

1 INTRODUCTION

1.1 Background

The need for additional traffic capacity on the east-west road links across central Kowloon, particularly for coping with the new developments on its western and eastern sides, has been recognized for a number of years. Since 1990, it was proposed in the West Kowloon Reclamation Transport Study that a route in tunnel, which is known as the Central Kowloon Route (CKR), should be developed to link the West Kowloon Highway with the future highway system.

Highways Department (HyD) commissioned the Design and Construction Assignment for the Central Kowloon Route in June 1998. An alignment study, preliminary design and impact assessments were carried out without proceeding to the detailed design or construction phases due to substantial changes in scope of CKR. The study was based on a dual two-lane configuration. Its findings indicated the need for resumption of some residential buildings in the vicinity of Bailey Street in To Kwa Wan and included an outline proposal for Re-provisioning of some government and community facilities in Yau Ma Tei. These facilities included Yau Ma Tei Police Station, Kowloon Government Offices, Yau Ma Tei Multi-storey Carpark Building, Yau Ma Tei Jockey Club Polyclinic Building and Specialist Clinic Extension Building, Yau Ma Tei Jade Hawker Bazaar, public toilet and refuse collection point adjoining Temple Street, and other minor facilities.

In March 1999, Government confirmed that a toll plaza for CKR would no longer be necessary. This removed a major constraint on the vertical alignment of CKR at the eastern end. The alternative alignment options for CKR were then re-examined taking into account the updated planning of the then South East Kowloon Development (SEKD) for reduced scale of reclamation. In August 1999, HyD commissioned a further study to investigate alternative routes to the east of Ho Man Tin with a view to minimise resumption of residential properties while dovetailing with the overall planning of the road network in the then SEKD. The study recommended a new alignment running through the bus terminus at Kowloon City Ferry Pier, which could avoid resumption of residential buildings.

Agreement No. CE 58/2006 (HY) – Central Kowloon Route and Widening of Gascoigne Road Flyover – Investigation was commissioned by HyD in August 2007 to conduct the investigation and preliminary design of the CKR (in dual 3-lane configuration) and Widening of GRF projects.

On 30 June 2011, HyD appointed the Arup – Mott MacDonald Joint Venture (AMMJV) under Agreement No. CE43/2010(HY) to provide consultancy services in respect of Central Kowloon Route – Design and Construction (the Assignment). This consultancy also includes the compilation of an Environmental Impact Assessment (EIA) Report to fulfil the relevant legislative requirements.

1.2 The Project

Through a number of studies and verifications of engineering feasibility, CKR is now a proposed dual 3-lane trunk road across central Kowloon linking the West Kowloon in the west and the proposed Kai Tak Development (KTD) in the east. The CKR will be about 4.7km long with an underground tunnel section of about 3.9km long, in particular, there will be an underwater tunnel of about 370m long in Kowloon Bay to the north of the To Kwa Wan Typhoon Shelter. It will connect the West Kowloon Highway at Yau Ma Tei Interchange with the road network at Kowloon Bay and the future Trunk Road T2 at KTD which will connect to the future Tseung Kwan O – Lam Tin Tunnel (TKO-LTT) and Cross Bay Link (CBL). CKR, Trunk Road T2 and TKO-LTT will form a strategic highway link, namely Route 6, connecting West Kowloon and Tseung Kwan O. Consultancy studies for Trunk Road T2, TKO-LTT and CBL have been commissioned by CEDD. In addition, 3 ventilation buildings, which will be located in Yau Ma Tei, Ho Man Tin and ex-Kai Tak airport area, are proposed to ensure acceptable air quality within the tunnel. **Figure 1.1** illustrates the latest alignment layout of the CKR. It is generally described in three sections, with the west portion from West Kowloon to Yau Ma Tei, central portion from Yau Ma Tei to Ma Tau Kok and east portion from Ma Tau Kok to Kowloon Bay. **Figure 1.2** illustrates the layout plan of Route 6 and CBL. More detailed description of the CKR is given in **Chapters 2 and 3**.

1.3 Designated Projects

CKR comprises the following elements which are classified as Designated Projects (DPs) as per Schedule 2, Part I of the Environmental Impact Assessment Ordinance (EIAO):

- A.1: A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing roads.
- A.7: A road or railway tunnel more than 800 m in length between portals.
- A.8: A road or railway bridge more than 100 m in length between abutments.
- A.9: A road fully enclosed by decking above and by structure on the sides for more than 100 m.
- C.2: Reclamation works (including associated dredging works) more than 1 ha in size and a boundary of which
 - (c) is less than 100 m from an existing residential area.
- G.5: A facility for the treatment of construction waste
 - (a) With a designed capacity of not less than 500 tonnes per day; and
 - (b) A boundary of which is less than 200m from an existing or planned
 - (i) Residential area;
 - (ii) Place of worship;
 - (iii) Educational institution; or
 - (iv) Health care institution.

The new road sections under CKR comprise of expressway, trunk road, primary distributor and district distributor. Some existing roads including Gascoigne Road Flyover, Hoi Wang Road, Lai Cheung Road etc will also be re-aligned or widened which constitute material change to exempted projects. Details of material changes of existing roads refer to **Section 3.4**. All these are DPs under Item A.1 of Schedule 2, Part 1 of EIAO.

The main tunnel is more than 800 m in length and hence is also a DP under Item A.7 of Schedule 2, Part 1 of EIAO.

A number of slip roads in form of viaducts (each having more than 100 m in length) have been proposed at both ends of the Project. These are DPs under Item A.8 of Schedule 2, Part 1 of EIAO.

Two landscaped decks would be constructed at the western portal and above the depressed road at east end respectively. Besides, full enclosures would be proposed at three locations in the west portion as noise mitigation measures, i.e. at the west portal, along the re-provisioned Gascoigne Road Flyover and a section of Ferry Street respectively. These are also DPs under Item A.9 of Schedule 2, Part 1 of EIAO.

