

**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP499)S.5(1)(A)**  
**PROJECT PROFILE FOR SHATIN TO CENTRAL LINK**

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## **1 BASIC INFORMATION**

### **1.1 PROJECT TITLE**

Shatin to Central Link (SCL)

### **1.2 PURPOSE AND NATURE OF THE PROJECT**

The Shatin to Central Link (SCL) will be a through-running line between Tai Wai and the Central Business District of Hong Kong Island. This new strategic railway corridor will increase significantly the cross-harbour and Shatin to Kowloon rail capacities and help redistribute the flows and relieve the other railway lines in Hong Kong and Metro Kowloon.

### **1.3 NAME OF THE PROJECT PROPONENT**

Kowloon-Canton Railway Corporation (KCRC)

### **1.4 LOCATION AND SCALE OF PROJECT AND HISTORY OF THE SITE**

The proposed SCL is an 18 km railway extension of the Ma On Shan Railway commencing at the existing KCRC Tai Wai Station, terminating in the Central Business District of Hong Kong Island at a station entitled Central West. The SCL basically comprises the following: -

- a) an integrated station with the existing Tai Wai station (TAW), together with a running line through to the Diamond Hill station (DIH) via Tsz Wan Shan station (TWS);
- b) a running line from Diamond Hill to Hung Hom, with underground stations at Kai Tak (KTA) within the South East Kowloon Development site, To Kwa Wan (TKW), Ma Tau Wai (MTW), Ho Man Tin (HMT) and Mass Transportation Centre at Hung Hom (HUH);
- c) an at-grade maintenance centre in the former Kai Tak Airport Passenger Terminal site for stabling and casual maintenance of the SCL rolling stock; and
- d) a running line from HUH, crossing Victoria Harbour with new underground stations at Exhibition (EXH), Admiralty (ADM) and Central West (CEW).

In addition, there is a people mover system (PMS) of about 1.7km to connect the Hung Hom and Whampoa areas. The locations of the alignment are shown on Drawing Nos. SCL002/CD/00101 to SCL002/CD/00103.

### **Running Line from Tai Wai to Diamond Hill**

The first 300 metres, adjacent to the Tai Wai Maintenance Centre, will be on a retained embankment. The railway then moves onto a 400 metre long viaduct, followed by a 100 metre length of cutting leading to the Hin Keng tunnel portal.

The 4.3km tunnel between the Hin Keng Portal and Diamond Hill station, includes a bored tunnel station at Tsz Wan Shan. This section of tunnel, which is located underneath the Lion Rock Country Park, will be constructed using drill and blast techniques. The length of tunnel between Tsz Wan Shan and Diamond Hill will be driven in mixed ground. Depending on the exact ground condition, some lengths of the tunnel will require stabilization using pretreatment.

### **Tsz Wan Shan (TWS)**

Tsz Wan Shan station will be located below Wan Wah Street. The station will be constructed by a combination of drill and blast techniques and mechanised mining in conjunction with ground treatment.

### **Diamond Hill Station (DIH)**

The Diamond Hill station is a 3-level structure, which will be located directly adjacent to the existing MTR Diamond Hill station, partially below Lung Cheung Road and the former Tai Hom Village. The concourse will be at the same level as the MTR station with direct connections. There will be shared entrances plus some new entrances. The station will be constructed by cut and cover methods.

### **Running Line from Diamond Hill to Kai Tak (1.1 Km)**

The route falls within the former Tai Hom Village site at Diamond Hill and the former airport site at Kai Tak, which is due for redevelopment under the South East Kowloon Development. The tunnel section between Kai Tak and Diamond Hill will likely be constructed by cut and cover techniques.

### **Kai Tak Station (KTA)**

Kai Tak station will be located on the former airport site and centrally beneath the new Road D2 proposed as part of the South East Kowloon Development. The station will be founded on diaphragm walls, which will also act as a temporary support to the cut and cover excavation.

### **The Approaches to Kai Tak Maintenance Centre**

The approach tunnels from the spur of the main running line to the Kai Tak Maintenance Centre will be in a stacked configuration. The tracks will be enclosed in a concrete box from the tunnel end to the point where the tracks enter the Maintenance Centre stabling area. The approach tunnels will be built using cut and cover techniques.

### **Kai Tak Maintenance Centre**

The Kai Tak Maintenance Centre will be designed as an adjunct to the maintenance centre under construction at Tai Wai, which will become the main maintenance centre for the combined Ma On Shan Railway/Shatin to Central Link. Generally, the Kai Tak Maintenance Centre is intended to be used for overnight stabling, although tracks will be provided for casual maintenance to avoid the need to interrupt planned maintenance schedules at Tai Wai.

Overall, the stabling area will be about 400 metres long and will provide stabling for twelve 8-car trains at Day One operation, increasing to eighteen 8-car trains by 2016. The tracks within the maintenance centre will be at ground level. Workshops, offices, plant-rooms and rest areas will be housed in a building in the south-west quadrant of the maintenance centre.

### **Running Line between Kai Tak and Hung Hom (3.5 Km)**

The tunnels will be bored from Hung Hom station to Kai Tak station by using earth-pressure-balanced tunnel-boring machines. The launching chambers will be located within KCRC's Hung Hom station area. They will be constructed of diaphragm walls using a top-down sequence to facilitate the underpinning of the Cheong Wan Road that accesses the KCRC podium. These launching chambers will form the start of a continuous tunnel-boring sequence that will extend to Kai Tak using tunnel-boring machine(s).

The route will pass through Cheong Wan Road, Chatham Road North and To Kwa Wan Road. On completion, the tunnel-boring machines will be extracted through the Kai Tak station box, thereby avoiding the need to excavate separate extraction chambers.

