

2 Consideration of Revised Scheme Alignments

2.1 Overview of Alignment Corridor

The SCL is a strategic railway line that runs through multiple districts in Hong Kong. It will strengthen the current railway networks by connecting several railway lines through a number of interchange stations. It will save travelling time and provide the community with faster and more convenient railway services. As discussed in **Section 1**, this EIA is prepared for the SCL (TAW-HUH), while the EIAs for SCL (MKK-HUH), SCL (HUH-ADM), Protection Works at Causeway Bay Typhoon Shelter and SCL (HHS) are covered by other EIA Studies.

SCL (TAW-HUH) is an approximately 11km long extension of the MOL and connects the WRL at Hung Hom. Most of the sections would be in the form of tunnel (i.e. underground) except for a section at Hin Keng, and another section at Hung Hom (see **Figure 2.1**), at which the alignment has to raise to connect with the existing MOL and WRL.

Other than linking the areas in Tai Wai and Hung Hom, the SCL (TAW-HUH) also aims to support the urban renewal of the existing Kowloon City District, planned Kai Tak Development. The alignment corridor therefore, after leaving the existing MOL Tai Wai Station, heads towards East Kowloon via Hin Keng and Chuk Yuen. The first station after passing Lion Rock is DIH where passengers can conveniently interchange to the existing Kwun Tong Line (KTL). Covered under this Project would be the train stabling sidings option occupying the former Tai Hom Village site to the south of DIH.

Passengers can also continue their journey to reach the future Kai Tak Development Area to the south of Diamond Hill where lot of different developments including public housing, private housing, sports venue etc have been planned. This KAT is an important and sustainable transportation infrastructure element that the future population in Kai Tak Development could enjoy.

In order to serve the population in Kowloon City, Ma Tau Wai, To Kwa Wan etc, the alignment (after passing Kai Tak area) has been planned to pass through all these areas and with stations provided. It will then reach HOM where passengers can interchange with the proposed Kwun Tong Line Extension (KTE) which is an extension of the existing KTL at Yau Ma Tei Station to Whampoa Garden.

Finally, passengers heading towards Hung Hom and Hong Kong Island can interchange at HUH. The remaining passengers can enjoy the seamless integration with the West Rail and access various areas in Tsim Sha Tsui East, West Kowloon and other areas along West Rail to Tuen Mun. As discussed in **Section 1.2**, both HOM and HUH would be implemented under another Designated Projects.

This EIA has considered the option of having the train stabling sidings located at Diamond Hill (i.e. DHS option). Recent study has revealed another possible option at Former Hung Hom Freight Yard (i.e. HHS option). The environmental assessment for HHS option including cumulative impacts has been separately addressed in the EIA for SCL (HHS).

2.2 Public Consultation

When selecting the preferred option, major factors that were considered included not only the engineering factors and environmental factors, but also views from the public received during the public consultation exercise.

As one of the SCL Project Objective, an extensive series of meetings/ consultations with public has been conducted during the preliminary design stage of the Project, with an objective to formulate a final scheme which meets the needs of the local community and is fully supported by the general public.

After the Executive Council approved the further planning and preliminary design of SCL by the MTR in March 2008, the Government and the MTR subsequently visited the District Councils and consulted local communities on the project. Extensive public consultation, including roving exhibitions and public forums, was conducted in collaboration with various District Councils and the local community to further collect views from the public on the new links. Details of the public consultation are detailed below:

First Round District Council Consultation

The initial proposal for the railway scheme was introduced to Shatin, Wong Tai Sin, Kowloon City, Yau Tsim Mong, Central and Western and Wan Chai District Councils during the period from March to May 2008.

Second Round District Council Consultation

During the preliminary design stage of the project, the revised railway scheme was presented to Shatin, Kowloon City, Yau Tsim Mong, Kwun Tong, Sai Kung and Wong Tai Sin District Councils from May to December 2009.

District Council Consultation in Detailed Design Stage

Having considered the collected views and suggestions from the community, some modifications have been made on the design of the Project to address their concerns. The DC consultation continued during the detailed design stage of the Project since 2010 with the latest development of the project presented to Shatin, Kowloon City, Yau Tsim Mong and Wong Tai Sin District Councils from time to time.

Legislative Council

Presentations of the project were also given to the Subcommittee of Matters relating to Railway of the Legislative Council in March 2008, March 2009 and Nov 2010.

Roving Exhibitions, Public Forums and Resident Meetings

Apart from consulting Legislative Council and District Councils, roving exhibitions and public forums were held in collaboration with various District Councils or local communities in community centres, schools and shopping malls to collect views and suggestions from the public. The details of the roving exhibitions and public forums are shown in the following table:

Table 2.1: Details of the roving exhibitions and public forums

District	Roving Exhibition	Public Forum
Shatin	• 16	• 1
Wong Tai Sin	• 13	• 3
Kowloon City	• 7	• 4

Appendix 2.1 provides a summary of the key public feedback on the Project. The public generally welcomes and looks forward to the implementation of SCL as early as possible. In response to comments received, some modifications have been made on the design of the Project to address their concerns, as highlighted below.

