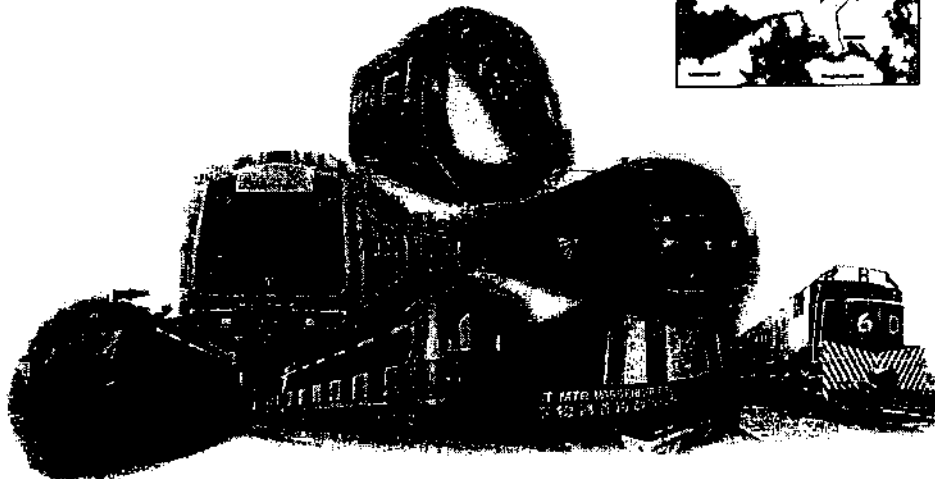
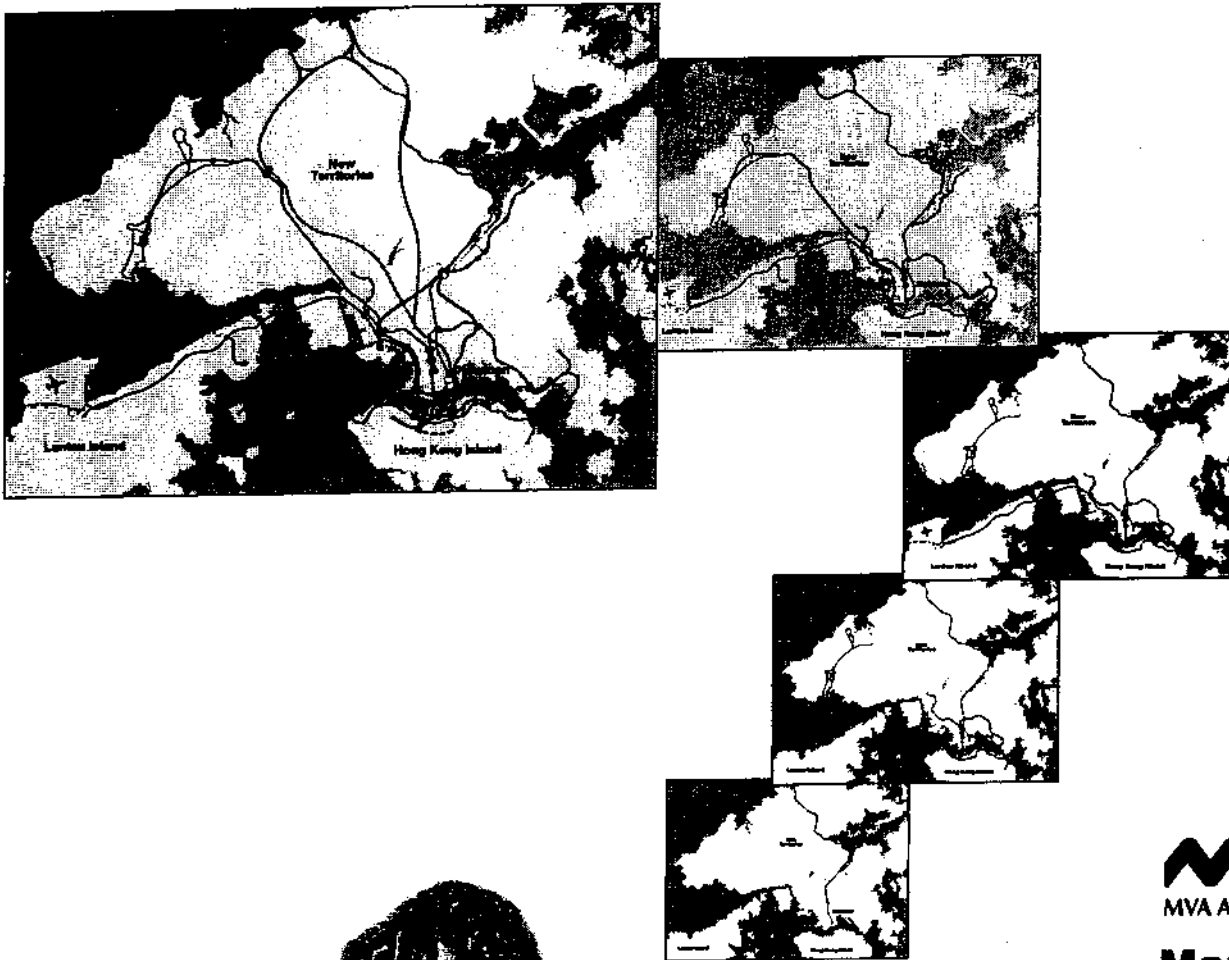


