

LEGISLATIVE COUNCIL BRIEF

ISLAND LINE EXTENSIONS, ROUTE 7 AND SOUTH HONG KONG ISLAND LINE

INTRODUCTION

At the meeting of the Executive Council on 21 January 2003, the Council ADVISED and the Chief Executive ORDERED that -

- (a) Completion of the North Hong Kong Island Line (NIL) of the Island Line Extensions (ILE) should be deferred to beyond 2016;
- (b) Alignment protection for the NIL should be undertaken administratively. Actual protection works should proceed only if MTR Corporation Limited (MTRCL) is prepared to fund them upfront except for a 50-metre section over Tsuen Wan Line's (TWL) immersed tube which should be constructed under the Wanchai Development Phase II (WDII) reclamation project and funded by Government upfront;
- (c) MTRCL should be asked to proceed with further planning on the West Hong Kong Island Line (WIL) Phase 1 from Sheung Wan to Belcher of the ILE including a possible link with the South Hong Kong Island Line (SIL);
- (d) Planning for WIL Phase 2 from Belcher to Kennedy Town should be held in abeyance until the way forward for the Western District Development (WDD) reclamation is clear;
- (e) Development of SIL should be considered along with Route 7. We would keep under review the planning of Route 7;
- (f) MTRCL should be asked to examine modifications to its preliminary proposal on SIL with a view to arriving at a more cost effective option, in particular options in railway technology;
- (g) Interim traffic improvement measures identified under the Alternative Alignments Study for Route 7 should proceed for completion by early 2006; and
- (h) Scope of further full traffic improvement measures along Pok Fu Lam Road should be kept under review.

A 2. The background information of the ILE, Route 7 and SIL is at Annex A.

JUSTIFICATIONS

North Hong Kong Island Line (NIL)

3. The NIL is planned to relieve congestion on the existing MTR network which is envisaged to happen between 2008 and 2012. The project will provide an additional rail corridor along the north shore of Hong Kong Island between the MTR Hong Kong Station and Fortress Hill Station. This will double the rail capacity along the northern coast of Hong Kong Island and solve the expected congestion problem on the Causeway Bay section of the existing Island Line (ISL). With the NIL, Tung Chung Line (TCL) will run directly from Lantau through West Kowloon, Hong Kong Station to Chai Wan while Tseung Kwan O Extension (TKE) from Tseung Kwan O will terminate at Sheung Wan, and finally Kennedy Town via the WIL. The NIL will therefore make cross-harbour trips on the TCL and TKE more attractive. By redistributing cross-harbour trips to the TCL and TKE, the NIL will also relieve the Nathan Road section of the TWL.

4. However, with a reduction in forecast employment of about 70 000 to 90 000 due to changes in land use assumptions since the Second Railway Development Study (RDS-2) including a much lesser scale of reclamation at Western District and reduced office development along the northern coast of Sai Ying Pun and Central reclamation, and the opening of the Shatin to Central Link (SCL) in 2008/09 sharing some of the cross-harbour trips and relieving the Nathan Road section of TWL, our assessment is that the Causeway Bay section of the existing ISL and the Nathan Road section of the TWL will still have spare capacity up till 2016. The respective critical peak hour passenger flows in these sections in 2016 are 66 000 and 58 000 passengers per hour per direction (pphpd), compared to an ultimate capacity of 85 000 pphpd and desirable capacity of 77 000 pphpd. We estimate that, even with the opening of the WIL Phase 1 and SIL, the loading on the critical sections of the existing ISL and TWL in 2016 will only increase to 73 000 and 61 000 pphpd respectively. There is therefore no strong need to implement the NIL within the window of 2008 to 2012 as set out in the Railway Development Strategy 2000 (RDS-2000). With such spare capacity, Government cannot justify providing financial support to MTRCL for the NIL, which can be deferred to beyond 2016.

5. We shall continue to protect the NIL alignment administratively and keep in view any changes in planning parameters which may affect its implementation. Our assessment is that only some of the protection works proposed by MTRCL costing about \$88 million can be considered highly desirable. If these works are not carried out at the same time as Territory Development Department's (TDD) reclamation projects in Central and Wanchai, there will be cost, engineering, traffic and environmental

implications when the NIL is actually built. Logically, these works should be funded by MTRCL and a decision to incorporate them or otherwise under Central Reclamation Phase III (CRIII) has to be made in early 2003. However, MTRCL has indicated earlier that as a commercial enterprise, it will not invest on the protection works for the NIL in the absence of a project agreement (PA) signed with Government. It asks the Government to fund such works initially and will reimburse Government after the PA is signed. It would be difficult for Government to fund such advance protection works on NIL now as the project may only be constructed some 10 years later. While the absence of these protection works will make it much more difficult, costly and disruptive to construct the future NIL, our assessment is that their absence should not render future railway construction impossible.

6. Unless MTRCL changes its mind, the protection works should not be undertaken, with the exception of protection work in relation to a 50-metre section of NIL on top of the immersed tube of TWL. We have found that when TDD executes reclamation work under the WDII reclamation project, it will have to construct a box structure, costing \$40 million minimum, over the immersed tube of TWL so as to protect it from additional loading arising from the reclamation, regardless of the NIL. The protection work for the immersed tube of TWL should be slightly upgraded at a comparatively small cost of less than \$10 million (as compared with a project cost of \$3.9 billion for WDII) to provide for the future construction of NIL, and to be funded by Government under the WDII project. Without such upgraded protection work, the subsequent construction of NIL may affect the safe operation of the TWL.

West Hong Kong Island Line (WIL)

7. Residents in the Western District have long urged for the western extension of the MTR from Sheung Wan. The WIL may also speed up the urban renewal in the district. The catchment population for the two additional stations for WIL Phase 1, namely the Sai Ying Pun and the Belcher Stations, total some 100 000 in 2016 while the corresponding catchment employment is about 60 000. The WIL Phase 1 could link up with the proposed SIL to form a transport 'loop' joining the population centres and tourism nodes in the Southern District with the northern coast of Hong Kong Island. Notwithstanding the drop in the planned residential and employment populations of the Western District from about 230 000 each to 190 000 and 90 000 respectively, there is a case to continue with the planning of WIL Phase 1 on transport and planning grounds. Therefore, MTRCL should be asked to proceed further with planning on the WIL Phase 1. Further negotiation with MTRCL on project cost and funding gap should continue.

8. Having considered the cost and benefit, the development of WIL Phase 2 is more contingent upon the Western District Development (WDD). Without the WDD, the catchment residential and employment populations of the Kennedy Town Station in 2016 will be about 42 000 and 9 000 respectively. WDD will add some 9 000 residential and 1 000 employment

populations to this catchment. Moreover, by constructing the WIL Phase 2 ahead of the WDD reclamation, additional cost will be incurred. There is no imminent need to proceed with WIL Phase 2 as the programme for WDD is still uncertain.

Route 7 versus SIL

9. We have compared Route 7 (unless the context otherwise requires, Route 7 in this paper refers to the section between Kennedy Town and Aberdeen) and the SIL in terms of financial and economic cost and benefit, transport performance and environmental impacts. We have used the MTRCL's SIL proposal rather than RDS-2's SIL proposal as a basis for comparison as the former will have a higher economic internal rate of return (EIRR) and serve more people. Although MTRCL's SIL proposal costs about 25% higher than the shorter route proposed in RDS-2, MTRCL's alignment will serve 167 000 residential and 105 000 employment populations in its catchment, including the Cyberport and Ocean Park, compared to 79 000 residential and 21 000 employment populations under the RDS-2's alignment. The EIRR of MTRCL's alignment is 16% compared to 11% of RDS-2 alignment. The details of the comparison are given in the following paragraphs.

(A) Financial and Economic Evaluation

10. As for Route 7, Government will have to invest an initial capital cost of \$10 billion and bear an annual recurrent cost of \$86 million thereafter. The SIL will not be financially viable, even assuming that the tourism initiatives under the Focus Study on Aberdeen Harbour and redevelopment of Ocean Park will materialize. There will be a funding gap albeit that it is expected to be less than the initial capital cost for Route 7.

11. Route 7's EIRR is around 11% and that of SIL around 16%, both measured in real terms per annum. Most of the benefits accrued to transport infrastructure is measured in time saving to the road users. We estimate that Route 7 will bring a total time saving of 15 million hours and SIL 20 million hours to the public at large, both for the same year 2016. Taking into account the monetised time savings, as well as all other benefits, the net economic benefits less recurrent cost in 2016 on Route 7 and SIL are \$1.5 billion and \$1.9 billion respectively.

(B) Transport Performance Evaluation

12. The relief brought about by the SIL on existing road network is not as significant as Route 7. The introduction of the SIL would reduce the amount of road traffic in Pok Fu Lam Road and Aberdeen Tunnel by about 10% while the effect of Route 7 is around 20%. This is understandable as rail passengers mainly come from other forms of public transport, essentially buses where the average occupancy of franchised bus in the peak period is about 50 compared

to 1.5 of private car. Other alternative improvements to the existing road network can be considered as discussed in paragraphs 20 to 23.

13. The SIL will also be more beneficial to any major redevelopment of the Ocean Park which might require a high capacity mass carrier.

(C) Environmental Evaluation

14. In order to serve Cyberport, a coastal Route 7 alignment would have to be adopted with a section between Sandy Bay and Waterfall Bay of about 3-kilometre (km) long to be either elevated, at-grade or slightly depressed, but not in tunnel due to physical constraint. This non-tunnel section, when compared with a full tunnel alignment, would have an adverse impact on air quality, bring about noise nuisance to the nearby residents, and would also cause visual intrusion to the natural shoreline when viewed landward from the East Lamma Channel.

