

LIST OF CONTENTS

	PAGE
1. INTRODUCTION	1
2. STUDY OBJECTIVES	3
3. PLANNING AND ECONOMIC CONTEXT	4
4. RAILWAY NETWORK ASSESSMENT.....	6
5. STRATEGY GOALS AND OBJECTIVES.....	7
6. RAILWAY EXPANSION SCHEMES.....	9
7. EVALUATION OF NETWORK OPTIONS.....	14
8. BENEFITS OF RAILWAY DEVELOPMENT	21
9. ECONOMIC AND FINANCIAL PERFORMANCE	23
10. INSTITUTIONAL STUDIES	24
11. IMPLEMENTATION.....	26
12. TOWARDS A PREFERRED NETWORK EXPANSION STRATEGY	29
13. ON-GOING RAILWAY PLANNING	31

FIGURES**LIST OF FIGURES**

FIGURE NO.	PAGE FOLLOWING
1 Existing and Committed Rail Network.....	1
2 Planning Context	3
3 Critical Rail Links and Interchanges.....	5
4 Network Building Blocks	8
5 Guangdong Province Railway Network.....	11
6 Port Rail Line Options.....	11
7 Long-Term Possibilities	12
8 Network Options - Component Schemes.....	14
9 Forecast Public Transport Demand	20
10 Typical Railway Implementation Programme	25
11 Preferred Network	29

ABBREVIATIONS

1. INTRODUCTION

- 1.1 The first Railway Development Study (RDS-1) was commissioned by Government in 1991 and completed in 1993. Taking into account the views from a subsequent public consultation exercise, the study formed the basis of the Government's first Railway Development Strategy (the 1994 Strategy) announced in December 1994.
- 1.2 The 1994 Strategy set out a railway development programme for passengers and freight up to the year 2011, including the following priority list of projects:
- West Rail (WR);
 - Tseung Kwan O Extension (TKOL); and
 - Ma On Shan to Tai Wai Link (MOSL) and extension of KCR from Hung Hom to Tsim Sha Tsui (TST Extension).
- 1.3 These three projects, shown in **Figure 1**, are now at different stages of implementation and programmed for completion over the period 2002 to 2004. In the case of West Rail, the Phase I railway from Nam Cheong to Tuen Mun is under construction, while the link from Nam Cheong to West Kowloon and the Northern Links (including the original Northern Freight Yard concept) were to be decided later after further study. In 1999, in light of the heavy transport demand at Lo Wu, the extension of East Rail to form a second Boundary crossing for rail passengers at Lok Ma Chau was approved by Government for implementation with a target completion by 2004.
- 1.4 Since the completion of RDS-1 there have been significant changes to the planning context. Those changes which will have the greatest impact on future railway development are the higher population projections in the light of the 1996 Population By-Census; the development of Strategic Growth Areas in the Northern New Territories; reduced reclamation and hence development in the Inner Harbour areas; the replacement of Port facilities on North Lantau by the Disney Theme Park; and the continuing growth in Cross Boundary passenger traffic.
- 1.5 In March 1999, the Government announced its plans to privatise MTRC through the sale and listing of a substantial minority of its share in MTRC. The corresponding Mass Transit Railway Bill was gazetted in September 1999 and passed by legislators in February 2000.
- 1.6 As a result of these changes, there is a need to plan for the next phase of railway development in Hong Kong. New priorities will need to be set and measures taken to ensure the timely implementation of future railway projects.
- 1.7 It is against this background that the Second Railway Development Study (RDS-2) was initiated in 1998.

2. STUDY OBJECTIVES

- 2.1 The overall objective of the Second Railway Development Study (RDS-2) is to provide Government with the basis to formulate a strategy for development of the railway system to serve the Hong Kong HKSAR over the next 20 years. RDS-2 covers passenger, freight, domestic and Cross Boundary services, and has taken into account a range of possible planning, economic and development scenarios. It must ensure that the railway network expansion proposals are safe, efficient, financially viable and environmentally acceptable; supported by an appropriate institutional framework.
- 2.2 Specifically, RDS-2 is to recommend a preferred railway network expansion plan which will be able to:
- facilitate timely accessibility to strategic growth areas for housing and economic development, and to stimulate further developments along railway corridors;
 - relieve bottlenecks in the existing railway system;
 - meet Cross Boundary passenger and freight traffic demands and ensure compatibility and integration with the railway system in the Mainland; and
 - increase the rail share in the overall transport system, and to reduce the environmental impact of road-based transport.
- 2.3 RDS-2 is also aimed at addressing the institutional issues which would affect the planning, construction and operation of railways, and recommending necessary improvement measures. These include the standards for the design and operation of railways, the implementation process and programme for railway projects, the institutional structure and funding of railways, and the fares charged for using the railway system.
- 2.4 The findings of RDS-2 are intended to provide the basis for Government to prepare a Railway Development Strategy comprising:
- a recommended railway network expansion plan; and
 - a recommended institutional framework.

3. PLANNING AND ECONOMIC CONTEXT

Land Use

- 3.1 For a long-term planning study such as RDS-2 it is inevitable that the planning and economic context will change during its course. In particular, there have been revisions to the planning data as the findings of Sub-Regional and other studies have been made available and as opinion has swayed against harbour reclamation. Also, the interim findings and assumptions from the parallel CTS-3 study have been made available throughout and progressively reflected in the RDS-2 assumptions.
- 3.2 The range of potential total development in the HKSAR was set by the three scenarios prepared by Planning Department in May 1998. The scenarios, from the Territory Population and Employment Data Matrices (TPEDM), are labelled S1, S2 and S3 and have total populations of 8.2, 8.9 and 10.1 million respectively for 2016.
- 3.3 Much of the future growth in population is located in Tseung Kwan O, the North East and North West New Territories and North Lantau. Employment is forecast to remain concentrated in Hong Kong Island and Kowloon. Thus the principal feature of commuter flows within the HKSAR will be to and from the existing urban area. The broad distribution of population and employment in each scenario is shown in [Figure 2](#) and summarised in Table 1.

Table 1 Summary of HKSAR Population and Employment Forecasts (thousands)

Scenario	S1		S2		S3	
	Population	Employment	Population	Employment	Population	Employment
1996	6,207	2,980	-	-	-	-
2006	7,358	3,612	7,736	3,889	-	-
2011	7,774	3,746	8,338	4,171	-	-
2016	8,184	3,789	8,934	4,372	10,130	5,238

Source: Planning Department, May 1998.

- 3.4 In the course of the study, the S2 datasets were updated to incorporate planning changes such as reduced harbour reclamation and development of the Strategic Growth Areas (SGAs) in the NWNT, at Hung Shui Kiu, and in the NENT, at Kwu Tung and Fanling North. A number of alternative land use distributions were also examined including more intensive development of SGAs in the northern New Territories by 2016.

Economic Growth

- 3.5 Economic growth influences a number of aspects of transport demand including vehicle ownership, propensity to travel through income levels, and modal choice through value of time. GDP assumptions have altered in the course of the study as revisions have been made to take account of the recent economic climate. Based on the most recent assumptions from CTS-3, average economic growth rates of 4-5% per annum have been assumed over the 20-year planning period. These growth rates take account of recent trends, particularly negative growth (recession) during 1998.

- 3.6 CTS-3 has developed a range of car fleet sizes, from the extreme of a "low" scenario assuming significant ownership restraint, to a "high" scenario where there is no additional ownership restraint. RDS-2 has adopted the latest CTS-3 "Medium" scenario of 618,000 cars in 2016 as its central assumption.