As described in **Section 1.2**, there is an underwater tunnel section of about 370 m in Kowloon Bay to the north of the To Kwa Wan Typhoon Shelter. Some temporary reclamation and dredging works for temporary fairways of marine vessels would be inevitably required. In order to reduce the amount of sediment to be dredged and the extent of seabed to be disturbed, the temporary reclamation would be constructed by using pipe pile wall approach. As compared to the conventional fully dredged approach (i.e. immersed tube tunnel (IMT) as in the EIA Study Brief), this scheme could reduce the amount of sediment to be dredged significantly. According to the latest engineering design, the area of temporary reclamation would be less than 3.8 ha, therefore only occupying less than 5% of the semi-enclosed waterbody within the area to the north of To Kwan Wan Typhoon Shelter in Kowloon Bay which is not a sea channel. In addition, the temporary reclamation is less than 100 m from the residential premises such as Grand Waterfront. Therefore, the temporary reclamation would be a DP under Item C.2 of Schedule 2, Part 1 of EIAO. On the other hand, the current dredging / excavated volume of sediment for the pipe pile wall scheme and dredging works for temporary fairways of marine vessels would be about 176,640 m³ which is less than 500,000 m³. There are no Site of Special Scientific Interest (SSSI), site of cultural heritage, bathing beach, marine park or marine reserve, fish culture zone, wild animal protection area, coastal protection area and conservation area identified within 500 m of the proposed dredging area. Besides, there is no seawater intake point within 100 m from the dredging operation. The nearest water abstraction point would be the planned Kai Tak District Cooling Water System Intake, which is about 900 m from the proposed dredging area. Hence, the dredging operation proposed under this Project is not a DP under Item C.12 of Schedule 2, Part 1 of EIAO.

According to the current construction methodology, a rock crusher is expected to operate 24 hours a day at the bottom of the each ventilation shaft of the west, central and east portion, with crushing capacity up to 1000 tons per day. This operation is considered as a DP under Item G.5 of Schedule 2, Part 1 of EIAO.

Concrete batching plant, magazine site and sand depot will not be required for this Project during construction and operational phases. Therefore, the Project will not be a DP under Item K.5, K.10 and K.11 of Schedule 2, Part 1 of EIAO.

The locations of the above DPs under CKR are shown in **Figure 1.3**.

1.4 EIA Study Brief

In accordance with the requirements of Section 5(1) of the EIAO, an application (No. ESB-156/2006) for an EIA study brief was submitted to Environmental Protection Department (EPD) on 29 September 2006 with a Project Profile (No. PP-300/2006). Pursuant to Section 5(7)(a) of the EIAO, the Director of Environmental Protection issued to the Project Proponent, namely Highways Department (HyD), an EIA study brief (ref: EIA Study Brief No: ESB-156/2006 dated 9 Nov 2006) to carry out an EIA study.

The alignment layout of the Project generally remains the same but some of the elements and works of the Project have been changed through a number of studies and verifications of engineering feasibility since the time of application of EIA study brief. For example:

- landscaped decks would now be constructed at the western portal and above the depressed road at east end;
- Yau Ma Tei Police Station would be conserved;
- a combination of full enclosure and noise barriers would be implemented along a section of Ferry Street;
- the originally proposed fresh air supply ventilation building at the junction of To Kwa Wan Road and San Ma Tau Street has been deleted;
- the originally proposed tunnel ventilation building at the west of Ferry Street would be shifted further to the seafront at Yau Ma Tei Interchange, etc.

More detailed account of the alternative alignment options is given in **Chapter 2**.

1.5 Need of the Project

As described in **Section 1.1**, the need for an alternative east-west traffic route across Kowloon, particularly to cope with new developments on its western and eastern sides, has been recognized for a number of years. Traffic congestion is now common on many of the existing east-west surface routes, including the Lung Cheung Road, Boundary Street, Prince Edward Road, Argyle Street, Waterloo Road, Chatham Road North and Gascoigne Road Flyover, etc. A new trunk road is required urgently to bypass these areas which accommodated a large portion of residential premises and connect West Kowloon directly with Kowloon Bay and KTD, and thereby help relieving the traffic congestion on these roads.

According to the updated Traffic Impact Assessment in 2012, for the scenario without CKR and other parts of Route 6 in place, the traffic conditions in Central Kowloon will continue to deteriorate with an increasing number of roads operating beyond their capacities, thus affecting the connectivity of key developments in Kowloon. The study shows that the journey time between West Kowloon and Kai Tak is predicted to increase from 20 minutes at present to 30 -

35 minutes in 2021. Projected queue lengths at critical east-west road links will also increase up to about 80%, i.e. 200m or above.

The CKR would therefore provide much-needed capacity for accommodating the east-west traffic movements generated by new developments in Kowloon. With CKR, the journey time between West Kowloon and Kai Tak would take around 5 minutes from portal to portal, representing a significant reduction of almost 70 - 80% journey time compared to that of about 20 minutes at present and around 30 - 35 minutes in 2021 during peak hours. Moreover, by relieving traffic congestion, most of the queue length at the critical east-west road links would be reduced and more manageable, with queues being dischargeable more readily. The proposed CKR would also bring considerable social and economic benefits. It includes not only the benefits of more direct and quicker journeys for travellers commuting between east and west of Kowloon, but the traffic within Central Kowloon would also enjoy smoother movement and therefore reduced travel time, as traffic diverts from congested routes such as the Lung Cheung Road, Boundary Street, Prince Edward Road, Argyle Street, Waterloo Road, Chatham Road North and Gascoigne Road Flyover etc. onto the new CKR corridor.

In fact, the benefits of the reduction in journey time in the above key east-west traffic corridors could also be represented in terms of the increase in average traffic speeds. For example, in 2021, the introduction of CKR would allow the average traffic speed on some of these key east-west traffic corridors to increase by up to 15kph during the peak hour. Since some of these key east-west corridors are experiencing serious traffic congestion during peak hour already and would probably be even more severe by 2021. The introduction of CKR would allow the increase in average traffic speed of up to 70%, which represent a rather high percentage of increase. Since vehicular emission would decrease as the average traffic speed increases, the introduction of CKR would cause a decrease of emission from vehicles travelling on these key east-west corridors. This decrease in vehicular emission would definitely provide positive impacts on the large number of residential buildings along these key east-west corridors, and also provide a contribution in achieving a better air quality in the region. An estimation has been made on the generation of nitrogen oxides, respirable suspended particulates, carbon dioxide along these key east-west traffic corridors (see [http://www.ckr-hyd.hk/pdf/044-02_English\(Combined\).pdf](http://www.ckr-hyd.hk/pdf/044-02_English(Combined).pdf)).