Tunnel spoil for the major section from Hung Hom to Kai Tak will be extracted from the south end of the tunnel, on KCRC land at Hung Hom, with a waterfront barging point for removal by sea.

### **To Kwa Wan Station (TKW)**

To Kwa Wan station will be underground with its platforms in a stacked configuration. It will be located beneath To Kwa Wan Road, adjacent to the Newport Centre and the Electrical and Mechanical Services Department buildings. The north end of the station falls within the former airport site, which is to be redeveloped as part of the South East Kowloon Development.

The station will be constructed by cut and cover methods. Diaphragm walls will form part of the station box.

### **Ma Tau Wai Station (MTW)**

Ma Tau Wai station will be located within an area of established developments. Situated under To Kwa Wan Road, the station will be flanked to the west by the Honour Building and to the east, by the Yik Yin and Chiap Thong Buildings, a petrol station, To Kwa Wan Mansion and the Tung Hing Building. The station box will be formed by diaphragm walls.

### **Ho Man Tin Station (HMT)**

Ho Man Tin station will be adjacent to the redevelopments at Valley Road Estate. It will be centred about Fat Kwong Street and located partly below the estate and partly below an existing slope adjacent to Shun Yung Street.

The platform and concourse will be contained within a cavern connected by adits to entrances. Following the driving of the two running tunnels through the station area, a shaft will be sunk at the north end. Mining of the cavern will then take place from the shaft using drill and blast methods.

### **Hung Hom Mass Transportation Centre (MTC)**

The key features of the Hung Hom Mass Transportation Centre:

- ? East Rail and West Rail tracks will be re-aligned to new at-grade platforms located within the KCRC freight-yard area;
- ? The Shatin to Central Link tracks will be laid directly beneath the re-aligned East Rail/West Rail platforms;
- ? Convenient cross-platform interchange between East Rail and West Rail; and
- ? Convenient links to the public transport interchange and other forms of transport.

Actual construction work at Hung Hom will largely be undertaken under the existing podium which will shield nearby sensitive receivers from dust and noise impacts.

### **Link between Hung Hom to Whampoa**

For the Whampoa area, an underground people-mover system (PMS) shuttle train will be built to link the area with Hung Hom Station and the SCL. The PMS is a driverless people mover system with a route length of about 1.7km, which is predominantly in tunnel. The proposed alignment of the PMS runs south of Hung Hom station and through KCRC's freight yard before passing beneath the piers of Hung Hom Bypass. It then follows the route of Hung Hom Bypass and Hung Hom Road heading northeast to the two stations at the junction of Tak Man Street and Hung Hom Road, Whampoa station (WHA) and at the junction of Man Yue Street and Hung Hom Road, Whampoa North station (WHN). The people mover tunnel will be constructed by cut and cover / bored method.

### **Running Line between Hung Hom and Exhibition Station**

The section from Hung Hom to Exhibition forms the Fourth Rail Harbour Crossing. The section comprises three parts, each having a different method of construction.

The first part, from Hung Hom Mass Transportation Centre to a new ventilation building adjacent to the existing seawall, will be constructed using cut and cover methods. Two separate, single-track tunnels will be constructed to take the railway line beneath the Hong Kong Coliseum. A stub tunnel to this building will form the reception chamber for the main part of the harbour crossing immersed tube tunnel.

About 1.7 km of immersed tube tunnel running from the Hung Hom reception chamber to the southern ventilation building in Causeway Bay Typhoon Shelter forms the second part of the FHC. The immersed tube tunnel will land on Hong Kong Island in the existing Causeway Bay Typhoon Shelter area at the edge of the planned new reclamation for Wan Chai Development Phase II and join the southern ventilation building.

The third part consists of the tunnels linking the ventilation building with Exhibition station; the tunnels will be constructed using tunnel-boring machines.

Tunnel cooling and ventilation will be provided through the ventilation buildings at either end of the harbour crossing and fan niches and ventilation shafts at Exhibition Station.

### **Exhibition Station (EXH)**

Exhibition station will be a three-level underground station located directly beneath Harbour Road. The station will include a concourse and plant room structure under Harbour Road Garden. The excavation and construction works will be phased to allow the tunnel-boring machines to pass through the station as the running tunnels are constructed. Convenient routes to nearby facilities and the adjacent MRT North Island Line Station will be built.

### **Running Line between Exhibition and Admiralty**

The 700 metre long section of running line between Exhibition and Admiralty stations is likely to be constructed using tunnel-boring machines. The tunnels will leave Exhibition Station and maintain their stacked alignment under Harbour Road. This section will terminate in a cut and cover chamber which is located in a works area next to Hong Kong Red Cross Society Service Centre.

### **Admiralty Station (ADM)**

Admiralty station lies across the eastern end of the MTR Admiralty Station under the Harcourt Garden. The station will be constructed by either cut and cover method or bored tunnel method.

**Running Line between Admiralty and Central West**

This section of the railway will comprise a 1200 metre long single, large-diameter tunnel carrying both tracks and will be constructed using drill and blast methods. The chosen alignment avoids all of the prestigious buildings in the area. This section of the tunnel terminates at Central West Station in the vicinity of the existing Central Government Offices.

**Central West Station (CEW)**

Central West station lies underneath the Hong Kong Central Hospital and slightly to the north of Government House. The station will likely be constructed by drill and blast method.

**1.5 NUMBER AND TYPES OF DESIGNATED PROJECTS**

The proposed project is a single project comprising a railway and its associated stations as defined under Schedule 2, Part I, Category A.2 of the Environmental Impact Assessment Ordinance.

