Project Overview

Objective
A set of Public Consultation Digests which consists of 6 parts, namely the Shatin, Wong Tai Sin, Kowloon City, Hung Hom, Hong Kong Island and Cross Harbour Sections, is available to tell you more about the Shatin to Central Link (SCL) project and seek your views. This digest on the Cross Harbour Section discusses the preliminary design and extent of reclamation of the SCL Cross Harbour Section.

Background
The Executive Council approved the further planning and design of the SCL by the MTR Corporation Limited (the Corporation) in March 2008.

The Government and the Corporation subsequently visited District Councils and consulted the local community on the project. The public consultation has commenced to further collect views from the public on the new Link.

The project is expected to be gazetted in late 2009 and the construction to start in late 2010. The Tai Wai to Hung Hom Section of the project will be completed by 2015, and the Hung Hom to Admiralty Section, to tie in with the major infrastructure projects on the north shore of Hong Kong Island, will be completed by 2019.

Alignment
The SCL is divided into two sections, namely the Tai Wai to Hung Hom Section and the Hung Hom to Admiralty Section. The Tai Wai to Hung Hom Section of the SCL will extend the Ma On Shan Line from Tai Wai to Hung Hom, with stations at Tai Wai, Hin Keng, Diamond Hill, Kai Tak, To Kwa Wan, Ma Tau Wai, Ho Man Tin and Hung Hom.

The Hung Hom to Admiralty Section will extend the East Rail Line from Hung Hom Station to Exhibition Station and Admiralty Station via the fourth rail harbour crossing.
The SCL will link up several of our existing railway lines to form two strategic corridors, namely the East West Corridor and the North South Corridor.

**Alignment of East West Corridor and North South Corridor**

The East West Corridor will be formed by the Ma On Shan Line, the proposed Tai Wai to Hung Hom Section of the SCL and the existing West Rail Line. Upon its completion, passengers will be able to travel freely between Tuen Mun and Wu Kai Sha without interchanging.

The North South Corridor will extend the existing East Rail Line (between Lo Wu/Lok Ma Chau and Hung Hom) from Hung Hom to Admiralty. After its commissioning, passengers from the boundary at Lo Wu / Lok Ma Chau will be able to travel directly to Admiralty without interchanging.

**Interchange Stations**

There will be convenient interchange between the SCL and the existing railway network. Six SCL stations, namely Tai Wai, Diamond Hill, Ho Man Tin, Hung Hom, Exhibition and Admiralty, are interchange stations where passengers can interchange with other railway lines.

<table>
<thead>
<tr>
<th>Stations</th>
<th>Interchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tai Wai</td>
<td>East West Corridor / North South Corridor</td>
</tr>
<tr>
<td>Diamond Hill</td>
<td>Kwun Tong Line</td>
</tr>
<tr>
<td>Ho Man Tin</td>
<td>Proposed Kwun Tong Line Extension</td>
</tr>
<tr>
<td>Hung Hom</td>
<td>East West Corridor / North South Corridor</td>
</tr>
<tr>
<td>Exhibition</td>
<td>Future North Island Line</td>
</tr>
<tr>
<td>Admiralty</td>
<td>Tsuen Wan Line / Island Line / Proposed South Island Line (East)</td>
</tr>
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Cross Harbour Section

The Cross Harbour Section of the SCL will extend the existing East Rail Line (between Lo Wu / Lok Ma Chau and Hung Hom) across the Victoria Harbour to Hong Kong Island.

As some of the proposed alignment options for the Cross Harbour Section may require reclamation, the proposed reclamation will have to fulfill the requirements of the Protection of the Harbour Ordinance by establishing an overriding public need for reclamation, proving there is no reasonable alternative, and ensuring the proposed extent of reclamation does not go beyond the minimum of that which is required by the overriding need.

Overriding Public Need

The term “overriding public need” refers to community needs. They would include the economic, environmental and social needs of the community and the overriding public need must be compelling and present. The following factors establish such an overriding public need for the SCL:

• Relieving congestion on the existing railway lines: The SCL will improve the railway network by providing new interchange stations and more route choices, helping to redistribute railway passenger flow to relieve congestion on existing railway lines, some of which (e.g. cross harbour section of the Tsuen Wan Line) will be over their desirable capacity in the near future.

• Supporting cross-boundary integration: The SCL’s direct and speedy rail service that connects the business centres in Hong Kong and Mainland China will have immense significance to support Hong Kong’s growing cross-boundary economic activities and social integration with Mainland China. Upon completion of the SCL, the journey time between Lo Wu and Admiralty Stations will be about 50 minutes only.