Stabling Sidings

DHS is a good demonstration of this process of balancing railway needs against environmental concerns. Owing to the level difference between Choi Hung Road and Lung Cheung Road, there is a long wall alongside Choi Hung Road. To minimize the wall effect, it will be architecturally treated to blend with the surrounding environment and the structure will be partially sunken below the level of Choi Hung Road.

Ventilation shafts

During the public consultation exercise, the Project Proponent was requested to design and locate the ventilation shafts such that environmental impacts including fixed plant noise (fan noise), air quality and visual impacts associated with their operations could be minimised.

In response to comments from the public, the ventilation shafts will be designed with the following provisions, as identified in later chapters of this report, to minimise the environmental impacts as far as practicable:

- Quieter plant such as those which have been effectively silenced would be chosen where necessary.
- Noise levels specification would be included when ordering new ventilation equipment.
- Direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure would be installed where necessary.
- Louvres of ventilation shafts would be located away from sensitive receivers as far as practicable.
- Ventilation shafts would be sensibly designed to blend in to the existing urban context.
- Planting would be encouraged to soften the visual impact of the ventilation shafts where possible.

Potential ventilation shaft noise impacts are assessed in **Section 8** of this report. In accordance with the assessment results, the ventilation shafts would be designed to comply with the specified noise limits with no adverse impacts.

SCL is an electric railway, and so there would not be any emissions from fossil fuel generated within the rail system. The only source of carbon dioxide (CO₂) would be from the breathing of the passengers and staff working in the station. The ventilation system is designed for an air exchange rate of 5 litre/person/second where practicable in accordance with MTRC Design Manual. As a result, all CO₂ exhaled by passengers/staff would be sufficiently diluted by the fresh air intake before being discharged through the normal air exchange. Similar to other electrified rail projects with substantial sections underground (e.g. Kowloon Southern Link), air quality impact from the operations of ventilation shafts would not be considered a key environmental issue.

There are very few sources of dust inside the railway system. MTR has commissioned a monitoring programme on the dust level at a ventilation shaft in Central and benchmarked the results with a nearby EPD continuous air quality monitoring station. The measurement results indicated that the dust level at the ventilation shaft area was no worse than any other spots in Central where the air quality was found to be affected predominantly by road traffic emissions. This result demonstrated that the dust level of exhaust air is no worse than those of the intake air in the ventilation shaft. This principle is also applicable to ventilation shafts in other locations.

The ventilation shaft is also designed to be sited at more than 5m from any opening at the adjacent building, in accordance with the Fire Services Department's requirement. At this distance, there should be no noticeable temperature effect as a result of emissions from ventilation shafts. The ventilation shafts would therefore not expect to lead to adverse air quality impacts to the neighbourhood.

2.3 Convenience for the Population to be Served

As discussed in **Section 2.1**, the passengers for SCL (TAW-HUH) would have the choices to interchange at a number of stations to suit their needs. They will provide convenience to the passengers as discussed below.

2.3.1 Tai Wai Station

Tai Wai Station will become the interchange station in New Territories for the East West Corridor and the North South Corridor. Passengers from Ma On Shan will be able to change trains for the North South Corridor, and passengers from North New Territories will be able to change trains directly heading to East Kowloon.

2.3.2 DIH

As an interchange station between the SCL (TAW-HUH) and the Kwun Tong Line, DIH will become the railway hub of East Kowloon. Passengers will be able to take trains on the East West Corridor and go from Ma On Shan directly to Diamond Hill without having to change lines at Kowloon Tong, and continue their journeys by interchanging to the Kwun Tong Line for East Kowloon. Passengers on the Kwun Tong Line will be able to change to the SCL northbound to the East New Territories, or southbound to Hung Hom and change there for trips across the harbour.

With SCL (TAW-HUH) in place, the journey time between East Kowloon, East New Territories and Hong Kong Island will be significantly reduced. For example, travelling between Kwun Tong and Hung Hom with interchange at Kowloon Tong takes 27 minutes while the future travelling time with interchange to the SCL at Diamond Hill will take about 19 minutes.

2.3.3 HOM (as part of another Designated Project)

HOM will be an interchange station between the future Kwun Tong Line Extension and the SCL (TAW-HUH). Passengers will be able to take trains on the East West Corridor from Ma On Shan via Ho Man Tin and change to Kwun Tong Line for Whampoa and the town centre of Kowloon. Passengers departing from Whampoa will be able to change to the East West Corridor at Ho Man Tin for a direct link to the New Territories, or further change trains on the North South Corridor at HUH to Hong Kong Island.

