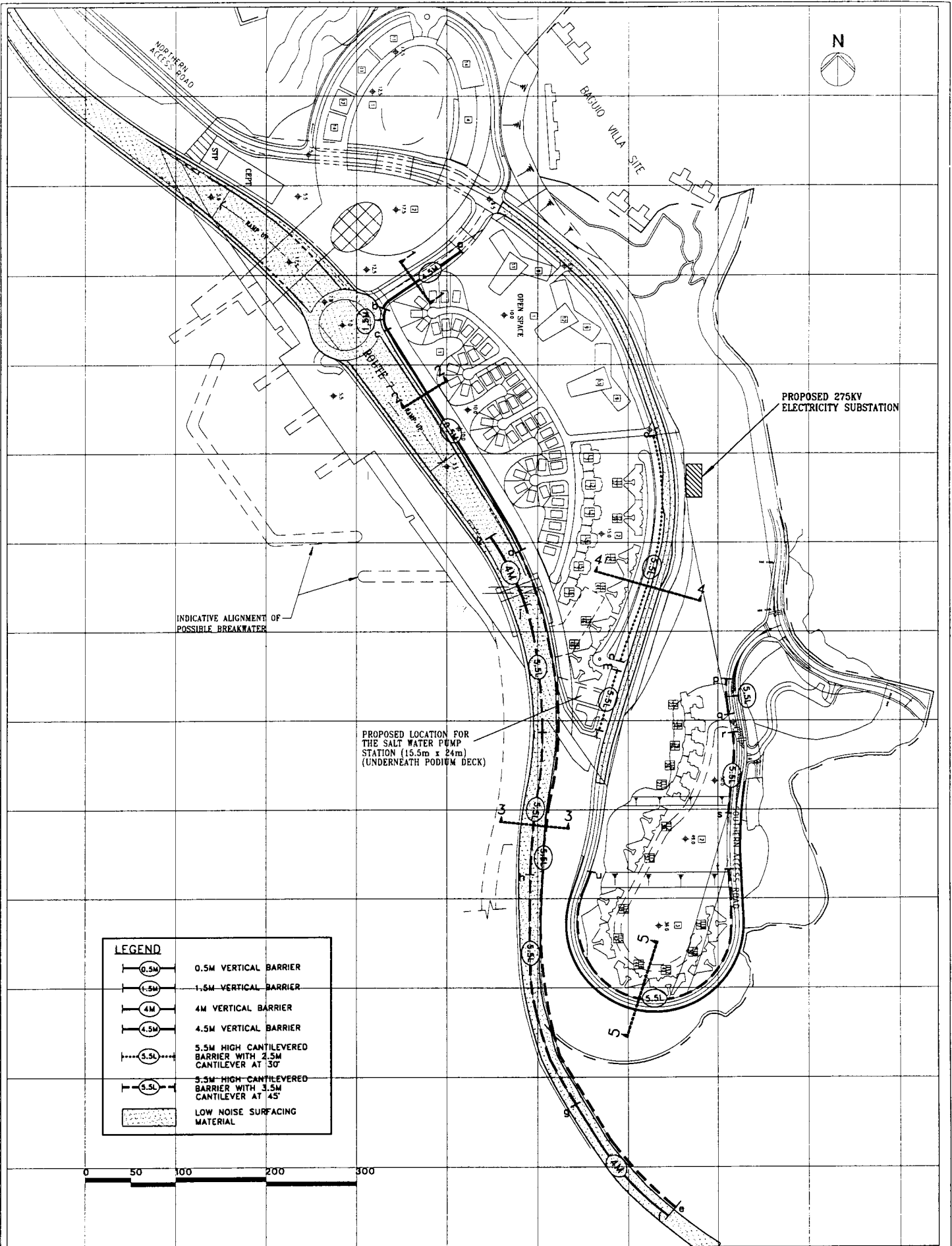
Title
MASTER LAYOUT PLAN OF PROPOSED CYBER PORT DEVELOPMENT

Figure
4

Scale
AS SHOWN

Date
MARCH 1999

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Project
CYBER PORT DEVELOPMENT AT TELEGRAPH BAY

