

**LEGISLATIVE COUNCIL
PANEL ON DEVELOPMENT**

Cost Management for Capital Works Projects

Follow-up Actions to Meeting on 17 July 2017

Supplementary information as required by the Panel on 17 July 2017 is provided below:

- (a) *in terms of the performance in cost estimation for public works projects, whether any Government officials should be held accountable for the recent cost overruns for some of the public works projects, e.g. the essential public infrastructure works of the South Island Line and the advance works of the construction of railway works of the Shatin to Central Link; if yes, the details; if no, the reasons*

There were two public works projects applying for increase in Approved Project Estimate (“APE”) in 2016-17 Legislative Council (“LegCo”) session, namely the South Island Line (East) Essential Public Infrastructure Works (“SIL(E) EPIW”) project and the Shatin to Central Link - construction of railway works – advance works (“SCL advance works”) project, which had been entrusted to MTR Corporation Limited (“MTRCL”) for implementation. In this connection, we have consulted the Transport and Housing Bureau and provide the information as below.

The major factors for the increase in APE for the SIL(E) EPIW project has already been detailed in the Public Works Subcommittee (“PWSC”) paper no. PWSC(2016-17)44 submitted to the LegCo as well as the supplementary information provided subsequently to the PWSC and the Finance Committee (“FC”). The major reasons for the increase are unfavourable ground conditions, underground utilities more complicated than expected, change in design to suit the actual site conditions, increase in provision for price adjustments, and adjustment of the on-cost payable to MTRCL.

The major factors for the increase in APE for the SCL advance works project have already been detailed in the PWSC paper no. PWSC(2016-17)43 submitted to the LegCo as well as the supplementary information provided subsequently to the PWSC and the FC. The major reasons for the increase for the advance railway works are unfavourable ground conditions,

modification of the construction schemes to suit the actual site conditions, and increase in provision for price adjustments.

Regarding the SIL(E) EPIW project, according to the entrustment agreement, MTRCL shall use its best endeavours to complete, or procure the completion of, the entrustment activities in accordance with the entrustment agreement. The Government has been closely monitoring the works of MTRCL, including requesting the submission of monthly progress reports, plans and safety reports. An officer of the Highways Department (“HyD”) at the level of Assistant Director has been attending the monthly liaison meeting with the General Manager or Project Manager, in order to monitoring the progress of the works and assisting MTRCL to resolve problems encountered during construction of the works, such that the works could be implemented on schedule. In addition to the liaison meeting, HyD has been requesting MTRCL to give detailed reports on critical construction matters; and closely liaising with the construction team of MTRCL by monthly progress reports and meetings as well as regular site inspections, and requesting more detailed information from MTRCL as necessary.

In financial aspect, MTRCL has to submit reports monthly, in order to report the financial situation of the EPIW and spell out the revised estimate and claims of the works under the project, for scrutiny by HyD.

Regarding the SCL project, MTRCL, as the trustee, is responsible for the overall management of the SCL project. The Government has been following the 3-tier monitoring mechanism to closely monitor the work of MTRCL, which includes a Project Supervision Committee (“PSC”) led by the Director of Highways. The PSC holds monthly meetings to review the progress of the project and monitor the procurement activities, post-tender cost control and resolution of contractual claims. MTRCL has to submit monthly progress reports to HyD to report the latest progress and financial position of the SCL project.

Moreover, an officer at Assistant Director level of HyD holds monthly Project Coordination Meetings with the General Managers and Project Managers of MTRCL to monitor different aspects of the implementation of the SCL project, including the timely completion of land-related matters, the handling of issues in relation to the design, construction and environmental fronts that may have potential impact on the progress and programme of the SCL project, as well as the handling of interfacing issues with other projects. Meanwhile, two officers at Chief Engineer level hold monthly Project Progress Meetings with the site supervision staff of MTRCL on major civil and E&M works. In case of delays, MTRCL would report delay recovery

measures at such meetings. HyD has also employed a Monitoring and Verification (“M&V”) consultant to assist in the monitoring work and undertake regular audits. The M&V consultant will review the works progress and advise HyD of any potential risk of delay. It will also offer comment to HyD on the appropriateness of MTRCL’s proposed delay recovery measures.

