List of Addendum-2 (Package-2.2)

No.	No. of Query	Volume / Section / Clause / Item / Page	Addendum
1	26	Vol 2, Annex 8 - 5	Vol 2, Annex 8-5, page 8-30
2	16, 20, 28	Vol 3, Price Schedule	Vol 3, Price Schedule B1, Schedule 3
3	-	Vol 2, Annex 7.1a	Vol 2, Annex 7.1.a – 3 pages
4	-	Vol 2, 7.2.7: Concrete Mix Design, Page 7-7	The sentence "**Admixture shall not be used in concrete mix design**" shall be read after the paragraph under clause 7.2.7 of sections 7 foundation of bid document volume 2

Approved by ____________

Schedule No. 3. Design Services

Item	Description	Unit	Quantity (1)	Unit Price[1]		Total Price[1]	
				Foreign Currency Portion [EURO] (2)	Local Currency Portion [BDT] (3)	Foreign [EURO] (1) x (2)	Local [BDT] (1) x (3)
1	Detailed line design including plan and profiles; conductor, earthwire and OPGW sag tension calculations; tower spotting, establishment of line schedule; Design of insulator strings, OPGW and earthwire attachments	Lot	1				
2	Foundations design for soil for all soil types including additional soil investigation and additional soil resistivity measurement	Lot	1				
3.1.	Design of "1T" tower - for complete Lot	Lot	1				
3.2.	Proto Assembly Test of "1T" tower	Lot	1				
3.3.	Load Test of "1T" tower	Lot	1				
4	Others	Lot	1				
Total (to Schedule No. 5. Grand Summary)							

1 In accordance with specifications in Bid Data Sheet under ITB 19.1.
2 Please specify the currency.

Name of Bidder: Signature of Bidder:

ANNEXURE-7.1(a)

DETERMINATION OF DEPTH OF FIXITY, LATERAL DEFLECTION AND MAXIMUM MOMENT OF LATERALLY LOADED PILES

7-1. DETERMINATION OF LATERAL DEFLECTION AT THE PILEHEAD AND DEPTH OF FIXITY

7.1.1 The long flexible pile, fully or partially embedded, is treated as a cantilever fixed at some depth below the ground level (see Fig. 2).

7-1.2 Determine the depth of fixity and hence the equivalent length of the cantilever using the plots given in Fig. 2.

Where $$T = \left(\frac{EI}{K_1}\right)^{\left(\frac{1}{5}\right)}$$

(k_1 is a constants given in Tables 1 below, E is the Young's modulus of the pile material in kg/cm2 and I is the moment of inertia of the pile cross-section in cm^4).

Note: Fig. 2 is valid for long flexible piles where the embedded length Le is ≥ 4R or 4T.

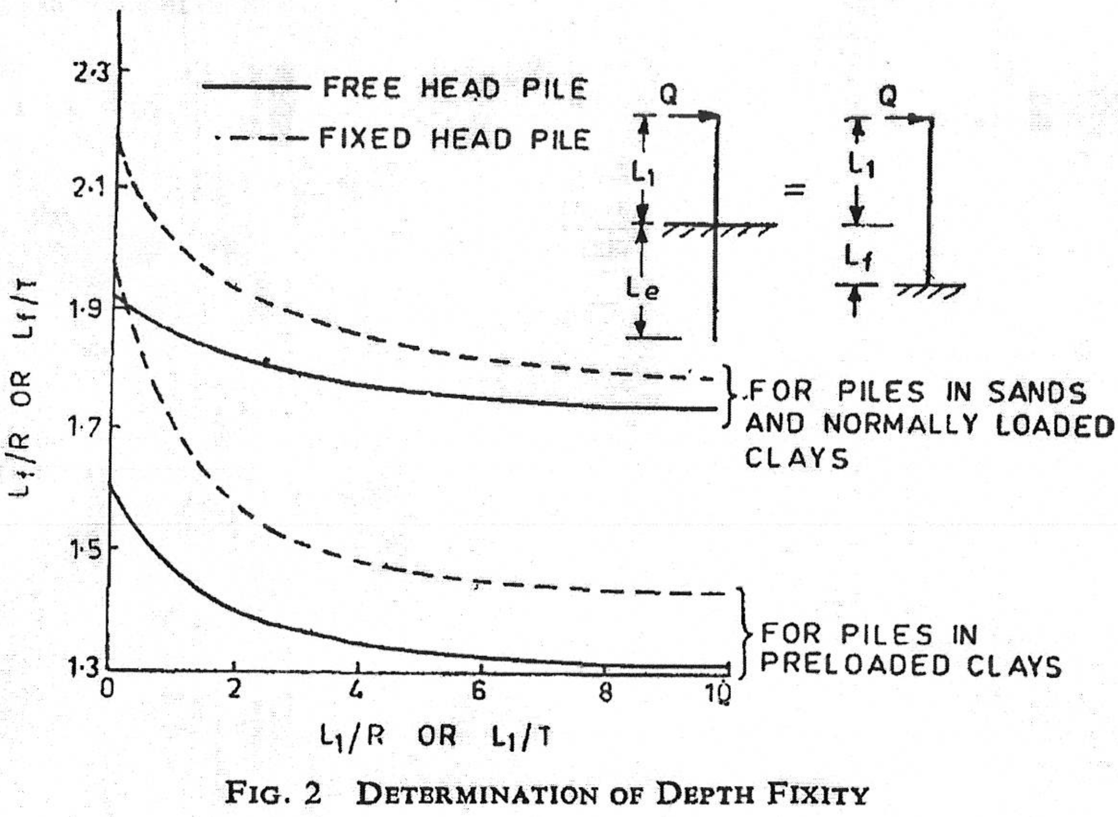

FIG. 2 DETERMINATION OF DEPTH FIXITY

K_1 is the constant of modulus of horizontal subgrade reaction, Values of k_1 are given below

