

1.10.2 Examples for estimation method adopted at various work stages

Example 2: **Brief design stage** – preliminary elemental form of estimate for phase 1

Table 1.4 Example 2: Brief design stage – preliminary elemental form of estimate for phase 1

(a) The C.F.A Calculation for 1 House		Note: <i>Example 2 (where only preliminary design is available)</i> It is a preliminary cost plan which is calculated by C.F.A × HK\$/m ² (elemental unit cost of similar project)
Level	Area (CFA)	
G/F	52 m ²	
1/F	52 m ²	
R/F	6 m ²	
Total	110 m ²	

(b) Brief Elemental Cost Plan (at very preliminary stage)

Summary of Estimate (Preliminary Estimate)

Total Site Area:	3,620 m ²
Total Gross Floor Area (GFA):	483 m ² (5,195 sq.ft)
Total Construction Floor Area (CFA):	550 m ² = 110 m ² CFA × 5 houses
CFA/GFA ratio:	1.14

		Phase 1		
	CFA (m ²)	Construction Cost (HK\$)	Unit Cost (HK\$/m ² CFA)	(HK\$/sq.ft GFA)
1 Site Investigation		605,000*	1,100	116
2 Hoarding		2,035,000*	3,700	392
3 Site Formation Works		2,200,000*	4,000	423
4 Foundation and Substructure (pending engineer's input, assumed raft foundation for houses)		1,100,000*	2,000	212
5 Superstructure	550	13,750,000	25,000	2,647
5.1 House A – 5 nos.	550	13,750,000*	25,000	2,647
6 External Works and Landscaping		26,235,000	47,700	5,050
6.1 External landscaping, paving and EVA		18,150,000*	33,000	3,494
6.2 Paving/pedestrian walkway outside site boundary		1,100,000*	2,000	212
6.3 Utilities within the site		6,050,000*	11,000	1,165
6.4 Underground drainage		605,000*	1,100	116
6.5 Utilities connections		330,000*	600	64
Sub-total	550	45,925,000	83,500	8,840
7 Preliminaries (15% of Item 1–6)	rounded up to	6,900,000	12,546	1,328
8 Contingencies (10% of Item 1–7)	rounded up to	5,300,000	9,636	1,020
9 Fluctuation		1,500,000	2,727	289
TOTAL CONSTRUCTION COST (at January 2020 Price Level)		59,625,000	108,409	11,477

Remark:-

* The costs are allowed figures for use in the presentation of the estimating exercise only and no further breakdown has been included.

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Example 3: The cost plant for the completion of conceptual design for phase 1

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1

(a) The C.F.A. Calculation for 1 House

Level	Area (CFA)
G/F	52 m ²
1/F	52 m ²
R/F	6 m ²
Total	110 m ²

(b) Elemental cost plan

Summary of Estimate (Preliminary Estimate)

Total Site Area:	3,620 m ²
Total Gross Floor Area (GFA):	483 m ² (5,195 sq.ft.)
Total Construction Floor Area (CFA):	550 m ² = 110 m ² CFA × 5 houses
CFA/GFA ratio:	1.14

Note:

Example 3 (where conceptual design is developed)

It is estimated from conceptual design information, and it involves the combination of estimate method as (a) approximate quantities x current complete unit rates (where measured quantities are available);

(b) C.F.A x HK\$/m² (elemental unit cost of similar project) (where measured quantities are not available due to insufficient design information)

		Phase 1		
		CFA (m ²)	Construction Cost (HK\$)	Unit Cost (HK\$/m ² CFA) (HK\$/sq.ft GFA)
1	Site Investigation		600,000*	1,091
2	Hoarding		2,000,000	3,636
3	Site Formation Works		2,200,000	4,000
4	Foundation and Substructure (pending engineer's input, assumed raft foundation for houses)		1,080,000	1,964
5	Superstructure	550	13,280,000	24,145
5.1	House A – 5 nos.	550	13,280,000	24,145
6	External Works and Landscaping		23,550,000	42,818
6.1	External landscaping, paving and EVA		15,820,000	28,764
6.2	Paving/pedestrian walkway outside site boundary		1,100,000*	2,000
6.3	Utilities within the site		5,700,000*	10,364
6.4	Underground drainage		600,000*	1,091
6.5	Utilities connections		330,000*	600
	Sub-total	550	42,710,000	77,655
7	Preliminaries (15% of Item 1–6)	rounded up to	6,500,000	11,818
8	Contingencies (10% of Item 1–7)	rounded up to	5,000,000	9,091
10	Fluctuation		1,455,000	2,645
TOTAL CONSTRUCTION COST (at January 2020 Price Level)			55,665,000	101,209

Remark:

* The costs are allowed figures for use in the presentation of the estimating exercise only and no further breakdown will be included.