Transport Network

- 3.7 The existing and committed railway network illustrated in **Figure 1** was used as a "Base" against which the future railway network expansion options were assessed.
- 3.8 The highway network assumptions reflect the CTS-3 medium case highway recommendations available in mid-1998. Toll rates for existing and future highways and toll growth assumptions were also based on CTS-3 which assumed that tolls increase annually in line with inflation, i.e. no real increase in toll rates.
- 3.9 Future bus routes were added to the existing route network to serve population growth areas, new highway schemes and new railway stations. Other non-rail public transport services were assumed to remain largely unchanged.

4. RAILWAY NETWORK ASSESSMENT

4.1 Within Hong Kong domestic railway system, the Nathan Road section of the Tsuen Wan Line (TWL) has historically been the most overloaded. Over the past year, however, overcrowding on this section has reduced significantly due to the diversion of passengers to competing bus services including express routes using the uncongested new highways in West Kowloon and the Western Harbour Crossing; the diversion of some passengers to the recently opened Tung Chung Line; and an overall reduction in travel demands due to the recession.

4.2 MTRC and KCRC have on-going programmes for service and capacity enhancements to make the most efficient use of available resources. These have included the upgrading of East Rail rolling stock, enhancement work to key East Rail and MTR stations, and signalling system upgrading on the MTR and East Rail.

4.3 Between late 2002 and 2004, the TKOL, WR and ER Extensions will come into operation and, as well as serving new railway corridors, will increase demands on the existing railway network, including the critical sections of the network:

- WR and MOSL will both feed additional passengers into the critical Nathan Road section of the TWL;
- TKOL will add substantial flows to the MTR harbour crossing between Lam Tin and Quarry Bay and feed additional passengers onto the Island Line via the new interchange now under construction at North Point; and
- MOSL will feed additional passengers to the Beacon Hill Tunnel section of ER.

4.4 While the extension of East Rail to Tsim Sha Tsui and the increased usage of the Tung Chung Line will help relieve the Nathan Road Corridor, RDS-2 has forecast that between 2006 and 2011 demands will eventually build up and approach capacity on the following critical links (shown in [Figure 3](#)):

- TWL - Nathan Road
- ISL - Causeway Bay
- ER - Beacon Hill Tunnel

and the following interchanges will be under most pressure:

- Tai Wai
- North Point
- Tsim Sha Tsui

4.5 Since 1997, Cross Boundary travel through Lo Wu has been growing by about 17% per annum, placing great strains on the Immigration, Customs and transport facilities at Lo Wu at holiday periods and weekends. This is currently the most congested part of Hong Kong railway system although there is adequate capacity on the East Rail train service to and from Lo Wu.

4.6 Until the opening of the Lok Ma Chau Spur Line in 2004, it will be necessary to maximise the capacity of the existing crossing at Lo Wu during busy periods by a combination of extended hours of operation and management systems to obtain the maximum throughput from the existing Immigration counters, use of the quota system at East Rail stations and provision of extra Through Trains.

5. STRATEGY GOALS AND OBJECTIVES

- 5.1 A strategy for railway infrastructure development must support the vision, strategic goals, and objectives set for achieving a sustainable future for Hong Kong.
- 5.2 The vision is to be a "World Class" city in every aspect. The goals are to achieve sustainable physical, social and economic development for Hong Kong in conjunction with neighbouring Shenzhen, the Pearl River Delta, and Mainland as a whole. Behind these high level goals are a range of sectoral policies and objectives including the development of a truly "World Class" transport system which provides:
- access to existing and future development areas for housing;
 - access to a wide range of job opportunities and social activities;
 - choice;
 - healthy competition;
 - opportunities for innovations and improvements;
 - environmentally friendly modes;
 - affordable fares and charges to the public;
 - efficient use of resources (human, land, fossil fuel...); and
 - self-financing public transport services.
- 5.3 The "Transport Strategy for the Future" entitled "Hong Kong Moving Ahead" published by Transport Bureau in conjunction with the Chief Executives' Policy Address in October 1999 set out five areas of focus to achieve these objectives:
- better integration of transport and land use planning;
 - better use of railways as the back-bone of our passenger transport system;
 - better public transport services and facilities;
 - better use of advanced technologies in transport management; and
 - better environmental protection.
- 5.4 Railway development has been accorded a high priority over many years. The Transport Policy Statement reinforces this and defines a leading role for railways in the future transport system. To this end RDS-2 is to provide the basis for Government to develop a Railway Development Strategy which:
- fulfils these general goals and objectives;
 - maps out a preferred network expansion plan;
 - identifies key relationships of the plan with other developments;
 - addresses the institutional requirements for plan implementation; and
 - determines the funding requirements.
- 5.5 Taking account of the above considerations of the general goals and objectives, RDS-2 has developed a set of criteria for use in the formulation of potential options for railway network expansion. These are summarised in Table 2.

Table 2 Criteria for Formulation of Network Expansion Plans

Sustainability	<ul style="list-style-type: none"> • maximise rail share of travel in the HKSAR and Cross Boundary • minimise the adverse impacts of transport and travel on the physical environment. • minimise the depletion of scarce resources - fuel, land
Development	<ul style="list-style-type: none"> • integration of transport and land use planning • facilitate urban renewal, in particular in <ul style="list-style-type: none"> - Central Kowloon - Western District - Wanchai • facilitate new development areas, in particular in <ul style="list-style-type: none"> - South East Kowloon - NENT - NWNT - Lantau - South Hong Kong Island - Tseung Kwan O Intensification • facilitate the housing programme by enhancing the scope for high density development and redevelopment.
Cross Boundary	<ul style="list-style-type: none"> • facilitate Cross Boundary travel for <ul style="list-style-type: none"> - commuting - leisure - business - freight <p>to adjacent Shenzhen and Pearl River Delta, and further into Mainland.</p>
Integration	<ul style="list-style-type: none"> • form part of an integrated transport system for Hong Kong and Cross Boundary providing: <ul style="list-style-type: none"> - hierarchy of transport links and services - convenient and seamless interchange - user-friendly system
Level of Service	<ul style="list-style-type: none"> • provide appropriate high quality metro, commuter, and inter-city services • provide adequate capacity to meet peak demands • charge affordable fares to the general public in order to offer an attractive choice compared with road-based travel
Economic	<ul style="list-style-type: none"> • provide a cost-effective railway system • generate maximum community benefits • offer affordable fares to avoid social exclusion • affordable investment for the community through Government or private sector
Financial	<ul style="list-style-type: none"> • to be self-financing • provide appropriate return to shareholders • generate sufficient returns to meet replacement and recurrent costs

6. RAILWAY EXPANSION SCHEMES

6.1 A recommended railway network expansion plan will provide the framework for railway development by identifying the component schemes, their priorities and the preliminary route alignments. RDS-2 has taken into account the broad social, economic, planning and environmental goals and objectives for the HKSAR in the short-listing of possible railway schemes. This was followed by a comprehensive evaluation process before arriving at a list of key railway expansion schemes.

6.2 The key railway expansion schemes are illustrated in **Figure 4** and are briefly described in this section and include the following:

- North Island Line (NIL)
- East Kowloon Line (EKL)
- Tai Wai - Diamond Hill Link (TDL)
- Kowloon Southern Loop (KSL)
- Fourth Harbour Crossing (FHC)
- Northern Links (NOL)
- West Island Line (WIL)
- Regional Express Line (REL)
- Mass Transportation Centre (MTC)
- Port Rail Line/Port Rail Terminal (PRL/PRT)
- South Island Line (SIL)

North Island Line (NIL)

6.3 The NIL "Swap" scheme links the Tung Chung Line (TCL) via the Central and Wanchai reclamation areas through to the eastern section of the Island Line (ISL) at Fortress. The Tseung Kwan O Line (TKOL) is then extended from North Point to connect into the ISL at Tin Hau and run through to the western terminus at Sheung Wan. It has a high priority for implementation as it relieves the ISL and TWL and promotes the use of the TCL, WR and TKOL. It is common to all railway network expansion options and its implementation needs to be co-ordinated with reclamation and infrastructure development along the north foreshore of Hong Kong Island.