As deliberated above, HyD had closely monitored the work of the MTRCL and the increases in APE were due to unexpected circumstances as set out above. In this connection, no Government officials should be held accountable.

- (b) *how the Administration could uplift cost estimation performance to minimize the risk of budget overrun*

Notwithstanding that there have been instances of cost overruns and delays in the delivering of certain mega projects in recent years due to unforeseeable circumstances that arose in the course of project implementation, we have maintained consistently good performance in cost estimation for projects under the Capital Works Programme as a whole. In retrospect, FC approved a total of about 650 Category A works projects with a total provision of \$770 billion in the past 10 years. Among them, about 70 projects required application to FC for additional funding, which totaled around \$60 billion. In other words, additional funding was required in approximately 10% of the projects and the amount represented some 8% of the total provision.

In addition, although there were projects that required additional funding owing to individual circumstances, we generally managed to complete the projects under the Capital Works Programme within the original APE overall and even with surplus. For example, about 850 Category A projects had the final accounts settled in the past 10 years. Their original APE totaled about \$240 billion as compared with the total final expenditure of about \$210 billion. Though some projects needed to apply for additional provisions from the FC, the surplus from other projects were not only able to offset the cost overruns but also managed to leave behind a balance of \$30 billion. In short, the total expenditure of these projects at final settlement accounted for only about 85% of their original APEs.

Nevertheless, Government has been striving to enhance the cost estimation performance of public works project. Works Departments have been performing project cost estimation using the Estimating Using Risk Analysis

method (ERA) since 1993. We are now reviewing the estimation methodologies to incorporate the latest estimation technique and to bring ERA more up-to-date. We are also conducting studies on the feasibility of applying Reference Class Forecasting (RCF) for public works projects in Hong Kong. RCF is a relatively new method adopting an objective approach in project cost estimation. While reference classes for major roadwork projects and site formation projects have been established, studies on drainage, sewerage, waterworks and building projects are still ongoing. Upon completion of the studies, we will consider the approach of applying RCF in the public works projects.

- (c) *details of the eight reviewed works policies/requirements promulgated by the high level working group led by the Development Bureau and comprising senior directorates from Works Department as shown in Enclosure 3 to the Administration's paper (LC Paper No. CB(1)1284/16-17(04))*

The eight reviewed works policies/requirements are detailed as follows:

1. Requirements on site cleanliness and tidiness

While the contractor's obligation are already in place in the contract to maintain the cleanliness and tidiness of the site, revised guidelines have been promulgated to introduce a rational approach based on the specific needs of individual projects. Empowered by the revised guidelines, the works departments can have the discretion to adopt the enhanced specification for the cleanliness and tidiness of the areas with public interface on need basis for individual contracts. This will facilitate public fund to be spent in a more cost-effective manner.

2. Uniforms for personnel working on public works sites

The requirements of provision of uniform to personnel working on public works sites have been implemented since 2011 to enhance the image of the construction industry. Revised guidelines have been promulgated to make the requirements more cost-effective. The revisions include unifying uniform specifications to enable general use, simplifying payment requirements and other administrative requirements, etc.

3. Reimbursement of contractor's and sub-contractors' MPF contributions for their site personnel

In view that the Mandatory Provident Fund ("MPF") Ordinance has been

enforced for around 17 years and employers are already aware of their liabilities for compliance with the MPF Ordinance at present, the requirement to reimburse the contractor's and sub-contractor's contributions to the MPF of their site workers has become unnecessary. Since the MPF requirements are still in force under the Ordinance, omission of the related contract terms for reimbursement of MPF in new contracts will not jeopardize the interests of site workers. With reduced administrative effort for monitoring the system, site personnel can concentrate more on other matters, such as safety and quality inspections.