1.6 Scenario “with” and “without” Project

As discussed above, if CKR does not proceed, traffic congestion would continue to worsen on the existing east-west surface routes. Indeed, many of the existing major road links in Kowloon are already operating close to or above capacity.

With further developments in the coming years at West Kowloon and KTD, traffic demand will increase considerably. If the situation were not remedied, the worsening traffic congestion would not only result in longer travelling time but also greater inconvenience and environmental impacts/ nuisances to the local residential populations living along these roads.

The proposed CKR, Trunk Road T2 and Tseung Kwan O – Lam Tin Tunnel will form part of Route 6, which will connect West Kowloon and Tseung Kwan O. If

CKR does not proceed, it would affect the overall implementation programme of this important strategic highway link.

Nevertheless, the implementation of CKR would inevitably introduce some temporary environmental impacts during construction phase. This would require some mitigation measures to alleviate the impacts. During the operational phase, the CKR would also change the traffic patterns for areas near to the portal and some mitigation measures would also be required.

1.7 Implementation Programme

The construction of CKR tentatively commences in 2015. The construction works would take about 5 years and the target commissioning date is around end 2020.

1.8 Concurrent Projects

The possible potential concurrent projects in the vicinity of the CKR are identified as follows. **Figure 1.4** shows the locations and alignments of these concurrent projects.

1.8.1 Kai Tak Development

According to the approved EIA Study “Kai Tak Development” (KTD) (AEIAR-130/2009), the project is located in the south-eastern part of Kowloon Peninsula, comprising the apron and runway areas of the former Kai Tak Airport and existing waterfront areas at To Kwa Wan, Ma Tau Kok, Kowloon Bay, Kwun Tong and Cha Kwo Ling. The Project also covers Kowloon Bay and Kwun Tong Typhoon Shelter and the adjacent water bodies. The project has commenced in early 2009 and is anticipated to complete beyond 2020.

The size of this project is approximately 323 ha. Under the latest Outline Zoning Plan (OZP) (No. S/K22/4) gazetted on 14 Sept 2012, a series of sub-districts are demarcated within KTD for different land uses. They include a commercial belt and Station Square planned at North Apron and North Apron East.

According to the LegCo Papers on Kai Tak Development (LC Paper No CB(1)1919/09-10(05), CB(1)396/09-10(05) and CB(1)570/08-09(03)), the KTD projects are grouped into three packages. These development packages are described in the table below and illustrated in **Appendix 1.1**.

Table 1.1: Development Packages of Kai Tak Development

Development	Package A	Package B	Package C
Development at North Apron	<ul style="list-style-type: none"> Public housing developments Primary schools and secondary school Kai Tak Government offices 	<ul style="list-style-type: none"> Sites for commercial/residential development. Underground streets Kai Tak River Station Square and Avenue Park 	<ul style="list-style-type: none"> Multiple-Purpose Stadium Complex Sites for commercial / residential development Sung Wong Toi Park
Developments at	<ul style="list-style-type: none"> Cruise Terminal (first berth); 	<ul style="list-style-type: none"> Cruise terminal building 	<ul style="list-style-type: none"> Metro park Sites for

Development	Package A	Package B	Package C
Runway	<ul style="list-style-type: none"> Runway park 	(including second berth) <ul style="list-style-type: none"> Tourism Node Heliport Bio-remediation of Kai Tak Approach Channel and the Kwun Tong Typhoon Shelter 	residential/commercial developments
Development at South Apron	-	-	<ul style="list-style-type: none"> Sites for commercial developments
Kwun Tong Public Cargo Working Area	<ul style="list-style-type: none"> Waterfront promenade 	-	-
Supporting infrastructure	<ul style="list-style-type: none"> District cooling system (first phase) 	<ul style="list-style-type: none"> District cooling system (second phase) Roadworks, pedestrian links, water supply, drainage and sewerage systems. 	<ul style="list-style-type: none"> District cooling system (final phase) Roadworks, water supply, drainage and sewerage systems.

Further liaison has been made with CEDD to collate additional status on the implementation programme of developments in Kai Tak. Additional information from Harbourfront Commission website has been also reviewed. All these information on the implementation programme of the developments in Kai Tak has been consolidated and is summarized below and in **Table 1.2**.

The approved KTD EIA Report (ref: AEIAR-130/2009) concluded that construction of electricity substations, footbridges and subway enhancements, superstructure construction and concreting works are not major dusty construction activities. It is therefore anticipated that it would not have significant contribution on the cumulative construction dust impacts on the receivers in the vicinity of CKR. However, the construction of road network, land formation and other related works will involve the use of Powered Mechanical Equipment (PME) including breakers, excavators, lorries, mobile cranes, concrete truck mixers, pokers, rollers, etc. which would have cumulative construction noise impact on the receivers affected by the CKR. Nevertheless, dust emission strengths presented in the approved EIA Study “Kai Tak Development” (KTD) (AEIAR-130/2009) will be adopted where appropriate.

The construction of some of these facilities under KTD may overlap with the construction of CKR, as described below.

Multi-Purpose Stadium Complex

According to the implementation programme in KTD, the construction of the Multi-Purpose Stadium Complex would tentatively commence in 2015, and completed by 2020. Cumulative construction phase noise and air quality impacts

are therefore anticipated. Cumulative visual impacts on sensitive receivers affected by CKR are also anticipated.

Kai Tak River

The existing Kai Tak nullah at the north apron will be transformed into a river channel as a key landscape feature of Kai Tak. The river channel will form a major green corridor in shaping the public space in the city centre. According to the implementation programme in KTD, construction of the Kai Tak River would commence by about 2013 and completed by around 2020. This project contains works elements of modification of Kai Tak Nullah; construction of 2 numbers of desilting compounds; and establishment of landscape softwork on Kai Tak Nullah. Cumulative noise, dust and visual impacts on sensitive receivers affected by CKR are anticipated.