East Kowloon Line (EKL)

6.4 The EKL is formed by a line running from Diamond Hill to Hung Hom and presents the opportunity for integrated landuse/railway development at Kai Tak and will trigger urban renewal and bring environmental improvements in the Ma Tau Wai/Hung Hom area. Its timing and design should be fully integrated with development at Kai Tak to ensure rail takes a leading role.

Tai Wai - Diamond Hill Link (TDL)

6.5 The TDL is formed by a link between Diamond Hill and Tai Wai and is recommended to be interconnected as a through running line with the EKL. A 3-way interchange between ER, MOSL and EKL-TDL could be provided at TAW or alternatively the EKL-TDL could be interconnected with MOSL to offer a through-running service which is more convenient to passengers, avoids complex interchange construction at TAW and is less costly.

6.6 The TDL will enhance the linkage of East Shatin and Ma On Shan to urban Kowloon and onwards to Hong Kong Island and improve connectivity of the MOSL

with railways in urban Kowloon. This will promote MOSL ridership and reduce transfers between MOSL and ER and has the useful function of relieving the critical TAW-KOT link. Early implementation will benefit ridership on MOSL but the actual construction of this route should be considered together with the implementation of the EKL to form a strategic rail corridor that can link Ma On Shan and SE Kowloon.

Kowloon Southern Loop (KSL)

- 6.7 The KSL extends WR from Nam Cheong to Hung Hom, which will promote usage of WR and cross Kowloon rail travel and thereby support development in Lantau Island, NWNT, West and East Kowloon. Its timing is flexible; early implementation is very beneficial as it promotes overall rail usage and development; later implementation is possible as it is not an urgent capacity relief scheme.

Fourth Harbour Crossing (FHC)

- 6.8 The choice of the FHC has been narrowed down to an extension of ER or the proposed EKL. The configuration of the FHC affects the overall railway network development plan and has been assessed as an integral part of the possible network expansion options rather than just as stand alone FHC scheme options.

East Rail as the Fourth Harbour Crossing (ER-FHC)

- 6.9 The extension of ER as a FHC provides a complete north-south corridor from the Boundary (LOW and LMC) to Hong Kong Island, enhancing opportunities for development in the Northern New Territories and promoting Cross Boundary rail travel.
- 6.10 In association with ER as the FHC, a complete east-west railway across the HKSAR will also be developed by linking WR to the MOSL by the KSL, EKL and TDL schemes. This will form a new east-west route across Kowloon with strategic north-south interchanges at MEF, NAC, TST, HUH, DIH and TAW. The phasing of this project is flexible. Ideally it would be developed early as a complete package and implemented with the ER-FHC. Alternatively it could be phased with the KSL being deferred as it is not an urgent capacity relief scheme and the TDL deferred if ER rolling stock and signalling upgrades can raise ER capacity sufficiently.

East Kowloon Line as the Fourth Harbour Crossing (EKL-FHC)

- 6.11 The alternative is to develop a new corridor from Ma On Shan via South East Kowloon to Hong Kong Island by linking MOSL, TDL and EKL-FHC. The new line will support the planned redevelopment of Kai Tak and provide a direct rail link between existing and planned development areas in Ma On Shan, East Shatin, South East Kowloon and Ma Tau Wai/Hung Hom with Hong Kong Island. Together with the KSL it will provide convenient connections with Hong Kong Island and across Kowloon for ER and Cross-Boundary passengers transferring at the MTC (see para. 6.21 below) at Hung Hom.
- 6.12 In conjunction with the EKL-FHC, the KSL would be extended to HUH to form a major interchange with ER and the EKL-FHC. The phasing is flexible; the line could be implemented as one package or the EKL-FHC could be constructed first, and then TDL and KSL implemented later.

Routeing of the Fourth Harbour Crossing on Hong Kong Island

- 6.13 Two main options have been assessed for the routeing of the FHC on Hong Kong Island.
- via stations at Exhibition and Admiralty (EXH/ADM)
 - via stations at Victoria Park, Leighton Hill, Wanchai South and Hong Kong Park (VIP/HKP)
- 6.14 The route via EXH/ADM provides a direct link to the main CBD areas and convenient interchange with both the NIL and the ISL. The extension via VIP/HKP gives a less direct route to Central and Wanchai and less convenient interchange to the ISL but extends the coverage of the railway system and improves access to the south of the existing ISL between Happy Valley and Central by providing new stations at Leighton Hill, Wanchai South and Hong Kong Park.
- 6.15 In both cases the lines can be extended to an additional station at Central West (CEW). This would further improve the penetration and hence attractiveness of the FHC, and provide a new station to serve the CBD area, extending the catchment of the railway system and improving accessibility to the densely developed area between Queen Road Central and Mid-levels.

Northern Links (NOL)

- 6.16 The NOL provide a link between the WR corridor and the ER corridor and with the Boundary crossing stations at Lok Ma Chau (LMC) and Lo Wu (LOW). The line could be operated by a number of alternative service patterns; a simple pair of shuttle services between Kam Sheung Road (KSR) and LMC/Kwu Tung (KTU) was assumed in RDS-2. The line links the North East and North West New Territories, opens up a new corridor for new Strategic Growth Areas (SGAs) now under study and promotes rail for Cross Boundary travel. The timing and priority of the NOL depend on the growth in Cross Boundary travel and programmes for the SGAs.

West Island Line (WIL)

- 6.17 The WIL is formed by an extension of the Island Line from the Sheung Wan terminus to Western District. The rail line will offer a much improved level of service over road transport; provide an interchange with road transport at Kennedy Town; help relieve road congestion; and will improve the environmental conditions in Western District and Central, as well as serving new development and redevelopment now under planning in West Hong Kong Island. The design and timing of the WIL are dependent on the planning of reclamation and redevelopment in Western District, but in principle early implementation would be beneficial in transport and environmental terms.

Regional Express Line (REL)

- 6.18 The Study supports the continued development of Through Train Services (TTS) by the introduction of high speed rolling stock such as the KCRC Ktt and Guang-Shen Railway X2000 trains and the step by step raising of service frequencies to meet market demands. However, whilst the Guangzhou East - Shenzhen section has been upgraded to provide for high speed services, the intensive domestic EMU services on ER restrict TTS to a 38 minute journey for the 34km between Lo Wu and Hong Hom.

- 6.19 In the short term it is recommended additional passing sections on ER are introduced to enable TTS to overtake ER trains to improve journey times. In the longer term a new high speed inter-city corridor, the REL, should be developed between the Boundary and the Mass Transportation Centre at HUH. This new line would potentially permit journey times of under 15 minutes through the HKSAR and just over 1 hour to Guangzhou. The corridor may also accommodate fast commuter services from the Northern New Territories and the Boundary regions, relieving ER and extending Hong Kong commuter catchment and overall accessibility (see [Figure 5](#)). Cross Boundary Services could be further improved, in liaison with the Mainland authorities, through development of a potentially high speed link by-passing Lo Wu and Shenzhen to connect into the Guang-Shen railway north of Shenzhen.

