The assessment results have been used as the basis for the evaluation of their respective impacts arising from the proposed Project on both existing and planned sensitive developments, as well as for the identification of locations where the acceptable criteria limits are exceeded and appropriate mitigation measures are required. Figure 2.2 indicates the limit of Environmental Impact Assessment Study Area.

Considering the nature and environment of the project, impacts arising from construction waste, ecology and cultural heritage are considered to be minimal. Therefore, they have not been included in the EIA Study Brief. No further assessment is therefore required.

The report has been prepared in accordance with the requirements stipulated in the Technical Memorandum on Environmental Impact Assessment Process. This covers relevant project information and legislation, existing environmental conditions, assessment criteria and methods, assessment findings and proposed mitigation measures.

The Environmental Monitoring and Audit (EM&A) programme is presented in a separate EM&A Manual.

1.4 Report Structure

This Final EIA Report consists of 8 sections, as follows:

(1) Introduction
(2) Description of the Project
(3) Noise Impact Assessment
(4) Air Quality Impact Assessment
(5) Landfill Gas Hazard Assessment
(6) Water Quality Impact Assessment
(7) Landscape and Visual Impact Assessment
(8) Conclusions

2.0 DESCRIPTION OF THE PROJECT

2.1 Proposed Works

This project is one of the improvement schemes recommended under the CTREK in 1996 which concluded that the local network would be saturated beyond the year 2001 and the traffic conditions would further deteriorate due to the intake of population around the surrounding developments. The project will support the development of requirements of the housing sites as well as creating opportunities to enhance the Yau Tong urban restructuring.

The project will reduce the traffic passing through the Lei Yue Mun Road / Kai Tin Road Roundabout by diverting the traffic to use the proposed underpass. Moreover, the widening works and junction improvement at the Yau Tong Road / Lei Yue Mun Road junction will increase the capacity to facilitate the traffic generated from the adjacent housing developments. Since the improvements are mainly used to improve the local traffic condition, alternative siting will not be effective.

The traffic figures used in the assessment of operation noise and air quality are based on the assumption that a coastal alignment is adopted by Western Coastal Road project, which the study is being undertaken by Territory Development Department. Should there be any change in the alignment design that affects the traffic pattern along Lei Yue Mun Road, review of this assessment should be carried out at later stage to verify the findings in this report.

During the review of the preliminary layout under this project, different options (including underpass, flyover, extensive road widening, etc) were explored and evaluated under various aspects in order to fulfill all the requirements and achieve the objective of the project, which is to increase the road capacity. Other aspects that had been used for evaluation were the choice of road alignment, form of structure, junction assessment, road traffic noise, air quality, landscape and visual impact, land resumption, construction costs, and programme. After striking the balance from all relevant aspects, the project scope has been determined and detail environmental impact study is then conducted to investigate and explore possible mitigation measures to remedy the unavoidable environmental impacts.

According to the proposed programme as shown in Appendix 2.1, construction is scheduled to commence in December 2004 for completion by the end of 2007 while the road will be in operation. The corresponding landscaping works will continue to progress. The scope of this Project comprises the following:

(a) construction of two sections of single lane eastbound underpasses. The first section is about 48m long while the second section is less 230m in length. They would be constructed beneath the existing Lei Yue Mun Road/Kai Tin Road roundabout and the new signalized control junction of Lei Yue Mun Road with Yau Tong Road and Slip Road to EHC;
(b) re-provision of a two lane slip road connecting Lei Yue Mun Road to the Kai Tin Road roundabout;
(c) construction of a single lane slip road connecting Kai Tin Road to the new signalized control junction;
(d) construction of a footbridge for pedestrian crossing at the junction of Lei Yue Mun Road and Kai Tin Road;
(e) junction modification at Lei Yue Mun Road/Yau Tong Road/Slip Road to EHC;
(f) construction of three sections of noise canopies, two sections of noise semi-enclosure, and a 7.7m high with 3m horizontal cantilevered noise barrier along Lei Yue Mun Road. The total lengths for the noise canopies, noise semi-enclosure, and cantilevered noise barrier are 175m, 112m, and 115m respectively; and
(g) associated geotechnical, landscaping and road reconstruction works.