This station will provide an alternative cross-harbour route for passengers travelling between Central Kowloon and Hong Kong Island, avoiding the bottleneck on the cross-harbour section of Tsuen Wan Line or road traffic congestion at the Cross Harbour Tunnel in Hung Hom.

The HOM Station is a single span station box with a rail level of -25mPD using a side platform arrangement. The rail level was set to obtain sufficient rock cover in order to minimise tunnelling risk for the crossover tunnel section beneath Chatham Road North and along Wuhu Street. The overall envelope of the station is largely contained where practical into the cut-and-cover boxes. The station layout will adopt the strategy of public circulation between the concourses and station platforms being fully contained within the cut-and-cover boxes. It also adopts a "cascading" approach to vertical circulation to minimise the station footprint and to keep passenger flow decision points to a minimum. The Air Raid Precaution (ARP) Tunnel network K4 (Chatham Road) and K5 (Valley Road) at the south of HOM Station will be filled up in order to provide a safe working environment to the workers in the close vicinity of the ARP tunnels

It should be noted that HOM was originally included in the SCL (TAW-HUH) EIA Study Brief (ESB 191/2008). During the subsequent design development, it has been considered by the Project Proponent that HOM would be better designed and constructed under the Kwun Tong Line Extension which is a separate Designated Project, and the EIA Report of Kwun Tong Line Extension has been approved under EIAO (ref: AEIAR-154/2010). Nevertheless, the cumulative impacts of the entire Kwun Tong Line Extension (including the HOM) would be considered in this EIA.

2.3.4 HUH (as part of another Designated Project)

Upon completion of the SCL (TAW-HUH), HUH will be transformed into an important railway hub for Hong Kong as an interchange station between the East West Corridor and North

South Corridor, benefiting passengers to all destinations in Hong Kong. When the Hung Hom to Admiralty Section is completed, passengers from the boundary at Lo Wu or Lok Ma Chau will be able to take trains on North South Corridor to Hong Kong Island directly. Passengers on the West Rail Line and Ma On Shan Line may also change here for trains on the North South Corridor for destinations on Hong Kong Island.

This fast alternative cross-harbour route for passengers from the New Territories and Kowloon will not only save them travelling time, but also relieve the bottleneck at the cross-harbour section of the Tsuen Wan Line and road traffic congestion at the Cross Harbour Tunnel in Hung Hom.

It should be noted that HUH was originally included in the SCL (TAW-HUH) EIA Study Brief (ESB 191/2008). During the subsequent design development, it has been considered by the Project Proponent that HUH would be better designed and constructed under the SCL (MKK-HUH) which is a separate Designated Project. Nevertheless, the cumulative impacts of the SCL (MKK-HUH) (including the construction of HUH) would be considered in this EIA.

A summary of the key benefits of the interchange stations is given below.

Table 2.2: Key benefits of the interchanging stations

Interchange Stations	Key Benefits
TAW	<ul style="list-style-type: none"> Passengers from East West Corridor can interchange to North South Corridor to access north east New Territories and Hung Hom
DIH	<ul style="list-style-type: none"> Passengers on SCL (TAW-HUH) can interchange to KTL to access East Kowloon and Central Kowloon
HOM ^[1]	<ul style="list-style-type: none"> Passengers on SCL (TAW-HUH) can interchange to KTE to access Whampoa and Central Kowloon
HUH ^[2]	<ul style="list-style-type: none"> Passengers on SCL (TAW-HUH) can interchange to SCL (MKK-HUH) and SCL (HUH-ADM) or carry on to connect to the West Rail Line

Note:

[1] As part of another Designated Project: Kwun Tong Line Extension (AEIAR-154/2010)

[2] As part of other Designated Project: SCL (MKK-HUH)

2.4 The Need for Former Tai Hom Village for Train Stabling Sidings

The former Tai Hom Village has been identified as a site with potential cultural values and landscape resources. Assemblage of Tang/ Song archaeological finds was uncovered at the former Tai Hom Village Archaeological Site. Three historical buildings and over 1,000 trees are located with the former Tai Hom Village. Given the potential impacts caused by the train stabling sidings on landscape and cultural heritage, the Project Proponent has conducted extensive studies to evaluate the followings:

- Whether the train stabling sidings are required from operational point of view;
- Are there any alternative sites (e.g. existing depots and other areas) to fulfil the operational requirements;
- Would the train stabling sidings be constructed underground to avoid impacts on landscape and cultural heritage

The following sections summarise the findings of the studies.

2.4.1 Operational Requirements for Stabling Sidings

The Diamond Hill Stabling Sidings (DHS) is an essential element for the operation of the SCL. The major function of the stabling sidings is to accommodate trains for deployment to meet the demand during morning peak hours. In non-operational hours, the stabling sidings would also be used for regular cleaning and inspection, but not for major repairing works.

Some operational requirements for allowing proper function of the DHS are summarised in **Table 2.3**. In order to meet the train stabling requirements, it has been established with the Railways Development Office (RDO) that additional stabling facilities would be required.