An Overview of the Rds-2 Strategic Environmental Assessment



Maunsell

in association with

Brooke Hillier Parker

Deutsche Bank

ERM Limited

FSDI of MOR

GHK (Hong Kong)

Kennedy and Donkin Ltd.

Murray Harrison Ltd.

Parsons Brinckerhoff (Asia) Ltd.

2. AN OVERVIEW OF THE RDS-2 STRATEGIC ENVIRONMENTAL ASSESSMENT

2.1 Broad Methodology of RDS-2

2.1.1 As outlined in *Section 1.2* above, RDS-2 comprised a number of Study elements of which the NDS represented the fundamental basis for determining the extent, location and timing of future railway development in Hong Kong. The NDS was also that part of the overall RDS-2 Study which was most integrally linked to the SEA Study and, as such, it is the methodology applied to the NDS that is of greatest significance to the SEA element of the RDS-2 Study.

2.1.2 The NDS was split into three main stages:

- Firstly, a series of initial planning, data gathering and patronage forecasting and preliminary (i.e. desktop level) engineering studies were undertaken culminating in a *Corridor Assessment* of the "maximum conceptual railway network". The initial comprehensive network was essentially the result of a multi-stakeholder "brainstorming" session of all possible new railway route configurations across the SAR and a review of previous railway proposals, plans and other information collected during the first study phase of RDS-2.
- Secondly, the *Network Assessment* phase required a thorough review of the previous findings including patronage forecasting assumptions, landuse and railway development potential, constructability and outline costs, and the variables therein, as well as the assembling of the initial comprehensive network options into a reduced set of network arrangements which incorporated the "common components" of the proposed new railway alignments outlined in the initial comprehensive network. The ability of these network configurations to meet the demands posed by various planning and development scenarios was documented during this work-phase with outputs expressed in factors such as the cost-effectiveness, efficiency and capacity of the networks to perform their intended task. The completion of this phase naturally led to the selection of a preferred network from the options that best met the multitude of different requirements posed by the stakeholders within the Study Team.
- Lastly, the *Scheme Assessment* phase addressed the issues associated with formation of the preferred network and with the individual alignments which made up the preferred network, including ancillary facilities and proposed construction methods, revised patronage and revenue forecasting, costing and economic and financial assessments. A supplementary activity involved investigating how the preferred network would be programmed and implemented and a review of priorities to confirm the most urgent schemes. The culmination of this stage of the study was the development of the railway development options. The development options covered the railway network and its formation, the individual schemes which make up the network and their priority, and an implementation plan for the network.

2.1.3 The results of these primary study stages were reported in a series of working papers and, the *Interim Report* of the RDS-2 Study. The results of the final stage of the Study, including a review and summary of the results of previous stages, are reported in the Final Report of the RDS-2 Study; this Final Report also includes an executive summary of the SEA Final Report.

2.2 Broad Methodology of the SEA

2.2.1 As stated in Section 2.1.2, an initial task of the NDS was to develop the initial comprehensive network. This was essentially conceived through a multi-stakeholder "brainstorming" session that considered all possible new railway route configurations across the SAR. From an environmental perspective, the SEA team considered that the most environmental benefit could be gained by ensuring that the proposed rail routes captured the maximum patronage and thereby encouraged a switch from road based means of transportation to rail. This switch was seen as having potential environmental benefits in terms of air quality, noise and lower land take requirements (the environmental benefits of rail in comparison to road are further discussed in Section 3).

