Shatin to Central Link (SCL)
Cross Harbour Section

The Hong Kong Institute of Architects
19 August 2009
History of Shatin to Central Link (SCL)

- Railway Development Strategy 2000 (RDS-2000) confirmed the policy objective of railways to form the backbone of the public transport system.
- Recommended in RDS-2000 for priority implementation with a target completion in 2011.
- MTRCL & KCRC were invited to submit proposals to Government for its implementation in 2001.
- KCRC was awarded the project in 2002 – design carried out but affected in 2004 because of impending merger.
- One of the 10 priority projects in 2007-2008 Policy Address.
- Government invited MTRCL to continue with SCL planning and design in March 2008.
- Government entrusted to MTRCL SCL design and site investigation works with Government funding.

Source: LegCo Paper No. CB(1)1036/07-08(03) on 27 March 2008
East West Corridor:
- Ma On Shan Line
- SCL (Tai Wai to Hung Hom Section)
- West Rail Line

North South Corridor:
- East Rail Line
- SCL (Hung Hom to Admiralty Section)

Cross Harbour Section

Interchange station
Current Programme for Shatin to Central Link

Shatin to Central Link Gazetted 2009

Commencement of Construction 2010

Completion of Tai Wai to Hung Hom Section 2015

Completion of Hung Hom to Admiralty Section 2019
SCL Cross Harbour Section

- Shatin to Central Link (SCL) needs to cross the harbour

- Construction of Cross Harbour Section may require reclamation

- The need for Compliance with Protection of Harbour Ordinance (PHO)

- Overriding Public Need Test
  - To establish that there is an overriding public need
  - To demonstrate that there is no reasonable alternative
  - To demonstrate that the proposed reclamation is minimum
The Overriding Public Needs for SCL
To Relieve Congestion on Existing Rail Lines

SCL will redistribute railway passenger flow to relieve congestion within existing railway lines, some of which will be over desirable capacity in near future.
To Support Cross Boundary Integration

SCL has immense significance to support HK’s growing cross-boundary economic activities & social integration with Mainland China.
To Relieve Congestion of Cross Harbour Tunnel

SCL will be safe, reliable and environmentally-friendly.

SCL will reduce road-based traffic and alleviate traffic at the Cross Harbour Tunnel.
To Relieve Traffic Congestion in Hong Kong

SCL will create the opportunity to relieve traffic congestion in Kowloon and on Hong Kong Island by providing an alternative transport choice.
To Mitigate Deterioration of Road-side Air Quality

SCL is a sustainable solution to mitigate
deterioration of road-side air quality on HK Island and Kowloon.
Benefits to the Community at Large
Social & Economic Benefits

- Employment opportunities during SCL construction – 11,000 jobs created
- Enhanced employment opportunities in areas along alignment – commercial / tourism related
- Passenger time savings worth HK$4.1 billion/year
- To catalyze rejuvenation of old urban districts
To Minimize Protracted Disruption to the Community

SCL will have to interface with Central – Wan Chai Bypass and other major planned projects along north shore of Hong Kong Island.

Source: Highways Department
There is an overriding public need
Constraints of Cross Harbour Section
Cross Harbour Section – Summary of Constraints

1. Hung Hom Interchange Station (horizontal & vertical constraints)
2. Cross Harbour Tunnel (CHT)
3. Central – Wan Chai Bypass (CWB)
4. Causeway Bay Typhoon Shelter (CBTS)
5. Typical Vertical Constraints
6. Operational Requirements
7. Hung Hom Bypass & Fender Piles
8. Seawall
9. Freight Pier
10. Fairway
11. Buoy
12. Gas Main
13. Breakwater
14. CHT Portal & Existing Seawall
15. Buildings & Infrastructure Projects
Central Alignment –
Constrained by Central – Wan Chai Bypass (CWB)
‘No Reclamations’ Options
‘No Reclamation’ Options – Cross Harbour Bridge

**Characteristics**
- Bridge piers in the harbour are regarded as reclamation
- Bridge deck should be high enough to allow passage of vessels
- Require extensive approaches at both ends. Approach ramps would extend almost to Admiralty Station.

**Implications**
- Require extensive land resumption for bridge piers and foundations
- Long approach ramps would cut off harbourfront
- Interchanges not practical
- Visual impact of Victoria Harbour

**NOT A REASONABLE OPTION**
‘No Reclamation’ Options – Tunnel in Mixed Ground Under the Harbour

**Diameter Dictated by:**
- structure gauge
- ventilation

**Vertical Alignment:**
- minimum ground cover to maintain ground stability
- desirable cover: 2 diameters
- geological conditions

Can only be constructed by tunnel boring machine (TBM)

Minimum 1~2 diameter of tunnel

Approx. 10m diameter
‘No Reclamation’ Options – Bored Tunnel in Mixed Ground Under the Harbour

Due to vertical alignment constraints, tunnels have to pass through mixed ground, i.e. through soft and rock strata.