15. While a direct environmental comparison between Route 7 and SIL cannot be made at this stage due to uncertainties in their alignments, in general, the monorail line under MTRCL's SIL proposal will be predominantly in tunnel except some sections between Cyberport and Ocean Park. Moreover, the proposed monorail system will use rubber tyred trains to reduce running noise so as to lessen its impact at the sections above ground. Furthermore, monorail trains are emission free at source as they are powered electrically.

16. From the above comparative analysis, the SIL has a higher EIRR and should be more environmentally friendly. In addition, financial commitment for Government will be much less. Although Route 7 will be more effective in relieving road traffic, other less expensive alternative means can be considered. In conclusion, we shall therefore consider to develop SIL. But we would keep under review the planning of Route 7.

Alignment and Operator of SIL

17. It is not practical to put the SIL for open tender as it is effectively a natural extension of MTR ISL. If we award the SIL to another party other than MTRCL, SIL commuters will most likely have to pay higher overall fares, due to second boarding charges for continuing their journeys on the MTR. Moreover, any operator, other than MTRCL, would not be able to benefit from the additional revenue on MTR systems drawn by the SIL. These will reduce the competitiveness of the rail service, lower the patronage of the SIL and reduce its financial viability. The funding gap will therefore be greater.

18. We should therefore invite MTRCL to plan and operate the SIL subject to agreement being reached between Government and MTRCL on the technical and financial issues regarding the project. We will ask MTRCL to review its SIL proposal, with a view to reduce costs, to better serve the population in Aberdeen and study the feasibility of developing WIL Phase 1 and SIL as a package including a review of the cost-effectiveness of extending the monorail from Belcher right up to the Sheung Wan MTR Station.

Concerns of other Public Transport Operators

19. Other public transport operators would prefer Route 7 to SIL, irrespective of the alignment and the rail operator. Route 7 will reduce road congestion making their service more attractive and reduce their operating cost. On the other hand, the introduction of rail service to the Southern District will no doubt take away some of their business. While the overall cost and benefit to the community as a whole should be our paramount consideration, we have to address their concerns by way of suitable inter-modal coordination of public transport services. We will consider the impact on the public transport services in the Southern District carefully as and when there are more definite proposals on the timetable and alignment of the SIL.

Interim Measures and Full Measures for improving Pok Fu Lam Road

20. The interim traffic improvement measures (Interim Measures) and full traffic improvement measures (Full Measures) developed under the Alternative Alignments Study for Route 7 will provide an alternative means of improving the local traffic condition along Pok Fu Lam Road to a manageable level without Route 7.

21. The proposed Interim Measures are cost effective given their relatively small construction cost of about \$50 million and the significant benefit in relieving local traffic congestion at junctions. The Interim Measures have no major land and environmental impacts and should be implemented as soon as possible. The volume to capacity (v/c) ratios of the critical road sections and the reserve capacities of the critical road junctions in years 2006, 2011 and 2016 under 'do-nothing' and 'with Interim Measures' scenarios are shown in Annex B1.

B1

22. With the SIL and Interim Measures in place, we predict that the v/c ratios of the critical section of Pok Fu Lam Road in year 2016 could be brought down to around 1.06 from 1.30. The v/c ratios of Aberdeen Tunnel in 2016 would be in the range of 1.08 to 1.14 from 1.32 which are manageable. The above v/c ratios have taken into account the various committed and potential developments mentioned in paragraph 14 of Annex A such as the uplifting of the Pok Fu Lam Moratorium and the tourism initiatives under the Focus Study on Aberdeen Harbour. The performance of the SIL with Interim

Measures on the existing road network and critical road junctions in 2016 are presented in Annex B2.

23. The proposed Full Measures costing \$1 billion will further improve the traffic conditions along Pok Fu Lam Road and resolve the capacity deficiency at the Pok Fu Lam Road/Smithfield/Mt. Davis Road junction in year 2016. As some of the proposed measures have potential land and environmental implications, the timing and scope of these proposed measures should be further reviewed in a detailed feasibility study to see if there is any room to reduce the scope of, or exclude some of the proposed measures.

IMPLICATIONS OF THE PROPOSAL

24. The proposal has financial and civil service, economic, environmental and sustainability implications as set out in Annex C. The proposal is in conformity with the Basic Law, including the provisions concerning human rights. It has no productivity implications.

PUBLIC CONSULTATION

25. We will brief LegCo and the relevant District Councils. Formal consultation under Cap 519 Railways Ordinance, Cap 370 Roads (Works, Use and Compensation) Ordinance and Cap 499 Environmental Impact Assessment Ordinance will be made where necessary.

PUBLICITY

26. Apart from this Legislative Council Brief, we will also issue a press release today. A briefing to the Legislative Council Panel on Transport will also be arranged at the earliest opportunity.

SUBJECT OFFICER

27. The subject officer is Mr WAN Man-lung, Principal Assistant Secretary for the Environment, Transport and Works (Transport and Works) (Tel. 2189 2187).

Environment, Transport and Works Bureau
21 January 2003

BACKGROUND INFORMATION OF ISLAND LINE EXTENSIONS, ROUTE 7 AND SOUTH HONG KONG ISLAND LINE

ISLAND LINE EXTENSIONS

The Island Line Extensions (ILE) is one of the six rail projects recommended by the Railway Development Strategy 2000 (RDS-2000). It comprises a North Hong Kong Island Line (NIL) and a West Hong Kong Island Line (WIL). The NIL is an extension of the existing MTR Tung Chung Line (TCL) along the north shore of Hong Kong Island to run through onto the eastern half of the existing MTR Island Line (ISL) at Fortress Hill Station with intermediate stations at Tamar and Exhibition. Concurrently, the MTR Tseung Kwan O Extension (TKE) will join and run through onto the western half of the ISL at the Tin Hau Station. The WIL is an extension of the MTR from Sheung Wan to the Western District. RDS-2000 indicated the completion window of ILE at 2008-2012.

2. Following the Chief Executive-in-Council's approval of 9 January 2001, we invited MTR Corporation Limited (MTRCL) to submit a project proposal for the ILE within 6 months, which MTRCL did on 16 July 2001. The respective layouts of the NIL and WIL are at Annexes D and E. The capital costs of both NIL and WIL are estimated to be around \$8 billion in December 2000 prices. For the projects to achieve the Corporation's required return for new projects (i.e. Weighted Average Cost of Capital plus 1%), both projects need government's financial support. MTRCL also identified potential property development sites along the NIL and WIL.

D & E

Revised Proposal

3. Further to MTRCL's submission of technical and financial proposals on the ILE, MTRCL submitted a revised financial proposal on the ILE in April 2002 taking into account changes in key external factors since the last submission. These changes included -

- (a) lower population and employment forecast, in particular along the northern coast and western part of Hong Kong Island;
- (b) change in land use of one of the potential property development sites from an office/hotel development to other use which is of little interest to MTRCL;
- (c) inclusion of reprovisioning costs in the railway estimate;
- (d) inclusion of the cost of the Western District Development (WDD) reclamation in the railway estimate to take into account its possible delay; and
- (e) changes to the programmes for the NIL and WIL.

4. MTRCL assessed the impact of these changes and concluded that the NIL and WIL projects were no longer financially viable, without additional government support, even after inclusion of the property profit based on “bare site” premia. In the revised financial proposal, MTRCL adopted the 2000-based Territorial Population and Employment Data Matrices Scenario I having a population of 8.1 million and an employment of 4.0 million in 2016 which were lower than the 8.9 million population and 4.4 million employment assumed in the July 2001 submission. As the NIL is basically a relief line for the ISL, a slight reduction of rail transport demand will affect the marginal revenue of the spilled over passengers greatly. WIL’s patronage is affected by the delay as well as the reduction of the scale of development of the WDD reclamation. MTRCL predicted that the fare revenues due to the NIL and WIL would drop significantly compared to the previous submission.

5. In the revised proposal, MTRCL proposed to delink the WIL from the WDD and submitted a programme option which would allow the eastern part of the WIL from Sheung Wan Station (SHW) to Belcher (BEL) Station (i.e. Phase 1), not affected by the WDD reclamation, to proceed first and the remaining part to Kennedy Town (KET) Station (i.e. Phase 2) to be commissioned later.

6. MTRCL has also updated the capital costs of the NIL, WIL Phase 1 and WIL Phase 2. While NIL’s cost stays at around \$8 billion, WIL Phase 1 and Phase 2 cost about \$5 and \$6 billion respectively, all in December 2000 prices. In the revised financial proposal, MTRCL assumed that the Corporation would operate the Shatin to Central Link (SCL). All three projects need substantial government financial support, even after the inclusion of property profits based on “bare site” premia. The capital costs of these rail projects are summarized in the table at Annex F.

F

7. The alignment of MTRCL’s WIL generally follows that of the RDS-2000 but combining the proposed Sai Ying Pun and Des Voeux Road Stations into a new Sai Ying Pun (SYP) Station midway between the two stations proposed in the RDS-2000. Other than the SYP Station, the WIL has two more stations, the previously mentioned BEL Station and KET Station, together with a stabling depot in the WDD reclamation. The WIL starts from existing tunnels west of the Sheung Wan Station and runs along Des Voeux Road West. At the junction with Whitty Street, it turns south towards Belcher’s Street. It then swings south beneath the lower slopes of Lung Fu Shan and Mount Davis, before passing beneath the Sai Wan Estate and entering the KET Station.