• Alleviating road-based traffic: The improved coverage of the railway network provided by the SCL will encourage more passengers to use the railway, thus reducing road-based traffic and relieving traffic congestion on Hong Kong Island and in Kowloon, especially at the Cross Harbour Tunnel.

• Mitigating deterioration of road-side air quality: Railway is a sustainable mode of transport and can reduce road-based traffic, helping to mitigate the deterioration of road-side air quality.
Benefits to the Community

The construction of the SCL is expected to bring about a number of social and economic benefits, including:

- Creation of 11,000 jobs during the construction period;
- Creation of commercial and tourism related employment opportunities along the SCL alignment;
- Passenger time savings that are worth HK$4.1 billion per year by 2021; and
- Rejuvenation of old urban districts.

In addition, disruption to the community will be minimized, as the construction schedule of the SCL will more or less coincide with that of the CWB and other major planned projects along the north shore of Hong Kong Island, and coordination between the SCL and these interfacing projects will be made.

Constraints

The choice of alignment options for the Cross Harbour Section of the SCL will be affected by a number of constraints:

- As the SCL has to extend the East Rail Line from Hung Hom towards Hong Kong Island as well as provide convenient interchange with the existing rail network on both sides of the harbour, the Cross Harbour Section must connect Hung Hom Station (for interchange with the East West Corridor) to Exhibition Station (for interchange with the future North Island Line).
- As constrained by the existing Hung Hom Station and neighbouring buildings, the new SCL platforms can only be located in the freight yard between the existing platform and The Metropolis to avoid affecting the current East Rail and Intercity rail service and the foundation of The Metropolis.
- The alignment of the SCL Cross Harbour Section is constrained by the existing and planned infrastructure facilities and buildings, including the Cross Harbour Tunnel (CHT), Central – Wan Chai Bypass (CWB), Causeway Bay Typhoon Shelter (CBTS) and the developments along the north shore of Hong Kong Island as hatched yellow in the below figure.
- The construction of a section of CWB will take place within the CBTS between 2010 and 2016. To avoid conflict with the CWB, the alignment of the Cross Harbour Section will have to either pass above or beneath the CWB. The SCL will also have to coordinate with the CWB regarding the re-arrangement of the anchorage area and moorings in order to minimize the disruption to the community and CBTS users.
- A number of railway design and operational requirements (e.g. minimum turning curve, maximum gradient, provision for ventilation system and emergency evacuation) will need to be taken into consideration when determining the alignment of the SCL Cross Harbour Section.
- Other constraints include geological conditions, Hung Hom Bypass fender piles, existing seawall, the freight pier in Hung Hom, harbour fairway, buoys, gas mains, CBTS breakwater and CHT portals.

Given the above constraints, the alignment of the SCL Cross Harbour Section will have to fall within the envelope shown on the right. Some alignment options may require reclamation.
Alignment Options without Reclamation

Different alignment options without reclamation were studied in the preliminary design process. They include a cross harbour bridge, a bored tunnel and a tunnel deep in rock.

Cross Harbour Bridge

If a bridge is constructed across the Victoria Harbour, the bridge deck will have to be high enough to allow the passage of vessels. Given the permissible maximum gradient for the railway, long approach ramps at both ends of the bridge will have to be built. However, this will require extensive resumption of private land and harbourfront area, and render it impossible for passengers at Hung Hom Station, Exhibition Station and Admiralty Station to interchange between existing and future rail lines. The cross harbour bridge will also pose a severe visual impact on the Victoria Harbour.

Bored Tunnel in Mixed Ground

A bored tunnel may be constructed underneath the seabed using the tunnel boring machine (TBM). Given the constraints presented by the alignment and the geological conditions, the tunnel will have to pass through soft and rock strata, causing serious wearing of the TBM cutterhead. Frequent intervention for maintenance and repair of the cutterhead will thus be required. To prevent the influx of underground water and the collapse of the excavation face, the cutterhead maintenance and repair work will have to be carried out under a pressure level in excess of the maximum 50 pounds per square inch as allowed by the Factories and Industrial Undertakings Ordinance. This will impose unacceptable risks to the health and lives of workers and the project.
Tunnel Deep in Rock

The construction of a tunnel deep in the rock strata can avoid a high pressure working environment. However, this will significantly lower the alignment of the Cross Harbour Section and thus the East Rail Line will need to be depressed from north of Mong Kok East Station. The alignment of the Cross Harbour Section will be too deep, making the interchange at Hung Hom and Exhibition Stations unacceptable.

