

### **MTR Sets Out Holistic Proposal to Verify Platform Slabs at Hung Hom Station Extension to Give Additional Assurance**

A holistic proposal formulated by the MTR Corporation has been accepted by the Government to verify the as-constructed condition and workmanship quality of the platform slabs and station structure and to assure the structural integrity of the Hung Hom Station extension under the Shatin to Central Link Project (“SCL”).

The proposal will verify the as-constructed condition of the East West Corridor platform slab at the diaphragm walls connection. It will also examine the workmanship of the coupler connections in light of allegations raised, and other known or suspected irregularities.

A staged approach will be adopted by first compiling the design amendment drawings and construction records, followed by on-site physical investigations by opening up the slabs to check that the steel bar/ coupler connections are in line with the drawings and records. To verify the workmanship of the coupler connections, opening up by statistical sampling is proposed. Areas where previous allegations made in relation to the workmanship of the coupler connections and steel bar fixing will also be taken into consideration.

Non-destructive testing will also be deployed to supplement the verification works.

“The staged approach has been carefully planned using a scientific statistical sampling approach in order to achieve a comprehensive verification. To provide additional assurance, the number of locations to be opened up is more than that proposed by our external engineering consultants,” remarked Dr Jacob Kam, Managing Director - Operations & Mainland Business of MTR Corporation.

“A pre-opening up structural assessment will be undertaken to ensure that the quality, integrity and the overall structural safety of the station structure will not be compromised by the verification exercise,” added Dr Kam.

Based on the verification findings, a further detailed structural review will be conducted of the platform slabs and the station structure. A long-term monitoring programme will also be formulated after the exercise for further assurance on the long-term performance and durability of the structure.

In coming up with the detailed proposal for the verification works, the Project team has taken into consideration the views of the Government, its Expert Adviser Team and our external engineering consultants. The on-site verification tests and reinstatement works, which are envisaged to take at least 16 weeks to complete, will commence as soon as the preparatory works at site are complete. The detailed structural review will then follow.

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An executive summary of the proposal is attached. The full proposal (English version only) can be found at the Shatin to Central Link project website ([www.mtr-shatincentrallink.hk](http://www.mtr-shatincentrallink.hk)).

The safety and the quality of railway projects remain as the Corporation's top priority and the Corporation will continue to work closely with the Government to take forward the SCL project to its completion.

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#### About MTR Corporation

MTR Corporation is regarded as one of the world's leading railway operators for safety, reliability, customer service and cost efficiency. In its home base of Hong Kong, the Corporation operates ten commuter railway lines, a Light Rail network, an Airport Express link as well as a new High Speed Rail service connecting Hong Kong to the Mainland of China that was launched in September 2018. These services carry about 5.8 million passenger trips on a normal week day. Another 6.5 million passenger trips are made on the rail services MTR operates outside Hong Kong in the Mainland of China, the United Kingdom, Sweden and Australia. In addition, the Corporation is involved in a range of railway construction projects as well as railway consultancy and contracting services around the world. Leveraging on its railway expertise, the Corporation is involved in the development of transit-related residential and commercial property projects, property management, shopping malls leasing and management, advertising media and telecommunication services.

For more information about MTR Corporation, please visit [www.mtr.com.hk](http://www.mtr.com.hk).

## **Executive Summary**

### **Background**

In May 2018, there were allegations in the media about threaded steel bars being cut during the steel fixing works and engagement deficiency in the connection of threaded steel bar and couplers at the diaphragm wall (D-wall) of the East West Line (EWL) slab in the Hung Hom Station Extension works under Contract No. 1112. The Contractor had adopted an alternative design amendment with design details which are different from the design drawings accepted by the Buildings Department. In light of the above, MTRCL has proposed that a holistic study should be conducted on the Hung Hom Station Extension works.

### **Purpose**

The purpose of the study is to verify the as-constructed conditions of the EWL platform slab to D-wall connection and investigate workmanship quality of the D-walls, the EWL and NSL (North South Line) slabs to D-wall connection, concrete and steel reinforcement, to provide assurance on the structural integrity of the Hung Hom Station Extension work.

### **Study Approach**

The holistic study is a carefully planned staged approach exercise consisting of the following perspective:

#### Stage 1 (desktop exercise)

- a. Compile a set of Contractor's design amendment drawings; and
- b. Engage external engineering consultants to check design amendment drawings against construction records.

#### Stage 2 (physical investigation)

- a. Inspect and verify the steel bar connection details by opening up EWL slab. The current plan is to open up a minimum of 24 locations;
- b. Inspect the workmanship of steel bar/ coupler connections by opening up the EWL and NSL slabs. The current plan is to open up 56 nos. random locations on the EWL and NSL slabs viz. 28 locations at each slab, and a minimum of 168 nos. steel bar/coupler connections combined for both slabs;
- c. Conduct a detailed review of D-wall construction records. If irregularities are identified, further opening up of the D-walls will be conducted; and

- d. Conduct a suite of Non-destructive Tests (NDT) to verify condition of the concrete, steel bar spacing, steel bar/coupler connection and to inspect shear link placement.

### Stage 3 (design analysis)

Based on verification findings in Stages 1 and 2, structural assessment will be conducted for EWL and NSL slabs and the station extension box. Remedial works, if required, will be designed and implemented wherever necessary to reinstate the structure to an acceptable state.

### **Opening –up Strategy**

After consolidating and verifying all relevant drawings and records in Stage 1, random locations in the EWL and NSL slabs will be opened-up under Stage 2 for the verification of steel bar/coupler connection and investigation of workmanship quality in order to give assurance to the quality of the works. An important consideration when planning the opening-up strategy is that any opening-up in terms of location, scale and depth must be done in a manner which should not compromise the built quality, integrity and the overall structural safety of the Station structure both during and after the investigation.

MTRCL has carefully taken into account the views of relevant Government Departments and Government's experts, including the Expert Adviser Team when preparing this Proposal. MTRCL has also engaged external engineering consultants to provide advice. The objectives are to verify the following issues:

- (i) The connection details, particularly the change from the original design drawings accepted by the Buildings Department; and
- (ii) Workmanship of the coupler connections and other parts of the construction works where concerns have been raised.

The open-up locations cover both the top and bottom steel reinforcement layers of the EWL slab and they have been selected having regard to gaps in objective documentary evidence, areas with alleged problems as well as random sampling. The NSL slab is cast and constructed at formation level. It is not feasible to open-up the bottom couplers of the NSL slab for verification.

In order to provide additional assurance, MTRCL will open up these locations for testing, the number of which is more than that suggested by our external consultants. NDT will also be deployed to check the steel bar/coupler connections as well as concrete quality where necessary. MTRCL will maintain close communication with the Government and

will review any need for further testing work in the light of the findings after each stage of the holistic study.

### **Timelines**

MTRCL has reviewed the Stage 1 interim reports and findings from the external engineering consultants to prepare this Holistic Proposal. The Stage 2 opening-up investigation and verification will commence as soon as this Proposal is agreed with the Government. It is envisaged that Stage 2 verification tests and reinstatement works will take at least 16 weeks to complete. If further sampling and testing are required, it will take more time. The timing of Stage 3 and whether any remedial works are required and their duration can only be established after the findings of the Stage 2 study are available.