Mass Transportation Centre (MTC)

- 6.20 In addition to the new railway schemes, RDS-2 also investigated the role and function of a Mass Transportation Centre (MTC). The MTC differs from other public transport interchanges. It provides for terminal facilities for Cross Boundary Inter-City services with the necessary customs and immigration facilities. The existing Hung Hom Terminal, which is centrally located in the HKSAR is already functioning as an MTC with good capability for expansion.
- 6.21 The MTC is proposed to remain at Hung Hom as it is the most central location for the HKSAR population and employment and will be the focus of a comprehensive network of railways and public transport and has good road access. In addition, construction of a Regional Express Line to the MTC at HUH is considered to be feasible and is proposed for the medium to longer term. The MTC will require a phased development programme co-ordinated with the implementation of EKL, KSL, FHC and REL.

Port Rail Line/Port Rail Terminal (PRL/PRT)

- 6.22 It is recommended that the PRL/PRT Project is taken forward for detailed feasibility studies by KCRC in conjunction with Government as it enhances the competitiveness of Hong Kong port by extending its hinterland deeper into Mainland China; generates significant economic benefits; and is potentially viable. The project (shown in [Figure 6](#)) will enable electric container train shuttle services to be operated between a rail consolidation/distribution centre at Pinghu in Shenzhen and Hong Kong container port at Kwai Chung and provide an annual capacity of over 2M TEUs. Early implementation will enable rail container transshipment through Hong Kong to take a strong market position as Mainland trade continues to expand. The KCRC has expressed keen interest in developing the PRL/PRT project and have been exploring various implementation methods. The route choice, timing and institutional structure for this project is the subject of detailed planning.

South Island Line (SIL)

- 6.23 A number of alignments and schemes were considered for linking the relatively dispersed developments of South Hong Kong Island to the railways and commercial areas along the north foreshore of Hong Kong Island. Whilst generating reasonable benefits, the relatively poor financial performance of the SIL schemes investigated make implementation difficult.

- 6.24 It is estimated that in order to make the SIL financially viable would require an additional 170,000 population and 43,000 jobs over and above planned development levels on the south side of Hong Kong Island. Therefore the SIL was not included in the Preferred Railway Network but could still be considered as a longer term railway possibility (see below).

Other Railway Development Schemes

- 6.25 As well as these new railway routes, other development-led extensions and new stations will need to be evaluated on a case by case basis in integrated land use/transport planning studies. New stations are now under planning at Kwu Tung (SGA), Tung Chung West (New Town Extension) and Hung Shui Kiu (SGA) amongst others.

Longer Term Railway Possibilities

- 6.26 The railway network expansion plans include a set of schemes for implementation in the next fifteen to twenty years. Looking beyond that time frame, RDS-2 has identified a number of possible railway schemes (shown in [Figure 7](#)) which may be worthy of further consideration. They are:

- Deep Bay Rail Link - between the WR corridor and developing rail nodes in West Shenzhen;
- Shenzhen Bypass - a possible extension of the REL to form a new Boundary crossing;
- Outer Western Corridor - new corridor linking Hong Kong Island - Lantau - NWNT dependent on future development levels at Lantau;
- East West Kowloon Line - new corridor to serve South East Kowloon and relieve other urban lines;
- Fifth Harbour Crossing - to allow the construction of both FHC options or possible alternatives;
- Chek Lap Kok Link - rail link from WR corridor in NWNT to the international airport; and
- South Island Line - dependent on land use development and transport infrastructure planning in South Hong Kong Island.

7. EVALUATION OF NETWORK OPTIONS

7.1 RDS-2 has short-listed new railway expansion schemes which are the building blocks for further network development. Those that will affect the configuration of the resulting network are the Component Schemes. They are:

- North Island Line
- East Kowloon Line
- Kowloon Southern Loop
- Tai Wai to Diamond Hill Link
- Fourth Harbour Crossing

Those that will not affect the network configuration are the Stand Alone Schemes. They include two domestic passenger lines:

- Northern Links
- West Island Line

and the two Cross Boundary related schemes:

- Regional Express Line
- Port Rail Line

Network Expansion Options - Component Schemes

7.2 RDS-2 has assembled the Component Schemes into two basic network expansion options. They were developed around the two main choices for the FHC and reflect different emphases.

The Regional Network

7.3 This network is built around the extension of the KCR ER as the FHC. This network configuration gives emphasis to:

- developing a sustainable railway system for the region as a whole;
- promoting socio-economic integration of Hong Kong and Mainland, and providing high quality rail links between the key centres in Hong Kong, Shenzhen and the PRD;
- promoting accessibility to employment opportunities on both sides of the Boundary and throughout the HKSAR;
- developing rail corridors through the HKSAR to link the major development areas, minimising the need for road travel;
- developing the Northern New Territories and Boundary Areas, promoting new areas for housing both sides of the Boundary; and
- developing a comprehensive HKSAR railway network.

The Urban Network

7.4 This network is built around the extension of a new EKL from SEK as the FHC. This network configuration gives emphasis to:

- extensive urban railway system in Metro;
- key interchange nodes with railway and public transport corridors serving the New Territories and Cross Boundary;
- urban rail links to all major development areas in Metro;
- use of rail to trigger urban renewal;
- minimisation of road-based travel in Metro; and
- integrated rail/pedestrian network systems within Metro.

7.5 Since under both network options, the FHC could route via either EXH/ADM or VIP/HKP on Hong Kong Island, and the EKL/FHC under the Urban Network could be implemented by MTRC or KCRC, these alternatives result in a total of six network expansion options as shown in **Figure 8** and summarised in Table 3 below.

Table 3 Network Options

Emphasis	Operator of EKL	Routeing on HK Island
Regional	KCR	EXH/ADM VIP/HKP
Urban	MTR	EXH/ADM VIP/HKP
Urban	KCR	EXH/ADM VIP/HKP


Comparison of the Network Options and Evaluation Results


Overall Transport Performance of Component Schemes

7.6 Each of the six network expansion options comprises basically the same set of rail links, it is therefore not surprising that their overall transport performance are similar. The overall performance of the network options is summarised in Table 4 below.

Table 4 Overall Transport Performance of Network Options

	Existing Network	Existing and Committed Rail Network			Component Schemes Added
	1998	2006	2011	2016	2016
<i>Daily Boardings (millions)</i>					
Total Rail Boardings ⁽¹⁾	3.73	5.90	6.46	6.86	7.75-7.89
Total PT Boardings	11.92	15.25	16.83	18.61	18.72-18.82
Rail Market Share	31%	39%	38%	37%	41%-42%
<i>Percent of trips by rail⁽²⁾</i>					
Island Corridor	75%	79%	78%	75%	76% - 80%
Central Kowloon	46%	53%	55%	54%	69% - 72%
Kowloon External	40%	64%	65%	65%	71% - 72%
Rural NT (R-R)	37%	53%	57%	57%	62% - 64%
<i>Critical Peak Hour Line Loadings (thousands)</i>					
TWL Flow (one-way)	61	86	90	93	56-63
TWL Flow/Capacity	72%	101%	106%	109%	66%-74%
ISL Flow (one-way)	45	79	79	80	70-74
ISL Flow/Capacity	53%	93%	93%	94%	82%-87%
ER Flow (one-way)	47	66	80	87	69-71
ER Flow/Capacity	52%	73%	89%	97%	77%-79%

 Section approaching capacity.

 Section overloaded.

Note: (1) KCR, MTR, LRT and tram.

(2) Rail comprises KCR and MTR, and excludes LRT and tram. Non-rail includes all public transport modes except taxi and special purpose bus.

7.7 Total rail ridership is forecast to increase from 3.7 million daily boardings in 1998 to nearly 6.9 million daily boardings in 2016 with the addition of the committed railway schemes. Further expansion of the network with the Component Schemes is then forecast to increase 2016 rail ridership by around 15% to between 7.8 and 7.9 million daily boardings.

