

Annex**Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road****Increase in Construction Costs due to
Higher-than-Expected Risk Assessment by Tenderers**

The Highways Department has carried out a detailed analysis of the tenders received for the two contracts of the Hong Kong Link Road (HKLR) project. The analysis reveals that tenderers have made a higher assessment of the risk of the works of the HKLR, leading to the higher-than-expected costs of works. According to the information in the tenders, we estimate that this factor has led to an increase in construction cost of \$3,440 million (in money-of-the-day (MOD) prices). The above figure has been derived from the relevant information on engineering design, construction programme and arrangement provided by the tenderers. Under a tight programme after the delay, tenderers have decided to adopt various measures in future design and construction to mitigate the risks of the project and take into account the additional costs for these to-be-implemented measures in their tenders.

2. The tenderers have to carry out works with stringent technical requirements under a tight time schedule. For instance, part of the works of the HKLR involves construction of viaduct in offshore areas, in which Hong Kong does not have much experience. The project is also the first recent major project that involves tunneling works through the rock layer in the vicinity of sensitive facilities such as fuel storage and the Ngong Ping 360 cable car on Lantau Island. It also requires tunnelling works underneath the Airport Express line and the Airport Road etc. Such works have to be carried out with extreme care in order not to affect the operation of the aforementioned facilities.

3. For part of the works, tenderers have adopted designs and construction methods that they consider they are most experienced, confident and conversant in accordance with their own knowledge and assessment of the difficulty of the works. The costs of these

construction methods are higher than those envisaged by the reference design we provided. For example, the tenderers plan to adopt micro tunnel boring machines to install the horizontal pipe piles for the Scenic Hill Tunnel underneath the Airport Express Line, which will increase the positional accuracy of the horizontal piles as well as reduce the installation time. Nevertheless, this construction method involves a more specialized technical expertise. The adoption of micro tunnel boring machines is also more expensive than other methods. As such, the construction cost is higher than expected.

4. The delay of the commencement of the HKLR has rendered the works programme, which was originally very adequate, very tight. Tenderers anticipate that some unforeseeable circumstances will cause delay to the works programme during construction. As such, when calculating their costs, they have taken into account the increase in labour resources and plant (e.g. piling rigs, derrick lighters, derrick barges, rock splitting equipment, excavators, plant for viaduct deck construction, etc.) as well as the arrangement of overtime work for shortening the construction period to assure the timely completion of the works.

5. For the design of the works, in view of the tight works programme, tenderers have also budgeted for more-than-expected design manpower for shortening the time for design works. The saving in the time of design will enable more time for construction.

6. Furthermore, in light of the recent abundance of job opportunities, construction workers have become more sensitive than expected in their preference over work locations. The work sites of the HKLR are located in remote areas on northern Lantau. Although the current overall labour force in the market is adequate, tenderers anticipate that most workers will choose to work in urban areas. Unless extra subsidies are provided, most workers are unwilling to travel to remote sites such as Lantau, or even take further boat trips from Lantau to work at sea.

7. A breakdown of the cost increase due to the aforesaid actual arrangements required by the tenderers is as follows:

Item		Cost (\$million) (in MOD prices)
Adoption of conservative construction methods to reduce engineering risks		1,650
(a) Viaduct section	600	
(b) Tunnel section	1,050	
Increase in labour and plant resources to reduce risks of delay		1,050
(a) Viaduct section	610	
(b) Tunnel section	440	
Increase in design costs (increase manpower and arrange overtime work to shorten time for design; and design modifications during construction)		300
Provision of subsidies to workers as a result of remoteness of work sites		440
Total		3,440

8. As a result of the above factors, the construction cost has increased by about \$3,440 million (in MOD prices). Excluding the other corresponding technical adjustments, this increase accounts for about half of the total increase of \$8,860 million (in MOD prices) for the HKLR project.