District Cooling System

A District Cooling System (DCS) will be implemented within KTD and the construction has commenced in 2011. The DCS will constitute a seawater pumping station to be completed by 2013 and a series of pipelines to be completed in phases after 2013. The seawater pumping station would also be constructed underground and is located approximately at the middle of the western coastline of the runway and there are no existing noise sensitive receivers within 300m and no existing air sensitive receivers within 500m. It is therefore considered that the construction of the seawater pumping station would not have significant contribution on the cumulative construction noise and dust impacts on the receivers affected by CKR.

The seawater pipework would also be implemented within KTD and be connected to the pumping stations. Most of these pipework would be buried underground and would be constructed in sections. In addition, most of these work sites would be far away from most of the receivers in CKR. The construction noise and fugitive dust impacts from the construction of the pipework system would therefore have insignificant cumulative impacts.

The construction of both the pumping stations and the pipework would not require any dredging and hence there is no cumulative impact on construction water quality impacts.

Cumulative impact from district cooling system during operational phase is not expected.

Cruise Terminal

The site formation for Kai Tak Cruise Terminal is being implemented by CEDD. The scope of works comprises the construction of a sloping seawall of about 1,100m and a 35m wide and 850m long apron area for berthing of cruise vessels of different sizes and capacities, as well as the dredging of about 1.38 million cubic meters of marine sediments to allow manoeuvring and berthing of mega cruise vessels.

According to the approved EIA Report for the Dredging Works for Proposed Cruise Terminal at Kai Tak (ref: AEIAR-115/2007), there are 2 stages of dredging.

The first stage of dredging would involve a total dredging volume of about 1,022,300m³. The second stage of dredging involving a lesser amount of about 680,000m³. Further liaison has been made with CEDD and the website of Tourism Commission and Harbourfront Commission have been reviewed. According to information available, the dredging works for the cruise terminal has commenced in 2010 and is anticipated to complete in 2013 for first berth and 2015 for second berth and remaining dredging works. Maintenance dredging will be carried out regularly during the construction period. The major construction works and the E&M works will be completed in 2014.

According to the latest design for CKR, dredging is required for the temporary reclamation for the construction of underwater tunnel which is anticipated to commence in 2017 (see **Chapter 3** for more details). The second stages of dredging for the Cruise Terminal may therefore overlap with the dredging work for the temporary reclamation. Cumulative construction phase water quality impacts are therefore anticipated.

Since the Cruise Terminal is located more than 300m and 500m from the noise and air sensitive receivers respectively for CKR, cumulative noise and air quality impacts are not anticipated. However, for a conservative assessment in air quality, the emission sources during the operational phase of the cruise terminal (e.g. emission from idling cruise and helicopter etc.) would be included in the assessment.

Interception Facilities at Jordan Valley Box Culvert

There will be a sewage pumping station and a dry weather flow intercepting and desilting compound at Jordan Valley Box Culvert provided within Kai Tak Development area to improve the water quality of Kai Tak Channel. According to the latest programme, the construction of these interception facilities commenced in 2011 and will be completed by 2013. Therefore, this project would not interface with the construction of CKR.

Other Infrastructure (such as Roads)

Some of the infrastructures such as roads would also be implemented concurrently with CKR. The cumulative noise, dust and visual impacts during the construction phase would need to be addressed. Cumulative visual impacts would also be anticipated during the operational phase.

For the developments in Kai Tak, the following EIA Reports have been reviewed:

- EIA for Feasibility Study for South East Kowloon Development date 1998;
- EIA for Kai Tak Airport North Apron Decommissioning (EIAO Register No.: AEIAR-002/1998);
- EIA for Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development (EIAO Register No.: AEIAR-044/2001);
- EIA for Decommissioning of the Former Kai Tak Airport Other than the North Apron (EIAO Register No.: AEIAR-114/2007);

- EIA for Dredging Works for Proposed Cruise Terminal at Kai Tak (EIAO Register No.: AEIAR-115/2007); and
- EIA for Kai Tak Development (EIAO Register No.: AEIAR-130/2009).

As discussed in the above sections, the latest landuse for Kai Tak are given in the latest Outline Zoning Plan (OZP) (No. S/K22/4) gazetted on 14 Sept 2012 which are more relevant than the previously approved EIAs. The OZP landuses in the vicinity of CKR have therefore been adopted for noise, air quality and landscape and visual impact assessment for CKR EIA. The dredging sequence and volume in the EIA for Dredging Works for Proposed Cruise Terminal at Kai Tak (EIAO Register No.: AEIAR-115/2007) has been considered in this CKR EIA. The sediment quality in EIA for Dredging Works for Proposed Cruise Terminal at Kai Tak (EIAO Register No.: AEIAR-115/2007) and EIA for Kai Tak Development (EIAO Register No.: AEIAR-130/2009) has also been considered as part of the baseline information. In addition, the marine archaeological information presented in the EIA for Kai Tak Development (EIAO Register No.: AEIAR-130/2009) has been considered as part of the baseline information.

1.8.2 Kai Tak Development – Roads D3A & D4A

Road D3A and D4A are both dual 2-lane district distributor roads, which are 1.4km and 0.1km long respectively, running on the Runway Precinct of KTD. Road D3A is running along the centre of the Runway Precinct and is replacing the original southern section of Road D3 that runs along the waterfront of the Runway Precinct. Road D4A is an extension of Road D4 connecting to the proposed Road D3A. They will serve the Cruise Terminal, the Tourism Node and the development sites in the Runway Precinct.

The construction of these roads will commence in 2014 tentatively and will be completed by 2017, which would interface with the construction of CKR. As such, cumulative dust and noise impact during construction is anticipated. In addition, vehicular emission from the road network associated with Road D3A and D4A and their induced traffic would also impact nearby sensitive uses. These cumulative impacts would therefore need to be addressed.

A separate EIA is being conducted by CEDD. It is anticipated that their EIA would also address the cumulative impacts and hence the mitigation measures required.

1.8.3 Trunk Road T2

Trunk Road T2 is a dual two-lane trunk road of approximately 3.6 km long connecting the CKR and Tseung Kwan O-Lam Tin Tunnel (TKO-LTT), and will form a new strategic highway network in order to relieve the existing heavily trafficked road network in the central and eastern Kowloon as well as Tseung Kwan O.