2.2.2 It was considered that the maximum patronages could be captured by extending the rail network, or providing new links, to existing or planned population centres (such as SGAs), and by relieving capacity constraints on congested sections of the existing rail network which would thereby increase the attractiveness of using the rail network and thereby lead to its greater use. This 'environmental' aim was, in essence, also an objective of the main RDS-2 team who wished to ensure high patronages to ensure the viability of the proposed rail lines, as well as to meet the Study's overall objectives of providing a rail network to meet the Territory's long term strategic growth projections, and to relieve network congestion. Consequently, by meeting the objectives of the main study, the broad environmental objectives were also met in the development of the initial comprehensive network.

2.2.3 An early task for the SEA Team was the preparation of a series of environmental constraint maps, which were used to inform the brainstorming process associated with the compilation of the initial comprehensive network. At this early stage of the Study, the intention was to facilitate the brainstorming process through identifying only those environmental resources and associated areas, which may be considered as "absolute constraints" to the development of new railways. Such areas were acknowledged as "absolute constraints" by the Administration through the application of strategic designation or "value" within the context of Hong Kong's statutory environmental regulations. This was the basis on which several of the early proposed railway alignments were abandoned.

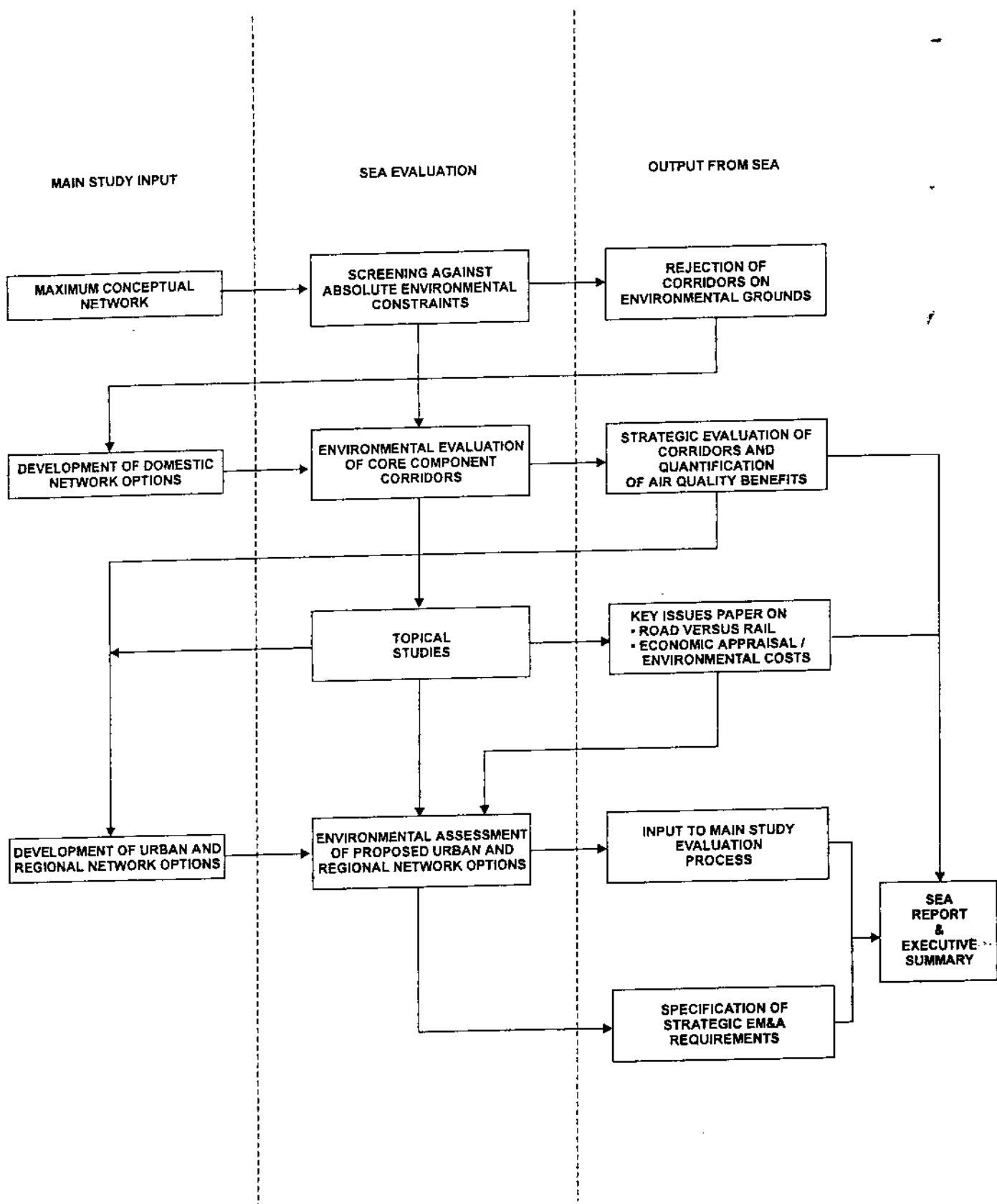
2.2.4 The first phase of study culminated in the preparation of the *SEA Initial Evaluation Report* which focused on providing a broad measure of the acceptability or otherwise of the components of the initial comprehensive network and an indication of future environmental issues which would have to be resolved should the corridors be retained for further study. The findings of the *SEA Initial Evaluation Report* were incorporated within the RDS-2 *Interim Report*.