7.8 The Component Schemes also contribute to a significant increase in the proportion of public transport trips by rail from 31% today to 41-42% in 2016. The increases in rail market share arising from the Component Schemes would have a major impact in reducing road traffic and improving the environment. Similarly the switch to rail in the New Territories will reduce vehicle kilometres substantially for these longer journeys.

7.9 The Component Schemes relieve all the critical links in the existing and committed network, namely TWL, ISL and ER, which would otherwise be attracting demands well in excess of capacity by 2016.

Comparison of the Network Options for Component Schemes

7.10 The marginal differences between a "more attractive network" from a "less attractive network" can only be seen at close quarters. RDS-2 has carried out a comprehensive evaluation of the six options comprising the Component Schemes using the evaluation criteria shown in Table 5.

Table 5 Evaluation Criteria and Measures

Criteria	Measures
Accessibility	Accessibility by rail to employment and other activities.
Development Potential	Improved rail access to existing and planned areas of development; spare capacity for future growth
Level of Service	Total rail ridership Rail market share Overloading of rail system Interchange Journey time
Engineering	Impacts on/disruption to existing infrastructure and services; construction difficulties/risks
Planning	Planning and property impacts
Environmental	Environmental impacts Rail market share Reduction in road traffic
Value for Money	Economic and financial viability
Phasing	Dependency on programmes for other lines and infrastructure

7.11 A summary of the key results is presented in Table 6 below.

Table 6 Evaluation of Network Options - Component Schemes

	Regional		Urban-MTR		Urban-KCR	
	EXH/ ADM	VIP/ HKP	EXH/ ADM	VIP/ HKP	EXH/ ADM	VIP/ HKP
Total Daily Rail ⁽¹⁾ Boardings (millions)	7.00	7.03	6.89	6.95	6.95	7.00
Total Daily Rail ⁽¹⁾ Passenger Kilometres (millions)	90.37	90.75	87.12	87.62	88.78	89.50
Rail ⁽¹⁾ Market Share	42%	42%	41%	41%	42%	42%
Peak Hour Line Loadings (thousands)						
- TWL (YMT-JOR)	56	58	57	62	58	63
- ISL/TKOL (TIH-CAB)	71	74	70	74	70	72
- ISL/TKOL (EHC)	76	76	75	77	76	76
- WR (KSR-TWW)	62	62	58	58	60	61
- ER (TAW-KOT)	71	68	70	71	53	54
Average Rail Journey Time (min)	22.7	22.9	22.7	22.8	22.8	22.9
Number of Transfers (millions)						
- Intracompany	2.49	2.50	3.07	3.05	2.90	2.93
- Intercompany	0.83	0.83	0.84	0.86	0.81	0.82
- Total	3.32	3.33	3.91	3.91	3.72	3.75
Savings in Annual Pollutants (tonnes)						
NO _x	465	501	390	403	441	495
RSP	42	46	35	36	40	45
CO ₂	122,778	132,233	103,629	106,997	116,230	130,455
Capital Costs (\$ billions) ⁽²⁾	50	56	49	55	49	54
Economic IRR (%) ⁽³⁾	16.7	15.6	15.5	13.8	16.0	15.0
Financial IRR (%) ⁽³⁾⁽⁵⁾	4.5	3.5	3.3	2.4	4.0	3.5
Financial Surplus/Deficit (\$ billion) ⁽⁴⁾⁽⁵⁾	3.2	-3.5	-4.7	-11.4	-0.1	-4.0

Notes: All figures refer to 2016 except costs, economic and financial.

(1) KCR and MTR only.

(2) Costs in 1998 prices including land resumption, re-provisioning and compensation.

(3) In real terms.

(4) Based on 4% real discount rate with Net Present Value (NPV) calculated as of 2006.

(5) System-wide (KCR+MTR).

7.12 The variation in total rail ridership between the options is relatively small. There is also very little variation in loadings on individual rail lines. The Regional options attract slightly higher rail usage than the Urban options. This is largely a result of

- the Urban options including interchanges at HUH between ER and WR (for all Urban options) and at Tai Wai for MOSL-EKL (for the MTR Urban options). The Urban KCR options attract higher demands than the MTR options for both alignments. The VIP/HKP alignment attracts slightly higher levels of rail ridership than the EXH/ADM alignment in all options reflecting the greater network coverage.
- 7.13 As discussed above, all the critical links are relieved. However, the NIL/Swap scheme would increase demands on the EHC which is forecast to be approaching capacity by 2016. The Urban MTR option gives most relief to this link for the EXH/ADM alignment but least relief for the VIP/HKP alignment.
- 7.14 There is very little difference in rail journey times between the various options. However the Regional options result in significantly less interchange than the Urban options. This is due to the assumption of the additional interchange at HUH between ER, WR and EKL-FHC under the Urban options. The MTR options result in the highest numbers of transfers due to the 3-way interchange at TAW. Under the Urban KCR options there would be through running between the EKL-TDL and MOSL.
- 7.15 The interchange facilities between the FHC and ISL at VIP/HKP are inconvenient, involving a long walk between the two lines, and of limited capacity, due to the already high loadings and congestion at the Victoria Park end of Causeway Bay (CAB) station. The Regional and Urban KCR VIP/HKP options have significantly lower interchange at VIP/HKP as it involves an intercompany transfer attracting an additional boarding charge for switching to MTR.
- 7.16 The increased market share from the Component Schemes leads to a reduction in road traffic and contributes to an overall improvement in air quality and other environmental benefits. All options contribute to a significant improvement in air quality by reducing NO_x, RSP and CO₂. The savings are greatest under the Regional options, reflecting the higher system usage and market shares.
- 7.17 The Urban options have a lower cost than the Regional options by about \$1-2 billion or 2-4%. The main source of the difference relates to 12 car station construction for KCR ER extensions and extra civil works for the MKK-HUH undergrounding section of ER in the Regional options. Further potential cost savings from the redeployment of rolling stock from lines relieved by new lines may be achievable particularly under the Urban-MTR option.
- 7.18 The Regional options generate higher economic benefits than the Urban options due to the assumption of through running between WR-EKL-MOSL. Similarly the assumption of through running at TAW under the KCR options gives higher economic benefits than the MTR options. These interchanges significantly impact on user benefits. The Economic Internal Rate of Return (EIRR) of all the options are in the range 14-17% well within scope for public financing. The Regional options give higher EIRR with higher benefits compensating for higher capital costs. Of the two Urban sets of options, the KCR option generates a higher EIRR. If cost savings can be achieved by redeployment of rolling stock, the EIRR of all the options could be increased to a similar level of around 17%.

- 7.19 The direct EXH/ADM options are substantially shorter and cheaper than the VIP/HKP options, whereas the VIP/HKP options serve new catchments and generate higher benefits. However the higher benefits do not compensate for the higher costs and the VIP/HKP options produce lower EIRR than the EXH/ADM options.
- 7.20 The Regional options have higher capital costs but generate sufficient additional revenues to produce somewhat higher FIRR and associated NPVs.
- 7.21 Capital costs for the EXH/ADM options are lower than the VIP/HKP options, in the range 10% to 12%. Revenues are similar for EXH/ADM and VIP/HKP routeings comparing corresponding Regional and Urban options. As a consequence the EXH/ADM options generate higher FIRR and NPVs than VIP/HKP options.
- 7.22 The Urban KCR options perform better financially than the MTR option due to the higher revenues of through running EKL-MOSL services at TAW which compensate for the slightly higher capital costs.
- 7.23 For the EXH/ADM options, the Regional option produces a FIRR of over 4% resulting in a financial surplus. The Urban KCR option also generates a 4% FIRR while the Urban MTR option generates a 3.3% FIRR. If cost savings can be achieved by redeployment of rolling stock, the FIRR of all the options could be increased to a similar level of around 5%. FIRRs for the VIP/HKP options are a half to one percent lower than the EXH/ADM options.