4. Sub-contractor management plan.

The requirements of sub-contractor management plan aim to facilitate effective management and monitoring of subcontractors by works departments. With collective experience accumulated by works departments over the years, we have streamlined the administrative efforts and management work for contractors and project offices, e.g. deleting some pre-priced items in the Bills of Quantities of the contract. With reduced administrative effort for monitoring the system, site personnel can concentrate on other matters, such as safety and quality inspections.

5. Site accommodation for site staff

New guidelines have been promulgated for site accommodation of resident site staff to achieve cost effectiveness. In general, the guidelines are largely in line with the standards promulgated by Government Property Agency for government offices.

6. Digitalization of as-constructed drawings

The requirements to provide as-constructed drawings in microfilms were outdated and relatively costly. Updated guidelines have been promulgated to require digital copies which are easier for use and at a lower cost.

7. Digitalization of progress photos

The requirements to provide album of hardcopies of progress and record photos were outdated and relatively costly. Updated guidelines have been promulgated to minimize the number of hardcopies of the photos by using digital copies which is at a lower cost.

8. Requirements for drainage impact assessment of new development

The requirements for drainage impact assessment of new development have been revised to include more reasonable guidelines for temporary works/flow diversion scheme to be implemented in the dry season. This can ensure more cost-effective design of the temporary works/flow diversion scheme.

(d) *elaboration on the partnering approach and open-book target cost contract forms of the New Engineering Contract*

The New Engineering Contract (NEC) form encompasses contract provisions to encourage contracting parties to adopt a partnering approach to take forward construction works, thereby avoiding or minimizing disputes. This contract form attaches great importance on risk mitigation and management and embraces a collaborative risk management mechanism which helps to further reduce project risks. The mechanism requires contracting parties to give early warnings on any risks as soon as they arise and work together to resolve such risks in a collaborative manner. Both parties have the obligation to notify each other if either of them becomes aware of any risks which would increase the project cost and/or cause delay. The contracting parties are required to attend the meetings for determining appropriate measures to address and mitigate risks collaboratively. Therefore, the NEC form could help improve the performance of construction contracts in terms of management, cost and time control.

The target cost options of the NEC, which are generally more suitable for relatively large scale and complex projects, features a pain-gain share mechanism under an open-book environment whereby the contracting parties are required to bare cost overrun and entitled to share savings from the target cost. This option provides a common objective for the contracting parties to undertake the works with an aim to enhancing project management and resulting in cost control in projects. Under the current arrangement, if the actual cost incurred by the contractor is lower than the final target cost, the cost saving is shared between the contracting parties. On the other hand, if the actual cost incurred by the contractor is higher than the final target cost, the extra cost is borne equally with a cap at 10% of the final target cost. This mechanism incentivizes the contracting parties to pro-actively propose more innovative and cost-effective construction proposals for advance completion of the works and generation of cost saving.

- (e) *in respect of the different types of construction materials and various categories of construction workers as shown in Annexes 2 and 3 of Enclosure 4 to the Administration's paper, the proportion of the cost of each item (e.g. sand, bitumen; concreter, bricklayer) in the total cost of construction works*

The proportion of the cost for each type of construction materials and labour in individual construction contracts will differ depending on the nature of the works and other specific characteristics of individual contracts. For example, a typical building works contract would normally require a relatively higher proportion of concretors, whereas a typical site formation works contract would normally require a relatively higher proportion of plant operators. In general, the material and labour costs account for about 50% and 30% to 40% respectively of a construction contract, depending on the nature of the works.

DEVB conducted a study in 2015 on the escalation of construction cost which had revealed that the construction cost for various types of construction works had escalated by around 40% to 60% during the period from 2010Q1 to 2013Q1. In addition to a 30% increase due to basic costs such as labour cost, materials cost and contract preliminaries, another 10% to 30% increase was due to the quest for higher quality products, higher regulatory and sustainability requirements, more stringent occupational, safety and health provisions, etc.

