PRELIMINARY ESTIMATE FOR
PROPOSED RESIDENTIAL DEVELOPMENT
AT 45-50 ABC ROAD, HONG KONG

Development Brief:

Site Area: 1200m2 CFA: 13690m2 GFA: 10080m2

Storey: 25 storey + 1 storey basement Flat: 168 no.

CFA / GFA Schedule:

		CFA (m2)	GFA (m2)
1 level	Sky Garden	480	-
23-storey	Residential Tower	11040	9600
1 level Podium	Clubhouse	552	480
	Residential Podium	408	-
Basement	Carpark	1200	-
	Total	13680	10080

Assume CFA:GFA = 1.15

Summary of Cost:

Item	Description	Estimated Cost $	Cost per CFA	Cost per GFA
(a)	Site investigation			
(b)	Demolition and hoardings			
(c)	Foundation			
(d)	Excavation and lateral supports			
(e)	Basement screen walls, wearing slabs and waterproofing			
(f)	Substructure			
(g)	Superstructure			
(h)	External works and drainage			
	External paving and landscaping works including Podium Garden and Outdoor Swimming Pool			
	Underground drainage			
	Utility connections			
(i)	Contingencies			
	Total			

Note: All prices are at September 2016 price level.

List of Assumption:

As description in other sections.

Inclusion:

All costs above included contract price fluctuation based on 3% per annum from September 2016 onwards.

Exclusion:

- Land cost or conversion premium; rates, taxes, government premiums and other outgoings
- Financing charges, marketing costs and developer's overhead
- Professional fees, legal fees, sales and letting charges
- Provision of utility service and drainage facilities of adequate capacity to the vicinity on the site
- Landscape compensation charges
- Works outside site boundary
- Built-in furniture, loss furniture, fittings and equipment

Cost Breakdown

Site investigation

The cost would depend very much on the number of boreholes and trial pits required. An allowance in the range of $300,000 to $1,000,000 without breakdown would be allowable.

Demolition and hoardings with breakdown

There should at least be two items in the breakdown:

(a) Costs of hoardings and covered walkways based on the perimeter length of the site ((30 + 40)m x 2 = 140m) with deduction of length against adjoining building (small additions at corners can be ignored); and

(b) Costs of demolition of the existing building based on the building area (1,200m2 x 6 = 7,200m2 ignoring roof features) or building volume (grubbing of underground may be included here or in the foundations or excavation).

Shoring or treatment to the face of the adjoining building should be addressed.

Foundations

Piling provisions can be calculated based on the assumption as to the ratio of sectional area of bored pile cross to CFA e.g. 1m2 bored pile section supporting 200m2 CFA.

Volume of piling = 1m2 / 200 x 40m deep = 0.2m3 bored pile per m2 CFA.
Piling cost per m2 CFA = 0.2m3 @$10,000/m3 = $2,000 per m2 CFA.

The approach rather than the accuracies of the quantities of piles and unit rates assumed is more important.

If a Candidate simply assumed a unit rate per site area or floor area, he should have given the source of the unit rate and explained that it would be applicable.

Excavation and lateral supports with breakdown

There should at least be three items in the breakdown:

(a) Costs of excavation including dewatering and disposal based on the volume of excavation; and

(b) Costs of the lateral supports (273mm diameter pipe piles) based on the basement perimeter length x depth of pipe piles; and

(c) Costs of strutting and shoring based on the basement perimeter length x depth of excavation x 600 kg/m2.

Question No. 1 – Cost Estimate (Cont'd)

NOTES TO ASSESSORS

The site area can be taken as the approximate excavation area, while the actual may differ.

The depth of excavation should be based on the storey height of the basement with some addition for the basement bottom slab and other footings and pipe caps below, and some deduction for the difference in ground floor level and existing ground level.

The perimeter of the site can be taken as the approximate perimeter length of the lateral support, while noting that there is an adjoining building.

The depth of perimeter pipe piles should be based on the excavation depth with addition for the embed length.

Again, the approach rather than the accuracies of the quantities of pipe piles and unit rates assumed is more important.

Basement screen walls, wearing slabs and waterproofing with breakdown

There should at least be two items in the breakdown:

(a) Costs of basement screen walls including their related waterproofing based on the area of the screen walls; and

(b) Costs of wearing slabs on top of basement bottom slabs including their related sub-soil drainage layer and waterproofing based on the area of the basement.

Substructure

While no breakdown is required, the cost should be estimated based on the total CFA (13,680m2, build-up provided under 'superstructure' below) @ $800 to $1,200/m2 CFA.

Candidates should have given the source of the unit rate and explained that it would be applicable.