According to the latest implementation programme, the construction of Trunk Road T2 and CKR will probably commence simultaneously in 2014/2015 and will be commissioned by end 2020 and there would be interface on the construction activities. As such, cumulative dust and noise impact during construction is anticipated. In addition, vehicular emission from the road network associated with

Trunk Road T2 and its induced traffic would also impact nearby sensitive uses. These cumulative impacts would therefore need to be addressed.

A separate EIA is being conducted by CEDD. It is anticipated that their EIA would also address the cumulative impacts and hence the mitigation measures required.

1.8.4 Proposed Road Improvement Works in West Kowloon Reclamation Development

Upon the completion of substantial developments in West Kowloon Reclamation Area (WKRA) including West Kowloon Terminus of the XRL, WKCD, building developments above the railway stations and new transport facilities, improvement to the existing road infrastructure in the WKRA is required to provide better infrastructural support to the above-mentioned developments. The proposed road improvement works include widening of elevated Nga Cheung Road (NCR) plus new slip road from Hoi Po Road to West Kowloon Highway (WKH) northbound, provision of new link road from elevated NCR to Western Harbour Crossing (WHC), provision of new link road from WKH southbound to NCR, interim road improvement option along Canton Road, and improvement works at the junction of Canton Road/Ferry Street/Jordon Road (EIA Study Brief No. ESB-236/2011 “Proposed Road Improvement Works in West Kowloon Reclamation Development Phase 1”).

These road improvement works are scheduled to commence in early 2014 and complete in 2015, which will interface with the construction of CKR. As such, cumulative dust and noise impact during construction is anticipated. In addition, vehicular emission from its induced traffic and road networks would generate cumulative operational air quality impact. Hence, the latest alignment of road networks within 500m study area of the CKR would therefore be included in the assessment.

A separate EIA is being conducted by HyD. It is anticipated that their EIA would also address the cumulative impacts and hence the mitigation measures required.

1.8.5 Kwun Tong Line Extension (KTE) & Associated Essential Public Infrastructure Works (EPIWs)

The KTE is an approximately 2.6km extension of the existing Kwun Tong Line from Yau Ma Tei Station to a new railway station at Whampoa and an interchange with SCL (TAW-HUH) at Ho Man Tin Station. The KTE includes the construction of the running line from Yau Ma Tei Station through to Ho Man Tin Station and Ho Man Tin Station to Whampoa Station, the proposed Ho Man Tin Station, Whampoa Station and their associated structures.

The construction works of KTE has commenced in mid-2011 and is scheduled for completion in 2015 according to the approved EIA Study “Kwun Tong Line Extension” (AEIAR-154/2010). In particular, all the major civil works would be completed by 2014 and only some minor reinstatement works would be carried out within the first quarter of 2015. On the other hand, operation of the KTE and EPIW would not cause air quality emission and hence, no cumulative operational air quality impact is anticipated. Similar to the operation of SCL (TAW-HUH), cumulative airborne and groundborne noise impact is also not anticipated.

The 3 EPIWs have also been assessed as concurrent projects (for potential cumulative impacts) in the approved KTE EIA Report. The 3 EPIWs for KTE are summarised below:

Oi Man Estate and Ho Man Tin Estate Connections

Oi Man Estate and Ho Man Tin Estate are situated to the west and north side respectively of the proposed Ho Man Tin Station (HOM), an interchange station between KTE and SCL (TAW-HUH). In order to provide better pedestrian connectivity from the station to these estates and enhance the walking environmental of the local area, a pedestrian link system comprising subways/covered walkways/covered footbridges was proposed. This pedestrian link will provide a direct, safe and barrier free connection between HOM and the neighbouring estates including Oi Man Estate and Ho Man Tin Estate. One pedestrian lift will be constructed adjacent to the proposed works area for the ventilation building in the Central Portion near Fat Kwong Street, but given the small nature of the works, it is unlikely to cause additional visual impact to the overall adjacent and planned VSRs due to other projects considered.

Public Transport Facilities

The public transport facilities including a lay-by of about 160 m in length for buses and green minibuses and 1 general pick-up/drop off facilities along Chung Hau Street at the northwest of Ho Man Tin Station. While this EPIW is outside 300m of the study area, cumulative noise impact is considered insignificant.

Chatham Road North Covered Footbridge

A new covered footbridge across Chatham Road North connecting the station entrance of HOM near Yan Fung Street Rest Garden to Wuhu Street, will be built and integrated with the existing Chatham Road Footbridge. The bridge deck of the existing Chatham Road Footbridge will be demolished while the current lift shafts and staircases will be retained remain as the vertical circulation route between the new footbridge level and street level. A new escalator landing will be constructed to the south end of the footbridge at the Wuhu Street Temporary Playground.

The new bridge is designed in 3 spans with the longest span up to 53m spanning across Chatham Road North. Provision for landscape planting will be allowed on both sides of the footbridge. Pier supports are located on the island on the side of the dual carriageway. Pre-bored H piles foundation will be adopted as the foundation of the new footbridge.

While this EPIW is outside 300m of the study area, cumulative noise impact is considered insignificant.

1.8.6 Shatin to Central Link – Tai Wai to Hung Hom Section (SCL (TAW-HUH))

SCL (TAW-HUH) is an approximately 11km long extension of the Ma On Shan Line (MOL) from Tai Wai through new stations, including Hin Keng Station (HIK), Diamond Hill Station (DIH), Kai Tak Station (KAT), To Kwa Wan Station (TKW), Ma Tau Wai Station (MTW), Ho Man Tin Station (HOM) and connects the West Rail Line at Hung Hom Station (HUH). Most of the sections would be underground except for a section at Hin Keng, and another section at Hung Hom,

where the alignments need to be raised and linked with the Ma On Shan Line and the West Rail Line respectively to form a strategic east-west rail corridor.