**1.6 NAME AND TELEPHONE NUMBER OF CONTACT PERSONS**

The contact person is Mr. Vic McNally, Environmental Manager, Kowloon-Canton Railway Corporation, at telephone no. 2684 8382.

## **2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **2.1 PROJECT PLANNING AND IMPLEMENTATION**

The whole project will be planned and implemented by KCRC in-house departments together with external consultants and contractors. Contractors will undertake construction, under the construction management control of KCRC.

### **2.2 PROJECT PROGRAMME**

The design contracts will be awarded in late 2002. Works contracts are scheduled to be awarded after Exco Approval is obtained, which is envisaged in the 2<sup>nd</sup> or 3<sup>rd</sup> quarter of 2004. The completion of SCL is projected in late 2008.

### **2.3 PROJECT INTERFACE**

Apart from the section between Tai Wai and Hin Keng, for which at-grade tracks and a viaduct will be adopted, the remaining SCL portions will be constructed in tunnels and underground stations. No insurmountable impacts on any existing or planned projects have been identified. Potential projects interfacing with SCL are listed as below, under respective stations and running lines:

<b>Stations/ Running Lines</b>	<b>Potential Interface Project</b>
Tai Wai to Hin Keng	? Route 9 ? Development above TAW Maintenance Centre
Diamond Hill Station	? HKHA Development at former Tai Hom Village
Diamond Hill to Kai Tak	? South East Kowloon Development
Kai Tak to To Kwan Wan	? South East Kowloon Development, including the proposed stadium
To Kwa Wan to Ma Tau Wai	? Planned Central Kowloon Route
Ho Man Tin Station	? Redevelopment of Valley Road Estate
Hung Hom Station	? Kowloon Southern Link ? Relocation of International Mail Centre ? Fifth Harbour Crossing
Fourth Harbour Rail Crossing to Exhibition	? Wanchai Reclamation II ? MTRC North Island Line ? North South Link ? Fifth Harbour Rail Crossing
Exhibition Station	? MTRC North Island Line ? Underground extension of Hong Kong Convention and Exhibition Centre ? Central Wanchai Bypass
Exhibition to Admiralty	? MTRC North Island Line ? Central Wanchai Bypass

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<b>Stations/ Running Lines</b>	<b>Potential Interface Project</b>
Admiralty	? MTRC North Island Line ? Central Reclamation III ? Justice Drive Extension ? Central Market Redevelopment

### **3 POSSIBLE IMPACTS ON THE ENVIRONMENT**

#### **3.1 OUTLINE OF PROCESSES INVOLVED**

A summary of processes involved is provided below:

##### **3.1.1 Worksites**

Worksites will be proposed at a location adjacent to each station. Activities taking place at those locations include storage of equipment and materials.

##### **3.1.2 Cut and Cover Construction**

Cut and cover construction techniques will likely be used for the construction of the running line Diamond Hill to Kai Tak, all Kowloon stations (except HMT & TWS), ADM station, EXH station, TBM launching and reception shafts (on Hong Kong and at Hung Hom) and possibly the PMS between Hung Hom and Whampoa as well. Either “bottom-up” or “top-down” sequences could be used for cut and cover construction methods. The cut and cover method relies on forming a cofferdam (by the installation of pipe pile walls, diaphragm walls, sheetpile wall, or contiguous bored pile walls) and excavating within the cofferdam. The cofferdam is suitably anchored or propped laterally to allow safe excavation and construction works to be carried out within its boundaries.

##### **3.1.3 TBM Construction**

TBMs will likely be used for the construction of the tunnels between Hung Hom and Kai Tak, and between the immersed tube landing point in Causeway Bay and Admiralty Station. A closed-face slurry-type boring machine will be used for the construction of the alignment, with the use of conventional drill and blast or other techniques to enlarge the TBM tunnels to form cavern stations, platform tunnels, adits and access/egress points.

##### **3.1.4 Drill and Blast /Cavern Construction**

Drill and blast methods will be adopted in construction of the section from Hin Keng to Tsz Wan Shan and also from Admiralty to CEW.

CEW, HMT and TWS will be constructed using drill and blast methods, enlarging the previously formed tunnels. The rock caverns are self-supporting structures involving the use of rock bolts or anchors to strengthen the rock where jointing or fissuring is evident at the rock surface. A permanent lining will also be provided which will improve the durability of the caverns from water ingress and falling rock debris.

### **3.1.5 Immersed Tube Tunnel (IMT)**

The immersed tube tunnel alignment runs between Hung Hom and the South Ventilation Building located within the existing Central Wanchai Bypass typhoon shelter. IMT construction methodology will mirror the method used for the cross-harbour vehicular and MTR tunnels: a reinforced concrete box type structure, cast in short sections in a dry-dock casting yard and stressed into longer units (about 100-120m) will be floated in and set in a dredged trench in the harbour bed on a uniformly graded gravel mattress. The trench will be back filled and the units covered over with an approximately 2m thick graded rock layer. The trench excavation will be carried out using traditional dredging techniques and the excavated material will be disposed at appointed marine disposal areas.

## **3.2 POTENTIAL ENVIRONMENTAL IMPACTS: CONSTRUCTION PHASE**

### **3.2.1 Air Quality**

Dust may be generated from excavation, cutting, filling, stockpiling and construction vehicle movements associated with the construction of the SCL. Potential air quality impacts may arise from the operation of construction plant and vehicles and the emission of radon gas from soils and rocks, particularly granite.

### **3.2.2 Noise**

Airborne and ground-borne noise is likely to be generated during the construction of the SCL. Airborne noise will be generated from cut and cover activities, excavation, backfilling, road reinstatement and construction of above ground structures. Ground-borne noise may be generated from TBM operation and drill and blast activities.