Soil Category	Value of constant k_1 Kg/cm^3
Soil Category 2	1.00
Soil Category 3	0.525
Soil Category 4	0.146

Table 1: Values of constant k_1

7.1.3 Knowing the length of the equivalent cantilever the pile head deflection (Y) shall be computed using the following equations:

$$Y = \frac{Q(L_1 + L_f)^3}{3EI}$$

..................for free head pile

$$= \frac{Q(L_1+L_f)^3}{12EI}$$

......................for fixed head pile

Here,

Y in cm

Q is the lateral load in kg

7.2. DETERMINATION OF MAXIMUM MOMENT IN THE PILE

7.2.1 The fixed end moment (M_F) of the equivalent cantilever is higher than the actual maximum moment (M) of the pile. The actual maximum moment is obtained by multiplying the fixed end moment

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Annex 8-4: Extensions

Tower Type	Type of Extension	Range (m)
132 kV Double-Circuit Towers for Single Grosbeak		
1DL	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1D1	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0,
1D25	Body/leg extension	Std., 1.5, 3.0, 4.5, 9.0
1DT6	Body/leg extension	Std. 1.5, ,3.0, 4.5, 6.0, 9.0
132 kV Four-Circuit Towers for Single Grosbeak		
1QL	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1Q15	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0
1Q30	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1QT6	Body/leg extension	Std. 1.5, ,3.0, 4.5, 6.0, 9.0
230 kV Double-Circuit Towers for Twin Mallard (not used)		
2DL	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0
2D3	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0, 18.0
2D25	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
2DT6	Body/leg extension	Std. 1.5, 3.0, 4.5, 6.0, 9.0
230 kV Double-Circuit Towers for Twin Mallard (not used)		
2QL	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
2Q1	Body/leg extension	Std., 1.5, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 25.0
2Q15	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
2Q30	Body/leg extension	Std. 1.5, 3.0, 4.5, 6.0, 9.0
2QT6	Body/leg extension	Std. 1.5, 3.0, 4.5, 6.0 & 9.0
132 kV Double-Circuit "1T" Tower for Single Grosbeak		
1T	Body/leg extension	Std. 1.5, ,3.0, 4.5, 6.0
230 kV Double-Circuit "2T" Tower for twin Mallard (not used)		
2T	Body/leg extension	Std. 1.5, ,3.0, 4.5, 6.0

Note: - Std. means Standard Tower

Annex 8-5: Basic Dimensions of Supports

Tower Type	Max. base width of standard height tower at k-point (m)	Max. width of Bottom Crossarm waist (m)	Min. height of standard height tower bottom conductor attachment point after creep or after load condition from k-point (m)
	x	y	z
1T	5.000	2.000	11.000
2T	6.500	2.200	13.000

Note:

i) In case the height of tower require to be increased as per detailed calculation on the basis of specification criteria then the width "x" to be considered as max. at calculated "z" height.

ii) Minimum height has been provided above. Height of towers to be calculated considering basic span and checked by the bidders/Contractors on the basis of criteria included in the specifica-

7.2.4.2 In addition to stubs of normal length, short stubs may be used, provided that provision is made for the attachment of bolted cleats.

7.2.4.3 Cleats shall be capable of transferring 100 percent of the design uplift working load (not factored load) and 50 percent of the design compression working load (not factored load) for shearing and bonding resistance.

7.2.5 Holding Down Bolts (Not Used)

7.2.6 Concrete Chimneys

7.2.6.1 Reinforced concrete chimneys shall be designed to withstand the maximum resultant horizontal residual shear component, with due allowance given where appropriate to resultant lateral (passive) earth pressure of the backfill (assumed to increase linearly with depth).

7.2.6.2 No allowance shall be made of the nominal strength of concrete in tension and the stub shall not be considered as providing any part of the tensile area of reinforcing steelwork.

7.2.6.3 The top of chimney of tower foundation shall be as per **Annex 7-8** to this Section.

7.2.6.4 Foundations for lattice steel tower legs with high hillside shear force, due to certain combinations of unequal leg extensions may however differ from those designed for level ground by the addition of extra reinforcement in the chimney.

7.2.7 Concrete Mix Design

7.2.9.1. The Contractor shall be entirely responsible for the control of the quality of concrete mixed and placed, in the Works. Before the commencement of any concrete work, the Contractor shall submit to the Engineer, a complete specification giving details of the materials used, source of supply, storage and quality control requirements, including preliminary trial mixes and works' tests reports. **This is a Hold Point.**

7.2.9.2. To ensure the durability of the concrete, the requirements specified in **Annex 7-6** shall be adhered to with regard to characteristic strength, minimum cement content and maximum free water/cement ratio. **Admixture shall not be used in concrete mix design.**

7.2.8 Concrete Cover

7.2.8.1. All structural steelwork and reinforcing including links and stirrups below ground level shall be completely encased in concrete to ensure a minimum cover as specified in **Annex 7-7**. Such cover shall exist from the point of entry into the concrete base to either 450 mm above final ground level, or to the top of the concrete leg extension.

7.2.8.2. All foundation concrete to a point 450 mm above final ground level shall be undertaken at the same time and using the same design mix as the main part of the foundation.