SCL (TAW-HUH) has commenced its construction in 2012 with completion in 2018, while the major civil construction works near the Project will be completed by 2016. It will therefore be constructed concurrently with CKR. Cumulative impact is therefore anticipated. All the construction works within 500m from the project boundary during this period, including site clearance, ground excavation, cut-and-cover tunnel section etc., presented in the EIA report for SCL (TAW-HUH) will be included in this assessment to account for the cumulative impacts. However, the cumulative construction noise impacts are obstructed by nearby building of the construction sites. Therefore, cumulative construction noise impacts are not anticipated. Moreover, all the dredging works for SCL (TAW-HUH) (i.e. the minor dredging works for Kai Tak Runway Barging Facility) would have been completed in 2012. It is therefore considered that there would be no cumulative water quality impacts from the marine works of SCL (TAW-HUH). Permanent above-ground structures, however, will pose cumulative landscape and visual impacts on some receivers during operational phase. The associated landscape and visual impacts were assessed and the mitigation measures have been proposed to reduce the impacts.

During the operational phase of the SCL (TAW-HUH), as only electrified trains would be operated, emissions that will cause air quality impact are not anticipated. No cumulative airborne and groundborne noise impact is also anticipated as the sections within 500m from the project boundary would be underground. As such, it is considered that there will be no cumulative air quality and noise impacts with the SCL (TAW-HUH) during the operational phase of CKR.

The SCL – Hung Hom To Admiralty Section and SCL Protection Works at CBTS are located at more than 500m away and hence would not have significant cumulative impacts.

1.8.7 Express Rail Link (XRL) – West Kowloon Terminus

The Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) will connect West Kowloon Terminus to the Mainland section of XRL at Hongmian Dao, southwest of Lok Ma Chau Terminus. The XRL will provide cross-boundary services between stations at Hong Kong, Futian, Longhua, Humen, Shibi, and other major Mainland cities.

The XRL will run as an underground railway in dedicated tunnels from West Kowloon Terminus (WKT) to the boundary crossing point at Huanggang, which is approximately 26km long. Major construction works in the vicinity of the CKR includes the construction of the proposed WKT and the cut-and-cover tunnel section near Jordan Road. According to the approved EIA Study “Hong Kong Section of Guangzhou - Shenzhen - Hong Kong Express Rail Link” (AEIAR-143/2009), all the construction works in West Kowloon area is scheduled to be completed by end of 2014. According to the latest VEP-377/2012 approved by EPD on 26 Oct 2012, the location of concrete batching plant for XRL will be revised. As stated in this VEP, the associated construction programme of (Works Area V, Zone 1 to Zone 3) will be six-month beyond the construction programme stated in the XRL EIA, i.e. June 2015. Cumulative construction airborne noise impact would need to be assessed. However, given the separation distance between the nearest NSR (W-P12 –

The Coronation) and (Works Area V, Zone 1 to Zone 3) is greater than 300m, the cumulative construction airborne noise impact is considered insignificant. Since the trains of XRL will be electrically operated, no cumulative operational air quality impact is anticipated. Cumulative airborne and groundborne noise impact is also not anticipated.

1.8.8 Road Works at West Kowloon

Upon the opening of West Kowloon Terminus of the XRL and the future development of the West Kowloon Cultural District (WKCD), additional traffic capacity and network restructuring within the West Kowloon Reclamation Area (WKRA) is required to accommodate the increasing traffic demand. The proposed roads include Road D1A, Road D1, Lin Cheung Road-Austin Road West Underpass and upgrading of Austin Road West.

These road works are currently being under construction and is expected to be completed by 2014, which will not interface with the construction of CKR. However, the vehicular emission from its induced traffic and road networks would generate cumulative operational air quality impact. Hence, the road networks as illustrated in the approved EIA Study “Road Works at West Kowloon” (AEIAR-141/2009) within 500m study area of the CKR would therefore be included in the assessment.

1.8.9 Upgrading of Central and East Kowloon Sewerage

This project aims to upgrade the existing sewerage facilities as well as provision of new sewerage facilities to collect and convey sewage within Central and East Kowloon to cater for the planned and forecast developments and population changes in these areas. The works comprises upgrading and construction of about 21 km long sewers and associated sewerage works as well as reviewing and/or upgrading of 17 existing Dry Weather Flow Interceptors (DWFIs) and associated improvement works in Central and East Kowloon. Phase 1 will be completed by 2012 while Phase 2 and the remaining works of this project is to be implemented from 2011 through 2019. According to the information provided by DSD/CM, interface with CKR is considered minimal. Moreover, in view of the small scale of works of this project, cumulative environmental impact is not expected.

1.8.10 Replacement and Rehabilitation of Watermains

The works of this project comprises the replacement and rehabilitation of aged fresh and salt water mains in areas including West Kowloon, Yau Tsim Mong, Kowloon City, Kwun Tong District in order to improve the water supply networks. The construction of Stage 4 of the project commenced in early 2011 for completion in 2015. In view of the small scale of works of this project, cumulative environmental impact is not expected.

1.8.11 Widening of Gascoigne Road Flyover

The existing Gascoigne Road Flyover (GRF) is about 1.2 km long. It operates mainly as a two-way road with one traffic lane in each direction. It is proposed to widen the GRF to a dual 2-lane carriageway to increase its capacity.

It is advised that the need and its implementation programme of the Widening of GRF is to be revisited after the commissioning of CKR. However, the respective project proponent considers that it is target to have the Widening of GRF beyond 2021. Therefore, the Widening of GRF is no longer considered as concurrent project. Nonetheless, the vehicular emission from its induced traffic would be taken account of in the operational air quality impact assessment.

As part of this Project, a section of GRF to be affected by CKR would be reprovisioned. The assessment would therefore need to address the potential construction noise and dust impacts due to the construction works of the reprovisioned section of GRF.

1.8.12 Submarine Gas Pipelines

An EIA Study has been conducted for the “Installation of Submarine Gas Pipelines and Associated Facilities from Ma Tau Kok to North Point for Former Kai Tak Airport Development” (ref: AEIAR-153/2010).

It would include twin submarine gas pipelines across the harbour, 2 land gas pipelines at To Kwa Wan and North Point, and 2 gas stations for pigging operation. According to the latest information provided by Hong Kong and China Gas Company Limited, the construction programme have commenced in the 4th quarter of 2011 for completion by the end of 2013. It would not overlap with dredging required for the proposed CKR underwater tunnel section and cumulative construction impact is not expected.