Figure 2.1 shows the scope of the Project work.

This project is also related to the housing development projects in the Lei Yue Mun vicinity and these housing projects will have their own local road improvement works to be carried out. However, those local improvement projects are not anticipated to have significant effect to this project.

2.2 Future Environmental Conditions in the Absence of the Project

Upon the completion and population intake of the housing estates – Ko Chiu Road Estate, EHC Housing Estate and Yau Tong Estate Redevelopment, the local network including Lei Yue Mun Road is expected to be beyond saturation. It is anticipated that the traffic demand would be similar with or without the proposed Project. Therefore, in the absence of the project, the increased traffic would only result in severe congestion, aggravated noise levels and deteriorated air quality for the area. On the other hand, a benefit gained from not constructing the proposed underpass would be the avoidance of potential landfill gas migration due to excavation. As for water quality, the difference in the extent of impact is considered insignificant.

2.3 Alignment Options

Considerations

(A) Site Constraints

At the onset of considering the options of the road improvement scheme, the following site constraints (See Fig. 2.3 and 2.4) along the proposed route, from north to south, are identified:

- the existing buildings and structures of Sceneway Garden and its podium deck above Lei Yue Mun Road, SKH Kei Hau Secondary School (Kei Hau School);
- the Sceneway Road Flyover, which is the only vehicular access to Sceneway Garden, in particular its deck, column, abutment, and foundations that impose very tight constraints both horizontally and vertically of providing space to accommodate the slop road and underpass;
- the Lei Yue Mun Road to and from the Eastern Harbout Crossing (EHC), on which the existing number of traffic lanes must be maintained and cannot be shifted westwards to provide more space;
- the slip road from Lei Yue Mun Road approaching to Kai Tin Road/Lei Yue Mun Road roundabout, on which the two traffic lanes must be maintained at all time; and
- Kai Tin Road Roundabout which dictates the merging level of the slip road with the roundabout and its foundations also constraints the selection of the underpass alignment.

In this project, one of the major purposes is to provide an additional road link for the southbound traffic on Lei Yue Mun Road to bypass the Kai Tin Road/Lei Yue Mun Road roundabout to reach Yau Tong area in order to alleviate the traffic congestion on the roundabout. In view of the above site constraints, the start point of this additional road link can be provided only on the area bounded by the Sceneway Garden, Kei Hau School, Sceneway Road Flyover and Lei Yue Mun Road corridor to EHC tunnel. Within this bounded area, the existing slip road approaching the roundabout must be either retained or relocated to ensure that the two traffic lanes on this slip road can be maintained at all time. In other words, the start section of additional road link and the slip road must be accommodated within this limited area. Moreover, due to the presence of the structural supports of the Sceneway Road Flyover (i.e. its column and abutment), the available space both horizontally and vertically to allow the slip road and the additional road link to pass underneath the Sceneway Road Flyover is very

limited. As a result, the alignment of the additional road lnk on the north side of the roundabout is heavily constrained.

(B) Design Requirements

Apart from the considerations on the site constraints, the road alignment design is required to comply with the current standards as stipulated in the Transport Planning and Design Manual (TPDM) by Transport Department and other relevant guidelines. In the alignment design, it is necessary to satisfy lots of traffic requirement on the road capacity, road width, road curvature, road gradient, design speed, sight distance, headroom, and road safety.