Table 2.3: Summary of Operational Requirements for Stabling Sidings

Operational Parameters	Requirements
(1) Site area	<ul style="list-style-type: none"> To achieve adequate length and width (including allowance for EVA, access roads, turn outs, staff accommodation, plant rooms, but excluding structures)
(2) Internal layout	<ul style="list-style-type: none"> Stabling tracks have already been arranged in a very space-efficient manner to fit into the Diamond Hill CDA Site and hence it is impossible to incorporate large structures between the stabling tracks.
(3) Location	<ul style="list-style-type: none"> A train stabling siding has to be near to the SCL (TAW-HUH) (SCL (TAW-HUH), comprising the West Rail Line, Kowloon Southern Link, Tsim Sha Tsui Extension, SCL and MOL) alignment from Wu Kai Sha to Tuen Mun to allow efficient train launching in order to meet the service requirement.

2.4.2 Using Existing Train Depots

Investigation has also been conducted for using existing train depots so as to avoid having a new DHS for SCL (TAW-HUH). A summary of the findings is given below:

Existing MTR Train Depot

Tai Wai Depot and Pat Heung Depot

Reasons that cannot be adopted for SCL (TAW-HUH) Train Stabling Sidings

The future SCL (TAW-HUH) will have a journey time of about 70 minutes (Wu Kai Sha to Tuen Mun). Train launching can only start at 5:30am but each station along the line must have the arrival of the "first train" at or around 6:00am to allow morning train service to commence. With just 30 minutes after launching, the first train from Tai Wai Depot and Pat Heung Depot will not be able to reach the other end of the line (as stated above the single trip will take 70 minutes) and hence a third launching point is required. In addition, the stabling capacity at Pat Heung Depot and Tai Wai Depot is unbalanced and hence the stabling sidings must be located east of HUH to allow trains to be launched evenly to meet the morning service requirement.

There might be an argument for commencing the morning train launching earlier than 5:30am to resolve the launching issue above. This means further reduction of the current tight maintenance window during non-traffic hours which will seriously affect the effectiveness and efficiency of essential maintenance activities (e.g. grinding of rail, inspection/maintenance of overhead line, repair of structures and trackside railway equipment, etc.) during non-traffic hours. There will be increasing chances of human errors and equipment failures if maintenance period is reduced from the current minimum.

Ho Tung Lau Depot

It is currently used as the depot for the East Rail Line and the fleet size will actually be increased after

extending its service across the harbour (SCL (HUH-ADM)). There is already a lack of space along the East Rail Line for additional stabling and there is no room to accommodate any trains of SCL (TAW-HUH).

The East Rail Line signalling system is not compatible with SCL (TAW-HUH) and hence it is not possible to stable the SCL (TAW-HUH) trains in Ho Tung Lau Depot as they cannot run by themselves to the SCL (TAW-HUH) line tracks.

Kowloon Bay Depot

It is currently used as the depot for the Kwun Tong Line. The SCL (TAW-HUH) is an extension of the former KCR lines where the rolling stock, signalling and traction power supply systems are incompatible with the urban line systems of the Kwun Tong Line. In addition, the ex-KCR trains are bigger and cannot fit into the Kwun Tong Line tunnels

2.4.3 Using Other Areas

Other than the existing train depots, the investigation has also covered a number of other sites further away. A summary of the findings is given below.

Other Areas

Reasons on whether it could be adopted for SCL (TAW-HUH) Train Stabling Sidings

Shatin Pass Quarry

The approximate 8 ha disused quarry requires extensive site formation works. The site at +100mPD will require a 3.3km spur line bifurcating near the Toll Plaza of the Lion Rock road tunnel from the SCL (TAW-HUH) track level at +0mPD. Such level difference will impose significant technical problem for track connection. The rock cavern option inside Lion Rock with over 100m depth below ground will have problems in providing fireman access and is not considered further. This site is therefore not suitable for use as the SCL (TAW-HUH) stabling sidings.

Hin Keng

The site immediately south of Tai Wai Depot is large enough to accommodate the new SCL (TAW-HUH) stabling facilities. However, this site will take up the existing leisure facilities including the Hin Tin Swimming Pool and the Hin Tin Playground. Furthermore, the entry/ exit tracks will either have to run parallel with the mainline for a long length until they can connect to the mainline in a straight section well into the Lion Rock Tunnel and therefore run in extremely close proximity to two housing blocks of the Hin Keng Estate, or they will jeopardize the site for HK.

Tai Shui Hang

The site is located south of the MOL Tai Shui Hang Station and is opposite to the existing Shatin Sewerage Treatment Works. The site is however not sufficiently large to accommodate the stabling facilities. Even if the arrangement of the tracks and accommodation areas were to be adjusted, the limited headroom and the column arrangement of the Tate's Cairn Highway approach road viaducts do not permit straight stabling tracks to be constructed within the site. The site is therefore not suitable

Other Areas**Reasons on whether it could be adopted for SCL (TAW-HUH) Train Stabling Sidings**

for use as the new SCL (TAW-HUH) stabling sidings.