In short, none of the above alignment options without reclamation for the construction of the SCL Cross Harbour Section is considered reasonable.

Other Alignment Options

A combination of the immersed tube tunnel and cut-and-cover tunnel methods is considered viable for the construction of the SCL Cross Harbour Section. Given the constraints of the CWB Slip Road 8, the alignment options can be divided into the Easterly Alignment and the Westerly Alignment. Both alignments will require works in the CBTS, and coordination with the CWB is thus essential. The following pages will outline the different alignment options within the CBTS.
Easterly Alignment

There are four options for the Easterly Alignment. All of these options will follow the CWB alignment so as to share the temporary reclamation as much as possible. Due to the overlapping of the two groups of tunnels, excavation will be much deeper than originally proposed by the CWB, and the duration for temporary reclamation will be lengthened by about 3 years. Construction complexity, risks and costs will also be increased.

In addition to the proposed reclamation for CWB, all of these options will require additional temporary reclamation (ranging from 0.6 to 2 hectares) at the connection between the immersed tube and cut-and-cover tunnels, and Option 1D will require permanent reclamation of up to 6.7 hectares at the CWB eastern portal. Cross platform interchange at Exhibition Station between the SCL and the future North Island Line will not be possible for some of these options due to alignment constraints.

Note: Figures shown are indicative only.
Easterly Alignment - Option 1C

Deeper tunnel; works in CBTS prolonged by approx. 3 years
No cross platform interchange
Central - Wan Chai Bypass
Temporary reclamation

Easterly Alignment - Option 1D (SCL above CWB)

(a) CWB alignment remains unchanged: SCL cannot be built above it
Cross Harbour Tunnel
Causeway Bay Typhoon Shelter (CBTS)
(SCL tunnels protrude above seabed)
CWB Tunnel
SCL Tunnel
SCL tunnels clash with CWB Slip Road 8

(b) CWB alignment lowered: increase in permanent reclamation (from 3.3 ha to 10 ha)
Existing Breakwater
Permanent reclamation (≈ 10 ha)
Temporary reclamation

Note: Figures shown are indicative only.
Westerly Alignment

The Westerly Alignment, which crosses above the CWB at the west of the CBTS, is the most direct cross harbour alignment. This option will require additional temporary reclamation of approximately 2.2 hectares, which already includes the portion required for the demolition and reinstatement of the breakwater.

Under the Westerly Alignment option, a section of the SCL tunnels within the CBTS can be constructed when CWB is also under construction. However, owing to the alignment and working space limitations, the construction of a section of the SCL tunnels in the middle of the CBTS cannot start until the removal of all temporary reclamation under the CWB. This will prolong the existence of the temporary reclamation within the CBTS by approximately 1.5 years. On the contrary, if the construction of the Westerly Alignment and the CWB are to be completed at the same time, more moorings will have to be relocated outside the CBTS. The Corporation will consult the concerned parties and refine the construction sequence in order to reach an acceptable solution.
Comparison of Alignment Options with Reclamation

Nevertheless, the possible coordination of the above alignment options with the CWB will depend on whether:

- Sufficient fairway and working space within the CBTS could be provided for the concurrent construction of the CWB and the SCL;
- The revised sequence of temporary reclamation and reprovisioning of moorings will be accepted by affected parties; and
- The SCL will be authorized as scheduled.

In short, the different alignment options with reclamation will require different extent of reclamation and have different degree of disturbance to the community. While the Corporation is consulting the opinions of different parties and government departments concerned, we consider that the Westerly Alignment is a better option in view of the factors as shown below:

<table>
<thead>
<tr>
<th>Option 1 – Easterly Alignment</th>
<th>Option 2 – Westerly Alignment</th>
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<tbody>
<tr>
<td>Option1A</td>
<td>Option1B</td>
</tr>
<tr>
<td>Permanent reclamation</td>
<td>Nil</td>
</tr>
<tr>
<td>Construction complexity and risk</td>
<td>High</td>
</tr>
<tr>
<td>Additional temporary reclamation</td>
<td>0.6 ha</td>
</tr>
<tr>
<td>Extended duration of works in CBTS</td>
<td>+ 3 years and delay to CWB</td>
</tr>
<tr>
<td>Disturbance</td>
<td>Prolonged occupation of moorings</td>
</tr>
<tr>
<td>Railway operation</td>
<td>Longer; without cross platform interchange at Exhibition Station</td>
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</tbody>
</table>
If the immersed tube and cut-and-cover methods are adopted for the construction of the Westerly Alignment, the necessary works in the Victoria Harbour and the impact associated with it will be as follows:

- Immersed tube tunnel: Since the seabed of the Victoria Harbour is undulated and the gradient requirement limits the depth of the alignment, part of the immersed tube tunnel and its protection layer will be higher than the existing seabed. Despite this, such portions will not affect the existing fairway.