Options Considered

Based on the above considerations, both underpass and flyover alternative options have been examined so as to work out a feasible and optimal alignment of this additional road link. The details of the recommended option and those options which have been considered are shown below:

(A) *Recommended Option* (See Fig. 2.1):

In this option, the start section of the underpass follows the same alignment of the existing two-lane slip road to the Kai Tin Road/Lei Yue Mun Road roundabout. It sinks to pass underneath the roundabout and continues to run underneath Lei Yue Mun Road (section south of the roundabout) until its emergence near Ko Chiu Road. Since the start section of the underpass occupies the space of the existing slip road to the roundabout, the existing slip road is to be shifted to the east of Lei Yue Mun Road cutting unavoidably a corner of the Kei Hau School platform. The shifted slip road then runds underneath Sceneway Road Flyover in between its abutment and column and joins the roundabout at the present road level.

The recommended option produces a nearly straight underpass alignment that in turn provides a good and sufficient sight distance, which is one of the crucial safety aspects for visibility to the drivers in the underpass. In addition, the recommend option also fulfills other requirements on safety, traffic, engineering and environmental aspects. In consideration of these different aspects and other options as detailed below, the proposed alignment of the underpass in this recommended option is adopted for this project.

(B) Other Options Considered

(a) Option 1 (see Fig. 2.5)

This option will retain the existing slip road to the roundabout at the present alignment. The start section of the underpass in this option passes through a corner underneath Kei Hau School platform. It continues to run underneath the Sceneway Road Flyover in between its abutment and column and then underneath the Kai Tin Road/Lei Yue Mun Road roundabout. The underpass continues to run underneath the section of Lei Yue Mun Road south of the roundabout until its emergence near Ko Chiu Road.

Similar to the recommended option, it is also unavoidable to temporarily occupy the Kei Hau School playground for shifting and reconstructing the existing

retaining walls of the school to construct the underpass. Besides, in this option the underpass at the corner of Kei Hau School will be at level lower than the shifted slip road of the recommended option. Therefore, the retaining wall reconstruction at Kei Hau School to make way for the underpass construction in this option will be more complicated, extensive, and time consuming than that in the recommended option. Besides, the construction of the underpass in between the foundations of the column and abutment of Sceneway Road Flyover will also increase the construction difficulties.

In addition, because the northern section of the underpass is meandering in order to pass in between the supports of the flyover, the required sight distance cannot be achieved due to the presence of the side walls of the underpass. Insufficient sight distance causes a safety problem to motorists especially in the confined underpass. Therefore, this option is not acceptable.

(b) Option 2 (See Fig. 2.6)

Similar to the option 1, the location of the existing slip road is maintained, but it is attempted to sink the underpass to pass underneath the Sceneway Raod Flyover just below the existing slip road instead of in between the column and abutment of the Flyover. The underpass then runs underneath the roundabout and then Lei Yue Mun Road until its emergence near Ko Chiu Road. I is necessary to sink the underpass adequately to pass underneath the slip road with acceptable road gradient and curvature. Attempts have been made to achieve an acceptable alignment. However, the results show that the road gradient still exceed the maximum allowance gradient in the TPDM and the winding underpass is also not able to provide sufficient sight distance, hence causing safety problem to the motorists. In unavoidably encroached and the diverging length is not adequate for the motorists to safely enter te underpass at the diverting point. As a result, this option is considered not acceptable.

(c) Option 3 (See Fig. 2.7)

In this option, it is considered to have the underpass alignment to run underneath the Lei Yue Mun Road southbound lanes leading to East Harbour Crossing (EHC) in order to bypass the Sceneway Road Flyover constraints. However, this arrangement requires the underpass north entrance portal to occupy the existing Lei Yue Mun Road. Since Lei Yue Mun Road is the exclusive road to and from EHC, any reduction to its road width is not acceptable. Hence, this option is considered as not accpetable. Hence, this option is considered as not acceptable.

(d) Option 4 *See Fig.2.8 and 2.9)

A flyover instead of underpass across Kai Tin Road/Lei Yue Mun Road roundabout has been considered. However, it is found not feasible to provide a bridge spanning across the roundabout in a very steep gradient because the vertical alignment of the flyover is restricted by the existing Sceneway oad Flyover and the elevated roundabout.