8. The phased completion option would allow WIL Phase 1 and WIL Phase 2 to proceed as separate projects. MTRCL has assumed its existing fare structure be extended to the WIL. With Phase 1 only, MTRCL estimates that

the marginal increase in daily patronage in 2016 is 100 000. If Phase 2 is considered as a separate project after completion of Phase 1, the marginal increase in daily patronage in 2016 is 56 000.

ROUTE 7 AND SOUTH HONG KONG ISLAND LINE

9. The Third Comprehensive Transport Study (CTS-3) provided a framework for developing a balanced transport strategy and infrastructure programmes to facilities the mobility of people and goods of Hong Kong in an environmentally sustainable manner up to 2016. It lays down the strategy that railway will form the backbone of the future passenger transport network. The study recommended fast-tracking the remaining section of Route 7 (Kennedy Town to Aberdeen) for completion by as early as 2006 to improve mobility whilst the South Hong Kong Island Line (SIL) was considered as a long-term possibility for further examination in the Second Railway Development Study (RDS-2) being conducted at that time. A number of changes in these two projects have occurred since the completion of the CTS-3 and RDS-2 in 1999 and 2000 respectively. The history and present situation of these projects are presented in the paragraphs below.

Route 7

10. Route 7 is a strategic link of about 13.5-kilometre (km) connecting the Cross Harbour Tunnel in Causeway Bay via Kennedy Town to Aberdeen. The section from Causeway Bay to Kennedy Town of 7.5-km long has been completed. The remaining section of Route 7 is planned to serve the traffic needs of the southern and western parts of Hong Kong Island including the proposed WDD (previously known as Green Island Development). Although CTS-3 recommended Route 7 (Kennedy Town to Aberdeen) be completed by 2006, the project was planned at the time of the study for completion by 2010 because of unavailability of land to construct the interchange in the Western District reclamation. This section of Route 7 will form part of the strategic trunk road system linking the southern part of Hong Kong Island to the Hong Kong International Airport and northwest New Territories via the Western Harbour Crossing together with Route 3 or Route 9. Under the project, slip roads will be provided to connect the stub end of the existing Route 7 at Kennedy Town and the WDD for serving the district and a new road link for traffic between Kennedy Town and Aberdeen will be constructed. With the provision of this additional road link, congestion along the existing major external roads serving the western half of the Southern District including Pok Fu Lam Road, Aberdeen Tunnel, Wong Chuk Hang Road and Victoria Road will be alleviated. It also helps provide additional road capacity for new developments, such as Cyberport, uplifting of Pok Fu Lam Moratorium, and tourism initiatives in Aberdeen, with spare capacity available which could enhance the developmental potential of the area.

Earlier Studies and Reviews

11. In 1998 we commissioned the Investigation and Preliminary Design of Route 7 - Section between Kennedy Town and Aberdeen (R7-I&PD) study. The R7-I&PD study recommended a dual 3-lane coastal alignment from the western end of the then Green Island Development to Aberdeen. To fully utilize the land resource of the reduced reclamation and minimize environmental impact, the R7-I&PD study also considered the feasibility of aligning Route 7 through Mt. Davis using a tunnel.

12. In view of the major changes in the related land use and strategic network occurred since CTS-3 including a significant scaling down of the planned Green Island Reclamation, deletion of Route-10 Hong Kong-Lantau Link and reassignment of the use of Telegraph Bay Reclamation from residential to Cyberport development, an in-house review on Route 7 was carried out in mid 2001. The review found that it was more urgent and cost effective to construct the northern section of Route 7 between Kennedy Town and Pok Fu Lam as a dual 2-lane highway with Mt. Davis tunnel by 2010. The implementation of the southern section of Route 7 between Pok Fu Lam and Aberdeen could be postponed to 2016 or beyond. In July 2001, we put forward to Legislative Council Panel on Transport a proposal to proceed with an engineering review on the northern section of Route 7 and the remaining southern section of the Route to be reviewed in the light of further development in the Southern District. Members strongly requested for early implementation of the whole project and passed a motion "Requests the Administration to construct Route 7 from Kennedy Town to Aberdeen mainly in tunnel form as soon as possible". At the special panel meeting held in September 2001, various groups were invited to express their views on Route 7. The concerned District Councils and some local organizations strongly requested for the construction of the Route 7 from Kennedy Town to Aberdeen. Other groups objected to the project because of environmental impact and visual intrusion on the existing natural shoreline and suggested that it should be replaced by a rail link.

Alternative Alignments Study

13. Having regard to the motion passed by Members and the views expressed at the Panel meeting in September 2001, we commissioned an Alternative Alignments for Route 7 - Section between Kennedy Town and Aberdeen - Investigation study in early 2002. The objective was to develop a number of dual 2-lane alignments for the route, as well as considering the option of upgrading existing roads. In formulating these alternative alignments, we had balanced various factors including environmental acceptability, engineering, land impact, costing, implementation programme, public views and traffic planning.

(A) Planning Assumption

14. Traffic forecast for the Alternative Alignments Study takes into account various committed and potential developments in the district including the Cyberport, the uplifting of the Pok Fu Lam Moratorium and the potential development areas recommended in the Planning and Development Study for Hong Kong Island South and Lamma Island. Apart from the above developments, further assumptions have been made, with reference to information supplied by individual project proponents, for other major planned developments such as Tourism Development at Aberdeen Harbour.

15. There is no significant growth in the total population in the Southern District up to 2016 except locally. The total forecast population in the Southern District in 2016 stands at 287 000, compared to 288 000 in 2001. On the other hand, the employment level in the Southern District will increase from 91 000 in 2001 to 157 000 in 2016. The increase mainly comes from the Cyberport Development before 2006 and Aberdeen and Wong Chuk Hang as well as Ap Lei Chau in future years.

(B) Interim Measures and Full Measures

16. Traffic impact assessment of the Alternative Alignments Study indicates that new developments in future years would aggravate traffic conditions on existing road network between Kennedy Town and Aberdeen, in particular Pok Fu Lam Road and Aberdeen Tunnel. The critical section of Pok Fu Lam Road and its junctions would experience capacity constraints starting from year 2006 onwards in the absence of road improvement schemes or new transport infrastructure. At the same period, Aberdeen Tunnel would operate at its ultimate capacity, with the volume to capacity (v/c) ratios¹ reaching 1.22 by year 2006. The forecast v/c ratios of the critical road sections and the reserve capacities² of the critical road junctions under 'do-nothing' scenario are at Annex B1. To cope with future traffic conditions along Pok Fu Lam Road, two sets of improvement measures have been developed under the Study, namely Interim Measures and Full Measures.

B1

17. Interim Measures including a proposed footbridge across the Pok Fu Lam Road/Smithfield/Mt. Davis Road junction and a new bus layby at Pok Fu Lam Road near its junction with Pokfield Road, at an estimated cost of about

¹ Volume to capacity (v/c) ratio is an indicator which reflects the performance of a road. A v/c ratio equal to or less than 1.0 means that a road has sufficient capacity to cope with the volume of vehicular traffic under consideration and the resultant traffic will flow smoothly. A v/c ratio above 1.0 indicates the onset of congestion. A v/c ratio above 1.2 indicates more serious congestion with traffic speeds progressively deteriorating with further increase in traffic; speed and freedom to manoeuvre will become increasingly restricted and drivers would experience a poor level of comfort and convenience.

² Reserve capacity (RC) of less than -20% implies very significant congestion which will result in unstable flow of significant variation and in practice, flow exceeding RC of -20% cannot occur and cannot be predicted within reasonable degree of confidence.

G \$50 million in September 2001 prices, are developed for completion by year 2006 to deal with the traffic conditions before year 2011. A layout plan showing the Interim Measures is at Annex G. With the implementation of the Interim Measures, the v/c ratios of the critical section of Pok Fu Lam Road between Pokfield Road and Sassoon Road in years 2006, 2011 and 2016 would be effectively reduced by about 10% to 1.09, 1.16 and 1.18 respectively whilst the critical road junctions would have no capacity problem in design years 2006 and 2011. The v/c ratios of the critical section and the reserve capacities of the critical road junctions in years 2006, 2011 and 2016 with Interim Measures are shown in Annex B1.

18. To address long-term traffic problems along Pok Fu Lam Road, Full Measures mainly consisting of two new U-turn facilities at Pok Fu Lam Road/Smithfield/Mt. Davis Road junction and near Hong Kong University, additional links between Victoria Road/Pok Fu Lam Road (Aberdeen bound) and seven proposed footbridges, in the cost of \$1 billion in September 2001 prices, are developed to enhance the throughput of Pok Fu Lam Road for completion before 2011. These Full Measures will remove all conflicting traffic movements at all the road junctions and eliminate all existing at-grade pedestrian crossings across Pok Fu Lam Road. The non-left turn traffic movements in conflict with the mainline traffic flow of Pok Fu Lam Road will be diverted to above grade-separated facilities in the vicinity. All existing at-grade pedestrian crossings across Pok Fu Lam Road will be replaced by footbridges. By introducing the above improvement measures, the critical section of Pok Fu Lam Road between Hill Road Flyover and Shek Pai Wan Road can operate with no stoppage caused by traffic lights and the travelling speed could be upgraded from 50 kilometres per hour (kph) to 70-80 kph. By segregating pedestrian movements with footbridges, the pedestrian safety across this 4-lane carriageway can also be enhanced. A layout plan showing the Full Measures is at Annex H. With the implementation of the Full Measures, the v/c ratio of the critical section of Pok Fu Lam Road between Pokfield Road and Sassoon Road in year 2016 will be reduced from the above 1.18 to 1.10 while that of Aberdeen Tunnel will be brought down from 1.29 to 1.27. Traffic conditions at Pok Fu Lam Road and Aberdeen Tunnel will be further improved with the provision of new transport infrastructure, the Route 7 or SIL.

