Annexure-B

GUIDELINES FOR PREPARATION OF PRELIMINARY ESTIMATES FOR RETROFIT CONSTRUCTION

TYPE OF ESTIMATES:

- Preliminary Estimate
- Detail Estimate

PRELIMINARY ESTIMATE:

Notes on Preliminary Estimate

1. In the preliminary estimate cost chart, the rates are to assess the cost of retrofitting works when detail architectural and structural design are not available.
2. Preliminary estimate cost chart is formulated by studying huge variables, data and assumptions only provide hints on the cost of retrofit construction over a couple of years.
3. A wide range variation of actual cost from preliminary estimate cost chart, directs to study (i) architectural & structural design (ii) site condition (iii) decision built up.
4. Exclusive works related to high density of cost in finishing works or any other unexpected deterioration of the existing building are beyond the scope of preliminary estimates.
5. Preliminary estimate never resembles an actual cost; instead, it's a probabilistic cost for fund conformity after time dependent tender and agreement procedure to run a smooth project.
6. Preliminary estimate cost chart includes 22.703% extra cost for providing contractor's profit, overhead charge and VAT.

Head of Accounts:

- Revenue
- Development

Requirements of Preliminary Estimate

The basic data required to conduct estimation of retrofitting works are as follows.

1. Request letter from requiring body
2. Approved site plan by the Department of Architecture
3. Approved building plan by the Department of Architecture
4. As-built Architectural drawings including each floor plan, section, elevation, site plan etc.
5. As-built Structural drawings
6. As-built Mechanical/Electrical/Plumbing drawings, as-built drawings of all utility connections
7. Material test reports of existing building such as concrete core compressive strength test report, rebar tensile strength test report etc.
8. Soil investigation report
9. Structural analysis, design drawings and materials specifications for retrofitting works
10. Observations/findings/suggestions/recommendations noted down from field survey

Check list before preparation of preliminary estimate:

In retrofitting, construction procedure and practical considerations play vital role. So, a precise field survey is required before estimation in order to verify and confirm the following-

1. Confirmation of actual condition with As-built drawing
2. Assessing building condition and confirmation of deterioration situation
3. Structure type and structural system
4. Applicability/limitations of the designed retrofitting methods (if any)
5. Apparent soil condition and approximate cost for sub-soil investigation
6. Special type of foundation: Raft or pile
7. Location and depth of drain and apron, septic tank/underground reservoir etc.

8. Conditions affecting construction work like- material carrying accessibility, road width, working time restriction (if any), noise regulation, etc.
9. Temporary construction requirements
10. Source of power supply and water supply
11. Drainage system obstacles and alternatives
12. Surface water & sewerage disposal
13. Need for site improvement/approach road etc.

Components of estimate

1. Project profile
2. Report
3. Abstract of cost
4. Estimate
5. Site plan
6. Building plan

Report Should Contain the Following Components:

1. Background and objectives
2. Description of the project
3. Rates of estimate.
4. Mode of financing
5. Charges

Cost For Retrofit Construction by Department and Private Owner:

- The cost will be reduced by **22.383%** (considering contractor's profit, overhead charge, VAT, price escalation and others) in case of retrofit construction by own management/private owner.

DETAIL ESTIMATE

Detail Estimation shall be carried out according to the guideline provided in PWD Schedule of Rate 2022, Annexure-B.