Wu Kai Sha CDA Sites

Two CDA sites north of Wu Kai Sha Station are yet to be developed, and the size of two sites combined is sufficient to accommodate the additional stabling sidings. However, the southern CDA site consists of a large number of lots, which have been acquired by a local developer. The northern site comprises of a golf club under a Short Term Tenancy and a number of Government Land Allocations (GLAs). Unless Government is willing to revoke the GLAs and resume the private lots, development of stabling sidings in the CDA sites will not be possible.

Kai Tak

As a result of the change in the alignment along Ma Tau Wai Road, the site reserved for the depot at Kai Tak has already been occupied by TKW. Also, the depot will be in direct conflict with the Lung Tsun Stone Bridge which was uncovered in 2008 and is now proposed to be preserved in-situ by the Antiques and Monuments Office. The previously proposed site at Kai Tak is therefore no longer available for use as the new stabling sidings.

Hung Hom Freight Yard

Following the termination of freight services in the existing Hung Hom Freight Yard in June 2010 and cessation of container cargo operation in April 2011, there is a possibility for modifying the Freight Yard under the Metropolis development for use as the new SCL (TAW-HUH) stabling sidings. However, the existing column grids were not designed for stabling and the associated connection tracks to the SCL (TAW-HUH) mainline and would need to be modified to accommodate the different stabling configuration and facilities. In addition the distance between TAW and Hung Hom is such that if a train were disabled on the mainline, the time to retrieve the disabled train to these sidings would significantly impact the service frequency. As a result, it may be necessary to make appropriate changes in the Diamond Hill, Kai Tak and Hung Hom Stations and its associated alignment and facilities of this Project to suit the SCL operational arrangement. With these adjustments in place, the former freight yard can thus be as well considered as one possible site to accommodate the train stabling requirement for SCL. This option (i.e. the HHS), as a designated project under Item A4 of Schedule 2 of EIAO, is assessed in a separate EIA study prepared according to EIA Study Brief (<http://www.epd.gov.hk/eia/register/study/latest/esb-233.pdf> ESB-233/2011).

2.4.4 The Diamond Hill CDA Site

Hence, it can be seen that it is essential to have separate stabling sidings for SCL (TAW-HUH) and there are no existing depots that could be adopted. Locating the stabling sidings at the Diamond Hill CDA site would meet the geographical requirement for an intermediate stabling located between TAW and PHD which would achieve the train service requirements

for the line. This proposed location is also located such that a disabled train could be shunted off the mainline so that normal operations could recommence without undue delay. Apart from the HHS site, the Diamond Hill CDA Site (i.e. the former Tai Hom Village), which is assessed under this Project, is therefore considered as a possible location for train stabling sidings.

2.4.5 Engineering Implications of Constructing the DHS Underground

Whilst the Diamond Hill CDA Site is an essential element for the operation of the SCL (TAW-HUH), the Project Proponent has also studied the feasibility of building DHS totally underground to avoid impacts on the trees and historical buildings. A summary of the engineering implications of constructing the DHS underground is given below.

Programme	:	The completion date for SCL (TAW-HUH) would need to be delayed by approximately 12 months
Excavated material	:	Additional 250,000m ³ of spoil material needs to be disposed due to the removal of the soil on site.
Fire safety	:	The DHS will become a basement and there are concerns about gaining access by fireman to the large basement during an emergency

From the engineering point of view, the site will require to be excavated for both semi-underground and fully underground DHS. Keeping the trees on top of DHS untouched is therefore not feasible. In addition, a fully underground DHS will require more vertical ventilation shafts, giving additional engineering and landuse constraints on the Diamond Hill CDA site above.

Due to the constraints in track gradient, the DHS has to be at a vertical level slightly lower than that of the existing Choi Hung Road. Given the existing profile of the site, the construction of the DHS would require the removal of the rock and spoil above the level of Choi Hung Road. In other words, the impacts on the trees and the 3 historical buildings are inevitable and mitigation measures are required (see **Section 4** and **Section 6** respectively for details).

2.5 Optimising Tunnelling Section

The use of tunnel would help to contain train induced air-borne noise that may be affecting neighbouring noise sensitive receivers, especially in an urban setting where noise sensitive receivers could be very close to the alignment. Optimise the tunnelling section has therefore been one of the important exercises conducted throughout the design process.

Out of the 11km long SCL (TAW-HUH) alignment, tunnel section would occupy about 8km which is more than 70% of the total length. However, since the SCL (TAW-HUH) has to connect the existing West Rail Line at Hung Hom and the Ma On Shan Line at Tai Wai to form an east west strategic rail corridor, the vertical levels of SCL at these 2 sections have to raise to join these existing rails accordingly. These 2 sections would therefore inevitably need to be at-grade or on viaduct instead of in the form of a tunnel. The noise impacts of these 2 at-grade or viaduct sections have been assessed and where necessary, mitigation measures have been proposed to comply with the statutory requirements (see **Section 8** for detailed noise assessment results).