(C) Recommended Alignment Options

19. Fifty alignment options, initially segments by segments in different geographical areas, have been identified under the Study to connect the stub end of the existing Route 7 at Kennedy Town to Aberdeen. Six preferred alignment options (including the Initial Alignment outlined in the earlier R7-I&PD study) have been selected and evaluated, based on a number of agreed criteria such as engineering, planning and land matters, environmental issues, programming and costing as well as transport planning. The evaluation of different alignment options, taking into account the views in the earlier public consultation, identifies two recommended alignments. We

here refer to these recommended alignment options as Options 1 and 2. Option 1 is about 7-km long which is mainly a coastal alignment with the section between WDD reclamation and Sandy Bay in tunnel and an interchange is provided at Cyberport. Option 2 has a length of about 6-km which is mainly in tunnel with approach roads at its portals to tie-in with the existing Route 7 stub-end and Aberdeen Praya Road and has no direct connection to Cyberport. The layouts of Options 1 and 2 are shown in Annexes I and J respectively. As the alignments and configurations of Route 7 are subject to refinement, the project costs provided at this stage are rough estimates only. The respective project costs of Option 1 and Option 2 are \$10.0 billion and \$11.5 billion in September 2001 prices. The annual recurrent costs of Option 1 and Option 2 are \$86 million and \$109 million in September 2001 prices respectively.

20. Each alignment option offers distinct feature. Option 1 provides more flexibility in connecting to Cyberport. Option 2 presents obvious environmental and land advantages but it has a higher project cost due to its tunnel configuration. A major benefit of this option bypassing Cyberport is that it could reduce the route length by about one kilometre and thus the travelling distance and time between Kennedy Town and Aberdeen. However, the bypass option could be a disadvantage to the utilization rate of the Route and the relief on existing roads to be discussed later. As phased implementation of Route 7 under Option 1 (Kennedy Town-Cyberport-Aberdeen) with the initial termination at Cyberport would overload the local roads in the vicinity, the Study has recommended that the full length of the route between Kennedy Town and Aberdeen should be completed in one go.

(D) Benefit of Route 7 on Existing Road Network

21. The benefit of introducing Route 7 on the existing road network and critical road junctions by years 2011 and 2016 are presented in Annex B2. On Aberdeen Tunnel, the relief to be brought by both alignment options are similar and the v/c ratios in years 2011 and 2016 would be reduced from 1.14 and 1.29 (after implementing Interim Measures along Pok Fu Lam Road) to about 1.00 and 1.09 respectively. With regard to the traffic conditions along Pok Fu Lam Road, the two alignment options perform differently. Option 1 with Cyberport interchange reduces the v/c ratios at the critical section of Pok Fu Lam Road between Pokfield Road and Sassoon Road in years 2011 and 2016 from 1.16 and 1.18 (after implementing Interim Measures) to 0.93 for both design years whilst Option 2 bypassing Cyberport has no significant benefit in relieving the traffic congestion. Due to the lack of connection to Cyberport and the local roads in the vicinity, the v/c ratio of Route 7 under Option 2 in 2016 is only 0.57 which indicates a low utilization rate of the Route while that of Option 1 with Cyberport interchange reaches 0.71. Under both options, critical road junctions along Pok Fu Lam Road would have spare capacities in years 2011 and 2016 and the reserve capacities are in the range of 19% to 26% for Option 1 and 6% to 12% for Option 2. In summary, Option 1 is preferred over Option 2 in traffic performance and cost

considerations. Our previous discussion on transport performance and economic benefit in paragraphs 10 to 12 of this paper are therefore based on Option 1.

South Hong Kong Island Line

22. RDS-2 advises that the most effective configuration of SIL is a shuttle providing direct linkage from the main population centres of Wah Fu and Ap Lei Chau to Central Business District. The capital cost is about \$8 billion. RDS-2 has assessed that without substantial additional planned developments in the Southern District, SIL(RDS-2), would not be viable. In order for the scheme to achieve a financial internal rate of return (FIRR) of 4% in real term, an additional planned population of 170 000 and employment of 40 000 in the rail catchment would be required. Otherwise, SIL(RDS-2) requires a funding support of \$5 billion.

Tourism Development in Aberdeen

23. The Government is examining the options for promoting the development of Aberdeen as one of the major tourism nodes in Hong Kong. With the help of relevant government departments, the Ocean Park Board is formulating a strategic plan to redevelop and reposition the park. This future development plan of the Ocean Park will provide input for finalizing the overall planning for the Aberdeen Harbour area. Throughout this planning process, it is very clear that any attempt to promote developments of the area as a tourism node will not be sustainable unless there is a substantial enhancement to the capacity of public transport links of the area to the central part of Hong Kong.

MTRCL's SIL Proposal

24. We received a preliminary proposal on SIL from the MTRCL in June 2002. MTRCL proposed a circuitous alignment for the SIL, in the form of a monorail system looping from the future BEL Station of the MTR WIL to the MTR ISL at Wanchai with intermediate stations at Cyberport, Wah Fu, South Horizons, Lei Tung, Wong Chuk Hang, Ocean Park and Happy Valley. The layout of SIL(MTR) is shown in Annex K. As MTRCL's monorail scheme will route through a number of isolated population centres as well as Ocean Park, the scheme will serve more population and tourists compared to RDS-2's alignment. With the looped alignment, commuters from the Southern District can interchange with MTR at Belcher and Wanchai.

25. MTRCL identifies that the SIL(MTR) will not be commercially viable without government's funding support. Our preliminary checking on MTRCL's proposal is that they have used outdated planning data (with higher population/employment) and they have also assumed that they would operate the SCL. However, the overestimated patronage may be offset by the

additional rail demand arising from the planned tourism development at Aberdeen Harbour and the conceived Ocean Park redevelopment.

(A) Route Alignment

26. The monorail line is about 13-km long and will be predominantly in tunnel except some sections between Cyberport and Ocean Park. The monorail starts from an underground station interchanging with the WIL at BEL Station and extends southwards in tunnel and comes out on viaduct at Cyberport Station. After leaving Cyberport, it enters a rock tunnel heading for Wah Fu Station. From Wah Fu onwards, it goes on viaduct crossing the Aberdeen Channel to Ap Lei Chau with station at South Horizons. It then enters a short rock tunnel before reaching Lei Tung Station. Thereafter, it crosses the Channel again on viaduct and runs eastwards above an existing nalluh with a station at Wong Chuk Hang. It then continues eastwards on viaduct with a station and a depot at Ocean Park. Beyond Ocean Park, it runs on elevated structure along the eastern side of the Aberdeen Tunnel approach road until entering into tunnel and goes northwards with a station at Happy Valley and finally terminates at the MTR ISL Wanchai Station providing interchange between the ISL and the SIL.

(B) Cost Estimate

27. The capital cost of the SIL(MTR) is around \$10 billion in December 2000 prices and is shown in the table at Annex F.

(C) Fares

28. MTRCL has assumed its existing fare structure is extended to the SIL(MTR) and estimates MTR passengers need to pay an additional fare, comparable to that of similar journeys on the MTR, to reach SIL(MTR) stations in the Southern District.

(D) Patronage Forecasts

29. In MTRCL's preliminary proposal, the 2016 marginal weekday patronage forecast, assuming no Route 7, is 270 000 of which 170 000 are new MTR passengers.

Performance of Road Network (in V/C Ratio) under 'Do-nothing' and 'With Interim Measures' Scenarios

Road	Scenario	Reference year 2000	Year 2006	Year 2011	Year 2016
Critical Section of Pok Fu Lam Road (between Pokfield Road and Sassoon Road)	Do-nothing	0.94	1.20	1.28	1.30
	With Interim Measures		1.09	1.16	1.18
Critical Section of Victoria Road (between Cadogan Street and Mt Davis Road)	Do-nothing	0.58	0.85	0.88	0.91
	With Interim Measures		0.85	0.88	0.91
Aberdeen Tunnel	Do-nothing	1.04	1.22	1.16 ⁽¹⁾	1.32
	With Interim Measures		1.21	1.14 ⁽¹⁾	1.29

Performance of Critical Road Junction (in Reserve Capacity) under 'Do-nothing' and 'With Interim Measures' Scenarios

Road	Scenario	Reference year 2000	Year 2006	Year 2011	Year 2016
Junction of Pok Fu Lam Road/ Pokfield Road	Do-nothing	10%	-8%	-12%	-12%
	With Interim Measures		17%	10%	7%
Junction of Pok Fu Lam Road/ Smithfield/ Mt Davis Road	Do-nothing	24%	-12%	-19%	-34%
	With Interim Measures		7%	0%	-19%

⁽¹⁾ The capacity constraint of Aberdeen Tunnel is mainly due to the tailback problem of the road network in its downstream areas in Wanchai and Causeway Bay. Upon completion of Central – Wanchai Bypass and Island Eastern Corridor Link by year 2011, there would be general relief in the downstream road network and thus enhance the throughput of Aberdeen Tunnel.