Question No. 1 – Cost Estimate (Cont'd)

NOTES TO ASSESSORS

Superstructure

While no breakdown is specifically required, the cost should be estimated based on the different usage of the superstructure construction floor area, which can be calculated as:

(a) Carpark CFA = 1,200m2 @ $9,000/m2 CFA;

(b) Club house CFA = 9,600m2 GFA x 5% x 1.15 CFA/GFA = 552 m2 @ $40,000/m2 CFA;

(c) Residential Podium CFA= 1,200m2 x 80% - 552m2 = 960 - 552m2 = 408m2 @ $35,000/m2 CFA;

(d) Residential Tower CFA (assuming GFA x 1.15 including roof stairs and plant rooms) = 9,600m2 x 1.15 = 11,040m2 @ $26,000/m2 CFA

(e) Sky garden CFA = 11,040m2 / 23 storeys = 480m2 (ignoring effects of roof stairs and plant rooms) @ $18,000/m2 CFA.

The total construction floor area (CFA) would be (1,200 (basement) + 960 (podium) + 11,040 (tower) + 480 (sky garden)) m2 = 13,680m2.

External works and drainage with breakdown

There should at least be five items in the breakdown:

(a) Costs of external paving and landscaping works at ground floor based on the site area outside the podium (1200 - 960)m2 = 240m2 @ $3,000/m2 to $4,000/m2 including lighting and site drainage; and

(b) Costs of swimming pool = 150m2 @ $30,000/m2 including filtration plant;

(c) Costs of podium garden (960 – 480 tower – 150 pool)m2 = 330m2 @3,000/m2 to $4,000/m2 including lighting and site drainage;

(d) Costs of underground drainage based on the site area; and

(e) Costs of utility connections based on a lump sum.

More careful Candidates may calculate the perimeter fence walls and entrance gate but the costs would be small as compared to the whole building.

2016 PP

THE HONG KONG INSTITUTE OF SURVEYORS
QUANTITY SURVEYING DIVISION
ASSESSMENT OF PROFESSIONAL COMPETENCE
FINAL ASSESSMENT – 13TH & 14TH SEPTEMBER 2016
PRACTICE PROBLEMS
NOTES TO ASSESSORS

Question No. 1 – Cost Estimate (Cont'd)

NOTES TO ASSESSORS

Preliminaries

The unit costs provided in the question paper are already inclusive of preliminaries. Therefore, other unit costs assumed by Candidates should also be inclusive of preliminaries.

Contingencies

5% to 10% allowance based on the costs of the works would be appropriate.

Inflationary allowance

The inflationary allowance should be calculated based on the cost of the contract package with due proportion for contingencies x inflationary multiplier.

The expected date for the return of the tender would be in November 2018 which is 26 months from September 2016.

The inflationary multiplier would be 1 + 0.03 x 26/12 = 1.065 based on flat rate, but would be 1.03 x 1.03 x (1 + 0.03 x 2/12) = 1.03 x 1.03 x 1.005 = 1.066 based on compound rate.

The inflationary allowance during the period of construction is normally included in the tender prices (except for contracts with fluctuation adjustments) which are used for estimating the current cost estimate, and therefore an extra allowance should not be necessary unless the construction period is abnormally long or unless the tender prices are from contracts with fluctuation adjustments.

Note: Answers covering 70% of the above should have full mark.

[20 marks]

2016 APC Answer

2016 Question No. 1 ANSWER

PROPOSED RESIDENTIAL DEVELOPMENT
AT 45-50 ABC ROAD, HONG KONG
PRELIMINARY ESTIMATE (10 Marks)

SUMMARY OF ESTIMATE

Total Site Area	=	1,200	m2
Total Gross Floor Area (GFA)	=	9,600	m2 (168 flats; av.57m2./ Flat)
Total Construction Floor Area (CFA)	=	13,680	m2
CFA/GFA	=	1.43	

24th September 2016

ITEMS	GFA	CFA	ESTIMATED COST	UNIT COST	
	(m2)	(m2)	(HK$)	(HK$/m2 CFA)	(HK$/sq. ft. GFA)
1. Site Investigation Works			800,000	58	8
2. Demolition and Hoarding			10,800,000	789	105
3. Foundation and Substructure			38,300,000	2,801	371
3.1 Foundation (assume adopting bored piles 40m deep from existing ground level)			27,360,000	2,000	265
3.2 Substructure			10,940,000	800	106
4. Basement Enclosure			29,100,000	2,127	282
4.1 Excavation and Lateral Supports (assume adopting 273mm Pipe piles without grout curtain)			25,400,000	1,857	246
4.2 Basement Screen Wall, Wearing Slab and Waterproofing			3,700,000	270	36
5. Superstructure	9,600	13,680	342,840,000	25,061	3,318
5.1 Carpark (1 level)		1,200	10,800,000	9,000	105
5.2 Clubhouse (allow 5% of Domestic GFA + 15%)		552	22,080,000	40,000	214
5.3 Residential Podium		408	14,280,000	35,000	138
5.4 Residential (CFA = GFA+ 15%)	9,600	11,040	267,040,000	26,000	2,778
5.5 Skygarden (1 level)		480	8,640,000	18,000	84
6. External and Landscaping Works			13,000,000	947	126
6.1 External Paving and Landscaping Works			10,400,000	760	101
6.2 Underground Drainage			2,100,000	150	20
6.3 Utilities Connections			500,000	37	5
Sub-total	9,600	13,680	434,640,000	31,787	4,208
7. Contingencies (10%)			43,480,000	3,178	421
Total Anticipated Construction Cost at September 2016 Price Level	9,600	13,680	478,320,000	34,965	4,629