2.6 Base Scheme Alignment in the EIA Study Brief

As discussed in **Section 1**, the proposed Project is a designated project under Schedule 2, Part I, Categories A2, A4, A7 and A8 of the Environmental Impact Assessment Ordinance (EIAO). An application (No. ESB-191/2008) for an Environmental Impact Assessment (EIA) Study Brief under Section 5(1)(a) of the EIAO was submitted by the Applicant on 18 June

2008 with a project profile (No. PP-356/2008) (the Project Profile). Pursuant to Section 5(7)(a) of the EIAO, the Director of Environmental Protection issued an EIA Study Brief (ref: EIA Study Brief No: ESB- 191/2008 dated 14 July 2008 to the Project Proponent to carry out an EIA Study. **Figure 2.1** shows the alignment adopted in the Project Profile and the EIA Study Brief.

The development of this base scheme alignment in the EIA Study Brief has in fact avoided a number of critical environmental issues including the following. More details for the above are given in **Section 15.2** for information.

- Avoidance of at-grade construction works and permanent structures within the Lion Rock Country Park which is important for ecological conservation and landscape and visual resources;
- Minimise above-ground works area to minimise disturbance in urban areas in which a lot of local residents / communities are living in close proximity to the construction works areas and the stations;
- Avoid natural streams and secondary woodland in Tai Wai; and
- Avoid alignment inside the consultation zone of the gas depot of China Gas Co. at the junction of Ma Tau Kok Road and To Kwa Wan Road.

As discussed in **Section 2.1**, the alignment corridor has been designed to run through multiple districts to serve as much population as possible. Both the alignment and the locations of stations are important considerations to the public in this aspect. At the time of preparing the EIA Study Brief, a total of 7 new stations were included in the base scheme alignment. These stations had also been strategically planned to maximise its convenience to the population to be served. A summary of the key elements including the stations of the base scheme alignment is given below.

Table 2.4: Overview of base scheme alignment in the EIA Study Brief

Key Elements	Descriptions (Base scheme Alignment)
Total Length	About 11km long
New Stations	Total 7 new stations, including <ul style="list-style-type: none"> • 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 • Hung Hom Station (HUH)* - connects to West Rail Line (WRL)
Stabling Sidings	At Diamond Hill CDA Site (former Tai Hom Village)

Note:

* According to the latest arrangement, the HOM and HUH will be separately implemented by other Designated Projects including Kwun Tong Line Extension, SCL (MKK-HUH) respectively. However, the cumulative impacts due to these 2 stations would be addressed in this EIA as well to fulfil the requirement in the EIA Study Brief.

This base scheme alignment would also enter the consultation zone of the gas depot of China Gas Co at the junction of Ma Tau Kok Road and To Kwa Wan Road. According to the latest information, this gas depot is a Potentially Hazardous Installation (PHI). Although a tunnel form would be adopted in this area and hence the hazard-to-life during operational phase is not an issue, the construction workers within the consultation zone should be subject to hazard-to-life assessment (see **Figure 2.1**).

2.7 Development of the Revised Scheme Alignment

The Project Proponent has appointed a Preliminary Design Consultant (PDC) responsible for the preliminary design of the SCL (TAW-HUH). One of the key objectives of preliminary design is to develop further on the base scheme alignment and identify any alternative options that would benefit the local communities better, including the public's concern on the need for HIK and shifting the alignment closer to Kowloon City District to tie in with the change in future population centre due to the reduced population to be served as a result of no reclamation in Kai Tak area.

In addition to the PDC, the Project Proponent has also appointed an EIA Consultant to advise on the environmental implications of different alignment and design options. Both the PDC and the EIA Consultant have been working to strike an optimal balance between different requirements of engineering, practicability, environmental, land constraints, etc.

2.8 Comparison of Base Scheme and Revised Scheme Alignments

The environmental implications arising from revising the base scheme alignment have been examined, and the environmental implications for the base scheme and revised scheme alignments have been compared and presented in **Table 2.5**.