### **3.2.3 Water Quality**

Water quality impacts may arise due to the following potential sources during construction of the SCL:

- ? Run off due to erosion of exposed surfaces, uncontrolled run off from plant maintenance, materials handling and other works areas;
- ? Wash out from concrete batching plants;
- ? Construction work force sewage;
- ? Construction of the Fourth Harbour Rail Crossing; and
- ? Marine disposal of potentially contaminated dredged/excavated sediment.

### **3.2.4 Waste Management**

Construction activities will result in the generation of a variety of wastes that may include:

- ? Excavated materials;
- ? Construction and demolition (C&D) materials;
- ? Site clearance waste;
- ? Chemical waste of residual oil and lubricating fluids from construction plants and machinery;
- ? General refuse from worksites; and
- ? Dredge/excavation of the submarine trench for the IMT.

It is envisaged that a total of 5Mm<sup>3</sup> of spoil will need to be disposed of from the project. Inert excavated materials and construction and demolition materials will be properly segregated and will either be used on site, or disposed of at a public filling area in accordance with the approved Waste Management Plan and as agreed with Civil Engineering Department (CED).

### **3.2.5 Hazard**

Various external hazards have the potential to impact upon the SCL railway including Shatin Water Treatment Works chlorine storage facilities, LPG storage facilities, the transport by road of dangerous goods, and the presence of a Towngas pipeline.

### **3.2.6 Ecology**

Generally the ecological impacts associated with this project will be minimal given that the majority of the alignment is in the urban area and will be built underground.

Small scale ecological impacts may arise in the following areas:

- ? Hin Keng tunnel portal;
- ? Diamond Hill Station and associated works areas;
- ? Ho Man Tin Station; and
- ? Works area at Fung Tak Park.

There will be a loss of small areas of plantation woodland and secondary woodland. Habitat loss will be small in size and these habitats are not considered to be of special conservation importance.

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**3.2.7 Historical and Cultural Impacts**

A number of heritage sites are identified within or in close proximity to the proposed alignment. They are presented in the following:

Location	Description
Running line between Tai Wai & Hin Keng Portal	<ul style="list-style-type: none"> <li>? The historical village of Tin Sam is located approximately 80 metres from the alignment.</li> <li>? The historical village of Ha Keng Hau lies approximately 100 metres from the site and 150 metres from the alignment.</li> <li>? The historical village of Hin Tin lies approximately 90 metres from the alignment.</li> </ul>
Running line between Hin Keng Portal & Tsz Wan Shan (TWS)	<ul style="list-style-type: none"> <li>? Tsz Wan Kok Temple lies approximately 300m from the alignment.</li> <li>? Tsz Wan Shan Kwun Yum Temple.</li> </ul>
Running line between Tsz Wan Shan (TWS) & Diamond Hill (DIH)	<ul style="list-style-type: none"> <li>? The Chi Lin Nunnery lies within 30 metres of alignment.</li> </ul>
Diamond Hill Station	<ul style="list-style-type: none"> <li>? Portions of the historical village of Tai Hom Tsuen lie within the boundaries of the station.</li> <li>? The Chi Lin Nunnery lies within 30 metres of the station at a higher elevation.</li> <li>? Stone house at 4 Tai Koon Yuen.</li> <li>? Former hanger at Tai Hom Tsuen.</li> <li>? Underground military structure at Tai Hom Village.</li> </ul>
Running line between Ho Man Tin (HMT) & Hung Hom Mass Transportation Centre	<ul style="list-style-type: none"> <li>? The Kwun Yum Temple lies approximately 300m from the alignment. The intervening area consists of a heavily built-up urban environment.</li> </ul>
Running Line between Hung Hom and Exhibition	<ul style="list-style-type: none"> <li>? The Noonday Gun is situated at the coast near the Causeway Bay Typhoon Shelter.</li> <li>? Wanchai Police Station lies approximately 150 metres from the Exhibition Station.</li> </ul>
Running line between Admiralty and Central West	<ul style="list-style-type: none"> <li>? Flagstaff House located at Cotton Tree Drive approximately 120m from the alignment.</li> <li>? Former French Mission Building located in Battery Bath approximately 90m from the alignment.</li> <li>? St. John's Cathedral located at Garden Road Central approximately 30m from the alignment.</li> <li>? Government House located in Upper Albert Road.</li> <li>? Network No.1, Queen's Road Central War Time Air raid shelter.</li> </ul>

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Location	Description
	<ul style="list-style-type: none"> <li>? Staircase and old walls in Battery Path area.</li> <li>? Flight of Stone Steps and Gas Lamps at Duddell Street.</li> <li>? Catholic Cathedral of Immaculate Conception at Glenealy, Central, approximately 200m from alignment.</li> <li>? St. Paul's Church at Glenealy.</li> <li>? Old Dairy Farm Depot at 2 Lower Albert Road, Central, approximately 15m from the alignment.</li> <li>? Old Kei Yan Primary School at Glenealy, Central, approximately 45m from the alignment.</li> <li>? Bishop House war time air raid tunnel at Glenealy.</li> <li>? Central Police Station at No. 10 Hollywood Road approximately 225m from CEW.</li> <li>? Victoria Prison at Old Bailey Street.</li> <li>? Former Central Magistracy at No.1 Arbuthnot Road approximately 180m from CEW.</li> </ul>

### 3.2.8 Land Contamination

A review of historical maps and selected historical aerial photographs indicates that the majority of the proposed alignment and stations are to be developed on land which has primarily been heavily developed for residential, commercial and recreational uses or on recently reclaimed land. There is little available information to indicate that there have been any major industrial uses along the alignment. The potentially contaminated areas are:

- ? The fuel storage and aircraft maintenance workshops at the former Kai Tak Airport, where decontamination measures are being implemented under the Kai Tak Airport North Apron Decommissioning;
- ? Gas works and EMSD workshop at the proposed To Kwa Wan station;
- ? Petrol Station at To Kwa Wan Road;
- ? Two petrol station sites located along Gloucester and Victoria Park Road; and
- ? Potential contamination from excavated material in the Tamar Basin.

