

# PRACTICE NOTES FOR QUANTITY SURVEYORS

## Pre-Contract Estimates And Cost Plans

## Preface

A Working Committee with representatives from The Hong Kong Institute of Surveyors, Association of Consultant Quantity Surveyors and Hong Kong Construction Association was set up in October 2010 to establish a set of Practice Notes for the benefit of Quantity Surveying professionals in Hong Kong.

The Practice Notes are not intended to promulgate a standard of practice, but rather to produce some basic guidelines for the following core practices:

Name of Practice Notes	Latest Version
Pre-contract Estimates and Cost Plans	October 2016
Tendering	November 2012
Cost Control and Financial Statements	November 2012
Valuation for Interim Payment Certificates	August 2014
Valuation of Variations	November 2012
Contractual Claims	November 2012
Final Accounts	November 2012

As different client organisations will have their own procedures and requirements, the Practice Notes, which are prepared mainly for private sector projects using the HKIA/HKIS Standard Forms of Building Contract, should be adapted as appropriate. Clients should consult professional quantity surveyors for advice to suit the specific requirements of individual projects.

The Working Committee expresses its gratitude to the representatives from Architectural Services Department and Hong Kong Housing Authority for sharing their experience in and knowledge of Quantity Surveying practice in the public sector for the improvement of the document.

## Disclaimer

All parties must rely exclusively upon their own skill and judgment when making use of this document. Neither The Hong Kong Institute of Surveyors, Association of Consultant Quantity Surveyors, Hong Kong Construction Association, nor any of the committee members and any other contributor assumes any liability to anyone for any loss or damage caused by any error or omission, whether such error or omission is the result of negligence or any other cause. Any and all such liability is disclaimed.

## PRE-CONTRACT ESTIMATES AND COST PLANS

**1. Nature and Purpose**

Construction cost is probably the largest single component of the capital cost of a property development project after land cost. A robust and accountable system of estimating the construction cost is therefore essential. Cost estimates form the framework for the cost planning used to manage the construction cost at different design stages of a project. Throughout the design stages, the Quantity Surveyor should prepare cost estimates in parallel with the development of the design. Cost estimates provide the latest cost information to facilitate the Employer and the Design Team making timely decisions as the design is being developed.

**2. Cost Estimates at Different Project Stages**

The type of cost estimate to be done varies at different stages of a project, ranging from ballpark figures in the early stage to fairly reliable figures at the detailed design stage prior to the return of tenders. Despite different terminology being used for the type of cost estimates at different stages of a project, cost estimates can be generally classified into the following categories according to their function.

**(a) Feasibility Cost Estimates (also commonly known as Rough Indication of Costs)**

At the feasibility stage of a project, information is rarely sufficient for preparation of a detailed cost estimate. The cost estimate prepared at this stage is expected to be fairly rough when compared with the cost estimates prepared at the later stages. Feasibility Cost Estimates provide an indication of the cost range to Employers, which is essential for the Employers to evaluate the viability of the investment. For some projects, the indication of costs is also used as a basis for funding applications.

Feasibility Cost Estimates are generally prepared based on planning parameters such as the site area, Plot Ratio, Gross Floor Area (GFA), Net Operational Floor Area (NOFA), Construction Floor Area (CFA), guestroom mix (for hotels), number of beds (for hospitals), number of seats (for auditorium/theatres), number of workstations (for office fit out), etc. Project benchmarking, that is the target grade or quality of the project, should be identified at this stage. Reference could be made to historical unit costs (\$/m<sup>2</sup> CFA/GFA, \$/room, \$/bed, \$/seat, \$/workstation, etc.) from past projects of a similar nature and/or scale to estimate the construction cost.

**(b) Design Stage Cost Plan**

The emphasis at design stage is to define the likely eventual scope of a project, together with identifying and evaluating the risks to be encountered during the entire design and construction process. The cost estimate prepared at design stage is called a "Cost Plan". As the name would suggest, a Cost Plan sets out the planned cost for each element, sub-element and even individual work item depending on the level of design information available at different design stages. It is a useful tool for updating cost estimates as the design develops. In a new build project, the design is typically developed in three stages – Concept Design Stage, Scheme Design Stage and Detailed Design Stage.

**i) Concept Design Stage**

During the Concept Design Stage, preliminary design information such as site plans, floor plans, overall building elevations/sections, area schedules, are usually available. In some projects, the outline structural form, building services systems and 3-D images of the project are also available at this stage. The Cost Plan is normally structured in an elemental/sectional format. The elemental/sectional cost is primarily worked out on the basis of \$/m<sup>2</sup> CFA/GFA, cost per functional unit (\$/room, \$/car parking space, \$/seat etc.), lump sum allowances or a combination of these.