- 2.2.5 The second broad phase of the SEA comprised an environmental evaluation of the reduced set of railway corridors. These network options (which arose out of the Network Assessment phase of the NDS) were developed after the rejection of 'unsatisfactory' schemes from the initial comprehensive network. The rail development options each contained the same Component Schemes, however, they differed with regard to the configurations of the Fourth Harbour Crossing, and the timing of the implementation of their components. Due to their similarity, the corridors within each of the rail development options were considered as "common or core components". The SEA identified the strategic environmental benefits and disbenefits of these preliminary network options through reporting on the air quality implications of the proposed alternative network options and a more detailed environmental evaluation of the potential environmental impacts of the network developments on the basis of the collation of a more comprehensive baseline than in the initial Study phase.
- 2.2.6 In parallel to the evaluation of the output from the NDS, the SEA undertook an investigation into the apparent inequities in the development of railways when compared to the development and promotion of road-based transport in Hong Kong. As part of this separate workstream, the SEA also reviewed the environmental, economic and other advantages that railway transport holds over road-based alternatives.
- 2.2.7 The baseline information collection exercise undertaken during the second stage of the SEA Study built upon the baseline information that had been collated during Stage 1. The Stage 1 data had been collected to enable the 'sieving' of the initial comprehensive network against those strategic resources that had been identified and, due to their statutory designation, classified as absolute environmental constraints (see Section 4.7). The work undertaken at Stage 2 identified and mapped those other recognised environmental resources which, although not considered as absolute constraints, may potentially be affected by, or affect, the proposed rail routes. The intention of this data collection exercise was to provide robust mapping data that the engineers could use to identify the location and extent of important environmental resources, in order that such resources could be sought to be avoided from the outset of the alignment development process.
- 2.2.8 The SEA *Interim Assessment Report* presented the results of the network option evaluation task carried out during the second phase of RDS-2 which was also incorporated into the Stage 2 of the wider RDS-2 Study and reported on a proposed preferred network arrangement which satisfied all, including environmental, criteria.
- 2.2.9 The final phase of the SEA study was intended to focus on the preferred network configuration. The SEA team was to conduct thorough environmental investigations to determine the performance of the overall network and to advise on the evaluation of any alignment options that may provide greater or lesser environmental benefit. Environmental Performance Indicators were proposed as criteria for the assessment and evaluation of the benefits and disbenefits of the proposed alignments and to facilitate the selection of options that were environmentally preferred. The overall strategic environmental implications of the recommended rail development options were also to be summarised. Subsequently, the findings of the overall study were to be recorded in the *SEA Final Assessment Report*; an executive summary of which would appear in the wider RDS-2 *Final Report*. An integral part of this final stage of the Study was to highlight those key environmental and other issues relevant to the proposed rail

development and to document these for later follow-up during feasibility and EIA studies. A broad overview of the flow of the SEA Study is shown diagrammatically in Figure 2.1.