Table 2.5: Summary of design changes and environmental implications of revised scheme alignment

Base Scheme Alignment		Proposed Changes of Revised Scheme Alignment	Environmental Benefits	Environmental Disbenefits	Remarks
Location	Design				
<u>Alignment Sections</u>					
Tai Wai Depot	At-grade	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
Tai Wai Depot to HIK	Embankment	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
HIK to Hin Keng Portal	Viaduct + Embankment + Tunnel	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
Hin Keng Portal to DIH	Tunnel (drill-&-blast within Lion Rock Country Park to Chuk Yuen, bored tunnel from Chuk Yuen to Po Kong Village Road, and Cut-&-Cover from Po Kong Village Road to DIH)	<ul style="list-style-type: none"> Underground alignment between Chuk Yuen and Po Kong Village Road slightly adjusted. No significant change in tunnel length. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> Most of the section would be within Lion Rock Country Park and there would be no at-grade temporary construction works within the country park area. Together with the fact that the construction method would remain the same, it is anticipated that there are no additional environmental impacts as compared to the base scheme alignment. Amount of spoil to be excavated would be similar.
DIH to KAT	Tunnel (bored tunnel + cut-&-cover)	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
KAT to TKW	Tunnel (bored tunnel)	<ul style="list-style-type: none"> Alignment will be shifted to the north. TKW relocated. Change of tunnel construction from bored tunnel to cut-&-cover and mined tunnel. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> The revised scheme alignment would however have interface with the Former Kowloon City Pier. All necessary engineering measures would be implemented to protect the pier during construction. (See Section 4) 	<ul style="list-style-type: none"> The alignment would be closer to the existing receivers along Ma Tau Chung Road but further away from the receivers along To Kwa Wan Road. Both alignments have similar density of NSRs, ASRs and VSRs along both sides. Hence, the associated environmental impacts

Base Scheme Alignment		Proposed Changes of Revised Scheme Alignment	Environmental Benefits	Environmental Disbenefits	Remarks
Location	Design				
		<ul style="list-style-type: none"> Tunnels between KAT and TKW will be constructed in railway reserves inside future residential development sites in the Kai Tak Development. Provisions have been made for future development foundations and basement to be constructed in close proximity to these tunnels. Cut and cover form of tunnels will provide more flexibility for future basement construction under this special arrangement". No significant change in tunnel length. 			<p>on noise, air quality and visual would be similar.</p> <ul style="list-style-type: none"> Amount of spoil to be excavated would be similar.
TKW to MTW	Tunnel (bored tunnel)	<ul style="list-style-type: none"> Alignment will run along Ma Tau Chung Road / Ma Tau Wai Road instead of To Kwa Wan Road. Construction method remains the same. No significant change in tunnel length. 	<ul style="list-style-type: none"> Alignment would avoid the PHI consultation zone of the gas depot of China Gas Co. The separation distance between the alignment and the PHI consultation zone is about 160m. 	<ul style="list-style-type: none"> The revised scheme alignment would however be closer to some built heritage (e.g. the Trinity Church building and the Sung Wong Toi Rock. The assessment has concluded that the impacts on these heritage items would be insignificant. (See Section 4). 	<ul style="list-style-type: none"> The alignment would be closer to the existing receivers along Ma Tau Chung Road/ Ma Tau Wai Road but further away from the receivers along To Kwa Wan Road. Both alignments have similar density of NSRs, ASRs and VSRs along both sides. Hence, the associated environmental impacts on noise, air quality and visual would be similar. Amount of spoil to be excavated would be similar.
MTW to HOM	Tunnel (drill-&-blast + cut-&-cover/	<ul style="list-style-type: none"> Alignment will run along Ma Tau Wai Road. MTW relocated. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> The alignment would be closer to the existing receivers along Ma Tau Wai Road but away from the receivers along To Kwa Wan Road.

Base Scheme Alignment		Proposed Changes of Revised Scheme Alignment	Environmental Benefits	Environmental Disbenefits	Remarks
Location	Design				
	bored tunnel)	<ul style="list-style-type: none"> Tunnel construction method changes to drill-&-blast + bored tunnel. No significant change in tunnel length. 			<p>Both alignments have similar density of NSRs, ASRs and VSRs along both sides. Hence, the associated environmental impacts on noise, air quality and visual would be similar.</p> <ul style="list-style-type: none"> Amount of spoil to be excavated would be similar.
HOM to HUH	Tunnel (cut-&-cover/ bored tunnel) + at-grade section	<ul style="list-style-type: none"> Tunnel construction method changes to cut-&-cover method. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> Slightly higher noise and air quality impacts with cut-&-cover method. 	<ul style="list-style-type: none"> Amount of spoil to be excavated would be similar.
HUH to WRL Tunnel	Tunnel + at-grade section	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
<u>Stations</u>					
HIK	Elevated station	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
DIH	Underground station	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
Diamond Hill Stabling Sidings (DHS)	Semi-underground	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
KAT	Underground station	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	-
TKW	Underground station	<ul style="list-style-type: none"> Station relocated 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> The station will be located in the vicinity of an area where assemblage of Song Dynasty pottery was discovered. Mitigation measures would be required to minimise the impacts (See Section 4) 	<ul style="list-style-type: none"> The station would be closer to the existing receivers along Ma Tau Chung Road but further away from the receivers along To Kwa Wan Road. Both would have similar density of NSRs, ASRs and VSRs in the vicinity. Hence, the associated environmental impacts on noise, air quality and visual