- Cut-and-cover tunnel on Hung Hom sea shore: A tunnel of about 100 metres extending from the sea shore underneath the Hung Hom Bypass to the harbour is expected to be constructed using the cut-and-cover method. During construction, a temporary working platform on both sides of the tunnel and a temporary cofferdam will be built. They are regarded as temporary reclamation. Occupying an area of about 1 ha, they will have no impact on the use of the harbour and will be demolished upon completion of the works.

- Removal and reinstatement of Hung Hom Bypass fender piles: Some of the existing Hung Hom Bypass fender piles will be removed to make way for the construction of cut-and-cover tunnels and reinstated in a slightly different location and in different form. However, the area occupied by the reinstated fender piles will more or less be the same. They will continue to serve the function of protecting the Hung Hom Bypass and have no impact on the use of the harbour.
Demolition and reinstatement of Hung Hom Freight Pier: Part of the pier structure has to be demolished to make way for the trench excavation for the immersed tube tunnel. If the pier is reinstated, it will not exceed the original footprint and will have no impact on the use of the harbour.

Proposed SCL Works in Hung Hom

Demolition and reinstatement of CBTS breakwater: Part of the CBTS breakwater will be removed during construction. Prior to the removal, temporary reclamation and a temporary seawall will be provided to protect vessels in the CBTS. The breakwater will be reinstated after the completion of the tunnel construction and all the temporary reclamation will be removed. Such works will be carried out concurrently with the temporary reclamation in the CBTS.

Reprovisioning of Royal Hong Kong Yacht Club (RHKYC) jetty and pontoon: Due to the temporary reclamation in the CBTS, the existing RHKYC jetty and pontoon will need to be reprovisioned nearby.
Temporary Marine Traffic Arrangements
Temporary marine traffic arrangements will be implemented at the nearby fairway during construction. The Corporation has carefully assessed the possible impact of the construction works on the nearby marine traffic and proposed mitigation measures.

Reprovisioning
Part of the mooring area in the CBTS will be temporarily affected by the construction of the SCL and will be reprovisioned. The Corporation is working with different parties and government departments concerned in arriving at an acceptable solution to minimize the impact on CBTS users.

Interfacing Projects
It is anticipated that the construction of the SCL Cross Harbour Section will be carried out more or less concurrently with several major infrastructure projects along the north shore of Hong Kong Island. They include the Central – Wan Chai Bypass and Wan Chai Development Phase II. The Corporation will closely liaise and coordinate with all concerned parties to minimize the impact on the public during construction.

Environmental Protection
The Corporation will ensure that the design, construction and operation of the SCL will comply with all relevant statutory requirements on environmental protection. Every possible measure will be taken to minimize the impact of the works on the public and the environment. A consultant has been appointed to carefully assess the possible impact of the construction and operation of the SCL and to propose necessary mitigation measures.

• SCL tunnel in CBTS: The tunnel in the CBTS will be constructed using the cut-and-cover method and will interface with the CWB. Both projects will require temporary reclamation in the CBTS for the construction of tunnels by the cut-and-cover method. Some additional moorings in the CBTS will be affected temporarily.
Public Consultation

The Corporation will conduct a public consultation programme, including roving exhibitions and public forums, to further introduce the SCL project to the community and collect your views on the SCL Cross Harbour Section, in particular the following issues:

• Is there an overriding public need for the SCL?
• Is there no reasonable “zero reclamation” option?
• Which of the two IMT alignment corridors (Easterly or Westerly) is a better option?
• What additional work should the Corporation and the Government undertake to maximize the integration of the construction work in the CBTS to achieve minimum reclamation?

Conclusion

The SCL Cross Harbour Section will extend the existing East Rail Line towards Hong Kong Island, providing convenient cross harbour service for North East New Territories residents and a direct link between Lo Wu/Lok Ma Chau and the central business district on Hong Kong Island. It will also help to alleviate congestion at existing rail and road networks.

MTR Corporation
HK PO Box No. 9916
Telephone: + 852 2993 2111
Fax: + 852 2798 8822