### **3.2.9 Landscape and Visual Impact**

The proposed route alignment involves construction through a well developed urban environment. Whilst the majority of the route will be underground, there will be a variety of activities and structures associated with the construction phase which may create varying levels of impacts on the physical landscape and visual amenity of surrounding areas. The cut & cover tunnel construction and excavation, temporary noise barriers for the works sites and illumination within the construction sites may create short-term adverse visual impacts.

## **3.3 POTENTIAL ENVIRONMENTAL IMPACTS: OPERATIONAL PHASE**

### **3.3.1 Air Quality**

Trains to be operated on the Shatin to Central Link will be electrically powered so there will be no dust and gaseous emissions. Tunnel ventilation and smoke extraction facilities will be carefully positioned to avoid potential air quality impacts.

### **3.3.2 Noise**

Operational rail noise will give rise to potential impacts on dwellings adjacent to the viaduct. Early morning (before 07:00 hours) and night-time (after 23:00 hours) train movements may present a potential issue. Other potential noise sources include noise emanating from tunnel ventilation shafts, tunnel ventilation fans, smoke extraction fans and environmental control systems.

Apart from rail noise, the passage of trains in the tunnel may generate ground-borne noise and vibration.

### **3.3.3 Water Quality**

Limited quantities of oils and lubricants will be used on the trains and may be deposited on the tracks by passing trains. As a result, the runoff from tracks may contain oil and grease as well as suspended solids. Water quality impacts may arise if oil, grease and suspended solids are not intercepted prior to discharge of track runoff. In addition, wastewater containing cleaning agents, discharge from air-conditioning systems and sewage generated at the SCL stations may also contribute to water quality impacts.

### **3.3.4 Waste Management**

Municipal waste, including litter, foodstuffs, plastics, wood, office waste and cleaning materials, will be generated during the operation of the proposed railway.

**3.3.5 Hazard**

No potential hazard is anticipated during the operation of the proposed railway.

**3.3.6 Ecology**

No ecological impacts are anticipated during the operation of the proposed railway.

**3.3.7 Historical and Cultural Impacts**

No historical and cultural impacts are expected during the operation of the proposed railway.

**3.3.8 Land Contamination**

No land contamination impacts are expected during the operation of the proposed railway.

**3.3.9 Landscape and Visual**

Potential landscape impacts would result from permanent loss of trees.

Potential visual impacts would arise from above ground running lines, above ground station entrances and tunnel-related ventilation shaft structures and plant rooms.

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**4 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT**

**4.1 EXISTING AND PLANNED SENSITIVE RECEIVERS**

**4.1.1 Noise**

Potential Noise Sensitive Receivers (NSRs) have been identified under EIA-TM. Representative NSRs include:

Location of Noise Sensitive Receivers in Construction Phase

<b>Area</b>	<b>Location</b>	<b>Sensitive Uses</b>
Running Line between Tai Wai & Hin Keng Portal	? Hin Keng Estate ? Hin Wan House	Residential
Running Line between Hin Keng Portal & Tsz Wan Shan	? Hin Keng Estate ? Hin Kwai House	Residential
Tsz Wan Shan station and Running Line between Tsz Wan Shan and Diamond Hill	? Tsz Ching Estate ? Residential buildings along Wan Wah Street & Po Kung Village Road	Residential
Diamond Hill station	? Ho Court ? Lung Poon Court ? Lung Wan Court	Residential
Running Line between Diamond Hill & Kai Tak	? Rhythm Garden, Block 5	Residential
Kai Tak Maintenance Centre	? Residential Buildings along Prince Edward Road West	Residential
Kai Tak station	? Cognition College	School
To Kwa Wan station	? Residential Buildings along To Kwa Wan Road	Residential
Ma Tau Wai station	? Residential Buildings along both sides of To Kwa Wan Road, Ma Tau Wai Road	Residential
Ho Man Tin station	? Future property development adjacent to the station	Residential
People Mover System between Hung Hom and Whampoa	? Whampoa Garden (residential blocks along Hung Hom Road), ? Residential blocks along Hung Hom Road	Residential
Running Line between Hung Hom Landfall to HK landfall	? Hong Kong Coliseum ? Hotel Nikko HK ? Residential properties along Gloucester Road	Recreational Hotel Residential
Running Line between HK Landfall and Exhibition	? Elizabeth House	Residential
Exhibition Station	? Causeway Centre	Residential

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Area	Location	Sensitive Uses
	? Renaissance Hotel ? Harbour View International House	Hotel Hotel
Admiralty Station	? HK Academy for Performing Arts	School
Running Line between Admiralty to Central West Station	? Chinese People's Liberation Army Office & Barracks ? Court of Final Appeal ? St. John's Cathedral ? HK Central Hospital	Office  Court Church Hospital

