

**THE HONG KONG INSTITUTE OF SURVEYORS  
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**BASICS of  
COST PLANNING  
&  
COST ESTIMATE**

By Victor Lau  
B.Sc., M.Sc., MHKIS, MRICS  
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# **COST PLANNING & COST ESTIMATE**

- **DEFINITIONS, TERMS & PROCESSES**
- **TYPES OF PRE-CONTRACT COST PLANNING**
- **FACTORS AFFECTING COST ESTIMATES/PLAN**

# **DEFINITIONS, TERMS & PROCESSES**

- A. Classification of Areas**
- B. Terms of Cost Estimate & Cost Plan**
- C. Pre-Contract Cost Planning Processes**

# DEFINITIONS, TERMS & PROCESSES

## A. CLASSIFICATION OF AREAS

### GROSS FLOOR AREA (GFA)

GFA is the area contained within the external walls of the building measured at each floor level (including any floor below the level of the ground), together with the area of balconies and the thickness of external walls (for submission to Planning Authorities)

*Note : Carpark & plant room areas are usually excluded, but this is NOT a fixed rule*

### CONSTRUCTION FLOOR AREA (CFA)

CFA is the covered areas fulfilling the functional requirements of the building measured to the outside face of the external walls or external parameter. Areas occupied by partitions, columns, internal structural walls, bay windows, stairwells, lift shafts, plant rooms, water tanks, carparks, open covered areas and the like are included.

# DEFINITIONS, TERMS & PROCESSES

## B. TERMS OF COST ESTIMATE & COST PLAN

### ELEMENTAL QUANTITY

- No. of door
- Area of wall finishes
- Volume of concrete structure

### ELEMENTAL RATIO

- Elemental quantity per CFA  
(i.e. Element Quantity / CFA)

### ELEMENTAL UNIT RATE

- Average cost per unit elemental quantity  
(i.e. Total Cost of Element / Elemental Quantity)

### INDICES

- Indication of price level for particular subject
  - tender price index
  - building services tender price index
  - labour index
  - material index
  - consolidated labour & material index

# DEFINITIONS, TERMS & PROCESSES

## C. PRE-CONTRACT COST PLANNING PROCESSES

Stages	Main Purposes	Available Information	Type of Cost Planning
<b>Inception &amp; Feasibility</b>	Prepare <u>feasibility studies</u> to determine cost limit / budget	Site location & area; Project details (e.g. type, plot ratio, CFA, height limit) <i>Note : No drawings</i>	<b>Preliminary Cost Estimate</b>
<b>Outline Proposal</b>	Prepare <u>cost estimate</u> & initial <u>cost studies</u> in order to confirm cost limit / budget	Sketch design (e.g. general layout, building shape, no. of storey)	<b>Elemental Cost Estimate</b>
<b>Scheme Design</b>	Prepare <u>cost plan</u> & detailed <u>cost studies</u> in order to confirm cost limit / budget	Plans, elevations & sections; Framing plans; Foundation information; Finishes level; Building services requirement	<b>Cost Plan</b>
<b>Design Development</b>	Update <u>cost plan</u> & further <u>cost studies</u> of alternative designs	Alternative design proposal	<b>Revised Cost Plan</b>
<b>Tender</b>	<u>Cost check</u> of final design	Complete design (i.e. tender / working drawings & specifications)	<b>Pre-Tender Cost Estimate</b>

# **TYPES OF PRE-CONTRACT COST PLANNING**

- A. Preliminary Cost Estimate**
- B. Elemental Cost Estimate**
- C. Cost Plan**
- D. Pre-Tender Cost Estimate**
- E. Reconciliation of Cost Plan**

# TYPES OF PRE-CONTRACT COST PLANNING

## A. PRELIMINARY COST ESTIMATE

$$\text{Total Construction Costs} = \text{Construction Floor Area (CFA)} \times \text{Unit Rate (\$/CFA)}$$