Summary of Network Option Evaluation

- 7.24 The assessments of the Regional and Urban options as part of overall railway network expansion plans revealed:
- all network options generate high economic returns;
 - the Regional options generate higher benefits and revenues;
 - the benefits generated by the Urban options are increased with through running of MOSL-TDL-EKL-FHC;
 - the Urban options have lower costs;
 - overall the economic and financial internal rates of return are similar; and
 - all network options are feasible in engineering terms.
- 7.25 Of the Urban options, comparison of the two operator options, KCRC or MTRC, for the TDL-EKL-FHC revealed:
- the KCR option generates higher economic benefits and revenues;
 - the MTR option costs less; and
 - the KCR option generates higher economic and financial rates of return.

7.26 The comparisons of the two routing options revealed that the EXH/ADM route:

- has lower capital cost by between \$5.4B and \$6.9B;
- serves well the major demands directly to Central from SEK; and
- is in line with planning intentions and causes relatively less disruption and reprovisioning requirements.

whereas the VIP/HKP route:

- opens up new development areas and accommodates a more diversified nature of traffic;
- generally generates higher benefits and revenues;
- gives greater road traffic relief; but
- could have significant impact on existing G/IC facilities (Victoria Park, Queen Elizabeth Stadium); and
- costs substantially more

7.27 It is concluded that on the basis of current planning intentions the direct route via EXH/ADM is more cost effective, whilst the VIP/HKP route would have to be considered in the context of possible future major redevelopment in the foothills areas of Causeway Bay, Happy Valley and Wanchai.

8. BENEFITS OF RAILWAY DEVELOPMENT

- 8.1 All the railway network expansion options, which RDS-2 has evaluated in detail, achieve the goals and objectives set out at the start of the Study. The networks comprising Component and Stand Alone Schemes would also bring about various benefits which are summarised below.

Integrated Land Use/Transport Development

- 8.2 Railways provide the basis for sustainable growth facilitating the development of high density nodes around stations to house the growing population and provide SAR-wide accessibility to employment and other daily needs. The railway expansion proposals place about 70% of the population and about 80% of job opportunities within approximately 1km of a railway station. Integrated railway/land use development provide the focus for planned SGAs in the New Territories and development and redevelopment in the Metropolitan area.

Transport Policy Objectives

- 8.3 Railways will form the backbone of the public transport system and with the implementation of the railway expansion proposals would carry 8 million or 44% of daily passenger boardings by 2016 (see [Figure 9](#)). In terms of usage of the public transport service network, KCR and MTR would account for around 60% of passenger-kilometres travelled in the HKSAR by 2016. The comprehensive railway network coverage will facilitate co-ordination with other public transport services at key interchanges nodes, maximising efficiency of service to passengers in terms of time and cost to meet forecast demand. This extensive coverage in combination with well planned pedestrian networks further extends the opportunities for integration with environmentally friendly public transport systems and maximises the catchment of the railway network.

Alternative to Road-based Travel

- 8.4 Whilst additional roads will be needed in the future, unrestrained road traffic growth is ultimately unsustainable for Hong Kong. The railway network expansion proposals provide an alternative to long term road programmes and can contain bus travel in downtown areas of Hong Kong Island and Kowloon to manageable levels. The expanded railway system will be capable of handling the peak hour demands and the convenience and accessibility will encourage the shift from private car usage to the public mode.

Environment

- 8.5 An integral part of RDS-2 was a Strategic Environmental Assessment (SEA) to ensure that environmental considerations were fully taken into account in developing and evaluating the railway network expansion plans and proposals.
- 8.6 A key activity at the start of the RDS-2 was to identify environmental constraints and baseline conditions to ensure schemes were environmentally acceptable. The proposed Railway Expansion Schemes are largely underground and the SEA has shown that no insurmountable environmental problems are anticipated during construction and operations.
- 8.7 The expanded railway network will reduce road-based travel significantly and help resolve the serious transport related environmental problems of Hong Kong. It is estimated that up to 180,000 tonnes of CO₂ emissions and more than 700 tonnes

of NO_x/RSP emissions could be saved on an annual basis. Whilst this contribution is important, resolution at source through fuel and engine technology improvements or changes and traffic restraint are still essential.

- 8.8 RDS-2 attempted to incorporate the environmental benefits of rail investment compared to road in the evaluation process. However shortcomings in the general approach used in Hong Kong were identified and it is suggested that overall planning and evaluation procedures need to be further improved in future studies.

Cross Boundary

- 8.9 Rail captures 80% of Cross Boundary travel today. The proposals provide a means for maintaining a high rail market share in the face of improving road links, thereby make a very significant contribution to sustainable development either side of the Boundary and help combat the regional transport related environmental problems. RDS-2 projects Cross Boundary travel could increase 3 or 4 fold by 2016, demonstrating how critical it will be to maintain the high market share and leading role of railways.

Level of Service

- 8.10 The comprehensive networks will offer fast and reliable travel throughout the HKSAR. The shortest travel times under the various network options for typical journeys between different parts of Hong Kong are as follows:
- Tin Shui Wai - Central - 41 minutes
 - Lo Wu - Admiralty - 50 minutes
 - Tsuen Wan - Kai Tak - 32 minutes
 - Tseung Kwan O - Central - 21 minutes
- 8.11 The Railway Expansion Schemes will provide adequate capacity and travel conditions to meet forecast 2016 demand and provide scope for further passenger growth whilst achieving high utilisation levels.

9. ECONOMIC AND FINANCIAL PERFORMANCE**Capital Cost**

- 9.1 Preliminary cost estimates (shown in Table 7) for the network development are in the range of HK\$80-100 billion, which over a 10-year period is not out of line with either previous rail investments or the committed schemes currently under construction in the HKSAR. Ranges are shown where the costs vary depending on: the order and timing of implementation; allocation of "shared" costs such as interchanges; the operator; and the extent to which redeployment of rolling stock between lines is achievable.

Table 7 Preliminary Estimates of Capital Costs (\$ billions)⁽¹⁾

Scheme	Regional	Urban-MTR	Urban-KCR
NIL/Swap ⁽²⁾	9-10	9-10	9-10
FHC ⁽³⁾	12-17	10-16	12-16
EKL	13	12-14	14
TDL	3	4-5	3-4
CEW Extension ⁽⁴⁾	2	2	2
KSL	10-11	7-8	8
NOL	9	9	9
WIL	10	10	10
REL ⁽⁵⁾	13-17	13-17	13-17
PRL/PRT	5-9	5-9	5-9
TOTAL STRATEGY	86-101	81-100	85-99

- Notes: (1) Costs in 1998 prices and include land costs.
(2) higher costs include NIL VIP station interchange with FHC.
(3) for Urban schemes includes cost of 3-way HUH I/C.
(4) extension from ADM or HKP.
(5) excludes rolling stock.

- 9.2 Over the period 1975 to 1998, total rail investment in the HKSAR amounted to broadly in the region of HK\$165 billion (1998 prices). From 1982 to 1998, rail investment has been at about the same level as total public capital expenditure on other forms of land transport, essentially roads or about 11% of total public sector capital expenditure. The latter was itself some 5% of Gross Domestic Product over the same period.

Economic Performance

- 9.3 The proposed railway network expansion plans generate real Economic Internal Rates of Return in the range 15-17% which is well above the normal hurdles for public sector investment.

Financial Performance

- 9.4 From an overall rail network perspective the proposed railway network expansion plans have been shown to accord financial returns in the range of 3.3% to 4.9% per annum in real terms, which is within range of the previous known Government benchmark real rate of return of 4%. Financial robustness can be improved further by support from directly related property development.