Annexure-C

Sample format of preliminary estimate

1	Assessment of existing building (TK. A =5% of (B+C))	TK.	A
2	Retrofitting construction of building: sub-structure cost up to ground floor (TK. B =B1+B2+B3+B4)	TK.	B
2.B1	Single footing and column jacketing up to ground floor (Cost for dismantling, safety protection, excavation, concrete, epoxy, filling & finishing work)	TK.	B1
2.B2	Column jacketing up to ground floor (Cost for dismantling, safety protection, excavation, concrete, epoxy, filling & finishing work)	TK.	B2
2.B3	Combined footing and shear wall up to ground floor (Cost for dismantling, safety protection, excavation, concrete, epoxy, filling & finishing work)	TK.	B3
2.B4	Sub-structure work for steel bracing up to plinth level (Cost for dismantling, safety protection, excavation, concrete & filling work)	TK.	B4
3.	Retrofitting construction of building: super structure cost (TK. C =C1+C2+C3+C4+C5+C6)	TK.	C
3.C1	Column jacketing work (Cost for dismantling, safety protection, concrete, epoxy & finishing work)	TK.	C1
3.C2	Beam jacketing work (Cost for dismantling, safety protection, concrete, epoxy & finishing work)	TK.	C2
3.C3	Shear wall construction work (Cost for dismantling, safety protection, concrete, epoxy & finishing work)	TK.	C3
3.C4	Steel bracing insertion work (Cost for dismantling, safety protection, concrete, epoxy, steel, non-shrink grout & finishing work)	TK.	C4

3.C5	Steel bracing insertion work with beam-column extension (Cost for dismantling, safety protection, concrete, epoxy, steel, non-shrink grout & finishing work)	TK.	C5
3.C6	Steel bracing insertion work with beam extension (Cost for dismantling, safety protection, concrete, epoxy, steel, non-shrink grout & finishing work)	TK.	C6
4.	Restoration and renovation civil works (TK. D =D1+D2+D3)	TK.	D
4.D1	Repairing & relocation of internal water supply and sanitation	TK.	D1
4.D2	Repairing & relocation of external water supply and sanitation	TK.	D2
4.D3	Repairing & relocation of external drain & apron	TK.	D3
5.	Restoration and renovation electrical works	TK.	E
6.	Fire fighting	TK.	F
	Sub Total (Sl. 1 to 6 / Tk A to F):	TK.	G
7.	Quality assurance, material sample collection & testing, etc. (1.00% on tk. G)	TK.	H
8.	Contingency (probable unforeseen expenditure related to work (Tk. I= J+K)	Tk.	I
8.A	Price Contingency (maximum 8.00% on Tk. G)	TK.	J
8.B	Physical Contingency (maximum 2.00% on Tk. G)	TK.	K
	Grand Total (Tk. L= G+H+I):	TK.	L

Annexure-D

Worked Out Example on Preparation of Retrofit Construction Preliminary Estimate

Building Type	:	Non-Residential Building
Building Category	:	Super Structure (8840 sft/per floor)
Type of structure	:	R. C. C. frame structure with 1: 1.5: 3 concrete (stone chips)
Location	:	Dhaka
Foundation	:	Shallow foundation, 6 storied
Sub-structure upto Ground Floor Information		
Column Jacketing with Footing	:	15 Nos
Column Jacketing without Footing	:	15 Nos
Shear Wall with Footing	:	4 Nos
Sub-structure for Steel bracing	:	8 Nos
Super Structure Information		
Column jacketing	:	30 Nos
Beam Jacketing	:	12 Nos
Shear Wall Insertion	:	4 Nos
Steel Bracing Infill	:	4 Nos
Steel Bracing out fill Beam Column Ext.	:	2 Nos
Steel Bracing out fill Beam Ext.	:	2 Nos

1. **Assessment of existing building (A)**

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
A	Assessment of building and investigation cost = 5% on "B+C"	LS	71,078,943.45	1	1	5%	3,553,947.17
						Sub Total A =	**3,553,947.17**

2. Retrofitting construction of building: sub-structure cost up to ground floor (B)

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
B1	Single foundation with column up to ground floor cost from project data sheet unit rate of column with footing_1	m	71,098.00	5.21	15.00	78.15	5,556,308.70
B2	Column jacketing up to ground floor cost from project data sheet unit rate of column without footing_2	m	47,029.00	5.21	15.00	78.15	3,675,316.35
B3	Footing with shear wall construction cost from project data sheet unit rate of footing with shear wall_3	sqm	57,223.00	17.6	4.00	70.40	4,028,499.20
B4	Sub structure of steel bracing insertion cost from project data sheet unit rate of sub-structure brace_4	sqm	38,386.00	7.25	8.00	58.00	2,226,388.00
					Sub-Total: B =B1+B2+B3+B4		**15,486,512.25**