2016 Question No. 1 ANSWER

PROPOSED RESIDENTIAL DEVELOPMENT
AT 45-50 ABC ROAD, HONG KONG
PRELIMINARY ESTIMATE

SUMMARY OF ESTIMATE

Exclusions

Cost for the following items are excluded from this Estimate :-

1. Land cost.
2. Financing charges, marketing costs and developer's overheads.
3. Legal fees, sales and letting charges.
4. Design and consultant fees and project management fees
5. Mock up, show flats and sales office.
6. Works outside Site boundary.
7. Fluctuation in construction cost from August 2016 price level to those at the date of tenders for the various construction packages.

2016 Question No. 1 ANSWER

PROPOSED RESIDENTIAL DEVELOPMENT
AT 45-50 ABC ROAD, HONG KONG 24th September 2016

CONFIDENTIAL

BACKUP CALCULATIONS

2. Demolition and Hoarding (2 marks)

a.	Demolition of existing building (6 levels)	7,200	m2	800	5,760,000
b.	Covered walkway with gantry (boundary facing roads)	110 (= 40+30+40)	m	25,000	2,750,000
c.	Temporary support to adjacent old building		sum		800,000
d.	Preliminaries (15%)		15%		1,396,500
					10,706,500
				say	10,800,000

4. Basement Enclosure

- pipe pile
- strutting
- excavation
- dewatering

Excavation Area	1,200	m2	
Excavation Depth:			
Basement storey height	3.5	m	
Wearing slab	0.5	m	
Base Slab and Pile Caps (assume average 2m thick)	2.0	m	
	6.0	m	
Pipe pile depth: assume 2 times of excavation	12.0	m	
Basement perimeter:	140	m	

4.1 Excavation and Lateral Supports (3 marks)

a.	CHS 273mm pipe pile 8mm thick; assume 12m deep (assume at 400mm centre to centre)	4,200	m	2,000	8,400,000
b.	Strutting; assume 600kg/m2; 6m deep	504,000	kg	18	9,072,000
c.	Excavation (including cart away / backfill); average 6m deep	7,200	m3	500	3,600,000
d.	Dewatering		5%		1,053,600
e.	Preliminaries (15%)		15%		3,316,840
					25,444,440
				say	25,400,000
				$/m2 total Basement CFA	$21,167/m2

4.2 Basement Screen Wall, Wearing Slab and Waterproofing (3 marks)

- screen wall
- waterproof to wall
- waterproof to basement slab
- wearing slab

Basement storey height	3.5	m
Wearing slab	0.5	m
Height of Basement Screen Wall:	4.0	m
Add side of pile caps	2.0	m
Height of Waterproofing to Screen Wall:	6.0	m

a.	400mm Basement RC screen wall	560	m2	2,600	1,456,000
b.	Waterproofing to wall	840	m2	450	378,000
c.	Waterproofing to basement slab (allow 30% of basement slab area for sides of pile caps)	1,560	m2	450	702,000
d.	Wearing slab	1,200	m2	550	660,000
e.	Preliminaries (15%)		15%		479,400
					3,675,400
				say	3,700,000
				$/m2 total Basement CFA	$3,083/m2

2016 Question No. 1 ANSWER

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CONFIDENTIAL

BACKUP CALCULATIONS

6.1 External Paving and Landscaping Works (2 marks)

Paving at G/F

Site Area	1,200	m2	
Less Ground Floor CFA	(960)	m2	
Paving at G/F	240	m2	

Podium Landscaping and Pool

G/F CFA	960	m2
Less Tower CFA	(480)	m2
Podium Outdoor Area:	480	m2
Less Pool Area:	(150)	m2
Podium Garden	330	m2

a.	Ground Floor - Paving and landscaping	240	m2	3,500	840,000
b.	Podium - Outdoor swimming pools including filtration plant	150	m2	35,000	5,250,000
c.	Podium - Garden	330	m2	5,000	1,650,000
d.	Fence wall along Site boundary facing roads	100	m	10,000	1,000,000
e.	External signage				300,000
f.	Preliminaries (15%)		15%		1,356,000
					10,396,000
		480	M2	21,667	10,400,000