10. INSTITUTIONAL STUDIES

Railway Standards

- 10.1 From the review of railway planning design and operating standards, it was concluded that the standards currently being used for KCR and MTR in the HKSAR are broadly appropriate for each type of railway.
- 10.2 It was also concluded that it would not be appropriate to set common standards to permit inter-working of KCR and MTR services in Hong Kong due to the intensity of service required on most lines and the difficulty and cost involved.

Railway Planning Process

- 10.3 A review was undertaken of the whole planning, design and implementation process for railways based on recent projects and statutory procedures. It was concluded that the typical 8-9 year process from conception to opening offered limited opportunities for fast-tracking. Whilst the initial planning phases may in certain cases be speeded up by combining early design stages and directly appointing an operator, the move towards consensus planning through greater public consultation and the strengthening or establishment of various ordinances serve to increase the potential for extending implementation programmes.

Funding

- 10.4 Preliminary financial studies indicate that the MTRC and KCRC would be capable of developing and financing the new schemes in the various railway network expansion plans.
- 10.5 During the course of the RDS-2 the Government has begun to take an initial step towards private sector participation in the Railway Corporations by the privatisation of the MTRC involving an Initial Public Offering of up to 49% of the Company shareholdings.
- 10.6 RDS-2 believes the two Corporations are well able to finance and implement the proposed schemes, and is of the view that a gradual introduction of private sector resources for financing railway development is appropriate. A possible scheme involving some form of private sector participation could be the proposed PRL/PRT.

Fares

- 10.7 Closer integration of rail fares is recommended in so far as maintaining revenue returns and commercial autonomy permits. Two key areas for improved integration could be explored:
- Fares for MTR/KCR interchange journeys should be developed in joint consultation by the Railway Corporations as the number of interchanges and route choices increase.
 - Rail fares should be rationalised as the railway network is expanded.
- 10.8 Whilst closer integration is put forward, the autonomy of the Railway Corporations to set fares has to be respected if they are to fulfil the requirement to operate on the basis of prudent commercial principles.

Further Rail Expansion

- 10.9 The railway schemes put forward are considered to be feasible under current policies and methods of financing. Further expansion of the railway system may involve development in lower demand corridors where schemes may still generate transport, development and environmental benefits but where it is likely that revenues will be unable to cover capital and operating costs in full.
- 10.10 A number of institutional and financing structures can be considered including options for different funding sources for the capital cost for the projects. The remaining costs including recurrent and replacements costs should be recovered from revenue sources on a proper commercial basis. This approach, in various forms, is increasingly common including for example in Singapore, Bangkok and Europe.

11. IMPLEMENTATION

Planning and Implementation Process

- 11.1 Hong Kong has a successful track-record in the planning and implementation of railway projects. Since the development of the initial MTR network in the 1970s, Hong Kong has built and put into operation 80 km of new railways, upgraded 35 km of existing railway and has a further 50 km of railways currently under construction. Nevertheless, the planning and implementation of railway projects is a complex process involving many tasks and parties which must be co-ordinated and programmed before the first train can be put into service.
- 11.2 Based on the experience of the Airport Railway and West Rail and taking into account the possible impacts of the new ordinances, a programme for a typical railway project was drawn up as shown in [Figure 10](#). It must be stressed this is indicative only and will be subject to variation for individual projects depending on their specific situation and requirements. The overall programme shown is 9 years. For less complex schemes, such as short extensions of existing lines, the programme could be reduced. However, in order to achieve timely delivery of any new railway services, it is essential that the planning and implementation process should start early.

Priorities

- 11.3 The priority of the railway expansion schemes will depend their individual role - whether they are needed to relieve other parts of the railway network or to serve future development (or both). There may also be interfaces with other projects and financial considerations which will affect the timing of schemes.
- 11.4 These factors are subject to the normal risks and uncertainties associated with planning and forecasting. Development plans and programmes change, so programmes for railway projects need to be kept as flexible as possible to adjust to these changes. This is possible at the strategic planning stage but flexibility is progressively reduced as each of the milestones identified in the project implementation process is reached.

Implementation Programme

- 11.5 The implementation programme for the railway expansion schemes showing the indicative timing of the schemes is summarised in Table 8.

Table 8 Implementation Programme

Scheme	Opening	Rationale	Operator
NIL	2008-2011	Needed to relieve TWL and ISL following opening of committed rail lines.	MTRC
FHC	2008-2011	Needed to provide additional cross harbour rail capacity.	MTRC/KCR C
EKL	2008-2011	Needed to serve redevelopment of Kai Tak and South East Kowloon.	MTRC/KCR C
TDL	2008-2011	Needed to relieve ER but could be deferred with earlier conversion of ER to ATO and associated higher service frequencies.	MTRC/KCR C
CEW	2011-2016	Not essential but improves penetration of FHC and relieves interchange with ISL.	MTRC/KCR C
KSL	2011-2016	Improves accessibility to ER and WR and east-west connectivity across Kowloon. Priority could be raised and implementation advanced to boost WR revenue.	KCRC
NOL	2011-2016	Links NENT and NWNT. Serves potential second generation SGAs at Ngau Tam Mei, San Tin and Au Tau. Improves accessibility to Boundary from Western NT.	KCRC
WIL	2011-2016	Supports redevelopment and planned additional employment in Western District. Provides road/rail interchange for West HK Island.	MTRC
REL	Flexible	Relieves ER, enhances Inter-City services and improves access to Northern NT.	Open
PRL/PR T	Flexible	Extends hinterland of Hong Kong container port deeper into Mainland China. Early completion for market positioning and viability.	KCRC

11.6 The NIL is the most urgent scheme since it can relieve the anticipated bottlenecks in the railway system up to 2011. The earliest the scheme could be open is 2008, but a specific implementation programme needs to be drawn up in conjunction with programmes for the Central and Wan Chai Reclamation Developments.

11.7 For all the other schemes a range of opening dates has been set depending on their order of priority. To open by 2011, schemes would need to be "triggered" by 2002/3. Similarly, to open by 2016 schemes would need to be triggered by 2007/8. Ideally, to spread construction and expenditure, implementation of these schemes would be phased over the period 2008 to 2016.

11.8 The implementation of the REL and the PRL/PRT as noted above are largely dependent on the pace at which the respective passenger and freight traffic demand would build up. As these are new initiatives, an early commitment to proceed with the planning of these projects will help to identify any key technical and interfacing issues.

Operators

11.9 The selection of the operator for the railway expansion schemes depends on whether lines are natural extensions of existing lines or are new free-standing lines.

11.10 The NIL and WIL are integrated extensions of the existing MTR network; and the KSL and NOL of the KCR system. The ER-FHC also forms an integrated extension of the KCRC network and would be associated with a WR-MOSL through running line operated by KCRC formed by KSL, EKL and TDL schemes.

- 11.11 The selection of the operator for the EKL-FHC and the associated TDL to MOSL is open as it can be constructed as a free-standing scheme by either Corporation. In view of the desire to foster healthy competition in the transport system the Government could consider putting the EKL-FHC and TDL out to tender as one package to the two Corporations. The conforming scheme would be defined by Government and require decisions to be made on how it will link to MOSL; the interchange arrangements at TAW, DIH, HUH stations in Shatin and Kowloon and with the NIL and ISL on Hong Kong Island; as well as provision for future lines such as KSL and Central West extension. The proposals could include associated property development. Non-conforming proposals as alternatives could be considered as long as the overall objectives can be shown to be achieved.
- 11.12 This approach would enable the Railway Corporations to bring to bear their expertise and experience and at the same time develop schemes to fit their business objectives. In particular the Corporations will be able to integrate the new lines into their growing networks and accrue economies of scale by reducing capital and operating costs through redeployment of trains between existing and new lines, shared depot facilities, as well as rationalised fare structures and spreading of Corporation overheads.
- 11.13 The REL, as a new concept, could be implemented in a number of forms. Whilst the Cross Boundary train services have traditionally been provided by the KCR, this new line, depending on its route alignment, terminal location and connections, could be an infrastructure project that could be opened for competitive bidding. RDS-2 has kept open the operator for this new line for the purposes of the network expansion plans.
- 11.14 As noted above the PRL/PRT project should be developed further by KCRC in conjunction with Government. It is recommended that the more detailed studies assess the potential role of the private sector and could consider various types of "OT" approaches.