2.3 Key Points in the RDS-2 Study

- 2.3.1 The completion of each of the RDS-2 Study phases represented key decision points for the client. In particular, the completion of Stage 2 marked the culmination of the network studies and the commencement of alignment level studies, which were to have generated engineering detail of all the potential schemes carried forward into the final stage of the study. This information was to be used during the final stages of the SEA process. However, as a result of the work undertaken during Stages 1 and 2, it became clear that the remaining 'preferred schemes' were predominantly those that provided relief to already constrained sections of the existing network, and were therefore mostly located in the urban area. Due to the engineering constraints associated with constructing a railway within an urban environment, the majority of the remaining schemes were, by necessity, underground. Due to the important nature of these 'network relief schemes', the focus of Stage 3 was predominantly upon these 'urban' Component Schemes rather than the 'Stand-alone' schemes.
- 2.3.2 By their nature, the operation of underground rail schemes generally has less of an impact on the environment than similar above ground schemes since the environmental resources that may be affected, and which are normally located on the surface, are not impacted upon. The promotion of underground schemes, which cost more to construct and operate, can normally be considered as the environmentally preferred option since the operational impacts are significantly reduced from an equivalent above ground alternative. Consequently, it was considered that each of the remaining underground schemes represented an 'environmentally preferable' option. Due to the limited environmental impacts from each of the remaining underground schemes each was, as demonstrated by the output from the Stage 2 work, considered to have a similar environmental performance.
- 2.3.3 As the focus of the final stage of the Study was upon fairly well defined underground schemes within the urban environment, the role of the SEA within this phase of the Study was slightly different to that which had been originally envisaged. For example, it had been envisaged that there would be a number of significantly different potential options for the preferred schemes (such as above ground or underground, or different surface alignments). It had been the intention to develop and use environmental performance indicators (EPIs) to evaluate each of these potential options for defined sections of alignment. This information would have provided an important input into the overall study to determine which option was preferred. However, the constraints within the urban environment resulted in each of the Component Schemes being predominantly underground, and no significantly different alternative surface options were proposed. Consequently, there were no options to compare against one another, and therefore the EPIs were not used to the extent originally intended. Similarly, with each of the Component Schemes being predominantly underground and within the urban environment, it was resolved that there was little benefit to be gained by completing a proposed third baseline collection task, as originally planned at the outset of the Study, as this would have provided no further information on which to evaluate the environmental performance of the schemes. Nevertheless, the corridors and their potential minor variations were evaluated individually and strategically. The overall cumulative environmental implications of the rail development options were also



THE SECOND RAILWAY DEVELOPMENT STUDY

DIAGRAMATIC FLOW OF SEA STUDY



Highways Department
Railway Development Office

SCALE	N. T. S.	CAD REF.		
DESIGNED	MJR	DATE	DRAWING / FIGURE No.	REV
DRAWN	LLH	MAY 00	2.1	

ALWAYS
40-5827

MVA ASIA LIMITED

Maunsell

assessed using, where appropriate, the broad methodologies defined in the EPIs. The results of the evaluations of the Component and Stand Alone Schemes are reported in Section 7 of this Report, whilst Section 8 provides details of the cumulative environmental implications.

2.4 Interface of the SEA

- 2.4.1 To facilitate the review by different parties, the SEA study has been reported in a separate deliverable stream to that of the main RDS-2 Study. It has therefore been essential and a fundamental priority of the SEA to ensure that SEA outputs have been effectively integrated into the other study streams and the overall RDS-2 programme.
- 2.4.2 The assessment and evaluation of the preliminary network options included the review by the SEA team of fundamental components of the networks including the location and impact of the FHC and the MTC as part of the wider RDS-2 Topical Studies.
- 2.4.3 The SEA contributed to the findings of the wider RDS-2 Study in essentially two main ways. Firstly, through a series of inputs to various sub-elements of RDS-2 such as the Topical Studies and also through the provision of Key Issue Papers which relate to the institutional aspects of the Study but also serve to fulfil the environmental justification of railways as outlined in the SEA Brief. Secondly, the SEA provided environmental input at key decision making stages of the NDS through provision of information on environmental resources, sensitivities and constraints and implications. The main interfaces of the SEA with the main study components, together with an overview of the study's overall approach, are summarised in Figure 2.2.
- 2.4.4 Additional, on-going interfaces within the Study Team were facilitated through monthly progress reporting and working level meetings between the Study Team members.
- 2.4.5 These methods have ensured that there has been an effective exchange of information between study members which has been fully utilised in the development of the overall Study. The integration of the SEA into the NDS, and vice versa, has ensured that a comprehensive assessment and evaluation of the future railway development options and alignments has been achieved.
- 2.4.6 As indicated earlier in Section 1.2.1, the SEA of RDS-2 was undertaken in close collaboration, in particular, with the NDS Study elements of RDS-2 as well as other study components. The following paragraphs describe the manner in which the SEA interacted with other study elements of RDS-2.