**Implications:**
- requires frequent (daily) intervention for maintenance & repair of cutterhead due to serious wearing in mixed ground
- interventions require work under pressure to maintain face stability

**Problems:**
- required to work under pressure > 50 pounds per square inch (psi)
‘No Reclamation’ Options – Bored Tunnel in Mixed Ground Under the Harbour

**Problems:**
- Factories and Industrial Undertakings Ordinance (Cap.59M) allows working up to maximum pressure of 50 psi
- All bored tunnel options will require regular intervention for maintenance and repair work in excess of 50 psi

**Conclusions:**
- Risk to health, life and project too high to be acceptable

**NOT A REASONABLE OPTION**
‘No Reclamation’ Options – Tunnel Deep in Rock

**Characteristics:**
- Alignment will be significantly lowered

**Implications:**
- East Rail would need to be depressed from north of Mong Kok East Station
- Interchange at Hung Hom and Exhibition Station either not practical or inconvenient
- Cannot provide required level of service

**NOT A REASONABLE OPTION**

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**Diagram Description:**
- CWB breakwater
- SCL Tunnel Deep in Rock
- Approx. 40m deeper interchange station
- Approx. 80m deeper rock
- Approx. 53m deeper interchange station
- Further deepening of building required
- Hung Hom Bypass
- Flood gate
There is no reasonable alternative
Other Options
Cross Harbour Section – Other Options

Other Options:
- Immersed tube tunnel
- Cut-and-cover Tunnel
- Combination of the above

Previous cross harbour tunnels have been constructed by immersed tube tunnel with cut-and-cover sections at each landfall.

Proven method

Immersed Tube Tunnel - Installation of Pre-cast Units into Trench in Seabed

(1) Trench dredging
(2) Lower immersed tube units
(3) Backfilling
Cross Harbour Section – Alignment Options for Immersed Tube Tunnel

**Easterly Alignment**

- **Option 1A**
- **Option 1B** SCL partly below CWB
- **Option 1C** SCL above CWB
- **Option 1D**

**Westerly Alignment**

- **Option 2** SCL cross over CWB

Note: Options of Easterly Alignment overlap within [diagram notation]
Cross Harbour Section – Alignment Options for Immersed Tube Tunnel

<table>
<thead>
<tr>
<th>Option</th>
<th>Permanent Reclamation</th>
<th>Construction Complexity &amp; Risk</th>
<th>Additional Temporary Reclamation</th>
<th>Duration of Works in CBTS</th>
<th>Disturbance</th>
<th>Alignment</th>
<th>Cross Platform Interchange at Exhibition Station</th>
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<tbody>
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<td>1A</td>
<td>Nil</td>
<td>High</td>
<td>0.6 ha</td>
<td>+ 3 years</td>
<td>prolonged occupation of moorings</td>
<td>longer</td>
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<td>1B</td>
<td>to be determined</td>
<td>Medium</td>
<td>2 ha</td>
<td>+ 3 years</td>
<td>Delay to CWB</td>
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<td>OK</td>
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<tr>
<td>1C</td>
<td>Nil</td>
<td>Medium</td>
<td>2 ha</td>
<td>+ 3 years</td>
<td>prolonged occupation of moorings</td>
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<tr>
<td>1D</td>
<td>additional 6.7 ha for CWB</td>
<td>Medium</td>
<td>0.6 ha</td>
<td>+ 1.5 years</td>
<td>limited mooring affected</td>
<td>shortest</td>
<td>Not OK</td>
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<tr>
<td>2</td>
<td>Nil</td>
<td>Low</td>
<td>2.2 ha</td>
<td>+ 1.5 years</td>
<td>limited mooring affected</td>
<td>shortest</td>
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Cross Harbour Section – Construction Sequence for Westerly Alignment

Legend
- **completed tunnel**
- **tunnel construction**
- **extent of temporary reclamation**
- **tunnel structure**

- **to be constructed together with CWB**
- **to be completed after CWB construction**
Westerly Alignment – Works in the harbour
1. Demolition & Reinstatement of CBTS Existing Breakwater
2. SCL Tunnel in CBTS

Temporary reclamation in CBTS: 2.2 ha
3. **Immersed Tube Tunnel**

- **Central – Wan Chai Bypass (CWB)**
- **Cross Harbour Tunnel**
- **Immersed tube tunnel**
- **Cut-and-cover tunnel**
- **Existing gas main**
- **EXHIBITION STATION**
- **HUNG HOM STATION**
- **Westerly Alignment**

**Typical Cross Section above Seabed**

**Typical Cross Section at Deeper Section of IMT**

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4. Reinstatement of Hung Hom Bypass Fender Piles
5. Reinstatement of Existing Freight Pier

- **Cut-and-cover tunnel**
- **Immersed tube tunnel**
- **Central – Wan Chai Bypass (CWB)**
- **Cross Harbour Tunnel**
- **Westerly Alignment**
- **Existing gas main**
- **To Hung Hom Station**
- **Immersed tube tunnel**
- **Freight Pier**
- **part of freight pier to be demolished**
6. Hung Hom Landfall – Cut-and-cover Tunnel

Temporary reclamation at Hung Hom: 1 ha
Your Views On:

1. Is there an overriding public need for SCL?

2. Is there no reasonable ‘no reclamation’ option?

3. Which of the two IMT alignment corridors (easterly or westerly) is the better option?

4. Should the extent of protection work in CWB be increased to avoid repeated temporary reclamation in CBTS?

5. What additional work should MTRCL and Government undertake to maximize the integration of the construction work in CBTS to achieve minimum reclamation?
# Public Consultation Process

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<th>Date/Duration</th>
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<td>Consultation with professionals</td>
<td>June 2009 onwards</td>
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<tr>
<td>Consultation with stakeholders</td>
<td>July 2009 onwards</td>
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<tr>
<td>Consultation with District Councils</td>
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<td>Public Forum – New Territories</td>
<td>24 August 2009</td>
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Thank You