Appropriate contingencies shall be included in the Cost Plan in consultation with the Employer and the Design Team. While it is common practice to allow for contingencies on a % basis, the risk based approach\* can also be adopted to estimate the amount of contingencies.

Below is a typical elemental cost summary of a new build project.

ELEMENTS	ELEMENTAL TOTAL	ELEMENTAL COST
	(HK\$)	(HK\$/m <sup>2</sup> of CFA)
1. Site Investigation and Demolition	5,000,000	200
2. Foundation and Basement Construction	50,000,000	2,000
3. Structure	70,000,000	2,800
4. Facade	25,000,000	1,000
5. Architectural Works	72,000,000	2,880
6. Building Services	80,000,000	3,200
7. External Works and Landscaping	15,000,000	600
8. Preliminaries (15%)	47,600,000	1,904
9. Contingencies (10%)	36,500,000	1,460
Total (HK\$)	<u>401,100,000</u>	<u>16,044</u>

\*Note: The risk-based approach is basically done by evaluating the likely cost implication of the project risks to determine the appropriate cost allowance for contingencies. This technique is intended to give more insight and confidence to the Employer with regard to the level of contingencies to be allowed for.

ii) Scheme Design Stage

The main objective of the Scheme Design is to develop the design to a sufficient level of detail that allows the Employer to confirm the design and specification of the major elements of the project before the commencement of the Detailed Design. During this stage, more design details such as building plans/elevations/sections, typical details, major materials schedule, outline specification, construction methods, foundation system etc. are normally provided.

The Cost Plan is further refined by breaking down the cost of the major elements similar to the snapshot given below. Planned costs of sub-elements are developed to provide greater clarity.

	(HK\$)	(HK\$/m <sup>2</sup> of CFA)
3. Finishings		
3.1 Roof finishes	7,220,000	289
3.2 Floor finishes	20,500,000	820
3.3 Internal wall finishes	17,500,000	700
3.4 Ceiling finishes	11,250,000	450
3.5 Décor, graphics and signage	2,500,000	100
Subtotal	<u>58,970,000</u>	<u>2,359</u>
4. Furniture and fittings		
4.1 Metal works and sundries	2,500,000	100
4.2 Built-in furniture	7,500,000	300
Subtotal	<u>10,000,000</u>	<u>400</u>
5. Building Services		
5.1 Plumbing and disposal	21,000,000	840
5.2 Electrical	32,500,000	1,300
5.3 Fire services	17,500,000	700
5.4 Lifts	4,000,000	160
5.5 MVAC	37,500,000	1,500
Subtotal	<u>112,500,000</u>	<u>4,500</u>

The planned costs could be estimated on the basis of unit costs, similar to the method adopted in the Concept Design Stage and supplemented with approximate quantities of major items measured from drawings. Budget allowances should be provided for any items not clearly given in the design but likely to be required in the eventual scope of the works. The Quantity Surveyor may also need to prepare cost studies for various design scheme options to facilitate

the Employer’s decision making as to which design scheme to select from the perspective of cost effectiveness. If required, the life cycle cost can be estimated for building elements such as lighting, electrical and mechanical plant, architectural finishes etc. which will have a long-term cost impact on the Employer’s future operation and maintenance costs.

iii) Detailed Design Stage

During this stage, design drawings and specifications should be developed in sufficient detail for tender purposes. The Quantity Surveyor should continuously monitor the costs as the detailed design develops, and advise the Employer and Design Team on corrective actions, if any, as soon as the estimated cost of any item exceeds the budget. The format of the Detailed Design Cost Plan would be basically a list of approximate quantities priced at composite rates. Miscellaneous items of a minor nature are normally priced on a percentage or lump sum basis in the Cost Plan.

Here is an example of the cost breakdown for internal floor finishes in a Detailed Design Cost Plan.

	Quantity	Unit	Rate	Amount
				HK\$
3.2 Floor finishes				
a. Natural stone to lift lobby	160	m <sup>2</sup>	2,820	451,200
b. Homogeneous tile to toilets	630	m <sup>2</sup>	900	567,000
c. "Grano" carpet tile to typical lobby/corridor	640	m <sup>2</sup>	500	320,000
d. Timber flooring to reception at G/F	20	m <sup>2</sup>	2,500	50,000
e. White tile to water tank	50	m <sup>2</sup>	550	27,500
f. Tenant area - no finish				-
g. Cement and sand screed to store room	60	m <sup>2</sup>	200	12,000
h. Cement and sand screed to plant room	400	m <sup>2</sup>	200	80,000
i. Cement and sand screed to staircase	210	m <sup>2</sup>	200	42,000
j. Allow for skirtings (10%)				154,970
			Subtotal	1,704,670