### CFA

- Land & development conditions (e.g. site area, plot ratio, site coverage, height limitation & GFA)
- Maximum buildable area = site area x approved plot ratio
- Approx. CFA = site coverage area x no. of floor (for building with full site coverage)
- Approx. CFA = GFA x conversion factor (1.05-1.10 for residential, 1.10-1.20 for office)

### Unit Rate

- Location factors
- Specification level
- Construction methods
- Cost analysis of previous similar projects
- Adjustment of price index



# TYPES OF PRE-CONTRACT COST PLANNING

## A. PRELIMINARY COST ESTIMATE

$$\text{Total Construction Costs} = \text{Functional Area} \times \text{Functional Rate}$$

### Functional parameters

- Hospital = 60m<sup>2</sup> to 120m<sup>2</sup> per bed x \$A/bed
- Hotel = 55m<sup>2</sup> to 100m<sup>2</sup> per room x \$B/room
- Auditorium = 1.5m<sup>2</sup> to 2m<sup>2</sup> per seat x \$C/seat
- Carpark = 30m<sup>2</sup> to 40m<sup>2</sup> per carpark x \$D/carpark

# TYPES OF PRE-CONTRACT COST PLANNING

## A. PRELIMINARY COST ESTIMATE

*Example of CFA x \$/CFA*

PROPOSED RESIDENTIAL DEVELOPMENT PRELIMINARY COST ESTIMATE (AS AT JULY 2004 PRICES) Site Area = 130,000 m <sup>2</sup>			
Element	CFA (m <sup>2</sup> )	Rate (\$/CFA)	Total (\$)
1. Site Formation	* 130,000	650	84,500,000
2. Detached House	15,000	14,870	223,050,000
3. Duplex Houses	7,500	16,670	125,025,000
4. Apartment Blocks	30,000	12,380	371,400,000
5. Club House	2,500	12,530	31,325,000
6. Car Park	8,000	4,470	35,760,000
7. External Works	** 39,000	750	29,250,000
<b>Total (as at July 2004 prices)</b>	<b>63,000</b>	<b>14,291</b>	<b>900,310,000</b>

*Note : \* Estimated site formation area  
\*\* Estimated external work area*

# TYPES OF PRE-CONTRACT COST PLANNING

## B. ELEMENTAL COST ESTIMATE

$$\text{Total Construction Costs} = \text{Sum of (Elemental Quantity} \\ \times \\ \text{Elemental Unit Rate)}$$

### Standard Elements

- Site preparation : demolition, site formation, site investigation
- Foundation & substructure : piling, basement
- Carcase : structural frame, door, window, curtain wall, shop front, skylight
- Finishings : roof, floor, internal wall, ceiling, external wall
- Fixture & fittings : metal work, built-in furniture, equipment
- Services : sanitary fitting, plumbing, electrical, fire services, HVAC, security, gas, communication, automation, swimming pool filtration plant, sewage, refuse disposal
- Miscellaneous work : external work, landscaping, drainage, utilities connection
- Preliminaries (% allowance)
- Contingencies (% allowance)

# TYPES OF PRE-CONTRACT COST PLANNING

## B. ELEMENTAL COST ESTIMATE

### Elemental Quantity

- Design information (e.g. Architect's first sketch design)
- Analysis of previous similar projects

### Elemental Unit Rate

- Location factors
- Specification level
- Construction methods
- Cost analysis of previous similar projects
- Adjustment of price index

### Allowance for

- Preliminaries
- Contingencies

# TYPES OF PRE-CONTRACT COST PLANNING

## B. ELEMENTAL COST ESTIMATE

### Report of Elemental Cost Estimate

- Cover
- Contents
- Summary of cost estimate (exclusions)
- General particulars (project details, definition of area, schedule of area, basis of cost estimate, drawing list)
- Outline specification & assumptions
- Supplementary information

# TYPES OF PRE-CONTRACT COST PLANNING

## C. COST PLAN

$$\text{Total Construction Costs} = \text{Sum of (Approximate Quantity} \\ \times \\ \text{Unit Rate)}$$