Base Scheme Alignment		Proposed Changes of Revised Scheme Alignment	Environmental Benefits	Environmental Disbenefits	Remarks
Location	Design				
					would be very similar. • Amount of spoil to be excavated would be similar.
MTW	Underground station	• Station relocated	• NIL	• NIL	• The station would be closer to the existing receivers along at Ma Tau Wai Road but further away from the receivers along To Kwa Wan Road. Both would have similar density of NSRs, ASRs and VSRs in the vicinity. Hence, the associated environmental impacts on noise, air quality and visual would be very similar. • Amount of spoil to be excavated would be similar.
HOM*	Underground station	• No change	• N/A	• N/A	-
HUH*	Semi-underground station	• No change	• N/A	• N/A	-
<u>Ventilation Buildings/ Shafts</u>					
HIK	Above-grade structure (about 20m high)	• No change	• N/A	• N/A	-
Ma Chai Hang	Above-grade structure (about 20m high)	• Shifted from near Chuk Yuen North estate to Ma Chai Hang Recreation Ground	• Roof level of ventilation building would be kept as low as possible and close to surrounding road levels to reduce visual impact.	• NIL	• Similar environmental setting (e.g. nature and number of sensitive receivers) and hence significant change in environmental implications not anticipated.
TKW	Above-grade structure (about 10m high)	• Station relocated. • Physical size remains similar.	• NIL	• NIL	• Similar environmental setting (e.g. nature and number of sensitive receivers) and hence significant change in environmental

Base Scheme Alignment		Proposed Changes of Revised Scheme Alignment	Environmental Benefits	Environmental Disbenefits	Remarks
Location	Design				
					implications not anticipated.
MTW	Above-grade structure (about 14m high)	<ul style="list-style-type: none"> Station relocated. Physical size remains similar. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> Similar environmental setting (e.g. nature and number of sensitive receivers) and hence significant change in environmental implications not anticipated.
<u>Emergency Access (EA)/ Emergency Escape Access (EEA)/ Emergency Egress Point (EEP)</u>					
Ma Chai Hang	Above-grade structure	<ul style="list-style-type: none"> Safety requirement The building is required to give firemen access to tunnel and to give safe egress to passengers from the tunnel in the event of an emergency. 	<ul style="list-style-type: none"> Integrated with Ma Chai Hang Ventilation Building, and visual impacts would be reduced 	<ul style="list-style-type: none"> NIL 	-
Wong Tai Sin		<ul style="list-style-type: none"> Safety requirement The building is required to give firemen access to tunnel and to give safe egress to passengers from the tunnel in the event of an emergency. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> Above-grade structure. Slight construction dust, noise and visual impacts 	-
Tam Kung Road		<ul style="list-style-type: none"> Safety requirement The building is required to give firemen access to tunnel and to give safe egress to passengers from the tunnel in the event of an emergency. 	<ul style="list-style-type: none"> NIL 	<ul style="list-style-type: none"> Above-grade structure. Slight construction dust, noise and visual impacts 	-

Note:

* According to the latest arrangement, the HOM and HUH will be separately implemented by other Designated Projects under KTE and SCL (MKK-HUH) respectively. However, the cumulative impacts due to these 2 stations would be addressed in this EIA as well to fulfil the requirement in the EIA Study Brief.

2.9 Selection of the Alignment

As discussed in **Sections 2.7** and **2.8**, two alignment options have been considered. The main difference is the portion from KAT to MTW. The base scheme alignment runs along To Kwa Wan Road after KAT before joining HOM. In order to serve the population better, the revised scheme alignment scheme has been designed to run along Ma Tau Chung Road/ Ma Tau Wai Road. TKW is also relocated to the western side of Kai Tak Development area adjacent to Olympic Avenue, whereas MTW is relocated to Ma Tau Wai Road adjacent to Ma Tau Wai Road/ To Kwa Wan Road Garden. Both TKW and MTW will be moved closer to existing and future population centres and will serve a larger population.

Both the base scheme and revised scheme alignments are similar in total length, construction methods, amount of spoil generated. Also, the number of stations and ventilation buildings will be identical in the two schemes. The number of environmental sensitive receivers from noise, air quality, visual, ecology would be similar. The revised scheme alignment would be closer to heritage items including the Former Kowloon City Pier, the landing steps of the 1924 seawall and the area where assemblage of Song Dynasty pottery were discovered. However, proper engineering solutions have been proposed (see **Section 4** of this EIA).

The revised scheme alignment would also avoid the consultation zone of the gas depot of China Gas Co at the junction of Ma Tau Kok Road and To Kwa Wan Road (see **Figure 2.1**). Therefore, no hazard-to-life for the construction workers would be expected.

Hence, the revised scheme alignment would generally be better in terms of environmental performance with implementation of appropriate mitigation measures. In addition, it would offer more benefits to the general public using the proposed railway. The revised scheme alignment is therefore selected and adopted as the basis for this EIA study.