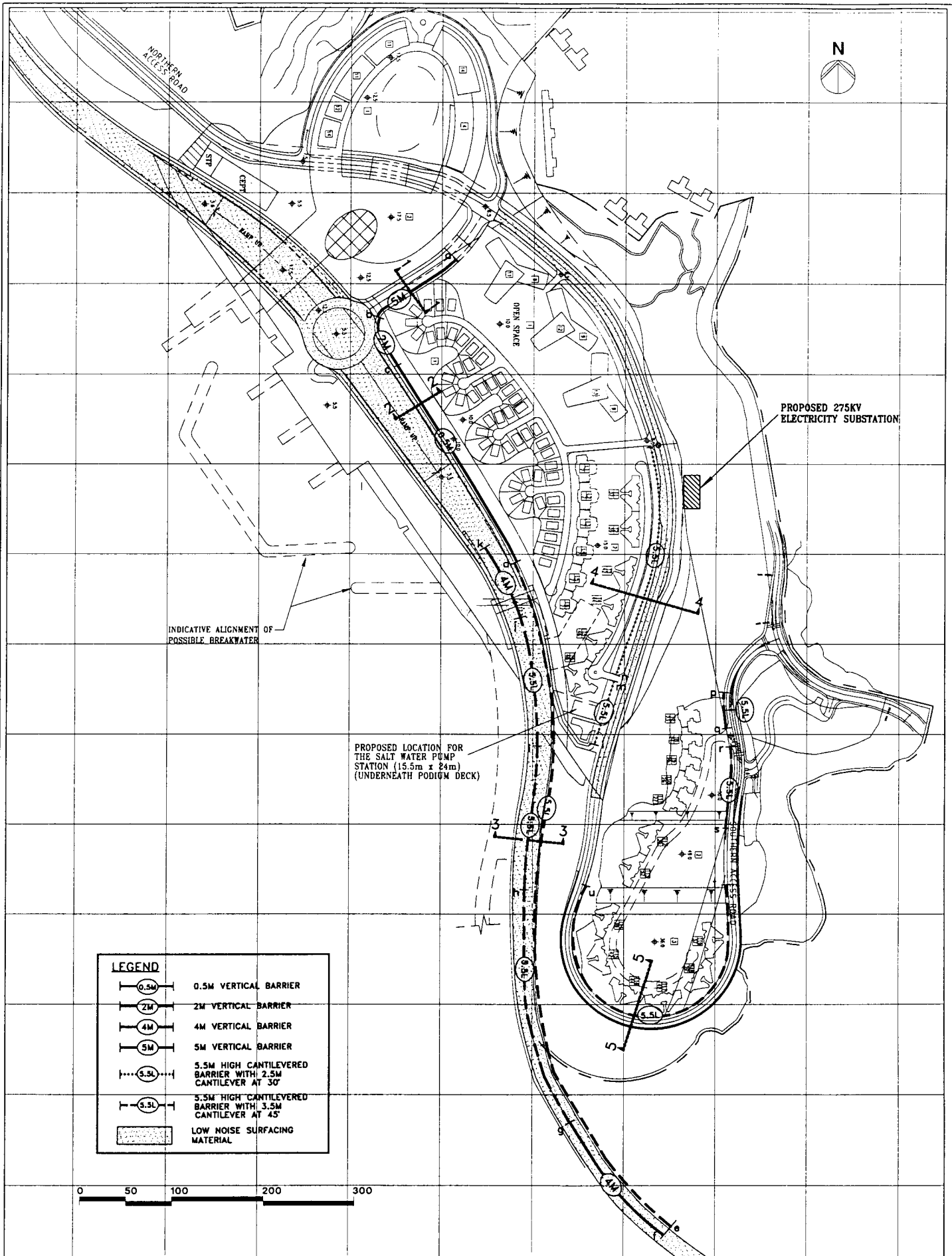
Title
PROPOSED NOISE MITIGATION MEASURES
- DEPRESSED ROUTE 7

Figure
5a

Scale
AS SHOWN

Date
MARCH 1999

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Project
CYBER PORT DEVELOPMENT AT TELEGRAPH BAY

Title
PROPOSED NOISE MITIGATION MEASURES
- AT GRADE ROUTE 7

Figure
5b

Scale
AS SHOWN

Date
MARCH 1999

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