- (c) Pre-Tender Estimate  
The pre-tender estimate is an independent valuation of the expected tender price. The Quantity Surveyor should price all items in the bills of quantities or schedule of rates provided to the tenderers using prevailing market rates (normally based on recent tender prices from similar projects, or supplier’s/ sub-contractor’s quotations, etc.). Cost variances between the Cost Plan and the Pre-Tender Estimate should be reconciled to identify design changes incorporated in the tenders since the Detailed Design Stage was developed. Market conditions, Contractor’s tendering strategy, procurement method and latest project constraints can be some of the factors contributing to the cost variance. The Pre-Tender Estimate should be provided to the Employer prior to the return of tenders, preferably as soon as possible after the tender documents are issued so that potential cost overruns can be identified.

3. Structure of a Cost Estimate or Cost Plan

All cost estimates / Cost Plans prepared during different stages of a project should contain, inter alia, the following information:

- (a) Summary of costs;
- (b) Description of the scope of the works;
- (c) Exclusions;
- (d) Schedule of CFA;
- (e) Assumptions and basis of pricing;
- (f) Cost breakdown commensurate with the amount of design information; and
- (g) A reconciliation between the current estimate and the previous estimate.

#### 4. Key Steps in the Preparation of a Cost Estimate or Cost Plan

##### (a) Identification of scope and estimating assumptions

A robust Cost Plan is underpinned by a clear understanding of scope and well thought assumptions. In preparing Cost Plans for various design stages, in addition to reviewing the information given, it is important for the Quantity Surveyor to thoroughly understand and interrogate the project scope of work. This can be facilitated by holding meetings with the Employer and the Design Team. The Quantity Surveyor should then draft a comprehensive list of estimating assumptions not just associated with the information that has been given but also the scope of any work identified separately with the Design Team. The Quantity Surveyor should then complete the draft Cost Plan based on these assumptions for circulation to the Employer and the Design Team for review. Ideally, a separate meeting should be held with the Design Team to review the Cost Plan to verify the assumptions and basis of pricing. The Cost Plan should be revised to incorporate the outcome of this review for re-issuance. This procedure should be repeated for each stage of design.

##### (b) Taking off quantities

A cost estimate can be worked out by a simple formula: quantity x unit rate. Taking off quantities from detailed design drawings is straightforward. However some skill is demanded in extracting quantities at Concept Design Stage or Schematic Design Stage when the scope / details are not fully shown on the drawings. The Quantity Surveyor should therefore exercise reasonable judgement, supported by some rules of thumb such as structural ratio, wall-to-floor ratio, number of doors per m<sup>2</sup> CFA, electrical outlets per room, etc., which are useful to verify the measured quantities. Adjustments should then be made to the measured quantities to fill in the gaps. Amongst the various design parameters, CFA is the most important parameter that should be identified during all design stages. It governs the design as well as the cost allocated to each element. The CFA is required to be confirmed with the Design Team every time a revised design is developed.

##### (c) Pricing

Unit rates are equally important in the aforesaid formula. Pricing the bills of quantities in a Pre-Tender Estimate can be quite simple with the support of past project cost data and quotations for specific items. Certainly, the Quantity Surveyor needs to consider the market conditions and project characteristics and make appropriate adjustments to the unit rates to complete the Pre-Tender Estimate. Pricing in design stage Cost Plans is no doubt harder. It requires adequate appreciation of the complexity and scale of the work, target standard of the project, construction methods, procurement strategy and other possible factors in determining the unit rates as well as lump sum allowances for incorporation into the Cost Plans.

When historical cost data is applied, it is important to understand the characteristics of the projects from which the historical costs are derived. Cost of site formation, for example, can vary significantly depending on its nature and scale. Other particulars such as contract conditions, provision for adjustment for fluctuations, construction programme, location, scope of external works, BEAM Plus rating, procurement method, Employer's special requirements, etc. should also be considered in making appropriate adjustments to the historical cost data.

Most importantly, the historical cost data must be adjusted to the tender price level. This is typically done by making reference to the tender price indices published by government departments or quantity surveying consulting firms. Where required, the Quantity Surveyor should predict any further price fluctuation from the latest date of available tender price index to the date of tender return, plus predictions during the construction stage to account for different construction periods.

Finally, when a Cost Plan is completed, it is important to carry out reconciliation with the previous Cost Plan to make sure the key changes are properly captured with reasons given for the differences. In this process, benchmarking with projects of a similar nature on high level \$/m<sup>2</sup> basis or other functional unit costs as used in Concept Design Stage could be introduced for comparison from a different angle of view.



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