Comparison of Route 7 and SIL on Road Network Performance (in V/C Ratio)

Road	Scenario	Year 2011	Year 2016
Critical Section of Pok Fu Lam Road (between Pokfield Road and Sassoon Road)	With Interim Measures	1.16	1.18
	With Route 7 (with Cyberport Interchange)	0.93	0.93
	With Route 7 (Bypass Cyberport)	1.05	1.09
	With SIL	-	1.06
Critical Section of Victoria Road (between Cadogan Street and Mt Davis Road)	With Interim Measures	0.88	0.91
	With Route 7 (with Cyberport Interchange)	0.45	0.45
	With Route 7 (Bypass Cyberport)	0.66	0.70
	With SIL	-	0.80
Aberdeen Tunnel	With Interim Measures	1.14	1.29
	With Route 7 (with Cyberport Interchange)	1.00	1.09
	With Route 7 (Bypass Cyberport)	1.02	1.09
	With SIL	-	1.14
Route 7	With Route 7 (with Cyberport interchange)	0.60	0.71
	With Route 7 (Bypass Cyberport)	0.46	0.57

Comparison of Route 7 and SIL on Critical Road Junction Capacity (in Reserve Capacity)

Road	Scenario	Year 2011	Year 2016
Junction of Pok Fu Lam Road/Pokfield Road	With Interim Measures	10%	7%
	With Route 7 (with Cyberport Interchange)	19%	19%
	With Route 7 (Bypass Cyberport)	9%	7%
	With SIL	-	17%
Junction of Pok Fu Lam Road/Smithfield/Mt Davis Road	With Interim Measures	0%	-19%
	With Route 7 (with Cyberport Interchange)	26%	24%
	With Route 7 (Bypass Cyberport)	12%	6%
	With SIL	-	-12%

Notes -

1. All the above v/c ratios and reserve capacities have assumed with Interim Measures at Pok Fu Lam Road.
2. The above traffic forecasts have taken into account various committed and potential developments as adopted in the Alternative Alignments Study. These include uplifting of Pok Fu Lam Moratorium and tourism initiatives under the Focus Study on Aberdeen Harbour.

IMPLICATIONS OF THE PROPOSAL

FINANCIAL AND CIVIL SERVICE IMPLICATIONS

Both WIL Phase 1 and SIL need government's funding support. We will firm up with MTRCL on the funding gaps and EPIW required when developing the above railway schemes further in the detailed planning and design stage. We will bid for the required funding and staff resources in the usual manner once the Government has decided to go ahead with the projects.

2. The construction cost of the Interim Measures for improving Pok Fu Lam Road is about \$50 million. The staff implication of the Interim Measures project would be nominal. As for the Full Measures, we can only finalize its financial and staff implication after we have completed the review on the project scope. We will secure the necessary funding and resources if required as usual.

ECONOMIC IMPLICATIONS

3. We estimate that the WIL Phase 1 will yield an economic internal rate of return (EIRR) of 16% and create some 1 700 jobs in the construction and related field during the project implementation. In addition, we anticipate that the project will stimulate urban renewal and property development in the Western District. As regards the investment in the SIL, we expect, depending on the final alignment, it will generate an EIRR of about 16% and bring in some 3 200 job opportunities. Besides, the SIL will enhance accessibility of the tourist attractions in the Southern District and help promote Hong Kong's tourism industry. For the EIRR of the Interim Measures, our broad-brush assessment indicates that the EIRR would be over 50%. The implementation of the Interim Measures will create some 20 jobs in the construction and related field.

ENVIRONMENTAL IMPLICATIONS

4. The Central Reclamation Phase III (CRIII) and the Wanchai Development Phase II (WDII) Environmental Impact Assessment (EIA) reports publicly exhibited and approved under Cap 499 EIA Ordinance have included construction stage impacts of advance NIL protection works assuming a seaward alignment. By incorporating these NIL protection works under the CRIII and WDII reclamation contract can avoid the associated dust and noise impacts due to future reopening of the completed road or ground surface when the NIL is actually built. Under the current proposal where only the protection work for a 50-metre section of NIL will be constructed under WDII, the potential future construction impacts, including the operational impacts of the NIL will need to be addressed in the future EIA.

5. MTRCL has planned the whole WIL alignment in tunnel and where practicable, building it by tunnelling method. In preparing the WIL project proposal, MTRCL has also carried out a preliminary environmental assessment and identified some potential environmental impacts, in particular the decommissioning of the abattoir at Kennedy Town, the noise impact to nearby residents during the construction of the Sai Ying Pun Station, and the need for preserving mature trees, where necessary and practicable, on the Western District Police Station site. These potential impacts need to be resolved in the detailed planning stage. The proposed implementation of the WIL in two phases would not result in additional environmental implications.

6. The SIL is at a very preliminary stage. MTRCL will undertake the necessary environmental assessment to address the environmental implications of the SIL in future studies.

7. Both the WIL and SIL are designated projects under Schedule 2 of the EIA Ordinance. Environmental permits are required for the construction and operation of the projects. When the WIL and SIL are taken forward for detailed planning, design and implementation, the EIA Ordinance will be fully complied with in selecting the optimal rail alignments, recommending the best practicable construction methods, identifying potential environmental impacts and devising effective mitigation measures to avoid the impacts to the maximum possible extent.

8. The Alternative Alignments Study for Route 7 indicates that the proposed Interim Measures have no major environmental issue except possible visual impact of the proposed footbridge. We envisage that the visual intrusion could be softened through proper design of the footbridge to blend in with its surroundings. Depending on the existing and future traffic flow and its associated environmental impacts, an element of the proposed Interim Measures that involves the widening of a section of a district distributor could be a designated project under the EIA Ordinance and if so, the relevant provisions should be complied with.

9. As regards the Full Measures identified in the Study, the proposed improvement works at Pok Fu Lam Road/Smithfield/Mt. Davis Road junction would have air, noise and visual impacts to the area around Pok Fu Lam Road Playground and also the proposed improvement scheme at Pok Fu Lam Road/Victoria Road junction will pose visual and environmental impacts to the existing and planned developments in the vicinity. The Full Measures project is a designated project under Schedule 2 of the EIA Ordinance. An environmental permit is required for the project. As the scope of the Full Measures is under review, we will carry out an EIA study to meet the requirements of the EIA Ordinance after deciding to proceed with these measures. We will apply for an environmental permit before construction works commence.

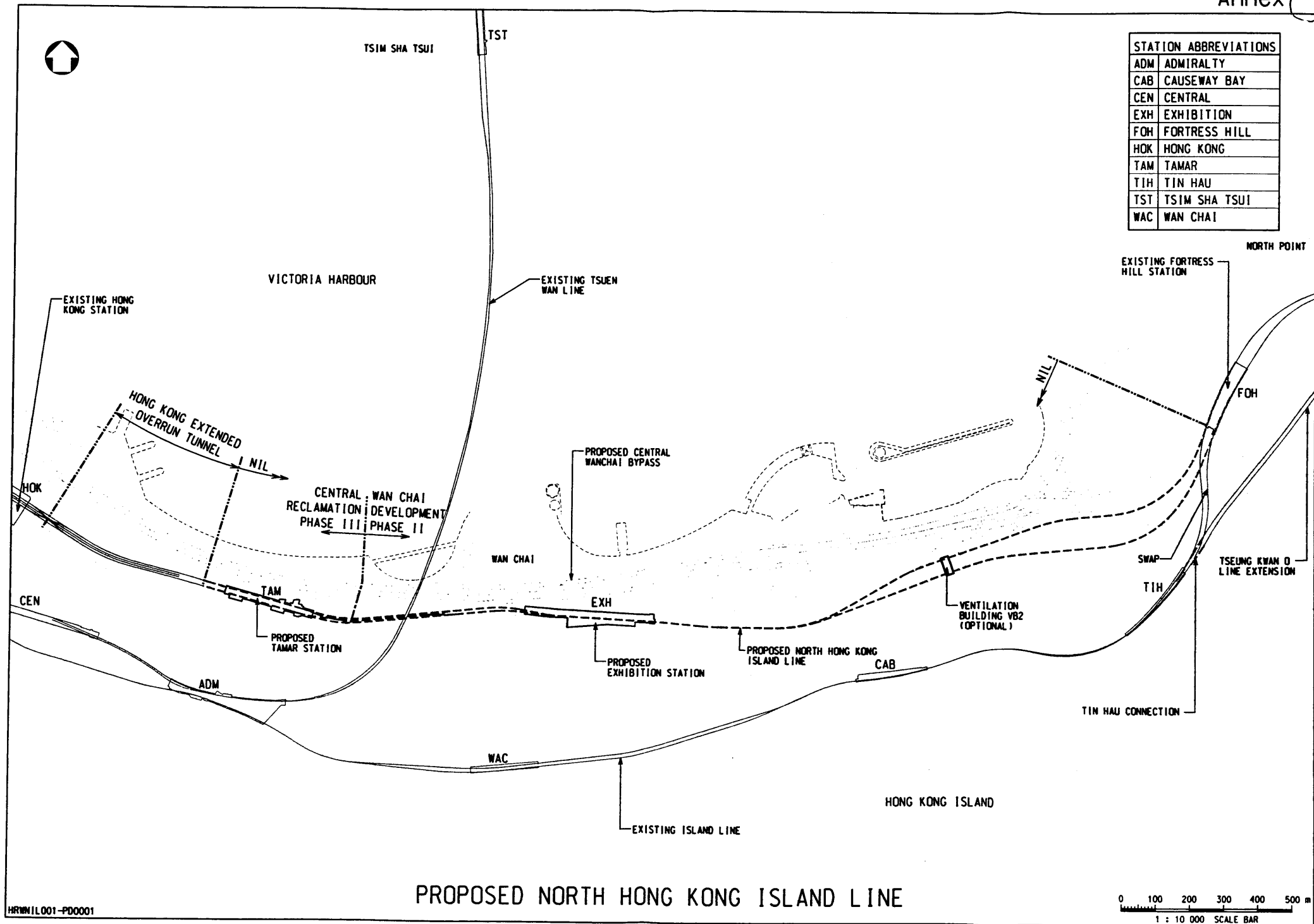
SUSTAINABILITY IMPLICATIONS

10. We decide to defer the completion of the NIL because the anticipated congestion in the railway network would not happen at the time as predicted in the Railway Development Strategy (RDS)-2000. Deferral of the NIL to beyond 2016 will not induce pressure on the existing rail network or road traffic and should not have any sustainability impact. We will carry out the sustainability assessment on the NIL as the project proceeds.