3. Retrofitting construction of building: super structure cost (C)

C1 Column jacketing work

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
a-1	1st. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	42,686.00	3.00	30	90.00	3,841,740.00
a-2	2nd. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	43,326.29	3.00	30	90.00	3,899,366.10
a-3	3rd. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	43,976.18	3.00	30	90.00	3,957,856.59
a-4	4th. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	44,635.83	3.00	30	90.00	4,017,224.44
	NB: Unit rate of Column member of a floor = 1.015 x that of previous floor				**Sub-Total:C1=**		**15,716,187.13**

C2 Beam jacketing work

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
b-1	Ground floor beam jacketing cost from project data sheet, beam jacketing_6, 4 m	m	49,502.00	4.00	12.00	48.00	2,376,096.00
b-2	1st. floor beam jacketing cost from project data sheet, beam jacketing_6, 4 m	m	50,244.53	4.00	12.00	48.00	2,411,737.44
b-3	2nd. floor beam jacketing cost from project data sheet, beam jacketing_6, 4 m	m	50,998.20	4.00	12.00	48.00	2,447,913.50
b-4	3rd. Floor Beam Jacketing cost from project data sheet, Beam Jacketing_6, 4 m	m	51,763.17	4.00	12.00	48.00	2,484,632.20
b-5	4th Floor Beam Jacketing cost from project data sheet, Beam Jacketing_6, 4 m	m	52,539.62	4.00	12.00	48.00	2,521,901.69

NB: Unit rate of Beam member of a floor = 1.015 x that of previous floor

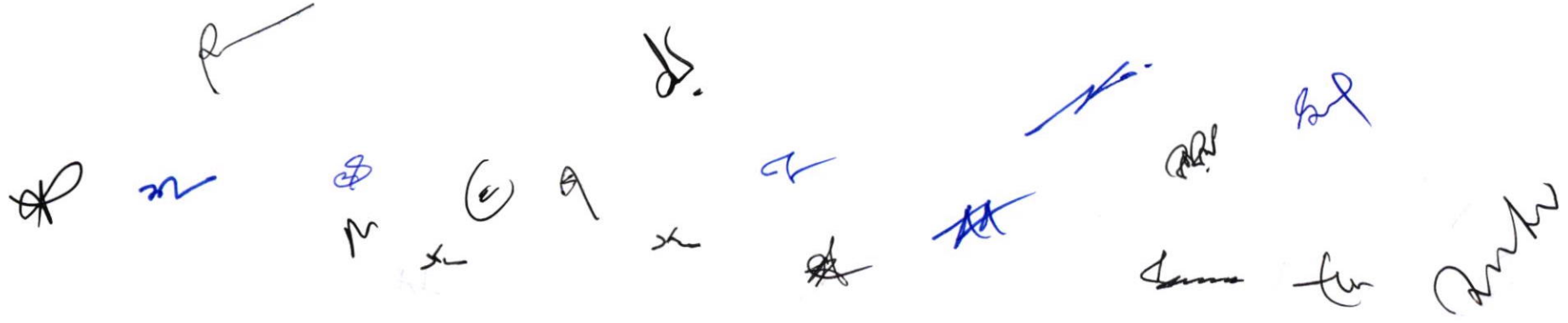
Sub-Total:C2= 12,242,280.83

C3 Shear wall insertion

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
c-1	1st. floor shear wall cost from project data sheet, in fill shear wall_7, 10.35 sqm	sqm	22,667.00	10.35	4.00	41.40	938,413.80
c-2	2nd. floor shear wall cost from project data sheet, in fill shear wall_7, 10.35 sqm	sqm	23,007.01	10.35	4.00	41.40	952,490.01
c-3	3rd. floor shear wall cost from project data sheet, in fill shear wall_7, 10.35 sqm	sqm	23,352.11	10.35	4.00	41.40	966,777.36
c-4	4th. floor shear wall cost from project data sheet, shear wall_7, 10.35 sqm	sqm	23,702.39	10.35	4.00	41.40	981,279.02