Location of Noise Sensitive Receivers in Operational Phase

Area	Location	Noise Sources
Running Line between Tai Wai & Hin Keng	? Village House No.21, King Hau Rd ? Village House No.29, King Hau Rd	Train Noise Train Noise
Running Line between Hin Keng Portal & Tsz Wan Shan	? Hin Keng Estate, Hin Wan House ? Hin Keng Estate, Hin Kwai House	Train Noise Train Noise/ Vent Shaft
Tsz Wan Shan station and Running Line between Tsz Wan Shan and Diamond Hill	? Tsz Ching Estate and residential buildings along Wan Wah Street & Po Kung Village Road	Vent Shaft
Diamond Hill station	? Future property development ? Lung Poon Court, Lung Wan Court	Vent Shaft Vent Shaft
Kai Tak Maintenance Centre	? Residential Buildings along Prince Edward Road West	Vent Shaft/ Mechanical Noise
Kai Tak station	? Premises (Schools and Buildings) along Prince Edward Road East	Vent Shaft
To Kwa Wan station	? Residential Buildings along To Kwa Road	Vent Shaft
Ma Tau Wai station	? Residential Buildings along both sides of To Kwa Wan Rd, Ma Tau Wai Road	Vent Shaft
Ho Man Tin station	? Future property development	Vent Shaft
People Mover System between Hung Hom and Whampoa	? Whampoa Garden (residential blocks along Hung Hom Road) ? Residential blocks along Hung Hom Road	Vent Shaft
Hung Hom Landfall	? Nikko Hotel/TST East Promenade	Vent Shaft
Causeway Bay Landfall	? Residential Premises along Gloucester Road	Vent Shaft

**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP499)S.5(1)(A)**  
**PROJECT PROFILE FOR SHATIN TO CENTRAL LINK**

<b>Area</b>	<b>Location</b>	<b>Noise Sources</b>
Exhibition station	? Causeway Centre	Vent Shaft
Admiralty station	? Citic Tower	Vent Shaft
Running Line between Admiralty and Central West Station	? HK Central Hospital ? Government House	Vent Shaft Chiller Plant

#### 4.1.2 Air Quality

Potential Air Sensitive Receivers (ASRs) have been identified under EIA-TM. Representative ASRs include:

<b>Area</b>	<b>Location of Potential Air Sensitive Receivers</b>
Running Line between Tai Wai & Hin Keng Portal	? Tin Sum Village ? Carado Garden – Block 3 ? Village houses on the northern side of the railway ? Hin Keng Estate – Hin Kwai House
Running Line between Hin Keng Portal & Tsz Wan Shan and Tsz Wan Shan station	? Tsz Ching Estate and residential buildings along Wan Wah Street ? Tsz Wan Shan Shopping Centre
Diamond Hill station	? Lung Poon Court – Lung Wan House ? Galaxia – Block D ? Industrial Buildings along Choi Hung Road – Ka Wing Industrial Building
Running Line between Diamond Hill & Kai Tak	? Rhythm Garden, Block 5
Kai Tak Maintenance Centre	? Residential Buildings along Prince Edward Road East
Kai Tak station	? Cognito College
To Kwa Wan station	? Workshop and Hostel of HK Society for the Blind ? Residential Buildings along To Kwa Wan Road ? Residential Buildings along Ma Tau Kok Road
Ma Tau Wai station	? Honour Buildings ? Residential Buildings along both sides of To Kwa Wan Road ? Wyler Garden – Block A
Ho Man Tin station	? Residential Buildings along Shun Yung Street ? Valley Road Estate
Hung Hom Mass Transportation Centre	? Hong Kong Polytechnic University ? Hong Kong Polytechnic University Staff Quarters ? The Metropolis

**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP499)S.5(1)(A)**  
**PROJECT PROFILE FOR SHATIN TO CENTRAL LINK**

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Area	Location of Potential Air Sensitive Receivers
People Mover System between Hung Hom and Whampoa	? Whampoa Garden (residential blocks along Hung Hom Road) ? Residential blocks along Hung Hom Road ? Commercial buildings on Hung Hom Road ? Hutchison Park
Running Line between Hung Hom Landfall to HK landfall	? Hong Kong Coliseum ? Hotel Nikko HK ? Residential Premises along Paterson Street
Running Line between HK Landfall and Exhibition	? Elizabeth House
Exhibition station	? Causeway Centre ? Renaissance Hotel ? Harbour View International House
Admiralty station	? HK Academy for Performing Arts ? Citic Tower
Running Line between Admiralty to Central West Station	? Chinese People's Liberation Army Office & Barracks ? Court of Final Appeal ? St. John's Cathedral ? HK Central Hospital

#### **4.1.3 Water Quality**

Potential Water Sensitive Receivers (WSR) have been identified under EIA-TM, as follows:

- i) Stream course of Hin Keng and the drainage around the worksites;
- ii) Victoria Harbour;
- iii) Causeway Bay Typhoon Shelter; and
- iv) WSD Saltwater Pumping Stations.

#### **4.1.4 Cultural Heritage**

Major historical and cultural heritage in the vicinity of the alignment is listed in Section 3.2.7.

#### **4.1.5 Landscape and Visual**

##### **Landscape Impacts**

The potential landscape impacts caused by the SCL would be:

- ? Impacts on existing trees along the East Rail Embankment (Tai Wai to Hin Keng portal);
- ? Impacts on landscape character areas of the East Rail Corridor (east of tracks) in Shatin (Tai Wai to Hin Keng portal);
- ? Impacts on existing topography and vegetation at Hin Keng portal;
- ? Impacts on public open space and existing trees and shrubs along Wan Wah Street & Tsz Wan Estate Central Playground (Tsz Wan Shan station);
- ? Impacts on existing trees in amenity areas at j/o Lung Cheung Road and Po Kong Village Road;
- ? Impacts on existing trees and shrubs at Lung Cheung Road;
- ? Impacts on landscape character areas at Diamond Hill, Lung Cheung Road and To Kwa Wan Road;
- ? Impacts on public open space and existing trees at Fat Kwong Street Garden and Playground;
- ? Impacts on public open space at Hoi Sham Park;
- ? Impacts on existing shrubs along Hung Hom Road (PMS between Hung Hom to Whampoa);
- ? Impacts on existing immature trees and shrubs located around the boundary of the Indoor Sports Hall and PTI (Exhibition station construction); and
- ? Impacts on existing mature trees located on the upper portion of Battery Path.