Cumulative operational impacts from submarine gas pipelines are also not expected.

1.8.13 Tseung Kwan O – Lam Tin Tunnel

With reference to the Project Profile (PP-361/2008) and the EIA Study Brief (ESB-195/2008) on TKO-LTT, the project is to construct a dual two-lane highway connecting TKO at Po Yap Road in the east with Trunk Road T2 in Kai Tak Development in the west. According to latest available information, the project involves a 4.2km long highway with about 2.6km of the highway is in the form of tunnel. The TKO-LTT will connect CBL to form a new external road link to meet the anticipated traffic flow in connection with further population intake and development in TKO New Town.

According to the latest implementation programme, the tentative commencement and commissioning dates for the construction works of TKO-LTT is early 2016 and end 2020 respectively. Nonetheless, this project is located outside 500 m from the Project boundary. Only the vehicular emission from its induced traffic would be taken account of in the operational air quality impact assessment.

A separate EIA is being conducted by CEDD. It is anticipated that their EIA would also address the cumulative impacts and hence the mitigation measures required.

1.8.14 Cross Bay Link

With reference to the Project Profile (PP-362/2008) and the EIA Study Brief (ESB-196/2008) on CBL, the project is to construct an approximately 1.8 km long dual two-lane road mainly on viaduct with a footpath and a cycle track across the Junk Bay mainly on viaduct. The CBL will connect the TKO-LTT to Wan Po Road near Area 86 of Tseung Kwan O (TKO) so that traffic to and from the southeastern areas of TKO will be able to by-pass the TKO town centre and avoid overloading the roads in TKO town centre.

According to the latest implementation programme, the tentative commencement and commissioning dates for the construction of the CBL is end 2016 and end 2020 respectively. Nonetheless, this project is located outside 500 m from the Project boundary. Only the vehicular emission from its induced traffic would be taken account of in the operational air quality impact assessment.

A separate EIA is being conducted by CEDD. It is anticipated that their EIA would also address the cumulative impacts and hence the mitigation measures required.

1.8.15 West Kowloon Cultural District

With reference to the Project Profile (PP-453/2011) and the EIA Study Brief (ESB-237/2011), the West Kowloon Cultural District (WKCD) is an important strategic project that will support Hong Kong's development as a creative economy and global metropolis, and is a major initiative to meet the long-term infrastructure needs of Hong Kong's arts and cultural development. The WKCD site is located on the West Kowloon Reclamation, comprising approximately 40 ha of previously undeveloped land bordering the Jordan/Tsim Sha Tsui area.

Construction of critical elements of the WKCD may begin as early as 2013 so as to commission the Phase 1 arts and cultural facilities in stages starting from 2014/2015. The proposed implementation plan for WKCD is divided into three phases, i.e. 2014-2017 for Phase 1, 2017-2020 for Phase 2 and beyond 2020 for Phase 3. Nonetheless, this project is located outside 500 m from the Project boundary. Only the vehicular emission from its induced traffic would be taken account of in the operational air quality impact assessment.

A separate EIA is being conducted by the respective project proponent. It is anticipated that their EIA would also address the cumulative impacts and hence the mitigation measures required.

1.8.16 Summary of Concurrent Projects

Table 1.2 summarises the major concurrent projects in the vicinity of the Project and the potential cumulative impacts during the construction and operation of the proposed CKR. **Figure 1.4** illustrates the locations of each concurrent project. As most of the projects are undergoing design development/detailed design and their implementation programmes and design layouts are subject to changes, details of the concurrent projects will be continually reviewed and discussed with the respective project proponents during the course of EIA study.

Table 1.2 Summary of Potential Concurrent Projects

No.	Concurrent Projects	Project Proponent	Programme [2]		Potential Cumulative Environmental Impacts	
			Start	Complete	Construction Phase	Operational Phase
1	Kai Tak Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design and Construction	CEDD		Beyond 2020		
	Kai Tak Development – Infrastructure at Former Runway and Remaining Areas of North Apron and Improvement of adjacent Waterways – Design and Construction					
	<ul style="list-style-type: none"> Site Formation for Kai Tak Cruise Terminal Development 		11/2009	2014	<ul style="list-style-type: none"> Hydrodynamic and Water Quality 	<ul style="list-style-type: none"> Nil
	<ul style="list-style-type: none"> Kai Tak Development - Advance infrastructure works for developments at the southern part of the former runway (Including Roads D4, D3A, D4A and part of Roads D3) 		2014	2017	<ul style="list-style-type: none"> Fugitive dust Airborne noise Landscape & visual 	<ul style="list-style-type: none"> Traffic noise and vehicular emission caused by induced traffic
	<ul style="list-style-type: none"> Kai Tak Development - Remaining Infrastructure Works for Developments at the Former Runway (Including part of Roads D3) 		2015	2020	<ul style="list-style-type: none"> Fugitive dust Airborne noise Landscape & visual 	<ul style="list-style-type: none"> Traffic noise and vehicular emission caused by induced traffic

			Programme [2]		Potential Cumulative Environmental Impacts	
No.	Concurrent Projects	Project Proponent	Start	Complete	Construction Phase	Operational Phase
	<ul style="list-style-type: none"> Kai Tak Development Infrastructure at north apron area of Kai Tak Airport (Including part of Roads D3) 		2011	2018	<ul style="list-style-type: none"> Fugitive dust Airborne noise Landscape & visual 	<ul style="list-style-type: none"> Traffic noise and vehicular emission caused by induced traffic
	<ul style="list-style-type: none"> Kai Tak Nullah modification works 		Early 2013	Mid 2018	<ul style="list-style-type: none"> Fugitive dust Airborne noise Landscape & visual 	<ul style="list-style-type: none"> Nil
	<ul style="list-style-type: none"> Road D2 and associated works 		Mid 2013	End 2017	<ul style="list-style-type: none"> Fugitive dust Airborne noise Landscape & visual 	<ul style="list-style-type: none"> Traffic noise and vehicular emission caused by induced traffic
	<ul style="list-style-type: none"> Kai Tak Development - Kai Tak Approach Channel and Kwun Tong Typhoon Shelter Improvement Works (Phase 1) 		Mid 2011	Sept 2014	<ul style="list-style-type: none"> Hydrodynamic and Water Quality 	<ul style="list-style-type: none"> Nil
	<ul style="list-style-type: none"> 600-metre opening at former airport runway 		Land-based construction: 2015 Opening and dredging: 2018 (To be reviewed by Development Bureau in end 2013)	Land-based construction: 2018 Opening and dredging: 2018 (To be reviewed by Development Bureau in end 2013)	<ul style="list-style-type: none"> Hydrodynamic and Water Quality 	<ul style="list-style-type: none"> Nil