2.5 Interface with Other Strategic Projects

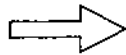
- 2.5.1 As the SEA is a strategic, Territory-wide study, a variety of information sources and ongoing studies have been referenced in order to apply a broad perspective to the issues and potential constraints associated with the development of new railways within the context of the SAR's economic, housing, transportation and development strategies. Work undertaken during the on-going Sustainable Development for the 21st Century (SUSDEV) study was drawn upon as this study aims to provide a framework for sustainable decision making so that future SAR policy can better balance social, economic and environmental needs. Within this context, the strategic findings of TDSR and CTS-3 were also used as they provided both important background on the proposed future development scenarios of the SAR, and confirmation of the need to

ENVIRONMENTAL INPUT

TOP DOWN STUDIES
• NETWORK DEVELOPMENT STUDY
• STRATEGIC ENVIRONMENTAL ASSESSMENT



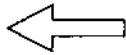
INSTITUTIONAL STUDIES



SCHEMES
• NETWORK RELIEF
• STRATEGIC DEVELOPMENT

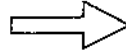


NETWORK OPTIONS
PREFERRED NETWORK

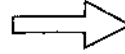


ENVIRONMENTAL INPUT

BOTTOM - UP STUDIES
• NETWORK CONSTRAINTS STUDY
• FOURTH HARBOUR CROSSING
• MASS TRANSPORTATION CENTRE
• CROSS BOUNDARY STUDIES



STRATEGIC EM&A



IMPLEMENTATION



THE SECOND RAILWAY DEVELOPMENT STUDY
KEY INTERFACES AND STUDY APPROACH

MVA		Highways Department Railway Development Office	
SCALE	DESIGNED	DATE	REV
	LLH	MAY 00	2.2
	DRWING	DRWING / FIGURE No.	
	CFA		
	DD		

promote rail infrastructure as part of a move towards sustainability. Given that the two later studies had already made a case for the promotion of railways within Hong Kong, the focus of the RDS-2 Study was concerned with identifying and defining the future railways options and their programme of implementation.

2.5.2 In addition to the aforementioned Studies, the SEA has also drawn upon, and been in contact and liaison with studies including, but not limited to:

- Cross-Links Study;
- Planning and Development Study on North East New Territories (NENT);
- Planning and Development Study on North West New Territories (NWNT);
- Metroplan;
- Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development;
- Northshore Lantau Development Feasibility Study, and
- Various planning and environmental studies within the Consultant's in-house database.

2.6 Liaison with Government Departments

2.6.1 The SEA study team has ensured that a productive and communicative relationship with relevant parties has been maintained at each stage of the study programme through the following means:

- Monthly progress reports;
- Contractual deliverables;
- Key Issues and working papers; and
- Informal communications (e-mail and telephone conversations)

2.6.2 ESMG meetings were held between the consultants, the client and relevant Government Departments. The ESMG meeting dates were programmed to meet with milestone deliverables of the SEA and to facilitate key decisions on the progress of the study. Additionally, they have been used to brief Government departments on the progress of the overall RDS-2 study and to discuss the scope and future direction of the SEA element.

2.6.3 In addition, steering and working groups were separately established by the client to provide guidance on policy and discuss interdepartmental issues, key decisions and their implications and on the progress of the study. All reports published by the SEA were initially sent to the client and thence members of the ESMG for comments and feedback which has ensured a comprehensive and consistent review of the environmental aspects in the Study.