##### **Visual Impacts**

The potential visual impacts caused by the SCL would be:

- ? Impacts on VSRs in Hin Keng Estate; along Che Kung Mui Road; Hollywood Plaza; planned CDA development at Diamond Hill; planned open space at Shun Hing Street; Hoi Sham Park; Fat Kwong Street Garden and Playground; Lung Poon Court, residential properties on Sun Wong Toi Road; planned residential properties in SEKDS, on To Kwa Wan Road, on Chatham Road North, Valley Road Estate, Chi Lin Nunnery; and pedestrians along To Kwa Wan Road.
- ? Impacts on Hin Tin Outdoor Swimming Pool and playground; walkers on the Wilson Trail; residential properties along Keng Hau Road and Prince Edward Road East; Lung Hang Estate; GIC facilities along Gillies Avenue, Prince

**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP499)S.5(1)(A)**  
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Edward Road East and Ma Tau Chung Road; and motorists along To Kwa Wan Road.

- ? Impacts on VSRs in Tsz Ching Estate and residential buildings along Wan Wah Street and Shung Wah Street (Tsz Wan Shan station).
- ? Impacts on VSRs in Whampoa Garden (residential blocks on Hung Hom Road) and the residential properties along Hung Hom Road (APMS between Hung Hom to Whampoa).
- ? Impacts on commercial land uses near the Exhibition Station (e.g. Great Eagle Centre, Harbour Centre and Sun Hung Kai Centre).
- ? Impacts from activities/structures in the vicinity of the Admiralty Station on the VSRs along the waterfront and Harbour Road.
- ? Impacts on VSRs along Queen's Road Central, Ice House Street, Lower Albert Road, Garden Road and Hollywood Road.

**4.2 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT AND EXISTING AND/OR PAST LAND USERS ON SITE WHICH MIGHT AFFECT THE AREA IN WHICH THE PROJECT IS LOCATED**

Review of historical survey maps indicates that areas where land contamination is most evident within the alignment and proposed works area is at the fuel storage and aircraft maintenance workshops at the former Kai Tak Airport. However, the site should be de-contaminated under the Kai Tak Airport North Apron Decommissioning before the SCL work commences. The gas works and EMSD workshop at the proposed To Kwa Wan Station as well as any petrol filling stations along the alignment which may need to be decommissioned might impose potential land contamination concern.

On Hong Kong Island, the majority of the proposed alignment and stations are to be developed on land which has primarily been heavily developed for residential, commercial and recreational uses or on recently reclaimed land. There is little available information to indicate that there have been any major industrial uses along the alignment. The only potentially contaminating sources include two petrol station sites located along Gloucester and Victoria Park Road, and potential contamination from excavated materials in the Tamar Basin.

## **5 ENVIRONMENTAL PROTECTION MEASURES AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS**

### **5.1 POTENTIAL MEASURES TO MINIMIZE ENVIRONMENTAL IMPACTS**

Various mitigation measures are proposed to minimize environmental impacts, as outlined below. It should be noted that these measures may be further refined during later stages of the EIA process.

#### **5.1.1 Construction Phase**

##### **Air Quality**

Standard dust suppression techniques, set out in the Air Pollution Control (Construction Dust) Regulations, should be sufficient to control the dust impacts on the nearby ASRs. These include on-site vehicle speed restrictions and wheel-washing facilities at all site access points, careful handling and the containment or damping of dusty materials, and frequent watering or covering of exposed areas of ground and prompt site restoration. These measures will be used as general practice to all construction sites to ensure that potential dust emissions are controlled and impacts upon sensitive receivers are minimized.

##### **Noise**

A package of mitigation measures has been designed to control construction noise impacts. Whilst not sufficient to fully resolve the predicted noise impacts, general good site practices will help to control the residual impacts. These include:

- i) Care in the placement and orientation of noisy plant away from sensitive receivers;
- ii) The use and correct fitting of silencers, mufflers and acoustic shields; and
- iii) Regular maintenance of plant and equipment.

A series of further mitigation measures has been identified, including the use of quiet plant, noise barriers and reducing the number of plant in use at one time which should be sufficient to control day-time noise impacts to within the established limit at most NSRs. At the NSRs where residual noise exceedances remain, impacts can be brought to within acceptable levels through refinement of the construction programme, use of noise enclosures and further restrictions on plant numbers and schedule.

Ground-borne noise impacts from TBM operations would also be minimized by the use of noise minimizing TBM technology as used on the West Rail. Noise and vibration from drill & blast activities will be instantaneous and its impacts to the nearby receivers can be minimized by careful scheduling of the construction programme.

### **Water Quality**

For land-based construction, water quality impact mitigation measures will include installation of appropriate drainage facilities to control site runoff, proper management on-site to prevent debris and harmful materials from reaching drainage facilities or water bodies, provision of adequate toilet facilities and proper disposal of sewage by a recognized waste disposal company, and provision of treatment facilities with adequate capacity to treat process water from tunnel construction activities prior to discharge.

For the construction of the Immersed Tube Tunnel, handling and disposal methods including the use of mechanical grabs, silt curtains and selection of appropriate vessel size will be necessary to reduce the release of suspended solids and nutrients in the water column during the excavation of sediments dredging. Contaminated sediment will be handled according to the current Environment, Transport and Works Bureau requirements for disposal in open sea or confined marine pits.