11. The proposed WIL (Phase 1) and SIL, when taken together, would form a loop of mass transport serving the population centres on the Hong Kong Island, and accord with the sustainability principle of providing a safe, accessible, efficient and clean transport system. According to our initial sustainability assessment, the proposed WIL and SIL should help improve mobility, air quality and help promote tourism development in the long term through enabling the commuters and tourists to switch to rail from road traffic. The WIL and SIL may also bring about other economic benefits to the society through facilitating development or redevelopment along the railway lines and resulting additional job opportunities.

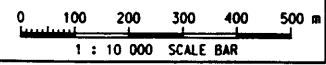
12. On the other hand, the sustainability assessment reveals that the introduction of a mass transit railway to the Southern District may impact on the patronage and viability of other modes of public transport including franchised buses, minibuses and taxis. We would examine and address the impacts during the early planning stage, and consult MTRCL and the affected trades as appropriate, with a view to facilitating their collaboration on the provision of shuttle services connecting more distant areas with the new stations while maintaining healthy competition between railway and other land-based transport. Moreover, the other identified potential problems, which involve the clearance or relocation of existing villages and other facilities, and possible environmental impacts including noise during construction and operation, air pollution from works sites, loss of open space and waste generated from tunnel excavation, will be addressed carefully at the detailed planning stage in consultation with the relevant departments. Temporary traffic arrangement will also be put in place to minimize disruptions during the construction period.

13. On the whole, Route 7 compares less favourably than the SIL. Route 7 will bring about less economic return than the SIL though both projects will create similar amount of jobs. As regards mobility, both Route 7 and the SIL will increase the average network speed. To evaluate the benefit in term of time saving to road users, the time saving from Route 7 is just about 75% of that of the SIL. On environmental quality, the SIL should have less impacts (including visual impact) than Route 7 since monorail trains are emission free and most of its alignment is put under ground.



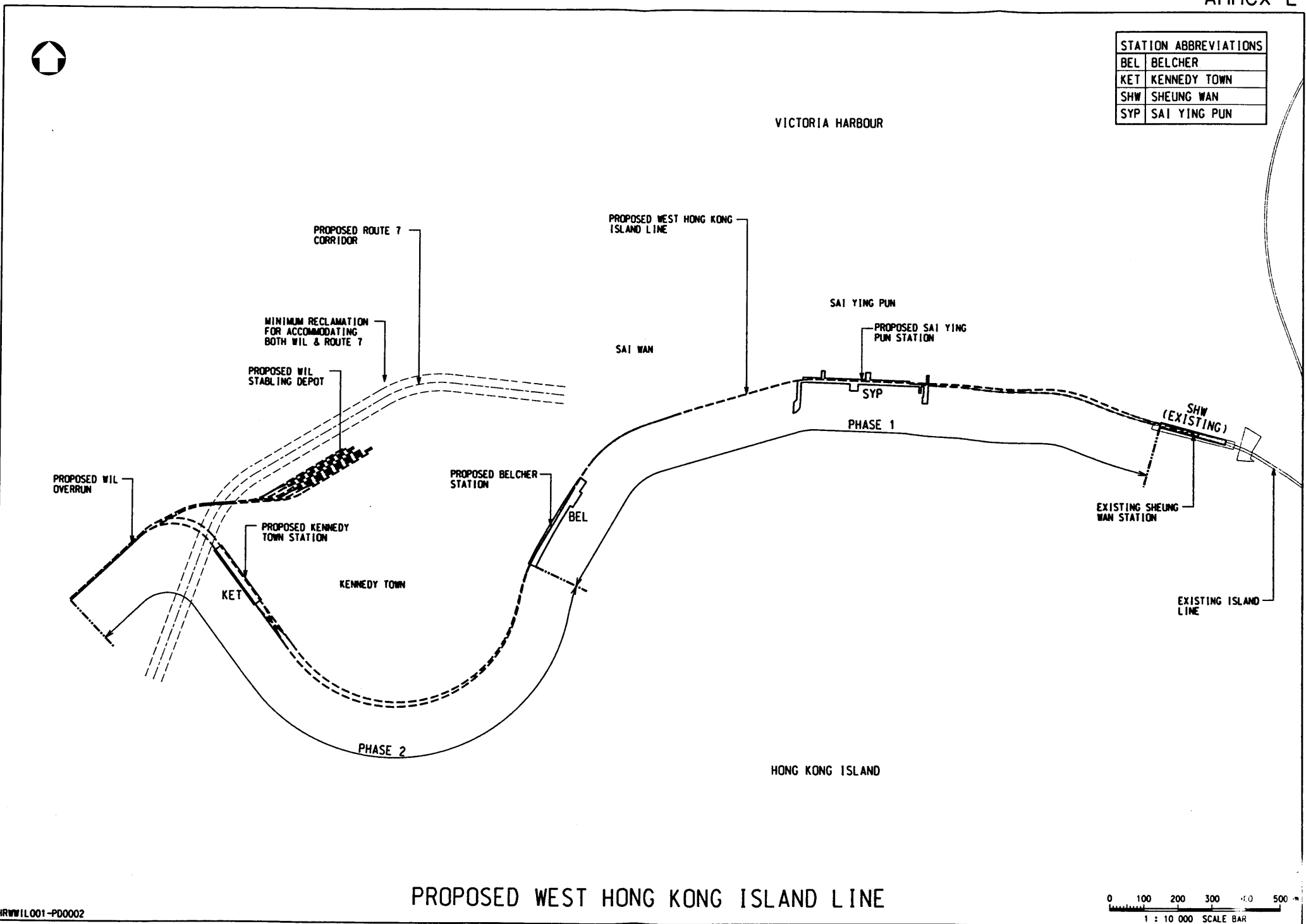
STATION ABBREVIATIONS	
ADM	ADMIRALTY
CAB	CAUSEWAY BAY
CEN	CENTRAL
EXH	EXHIBITION
FOH	FORTRESS HILL
HOK	HONG KONG
TAM	TAMAR
TIH	TIN HAU
TST	TSIM SHA TSUI
WAC	WAN CHAI

PROPOSED NORTH HONG KONG ISLAND LINE



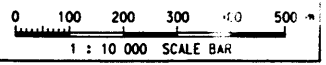
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STATION ABBREVIATIONS	
BEL	BELCHER
KET	KENNEDY TOWN
SHW	SHEUNG WAN
SYP	SAI YING PUN



PROPOSED WEST HONG KONG ISLAND LINE

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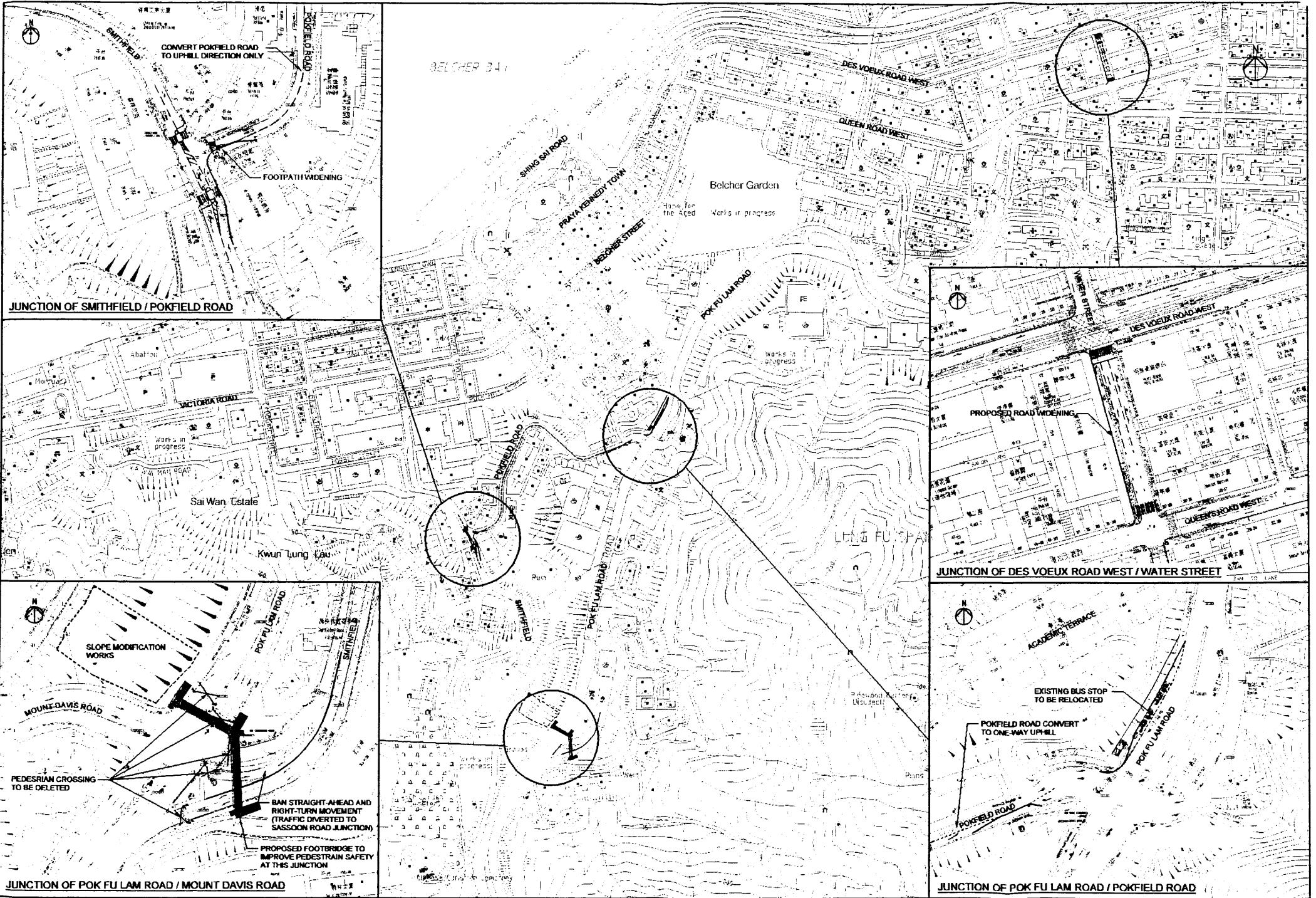