- (f) *how the Administration could prevent possible oligopoly by a small number of large engineering/construction consultants/companies for the implementation of public works projects*

In selection of consultants and contractors, both the tenderer's technical capability and the tender price are taken into account to ensure service quality and cost-effectiveness in public works procurement. In setting technical capability requirements, we are mindful of their impact on the tender competition to ensure that sufficient tenderers would be available to bid for the tender.

At the moment, over 150 contractors and 80 consultants are undertaking major works contracts and major consultancies respectively and managed by government departments under the Capital Works Programme. Although we already have a sizeable pool of contractors/consultants working on public works projects, it is our long-standing objective to expand the overall

capability and capacity of the market to sustain the long-term development of infrastructure in Hong Kong.

We will also continue to monitor the construction market closely and implement suitable market regulating measures to facilitate the participation of contractors/consultants of different sizes in public works projects. Recently we have completed a review on the admission and management requirements for contractors and promulgated relevant updates in November 2016 to facilitate market entry. These measures could enhance tender competitions, upward mobility of small to medium-sized contractors as well as providing more flexibility for non-listed contractors to form partnership with listed contractors in the participation of public works projects.

- (g) *whether the Administration would consider taking punitive action against the contractors of multiple public works projects which had cost overruns; if yes, the details; if no, the reasons*

In the past three LegCo sessions, there were eight projects in total applied for increase in APE. Four of the projects were implemented by government departments while the others were railway-related projects entrusted to MTRCL for implementation. Among the four projects implemented by government departments, only two required increase in APE due to reasons arisen during construction. There were around 10 contractors/joint venture companies participated in these two projects and there is no contractor/JV company involved in both projects.

In general, the main reasons for increases in APE include (i) increased provisions for price adjustments to cover higher-than-expected escalation in labour and material costs; (ii) increases in project contingencies to cover unforeseen situations; and (iii) higher-than-expected tender returns. Performance of contractors is generally not the cause of project cost overrun.

Nevertheless, we have put in place a well-established mechanism to reflect the performance of the contractors in the quarterly reports, which will be taken into account in future tender evaluations. In assessing tenders, the past performance of the contractors in aspects of progress of works, site safety, claim attitude, etc., will be duly considered. We will continue to review and enhance the mechanism when necessary.

For the railway-related projects entrusted to MTRCL for implementation, the Government will request MTRCL to review their systems for evaluating the performance of the contractors such that the contractors' performance will be

taken into account in selecting contractors for undertaking future railway-related projects.

- (h) *elaboration on the work of the Development Bureau in collaboration with the Construction Industry Council in adopting innovation and advanced technology in public works projects to reduce manpower requirements and enhance productivity for achieving better cost-effectiveness*

To enhance productivity of the construction industry, we support the Construction Industry Council (CIC) to establish an innovation and technology application centre. The centre is expected to be in operation in the second half of this year, starting with collecting latest information on local and overseas construction technologies to establish a knowledge hub, enhancing the productivity and safety performance of the construction industry. In the long run, the centre aims at establishing a global research network to promote interdisciplinary research and application on enhancement of productivity.

We are striving to promote the Building Information Modeling (BIM) technology. We will require consultants and contractors undertaking design and construction to adopt BIM in major capital works projects which commence design in 2018 and thereafter. We hope that through the BIM technology, the industry can better manage the relevant information at the various stages of construction projects so as to control project costs, optimise design, improve co-ordination and reduce construction waste. CIC will continue to pursue the work of mapping out the BIM Standards, enhance related training and promotion.

We will continue to collaborate with CIC on introducing innovation and advance technology to the construction industry with the objective of reducing manpower requirements, enhancing productivity and lowering the construction cost of Hong Kong at large.

Development Bureau
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