No.	Concurrent Projects	Project Proponent	Programme [2]		Potential Cumulative Environmental Impacts	
			Start	Complete	Construction Phase	Operational Phase
2	Multi-Purpose Stadium Complex at Kai Tak	Arch SD	2015	2020	<ul style="list-style-type: none"> Fugitive dust Airborne noise 	<ul style="list-style-type: none"> Landscape & visual
3	Design-Build-Operate a District Cooling System (Phase II Works) at Kai Tak Development	EMSD	2011	Post 2013	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Nil
4	Provision of Interception Facilities at Jordan Valley Box Culvert	DSD	2011	2013	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Nil
5	Kai Tak Development – Trunk Road T2 and Infrastructure at South Apron – Investigation, Design and Construction	CEDD	2014/2015	End 2020	<ul style="list-style-type: none"> Fugitive dust Airborne noise 	<ul style="list-style-type: none"> Traffic noise and vehicular emission caused by induced traffic
6	Proposed Road Improvement in West Kowloon Reclamation Development - Feasibility	HyD	Early 2014	2015	<ul style="list-style-type: none"> Fugitive dust Airborne noise 	<ul style="list-style-type: none"> Traffic noise and vehicular emission caused by induced traffic
7	Kwun Tong Line Extension (Construction of Ho Man Tin Station & EPIW)	MTR	2011	2015	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Nil
8	Shatin to Central Link (Tai Wai to Hung Hom)	MTR	Mid 2012	2018	<ul style="list-style-type: none"> Fugitive dust Landscape & visual 	<ul style="list-style-type: none"> Landscape & visual

No.	Concurrent Projects	Project Proponent	Programme [2]		Potential Cumulative Environmental Impacts	
			Start	Complete	Construction Phase	Operational Phase
9	Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (Construction of West Kowloon Terminus)	MTR	01/2010	2015	• Nil	• Nil
10	Road Works at West Kowloon	MTR	2011	2014	• Nil	• Traffic noise and vehicular emission caused by induced traffic
11	Upgrading of Central and East Kowloon sewerage - phase 2	DSD	Mid 2011	End 2015	• Nil	• Nil
12	Upgrading of Central and East Kowloon sewerage	DSD	Mid 2013	End 2019	• Nil	• Nil
13	Replacement and Rehabilitation of Watermains, Stage 4 Phase 1	WSD	03/2011	12/2015	• Nil	• Nil
14	Replacement and Rehabilitation of Watermains Stage 4 - remaining works	WSD	03/2012	12/2015	• Nil	• Nil
15	Widening of Gascoigne Road Flyover	HyD	under review	under review	• Nil	• Traffic noise and vehicular emission caused by induced traffic

No.	Concurrent Projects	Project Proponent	Programme [2]		Potential Cumulative Environmental Impacts	
			Start	Complete	Construction Phase	Operational Phase
16	Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development	Hong Kong & China Gas Company Ltd	Q4 2011	End 2013	• Nil	• Nil
17	Tseung Kwan O – Lam Tin Tunnel ^[1]	CEDD	Early 2016	End 2020	• Nil	• Traffic noise and vehicular emission caused by induced traffic
18	Cross Bay Link ^[1]	CEDD	End 2016	End 2020	• Nil	• Traffic noise and vehicular emission caused by induced traffic
19	West Kowloon Cultural District ^[1]	WKCD	2013	Beyond 2020	• Nil	• Traffic noise and vehicular emission caused by induced traffic

Note: [1] These concurrent projects are located outside 500m from the Project boundary. Only induced traffic are included.

[2] All the completion years and commissioning years of the interface projects are tentative only for the purpose of EIA, and may be subject to further development by the respective project proponents.

1.9 Structure of this EIA Report

The structure of this EIA report is outlined below for ease of reference.

<u>Chapter</u>	<u>Title</u>	<u>Aims</u>
1	Introduction	Introduces the background information and the layout of the EIA Report.
2	Alternative Alignment Options	Summarises the various options considered and the main reasons for adopting the scheme recommended.
3	Project Description and Construction Methodology	Describes the project requirements covering the study area and site location, project nature and scope and the implementation programme, and describes relevant main construction/engineering aspects for the recommended scheme.
4	Air Quality Impact	Presents the legislation, methodology, assessment and recommendations for air quality impacts.
5	Noise Impact	Presents the legislation, methodology, assessment and recommendations for noise impacts.
6	Water Quality Impact	Presents the legislation, methodology, assessment and recommendations for water quality impacts.
7	Waste Management Implications	Presents the legislation, methodology, assessment and recommendations for waste management.
8	Land Contamination Impact	Presents the legislation, methodology, assessment and recommendations for land contamination evaluation.
9	Hazard Assessment	Presents the legislation, methodology, assessment and recommendations for hazardous impacts.
10	Landscape and Visual Impact	Presents the legislation, methodology, assessment and recommendations for landscape and visual impacts.

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| 11 | Impact on Cultural Heritage(Terrestrial &Marine Archaeology) | Presents the legislation, methodology, assessment and recommendations for cultural heritage impacts (terrestrial & marine archaeology). |
| 12 | Impact on Cultural Heritage(Built Heritage) | Presents the legislation, methodology, assessment and recommendations for cultural heritage impacts (built heritage). |
| 13 | EM&A Requirements | Presents the EM&A requirements. |
| 14 | Summary of Environmental Outcomes | Presents the Key Environmental Outcomes. |
| 15 | Conclusion | Summarises the findings. |