12. TOWARDS A PREFERRED NETWORK EXPANSION STRATEGY

- 12.1 The findings of RDS-2 form the basis for Government to prepare a Railway Development Strategy in the context of the overall transport plans and policies promulgated in late 1999 following completion of the Third Comprehensive Transport Study.
- 12.2 RDS-2 has studied in detail six network expansion options for the Component Schemes as alternative railway network development plans and found them all capable of achieving the objectives of RDS-2. Together with the Stand Alone Schemes, the six network options provide a suitable framework for the preparation of the final Railway Development Strategy but the selection of the preferred option will involve careful balancing of the relative merits of the broad social, economic, financial and strategic development aspects of the options.
- 12.3 The choice of the FHC is the key factor affecting the network comparison and selection of the preferred network. The choice of FHC and its routing on Hong Kong Island involves a range of issues and should reflect overall strategic planning intentions. The ER-FHC options cost more but generate higher benefits and open up new north-south and east-west rail corridors giving a stronger "Regional Emphasis". The EKL-FHC options have lower costs, still generate substantial benefits, provide a new urban corridor across the harbour and convenient distribution from an MTC at HUH giving a stronger "Urban Emphasis". On Hong Kong Island the EXH/ADM options have lower cost and serve the major commuter demands, whilst the VIP/HKP options extend the rail network coverage and open up new areas.
- 12.4 As illustrated in Section 7 above, RDS-2 has found that the overall performance of the six network options to be finely balanced. On the one hand, the Regional Network fares marginally better in transport terms and in meeting the long term development intentions of the HKSAR. On the other, the Urban Networks will be more advantageous in terms of lower costs and in serving the urban areas covered by the MTR system.
- 12.5 As none of the network options distinctly stands out to be a better choice than the other, RDS-2 has adopted a more pragmatic approach to develop a practical network expansion strategy. Instead of dwelling on the finely balanced network performance indicators, RDS-2 has resolved to balance the institutional and implementation merits of the options.
- 12.6 Amidst the six network options, the choice of the FHC is at the heart of the selection. The adoption of the Regional Network will automatically result in the KCRC implementing the bulk of the railway network expansion schemes, namely, the KSL, FHC, EKL, TDL and the NOL; whilst the MTRC will be left with only the NIL and WIL. On the other hand, if the Urban Network is to be adopted, the package for the FHC/EKL/TDL could be implemented by either Corporation as discussed in Section 11 above. This approach would enable the Railway Corporations to compete for this package whereby it will allow the Corporations to utilise the best of their expertise and experience to develop the most cost-effective schemes that will fit also with their respective business objectives.

- 12.7 RDS-2 has thus come to the conclusion that the preferred network expansion plan should be based on the Urban Network as illustrated in [Figure 11](#). It will mean the two Corporations would be invited to submit conforming proposals for Government detailed evaluation before a final decision is taken. Such a strategy will also permit the Corporations to submit, in addition to the conforming schemes, alternative proposals that will still meet the overall objective of railway infrastructure development.
- 12.8 On the basis of the RDS-2 recommendations on the preferred network expansion plan using the Urban Network, the next step will be for Government to determine how best to formulate the final Railway Development Strategy and how best to achieve its implementation.

13. ON-GOING RAILWAY PLANNING

- 13.1 Government Railway Development Strategy will provide the framework for strategy development over the next fifteen years. However it will require continuous monitoring and updating within the broad framework to accommodate the ever-changing social, economic and planning environment.
- 13.2 In conjunction with other strategic transport and/or land use planning studies for the HKSAR, the Strategy should be reviewed on an on-going basis; and be subjected to a comprehensive review every 5 years following the Population Census or By-census. By these means railway development should be fully integrated within the overall landuse/ transport/environmental planning process.

STATION ABBREVIATIONS

ADM	Admiralty	KWF	Kwai Fong	SKM	Shek Kip Mei
CAB	Causeway Bay	KWH	Kwai Hing	SKS	Sha Kok Street
CEN	Central	KWT	Kwun Tong	SKW	Shau Kei Wan
CEW	Central West	LAK	Lai King	SSP	Sham Shui Po
CHG	Chevalier Garden	LAT	Lam Tin	STT	Sha Tin Tau
CHH	Choi Hung	LCK	Lai Chi Kok	SWH	Sai Wan Ho
CHW	Chai Wan	LEO	Lee On	SYP	Sai Ying Pun
CIO	City One	LMC	Lok Ma Chau	TAK	Tai Koo
CLK	Chek Lap Kok	LOF	Lok Fu	TAP	Tai Po
CSW	Cheung Sha Wan	LOP	Long Ping	TAW	Tai Wai
DIH	Diamond Hill	LOW	Lo Wu	TIH	Tin Hau
ETS	East Tsim Sha Shui	MEF	Mei Foo	TKL	Tiu Keng Leng
EXH	Exhibition	MKK	Mong Kok (KCR)	TIS	Tin Shui Wai
FAN	Fanling	MOK	Mong Kok (MTR)	TKO	Tseung Kwan O
FAS	Fanling South	MOS	Ma On Shan	TST	Tsim Sha Tsui
FOH	Fotress Hill	NAC	Nam Cheong	TSW	Tsuen Wan
FOT	Fo Tan	NOP	North Point	TSY	Tsing Yi
HAH	Hang Hau	NTK	Ngau Tau Kok	TUC	Tung Chung
HEO	Heng On	OLY	Olympic	TUM	Tuen Mun
HFC	Heng Fa Chuen	PEB	Penny's Bay	TWW	Tsuen Wan West
HKP	Hong Kong Park	POL	Po Lam	UNI	University
HMT	Ho Man Tin	PRE	Prince Edward	VIP	Victoria Park
HOK	Hong Kong	PRT	Port Rail Terminal	WAC	Wan Chai
HUH	Hung Hom	QUB	Quarry Bay	WKN	West Kowloon
JOR	Jordan	SAT	San Tin	WTS	Wong Tai Sin
KOB	Kowloon Bay	SHT	Shatin	YAO	Yam O
KOT	Kowloon Tong	SHM	Shek Mun	YAT	Yau Tong
KOW	Kowloon	SHS	Sheung Shui	YMT	Yau Ma Tei
KSR	Kam Sheung Road	SHW	Sheung Wan	YUL	Yuen Long
KTU	Kwu Tung	SIH	Siu Hong		

RAILWAY LINE ABBREVIATIONS

EKL	East Kowloon Line	PRL	Port Rail Line
ER	East Rail	REL	Regional Express Line
FHC	Fourth Harbour Crossing	SIL	South Hong Kong Island Line
ISL	Island Line	TCL	Tung Chung Line
KSL	Kowloon Southern Loop	TDL	Tai Wai to Diamond Hill Link
LRT	Light Rail Transit	TKOL	Tseung Kwan O Line
MOSL	Ma On Shan Line	TWL	Tsuen Wan Line
NIL	North Hong Kong Island Line	WIL	West Hong Kong Island Line
NOL	Northern Links	WR	West Rail