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

Back-up Calculations

<i>Descriptions</i>	<i>Quantity</i>	<i>Unit</i>	<i>Rate</i>	<i>Estimated Cost</i>
2 Hoarding	265	m	HK\$ 7,500	HK\$ 1,987,500
a Hoarding			Total	1,987,500
			Say	2,000,000
3 Site Formation Works				
a Excavation; assumed 1m depth	3,620	m3	250	905,000
b Cart away	3,620	m3	340	1,230,800
			Total	2,135,800
			Say	2,200,000
4 Foundation and Substructure				
Total building footprint:	260 m2			
Total building footprint with raft foundation:	260 m2			
a Raft foundation footing; assumed 1m depth thick	260	m2	4,000	1,040,000
b Blinding layer	260	m2	130	33,800
			Total	1,073,800
			Say	1,080,000
5 Superstructure				
Back-up calculations refer to next pages				
6.1 External Works and Landscaping				
Site Area:	3,620 m2			
Less: G/F CFA of Houses:	260 m2			
External landscaping, paving and EVA:	3,360 m2			
a External landscaping, paving and EVA including drainage, lighting, etc.	3,360	m2	4,000	13,440,000
b 2.5m high fence wall along site boundary; painted finish, design to budget	260	m	8,000	2,080,000
c Main entrance gate		sum		100,000
d Signage		sum		100,000
e Guard house	1	No.	100,000	100,000
			Total	15,820,000
			Say	15,820,000

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

Elemental Breakdown for 5. Superstructure		
Total Construction Floor Area (CFA):	550 m ²	= 110 m ² x CFA x 5houses Phase 1
<i>Elements</i>	<i>Elemental Total</i>	<i>Elemental Unit Cost</i>
	(HK\$)	(HK\$/m ²)
1. Carcase		
1.1 Frame and slab	2,770,000	5,036
1.2 Internal walls	610,000	1,109
1.3 Doors and shutters	450,000	818
Sub-total for Item 1	3,830,000	6,964
2. Facade		
2.1 External walls	1,230,000	2,236
2.2 External wall finishes	520,000	945
2.3 Windows	690,000	1,255
Sub-total for Item 2	2,440,000	4,436
3. Finishings		
3.1 Roof finishes	70,000	127
3.2 Floor finishes	810,000	1,473
3.3 Internal wall finishes	590,000	1,073
3.4 Ceiling finishes	270,000	491
3.5 Decor, graphics and signage	730,000	1,327
Sub-total for Item 3	2,470,000	4,491
4. Furniture and Fittings		
4.1 Built-in furniture	1,060,000	1,927
4.2 Metal works and sundries	60,000	109
4.3 Artwork	500,000	909
4.4 Equipment	450,000	818
4.5 Special light fittings	10,000	18
Sub-total for Item 4	2,080,000	3,782
5. Building Services		
5.1 Sanitary fittings	200,000	364
5.2 Plumbing and drainage	550,000	1,000
5.3 Electrical	830,000	1,509
5.4 Fire services	280,000	509
5.5 Mechanical ventilation and air- conditioning	370,000	673
5.6 Gas	110,000	200
5.7 Builders work, profit and attendance (5%) of Item 5 Building Services	120,000	218
Sub-total for Item 5	2,460,000	4,473
Total for Superstructure (Phase 1)	13,280,000	24,145

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

Back-up Calculations for 5. Superstructure

Total Construction Floor Area (CFA): 550 m² = 110 m² × CFA × 5houses

Descriptions	Quantity	Unit	Phase 1	
			Rate	Estimated Cost
			(HK\$)	(HK\$)
1.1 Frame and Slabs				
Horizontal elements				
a. Reinforced concrete, grade 45D; to slab and beam	133	m ³	1,300.00	172,900
b. Rebar to slab and beam (230kg/m ³)	30,590	kg	12.00	367,080
c. Formwork to slab and beam	665	m ²	350.00	232,750
d. Allow 5% for miscellaneous (rounded up)				40,000
		Total for Horizontal elements:		812,946
Vertical elements				
a. Reinforced concrete, grade 45D; to structural wall	227	m ³	1,300.00	295,100
b. Rebar to structural wall (280kg/m ³)	63,560	kg	12.00	762,720
c. Formwork to structural wall	2,268	m ²	350.00	793,800
d. Allow 5% for miscellaneous (rounded up)				100,000
		Total for Vertical elements:		1,951,620
		Total		2,764,350
		Say		2,770,000
1.2 Internal walls				
a. 75mm thick concrete block wall	546	m ²	700.00	382,200
b. Glass partition for shower	45	m ²	5,000.00	225,000
		Total		607,200
		Say		610,000
1.3 Doors and shutters				
a. Double leaf doors to flat entrances	5	no.	20,000.00	100,000
b. Single leaf to bedroom	20	no.	6,000.00	120,000
c. Single leaf doors to bathroom	10	no.	6,000.00	60,000
d. Single leaf doors to kitchen	10	no.	7,000.00	70,000
e. Single leaf doors to living/dining room	10	no.	6,000.00	60,000
f. Single leaf doors to roof	5	no.	7,000.00	35,000
		Total		445,000
		Say		450,000
2.1 External walls				
a. 200mm thick reinforced concrete wall	1,079	m ²	1,100.00	1,186,900
b. 150mm thick reinforced concrete parapet wall	33	m ²	1,100.00	36,300
		Total		1,223,200
		Say		1,230,000