Capital Costs of NIL, WIL, SIL and Route 7

<u>Project</u>	<u>Capital Cost</u> ⁽¹⁾
NIL	\$8 billion
WIL (SHW to BEL)	\$5 billion
(BEL to KET)	\$6 billion
Combined	\$11 billion
SIL	\$10 billion
Route 7	\$10 billion

Note

1. NIL, WIL and SIL in December 2000 prices and Route 7 in September 2001 prices

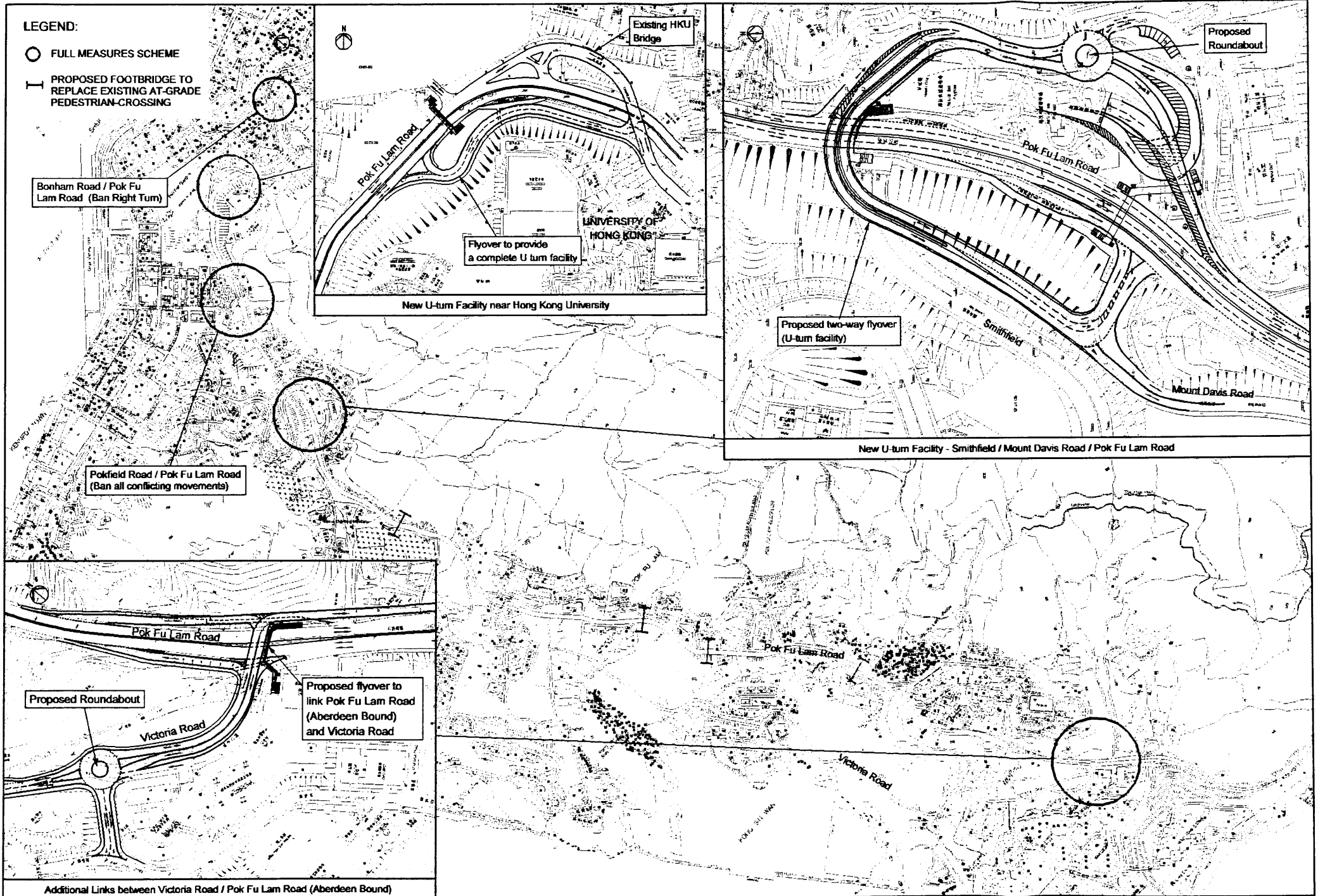


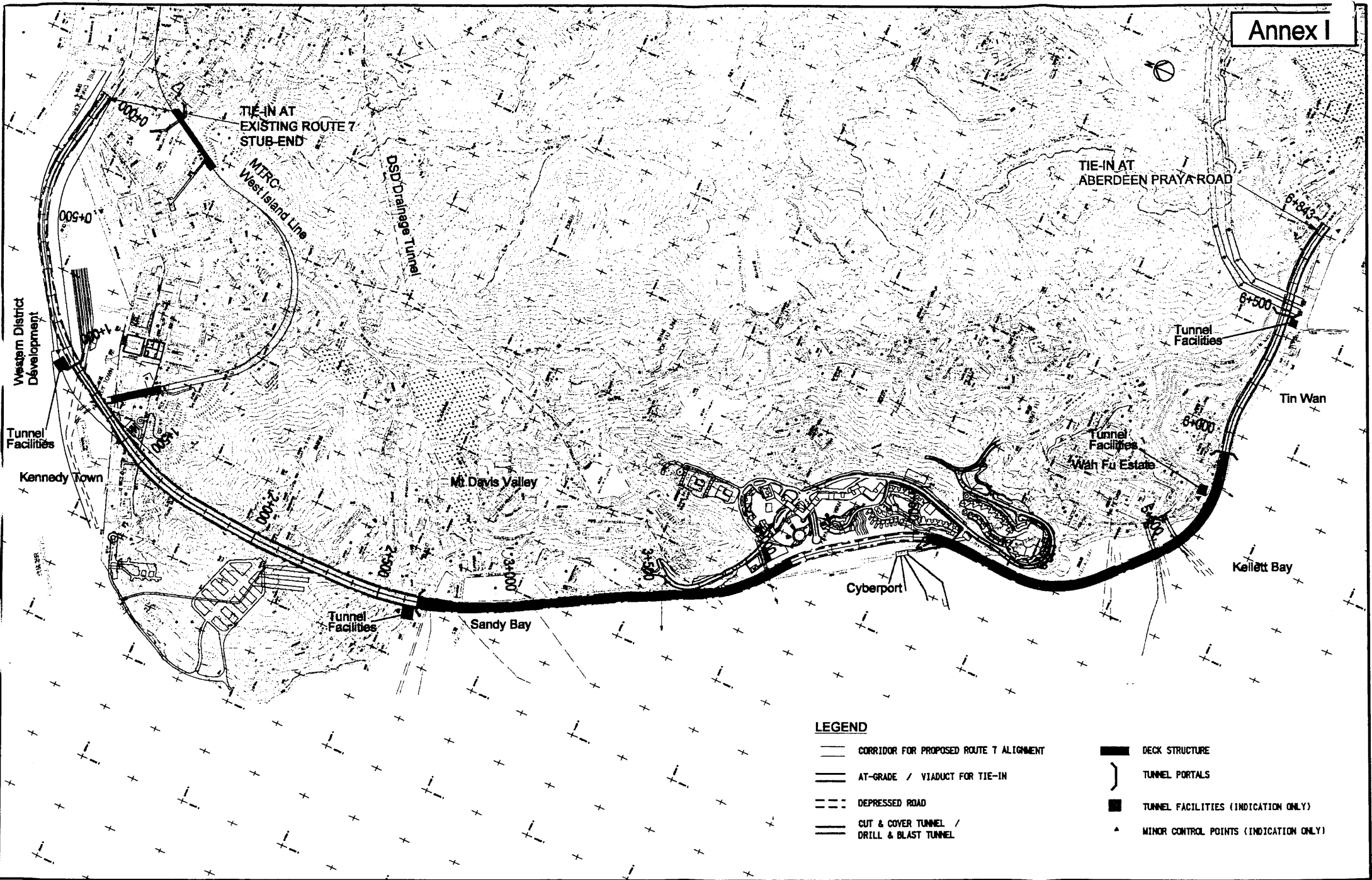
INTERIM MEASURES

LEGEND:

○ FULL MEASURES SCHEME

I PROPOSED FOOTBRIDGE TO REPLACE EXISTING AT-GRADE PEDESTRIAN-CROSSING

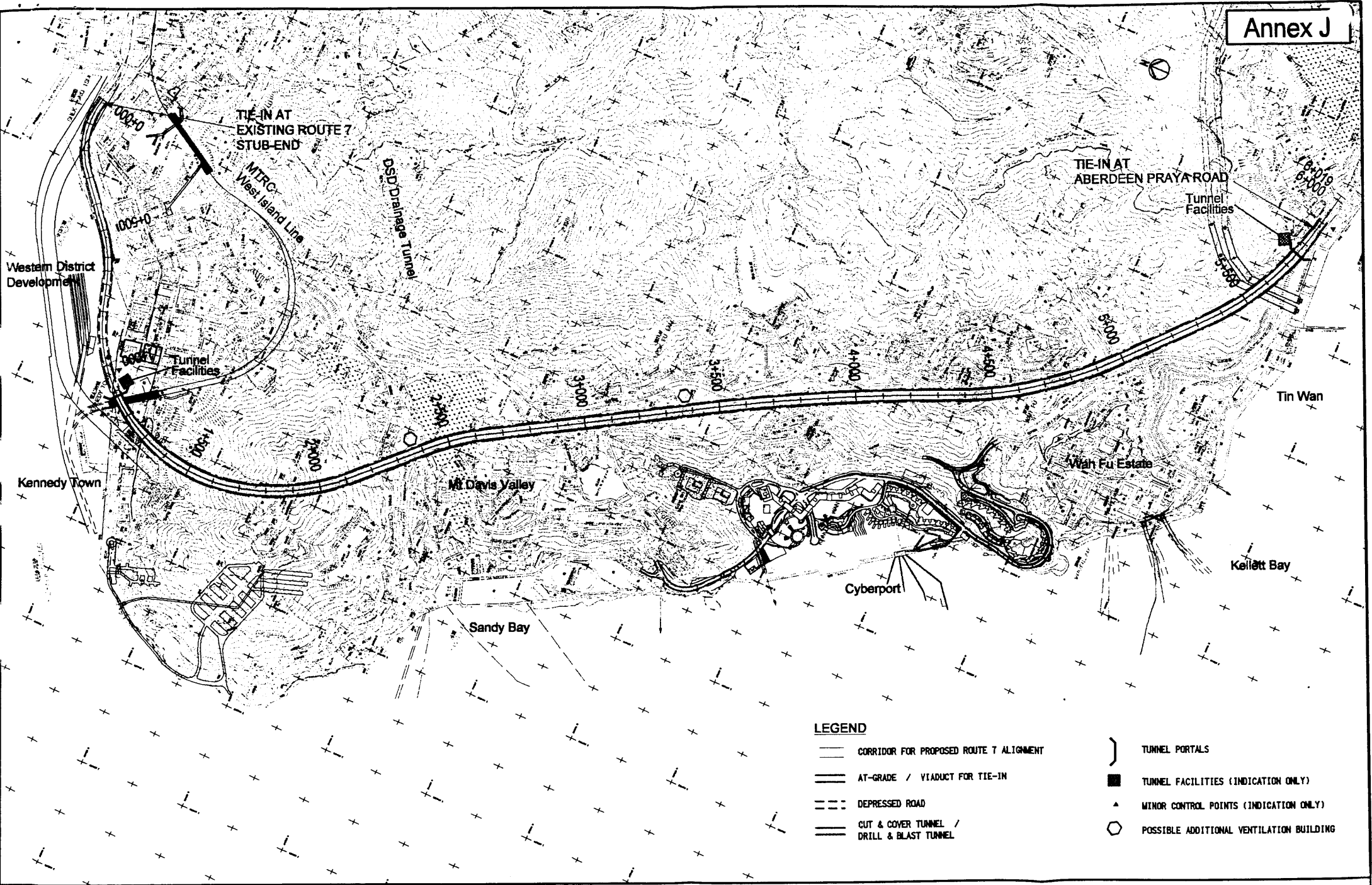




LEGEND

- CORRIDOR FOR PROPOSED ROUTE 7 ALIGNMENT
- AT-GRADE / VIADUCT FOR TIE-IN
- DEPRESSED ROAD
- CUT & COVER TUNNEL / DRILL & BLAST TUNNEL
- DECK STRUCTURE
- TUNNEL PORTALS
- TUNNEL FACILITIES (INDICATION ONLY)
- MINOR CONTROL POINTS (INDICATION ONLY)

LAYOUT OF ROUTE 7 (OPTION 1)



TIE-IN AT
EXISTING ROUTE 7
STUB-END

TIE-IN AT
ABERDEEN PRAYA ROAD

Westam District
Development

Kennedy Town

Mt Davis Valley

Sandy Bay

Cyberport

Wah Fu Estate

Tin Wan

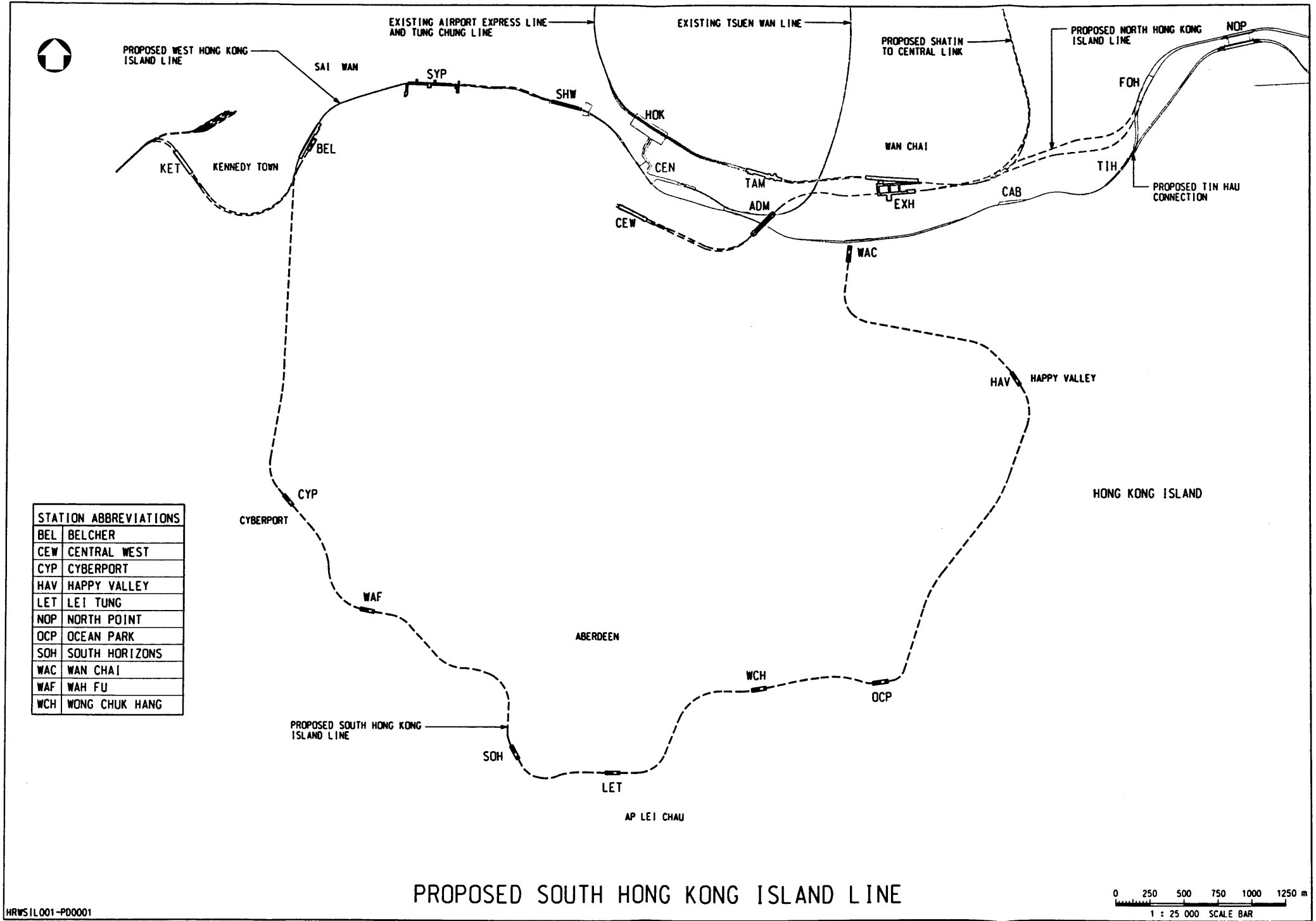
Kellatt Bay

LEGEND

- CORRIDOR FOR PROPOSED ROUTE 7 ALIGNMENT
- == AT-GRADE / VIADUCT FOR TIE-IN
- - - DEPRESSED ROAD
- CUT & COVER TUNNEL /
DRILL & BLAST TUNNEL

- } TUNNEL PORTALS
- TUNNEL FACILITIES (INDICATION ONLY)
- ▲ MINOR CONTROL POINTS (INDICATION ONLY)
- POSSIBLE ADDITIONAL VENTILATION BUILDING

LAYOUT OF ROUTE 7 (OPTION 2)



STATION ABBREVIATIONS	
BEL	BELCHER
CEW	CENTRAL WEST
CYP	CYBERPORT
HAV	HAPPY VALLEY
LET	LEI TUNG
NOP	NORTH POINT
OCP	OCEAN PARK
SOH	SOUTH HORIZONS
WAC	WAN CHAI
WAF	WAH FU
WCH	WONG CHUK HANG

PROPOSED SOUTH HONG KONG ISLAND LINE