2.7 The Influence of Strategic Environmental Considerations

- 2.7.1 At the outset of the study, it was presumed that at some future point, a trade-off between environmental and other considerations would be required to overcome the competing demands and intractable positions of various stakeholders and disciplines within the railway development process. As a result of the study findings, which focussed the final phase of the Study upon the urban development options, these direct trade-offs did not occur because the component schemes under consideration were largely sub-surface urban railways which, in comparative terms, were largely environmentally neutral. Nevertheless, the commissioning of an SEA did involve developing and rationalising a common understanding on the role and purpose of the Study and the limitations of the process.
- 2.7.2 One of the first important decisions to be reached was that the correct focus of the SEA was to be on potential operational impacts of the proposed railway development options rather than construction issues. Whilst the later may traditionally be seen to be more physically impacting on the community, in reality, construction impacts, notwithstanding their severity, are short term relative to the benefits or disadvantages provided over the lifetime of a railway, which is typically measured over several decades.
- 2.7.3 The SEA team also established a clear distinction between those environmental issues that were of foremost importance in the planning and operation of the new railways and those issues, which, whilst of relevance, were of secondary importance.
- 2.7.4 In order to ensure that the SEA process did not apply presumptive valuations of environmental resources, which were unsupported by the Administration's own actions in applying protective designations to different elements within the Hong Kong environment, a definition of "strategic value" was agreed. This definition was founded on the level of protection provided by the Hong Kong Government to a particular resource or location. For example, some environmental resources in Hong Kong are protected by statute (e.g. country parks), others are managed through procedural or administrative means (e.g. potentially hazardous facilities), whilst some types of resource (e.g. landscape resources) are less well identified, although some areas are extended protection both indirectly through, for example, the Country Parks Ordinance, and more directly through the Town Planning Ordinance.
- 2.7.5 Establishing strategic value through direct reference to the policies and actions of the Administration was essential to ensuring that the SEA was consistent with the Government's own decision-making processes and priorities. It would have been wholly inappropriate for the SEA study to have applied any presumptive constraints to the development of new railways that are not routinely applied to the development of other infrastructure projects.
- 2.7.6 Similarly, the SEA team consistently sought to ensure that environmental improvement was achieved without placing constraints upon railway developers that were unsupported in law or that were provided for within legislation that is applied during later development stages.

- 2.7.7 The RDS-2 Study was undertaken with a view to moving away from the more common approach adopted by similar studies which focuses upon transport planning and strategic growth factors. Whilst these factors played a key role in developing the network, other factors, and in particular environmental factors, played a significant role in the development process, particularly during the early stages of the Study, when a number of proposed rail corridors were immediately rejected on environmental grounds.
- 2.7.8 The objectives of the RDS-2 study were to ensure that the preferred network that was developed was safe, efficient, financially viable and environmentally acceptable and that it could be supported by an appropriate institutional framework. To achieve this aim, environmental considerations were both an important and integral aspect of this decision making process. However, by necessity, the selection of schemes was also influenced by other factors in order to ensure that the Study's broader objectives were met.
- 2.7.9 For example, from an environmental perspective it may at first appear that a rail scheme should be proposed to alleviate traffic congestion in certain areas and thereby improve air quality. However, for such a scheme to be realistically considered, it must be shown that the projected ridership figures and, hence, the financial return criteria set by the transport planners can be satisfied. Similarly, in order to achieve the hypothetical air quality benefits, the proposed scheme must be sufficiently attractive (in terms of access, travel times and costs etc.) to persuade road users to shift to using the rail system. To maintain this shift in transportation mode, constraints must be put in place to prevent vehicle numbers from returning to pre-rail levels. It can therefore be seen that the selection of schemes must be considered on a holistic basis, and that it is not feasible for environmental considerations alone to drive this process.
- 2.7.10 However, the implementation of the SEA has resulted in environmental considerations being given a high priority within the decision making process. Additionally, in relation to certain issues, the aims of both the SEA Team and the main study team have been complementary. For example, from an environmental perspective, it is considered that the maximum air quality benefits are likely to be accrued from those rail routes which capture the highest rail patronages and that thereby bring about a shift from road based transportation to rail. The capture of high patronages, and the provision of connections to areas without adequate rail links, is also a goal of the main study. Consequently, it is considered that the those schemes that can be financially justified by the main study team (since they have high projected use) are also likely to be those that provide the maximum potential for resulting in environmental (air quality) benefits.
- 2.7.11 Overall, due to the effective input from the SEA team and the attainment of common goals, it is considered that the SEA study objectives have been satisfied.