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Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

<i>Back-up Calculations for 5. Superstructure</i>				
<i>Total Construction Floor Area (CFA):</i>		550 m2	$= 110 \text{ m2} \times \text{CFA} \times 5\text{houses}$	
				Phase 1
<i>Descriptions</i>	<i>Quantity</i>	<i>Unit</i>	<i>Rate</i>	<i>Estimated Cost</i>
			(HK\$)	(HK\$)
2.2 External wall finishes				
a. Ceramic tiles (P.C. HK\$50/m2) to external wall	1,079	m2	450.00	485,550
b. Ceramic tiles (P.C. HK\$50/m2) to parapet wall	66	m2	450.00	29,700
			Total	<u>515,250</u>
			Say	520,000
2.3 Windows				
a. Window to bedroom	56	m2	3,500.00	196,000
b. Window to bathroom	6	m2	3,500.00	21,000
c. Window to kitchen	11	m2	3,500.00	38,500
d. Window to living/dining room	28	m2	3,500.00	98,000
e. Window to internal staircase	56	m2	6,000.00	336,000
			Total	<u>689,500</u>
			Say	690,000
3.1 Roof finishes				
a. Tiles including cement sand screed, insulation and waterproofing	46	m2	1,300.00	59,800
b. Waterproofing and insulation only	6	m2	500.00	3,000
c. Allow for skirting (10%)		sum		<u>6,280</u>
			Total	<u>69,080</u>
			Say	70,000
3.2 Floor finishes				
a. Natural stone to house entrance	33	m2	1,400.00	46,200
b. Stone finishes to bedroom	108	m2	1,400.00	151,200
c. Stone finishes to bathroom	29	m2	1,400.00	40,600
d. Stone finishes to kitchen	38	m2	1,400.00	53,200
e. Stone finishes to living/dining room	205	m2	1,400.00	287,000
f. Stone finishes to internal staircase; including nosing tiles	107	m2	1,400.00	149,800
g. Allow for skirting (10%)		sum		<u>72,800</u>
			Total	<u>800,800</u>
			Say	810,000

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

Back-up Calculations for 5. Superstructure

Total Construction Floor Area (CFA): 550 m2 = 110 m2 × CFA × 5houses

Descriptions	Quantity	Unit	Rate	Phase 1
				Estimated Cost
			(HK\$)	(HK\$)
3.3 Internal wall finishes				
a. Plaster with emulsion paint to house entrance	147	m2	200.00	29,400
b. Plaster with emulsion paint to bedroom	592	m2	200.00	118,400
c. Glazed ceramic tiles to bathroom	207	m2	650.00	134,550
d. Glazed ceramic tiles to kitchen	240	m2	500.00	120,000
e. Plaster with emulsion paint to living/dining room	662	m2	200.00	132,400
f. Plaster with emulsion paint to internal staircase	266	m2	200.00	53,200
			Total	587,950
			Say	590,000
3.4 Ceiling finishes				
a. Plaster with emulsion paint to house entrance	33	m2	200.00	6,600
b. Plaster with emulsion paint to bedroom	108	m2	200.00	21,600
c. Gypsum board suspended ceiling to bathroom	29	m2	1,500.00	43,500
d. Gypsum board suspended ceiling to kitchen	38	m2	1,500.00	57,000
e. Plaster with emulsion paint to living/dining room	205	m2	200.00	41,000
f. Plaster with emulsion paint to internal staircase	107	m2	200.00	21,400
g. Allow for bulkhead	5	house	15,000.00	75,000
			Total	266,100
			Say	270,000
3.5 Decor, Graphics and Signage				
a. Decor, graphics and signage		sum		730,000
			Total	730,000
			Say	730,000
4.1 Built-in furniture				
a. Kitchen cabinet with worktop	10	no	90,000.00	900,000
b. Vanity counter with marble countertop and mirror cabinet to bathroom	10	no	15,000.00	150,000
c. Letter box	5	house	1,500.00	7,500
			Total	1,057,500
			Say	1,060,000
4.2 Metal works ad sundries				
a. Metal works and sundries	550	m2	100.00	55,000
			Total	55,000
			Say	60,000