### Standard Elements

- Site preparation : demolition, site formation, site investigation
- Foundation & substructure : piling, basement
- Carcase : structural frame, door, window, curtain wall, shop front, skylight
- Finishings : roof, floor, internal wall, ceiling, external wall
- Fixture & fittings : metal work, built-in furniture, equipment
- Services : sanitary fitting, plumbing, electrical, fire services, HVAC, security, gas, communication, automation, swimming pool filtration plant, sewage, refuse disposal
- Miscellaneous work : external work, landscaping, drainage, utilities connection
- Preliminaries (% allowance)
- Contingencies (% allowance)

# TYPES OF PRE-CONTRACT COST PLANNING

## C. COST PLAN

### Approximate Quantity

- Design information (e.g. drawings & specifications)
- By measurement

### Unit Rate

- Supplier's / Sub-contractor's quotations
- Recent returned tenders
- Cost analysis of previous similar projects
- Adjustment of price index

### Allowance for

- Preliminaries
- Contingencies

# TYPES OF PRE-CONTRACT COST PLANNING

## D. PRE-TENDER COST ESTIMATE

- Based on B.Q.
- Priced in current unit rates
  - Supplier's / Sub-contractor's quotations
  - Recent returned tenders
  - Cost analysis of previous similar projects
  - Adjustment of price index



# TYPES OF PRE-CONTRACT COST PLANNING

## E. RECONCILIATION OF COST PLAN

- Reflecting change of design / specification
- Cost differences between old & new designs / specification
- Cost saving exercise
- Factors caused cost differences
  - Change in Employer's requirements
  - Change in development
  - Change in site conditions
  - Change in design
  - Change in specification
  - Change in price indices

# TYPES OF PRE-CONTRACT COST PLANNING

## E. RECONCILIATION OF COST PLAN

### *Example*

<u>Item</u>	<u>(\$)</u>
(1) Cost Plan No. 1 (as at February 2003 prices)	L
(2) Adjustments	
(a) Increase overall building height from A m to B m	
(i) (+) structure	[cost of structure ÷ A x (B - A)]
(ii) (+) architectural feature	[cost of architectural feature ÷ A x (B - A)]
(iii) (+) window	[cost of window ÷ A x (B - A)]
(iv) (+) E & M	[cost of E & M ÷ A x (B - A)]
(v) (+) internal finishes	[cost of internal finishes ÷ A x (B - A)]
(vi) (+) foundation & sub-structure	[cost of fdn & substr x 15%(say)]
(b) Allowance for Preliminaries Costs	[Total of (a) x 10%(say)]
	<hr style="width: 100%;"/>
	M
(3) Adjustment for Tender Price Index (TPI)	$N = (L + M) \div \text{TPI}(\text{old}) \times [\text{TPI}(\text{new}) - \text{TPI}(\text{old})]$
	<hr style="width: 100%;"/>
<b>Cost Plan No. 2 (as at July 2004 prices)</b>	<b><u>L + M + N</u></b>

# Factors affecting Cost Estimate / Plan

# Factors affecting Cost Estimate /Plan

- Cost Information
  - Source of cost data
  - Supplier's / Sub-contractor's quotations
  - Use of previous cost data
  - Use of previous cost analysis
  - Application of tender price indices
  - Reasonable % allowances
  - Inclusions & exclusions
- Market Information
  - Market conditions (e.g. inflation / deflation etc.)
  - Rapid change of material (e.g. huge increase of structural steel price in 2003)
  - Change of labour costs (e.g. decreasing since 1997)

# Factors affecting Cost Estimate /Plan

- Experience of Q.S. / Estimator
  - Senses of build-up rates
  - Senses of elemental unit rate
  - Reasonable assumptions
  - The more expensive elements, the more attention paid
  - Knowledge of construction methods
  - Knowledge of new technologies (e.g. pre-cast façade, steel formwork, light weight concrete internal wall etc.)
  - Knowledge of building regulations
  - Senses of market trend
  - Senses of material costs (Lockhart / Portland Street)
  - Senses of construction related news (e.g. 建築廢物堆填費 \$27-\$125 / ton)

# Thank You

[victorlau@hkis.org.hk](mailto:victorlau@hkis.org.hk)