NB: Unit rate of shear wall member of a floor = 1.015 x that of previous floor

Sub-Total:C3= 3,838,960.18



C4 Steel bracing work

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
d-1	Ground floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	94,151.00	5.88	4.00	23.52	2,214,431.52
d-2	1st. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	95,563.27	5.88	4.00	23.52	2,247,647.99
d-3	2nd. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	96,996.71	5.88	4.00	23.52	2,281,362.71
d-4	3rd. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	98,451.66	5.88	4.00	23.52	2,315,583.15
d-5	4th. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	99,928.44	5.88	4.00	23.52	2,350,316.90
	NB: Unit rate of steel bracing member of a floor = 1.015 x that of previous floor					**Sub-Total:C4=**	**11,409,342.28**

C5 Steel bracing work with beam-column extension

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
e-1	Ground floor steel bracing insertion with beam-column extension cost from project data sheet, out fill shear wall, column+beam_9, 5.88 sqm	sqm	122,672.00	5.88	2.00	11.76	1,442,622.72
e-2	1st. Floor steel bracing insertion with beam-column extension cost from project data sheet, out fill shear wall, column+beam_9, 5.88 sqm	sqm	124,512.08	5.88	2.00	11.76	1,464,262.06
e-3	2nd. Floor steel bracing insertion with beam-column extension cost from project data sheet, Out fill Shear wall, Column+Beaml_9, 5.88 sqm	sqm	126,379.76	5.88	2.00	11.76	1,486,225.99
e-4	3rd. Floor steel bracing insertion with beam-column extension cost from project data sheet, Out fill Shear wall, Column+Beaml_9, 5.88 sqm	sqm	128,275.46	5.88	2.00	11.76	1,508,519.38

e-5	4th. Floor steel bracing insertion with beam-column extension cost from project data sheet, Out fill Shear wall, Column+Beaml_9, 5.88 sqm	sqm	130,199.59	5.88	2.00	11.76	1,531,147.17

NB: Unit rate of Steel Bracing member of a floor = 1.015 x that of previous floor

Sub-Total:C5= 7,432,777.33

C6 Steel bracing work with beam extension

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
f-1	Ground Floor **steel bracing insertion with beam extension** cost from project data sheet, Out fill Shear wall, Column+Beaml_10, 5.88 sqm	sqm	107,246.00	5.88	2.00	11.76	1,261,212.96
f-2	1st. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beaml_10, 5.88 sqm	sqm	108,854.69	5.88	2.00	11.76	1,280,131.15
f-3	2nd. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beaml_10, 5.88 sqm	sqm	110,487.51	5.88	2.00	11.76	1,299,333.12
f-4	3rd. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beam_10, 5.88 sqm	sqm	112,144.82	5.88	2.00	11.76	1,318,823.12
f-5	4th. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beam_10, 5.88 sqm	sqm	113,827.00	5.88	2.00	11.76	1,338,605.47

NB: Unit rate of steel bracing member of a floor = 1.015 x that of previous floor

Sub-Total:C6= 6,498,105.82

Total C= (C1+C2+C3+C4+C5+C6) 57,137,653.57

Sub-Total: B+C= 72,624,165.82

Sub-Total: A+B+C= 76,255,374.11

4. Restoration and renovation civil works (D)

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
4.D1	Repair and relocation of internal water supply and sanitation	LS	D1	1	1	1	D1
4.D2	Repair and relocation of external water supply and sanitation	LS	D2	1	1	1	D2
4.D3	Repair and relocation of external drain & apron	LS	D3	1	1	1	D3

Sub-Total D=(D1+D2+D3) D

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
5.	Restoration and relocation of electrical works (E)	LS	E	1	1	1	E
6.	Fire-fighting (F)	LS	F	1		1	F

Sub Total G= A+B+C+D+E+F G

7. Quality assurance, material sample collection & testing (1% of G) **"H"= 1% of G**

8. Contingency (probable unforeseen expenditure related to work (I)

8.A Price contingency (maximum 8.00% on Tk. G) **"J"= 8% of "G" or Actual need**

8.B Physical contingency (maximum 2.00% on Tk. G) **"K"= 2% of "G" or Actual need**

Sub-Total I = (J + K)

Grand Total L = (G+H+I)