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

Back-up Calculations for 5. Superstructure

Total Construction Floor Area (CFA): 550 m² = 110 m² × CFA × 5 houses

				Phase 1
Descriptions	Quantity	Unit	Rate	Estimated Cost
			(HK\$)	(HK\$)
4.3 Artwork				
a. Artwork at house entrance	5	no	100,000.00	<u>500,000</u>
			Total	<u>500,000</u>
			Say	500,000
4.4 Equipment				
a. Kitchen appliances	10	house	40,000.00	400,000
b. Electric water heater to kitchen	10	house	5,000.00	<u>50,000</u>
			Total	<u>450,000</u>
			Say	450,000
4.5 Special light fittings				
a. Special lighting fittings for house entrance		sum		10,000
			Total	<u>10,000</u>
			Say	10,000
5.1 Sanitary fittings				
a. Sanitary fittings to bathroom	10	no	15,000.00	150,000
b. Allow for bathroom accessories	10	set	5,000.00	<u>50,000</u>
			Total	<u>200,000</u>
			Say	200,000
5.2 Plumbing and drainage				
a. Plumbing and drainage	550	m ²	1,000.00	<u>550,000</u>
			Total	<u>550,000</u>
			Say	550,000
5.3 Electrical				
a. Electrical	550	m ²	1,500.00	<u>825,000</u>
			Total	<u>825,000</u>
			Say	830,000
5.4 Fire Services				
a. Fire services	550	m ²	500.00	<u>275,000</u>
			Total	<u>275,000</u>
			Say	280,000

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

Back-up Calculations for 5. Superstructure

Total Construction Floor Area (CFA): 550 m² = 110 m² x CFA x 5houses

				Phase 1
Descriptions	Quantity	Unit	Rate (HK\$)	Estimated Cost (HK\$)
5.5 Mechanical Ventilation and Air Conditioning				
a. Split type air conditioning to house entrance	5	no	20,000.00	100,000
b. Thermal ventilator to bedroom	20	no	6,000.00	120,000
c. Ventilation fans to bathroom and kitchen	20	no	6,000.00	120,000
d. Allow for bulkhead of mechanical ventilation	5	house	6,000.00	30,000
			Total	370,000
			Say	370,000
5.6 Gas				
a. Gas	550	m ²	200.00	110,000
			Total	110,000
			Say	110,000
5.7 Builders works 5% of Building Services		Sum		117,000
			Total	117,000
			Say	120,000
			Total of 5. Superstructure (Phase 1)	13,280,000

Table 1.5 Example 3: The cost plan for completion of conceptual design for phase 1 (Cont'd)

FORECAST OF CONSTRUCTION COST FLUCTUATION

Price Level in Estimate: July 2018

* Assumed fluctuation percentage as follows:-
 January 2018 to December 2018: +1%
 January 2019 to December 2019: +3%
 January 2020 to December 2020: -1%

Works Packages	Phase 1				Anticipated Tender Award Date	Percentage Calculation	Fluctuation Percentage	Fluctuation Period	Year 2018	Year 2019	Year 2020
	Anticipated Construction Sum as of July 2018 Level	Anticipated Contract Sum (Included Preliminaries and Contingencies)	Anticipated Cost of Inflation upto Tender Date	Total Construction Cost Including Inflation							
1. Site Investigation	(HK\$) 600,000	(HK\$) 762,000	(HK\$) 2,000	(HK\$) 764,000	October 2018	Formula $(1 + 1\%)^{(2/12)} - 1 =$	(% p.a.) 0.17%	(Month) 2	+1% 2	+3% –	–1% –
2. Hoarding	2,000,000	2,539,000	11,000	2,550,000	January 2019	$(1 + 1\%)^{(5/12)} - 1 =$	0.42%	5	5	–	–
3. Site Formation Works	2,200,000	2,792,000	12,000	2,804,000	January 2019	$(1 + 1\%)^{(5/12)} - 1 =$	0.42%	5	5	–	–
4. Foundation and Substructure	1,080,000	1,370,000	27,000	1,397,000	July 2019	$(1 + 1\%)^{(5/12)} \times (1 + 3\%)^{(6/12)} - 1 =$	1.91%	11	5	6	–
5. Main Contract Works (including Superstructure, External Works & Landscaping)	36,830,000	46,747,000	1,403,000	48,150,000	June 2020	$(1 + 1\%)^{(5/12)} \times (1 + 3\%) \times (1 - 1\%)^{(5/12)} - 1 =$	3.00%	22	5	12	5
6. Preliminaries (15%)	6,500,000	Included	Included	Included							
7. Contingencies (10%)	5,000,000	Included	Included	Included							
total	54,210,000	54,210,000	1,455,000	55,665,000			5.92%				