### **Waste Management**

In order to control waste issues, mitigation measures will include:

- i) General good housekeeping practices;
- ii) Sorting and segregation of wastes for reuse and disposal;
- iii) Observing the requirements of the waste disposal licenses; and
- iv) Meeting the requirements of the Waste Disposal Ordinance.

In addition, both on-site and off-site re-use of excavated inert materials will be considered. Useful materials in the C&D materials will be recycled where practicable. Waste disposal at landfill sites will be considered as a last resort. Waste Management Hierarchy will be implemented to minimize waste generation and maximize waste recovery and recycling.

Chemical wastes will be handled according to EPD's guidelines. In case temporary storage becomes necessary for the chemical waste, it should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste.

Potential impacts associated with the exposure to and disposal of dredged marine sediments could be mitigated by the following measures:

- i) Minimizing exposure to any contaminated material by the wearing of protective gear and preventing eating during dredging;
- ii) Any contaminated sediment dredged will not be allowed to be stockpiled on site and should be immediately removed from the site.
- iii) All vessels for marine transportation of dredged sediment will be fitted with tight-fitting seals to their bottom openings to prevent leakage of materials; and

- iv) Loading of barges and hoppers will be controlled to prevent splashing of dredged material to the surrounding water, and barges or hoppers should under no circumstances be filled to a level which will cause overflowing of materials or polluted water during loading or transportation.

### **Hazard**

No mitigation is required as no impact is identified.

### **Ecology**

The highly valuable Champion trees and protected tree species will be preserved as far as possible. However, if unavoidable, the trees will be transplanted.

### **Historical and Cultural Heritage**

Vibration monitoring will be conducted during the construction process to ensure that no adverse impact occurs on the nearby buildings of historical and cultural value.

### **Land Contamination**

Potential exposure to contaminated materials can be limited by minimizing construction workers' direct contact with soils, wearing of protective clothing, providing adequate hygiene and washing facilities and preventing smoking and eating during soil interface activities.

Only licensed waste hauliers will be used to collect and transport contaminated materials for disposal, and vehicles will be suitably covered to limit dust emissions or contaminated wastewater run-off, and truck bodies and tailgates sealed to prevent any discharge during transport or during wet conditions.

### **Landscape and Visual Impact**

Recommended Landscape and visual impact mitigation measures include:

- i) Avoidance of impacts on adjacent landscape by minimizing temporary works areas;
- ii) Avoidance of impacts on existing mature trees;
- iii) Temporary re-provision of open space for any public open spaces affected by construction works;
- iv) Control of night-time lighting; and
- v) Erection of decorative screen hoarding.

### **5.1.2 Operation Phase**

#### **Air Quality**

No specific mitigation measures are required.

#### **Noise**

Air-borne train noise for the above-ground section will comply with the stipulated noise criteria after provision of a multi-plenum system and appropriate noise enclosure. Mitigation of ground-borne noise is by means of appropriate track design including the use of Floating Slab Track (FST) or Low Vibration Track (LVT). For fixed plant noise, adequate noise control treatment such as silencers, acoustic louvres, quiet plant and an increase in the plantroom wall thickness will be adopted.

#### **Water Quality**

The runoff will be diverted through silt and oil traps to remove oil and lubricating fluids before discharging into the existing sewerage system. In addition, oil interceptors will be provided at the stations to treat potentially contaminated runoff. As any operational discharges will be required to comply with the Water Pollution Control Ordinance, no adverse impacts will occur.

#### **Waste Management**

Chemical waste generated during the operational phase will be handled according to EPD's guidelines. In case temporary storage becomes necessary for chemical waste, it will be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste.

Implementation of good housekeeping practices and the observation of the requirements of the Waste Disposal Ordinance will prevent adverse impacts.

#### **Cultural Heritage**

Vibration impacts on the nearby historical and cultural resources will be mitigated by proper track design and incorporation of FST or LVT.

#### **Landscape and Visual**

Landscape impact mitigation measures which will be incorporated within the permanent landscape design include the following:

- i) Reinstatement of cut or disturbed slopes; disturbance to planted slopes will be avoided where possible;
- ii) Compensatory tree planting will be incorporated along all roadside, public open spaces, amenity areas affected by the construction works;

- iii) Permanent off-site re-provision of open space will be considered for any permanent loss of public open space; and
- iv) Sensitive architectural design of all visible structures such as ventilation structures, plant buildings and station entrances.

## **5.2 POTENTIAL SEVERITY, DISTRIBUTION AND DURATION OF ENVIRONMENTAL EFFECTS**

It is anticipated that the construction work will commence in 2004 with completion targeted for 2008. Air, noise and vibration, water, waste, ecology, cultural heritage, and landscape and visual impacts will be an issue for the duration of construction. Their severity and distribution is outlined in Sections 3 and 4.

Air quality impacts will be most severe during earthworks and excavation activities. Noise and vibration impacts will be most severe during excavation, piling, concreting and tunnelling. Water quality impacts will be most severe during excavation and drilling.

## **5.3 FURTHER IMPLICATIONS**

Public interest in the project is likely to be moderate in view of the fact that the alignment will be passing through such a major commercial district, with temporary disruption caused to various business and residential properties in the area. The railway, however, is for the benefit of the public and will potentially create job opportunities.

**6 USE OF PREVIOUSLY APPROVED EIA REPORTS**

No previously approved EIA report exists for the proposed project. However, reference may be made to KCRC East Rail Extension – Hung Hom to Tsim Sha Tsui which has been approved with conditions by the EPD.