

## 1.0.0 INTRODUCTION

- 1.1.0 The purpose of this specification is to specify all details required by a Design Agency for:
- 1.1.1 Generating Civil and Structural designs & drawings of Control room buildings/ GIS building for 400kv Substation at Vellalaviduithi ,400 kV Switchyard (GIS) At Udangudi,400 kV Switchyard at Yadadri & 400 kV Switchyard at Patratu Being Executed By BHEL. The **Customer** are M/s TANGEDCO (Udangudi), M/s TANTRANSCO (Vellalaviduithi), M/s NTPC (Patratu) & M/s TSGENCO (Yadadri).

## 2.0.0 SCOPE

- 2.1.0 Preparation & submission/correction/resubmission of detailed design &/or drawing of any item or items indicated in Annexure I ***including their approval from Consultant /Customer*** based on BHEL's input and BHEL's/Customer's Specification. The detailed design & drawing work shall include, but not limited to :
  - 2.1.1 Verification of all data, criteria and information contained in the contract documents.
  - 2.1.2 Generation of all data, criteria and information required for the completion of work including liaison and interfaces with BHEL/Consultant/Customer.
  - 2.1.3 Analysis and design on standard software like STAAD pro, etc., and/or in house generated EXCEL or other programs by qualified and experienced personnel. All calculations shall be prepared in a neat, sequential, comprehensive form and properly checked to ensure their correctness and completeness.
  - 2.1.4 Preparation of construction drawings with sufficient detailing so that no difficulty is faced by site engineers during execution.
  - 2.1.5 Providing reinforcement quantities (diameter wise)/Structural steel for procurement purpose as and when required at various stages of project.
- 2.2.0 Visit to Site or Customer's/Consultant's office: The Design Agency shall depute their engineer(s) to site or Customer's/Consultant's office for any clarification etc. as required by BHEL/Consultant/Customer.
- 2.3.0 Switchyard Control Room Building shall be suitable for installation of Solar Photo Voltaic Panels on roof tops for Renewable Energy purpose for **NTPC Patratu Building Only**.
- 2.4.0 Building for **NTPC Patratu project** shall be designed as GRIHA (Green Rating for Integrated Habitat Assessment) compliant Green Building with a minimum Three (3) star rating. Bidder shall perform all services related to GRIHA certification including preliminary assessment, GRIHA facilitation, simulation & analysis leading to obtaining the final certification by GRIHA. For information about GRIHA, bidder is requested to visit the web site [www. Grihaindia.org](http://www.Grihaindia.org). Bidder shall obtain and submit final certificate from GRIHA to owner.

### 3.0.0 SPECIFIC TECHNICAL REQUIREMENTS

3.1.0 The specific technical requirements shall be as per input provided by BHEL from time to time after award of work.

3.2.0 The Design Agency shall interact closely with BHEL engineering group for any input/ clarification and finalize details across the table. There may be certain cases when on account of revision or change of inputs certain design/ drawing may be required to be redone. ***No claim on account of this shall be entertained.***

### 4.0.0 SCHEDULE OF ITEMS

4.1.0 The Schedule/BOQ of Items shall be as per **Annexure I**. The Design agency is required to quote their most competitive rates for these items. The quantities shown in annexure I are tentative and may vary to any extent as per project specific BOQs.

### 5.0.0 DOCUMENTATION

5.1.0 All design documents including computer outputs shall be neatly typed , produced on A4 size paper and shall have a 'Cover Sheet' (To be provided later).

5.2.0 All drawings shall be prepared in AutoCAD as per standard sizes (viz. A0, A1, A2, A3 & A4) and shall have a 'Title Block' (To be provided later).

5.3.0 The number of copies of design documents & drawings required to be submitted shall be as follows:

- |    |   |          |
|----|---|----------|
| A. | <i>At each stage of approval.</i>       |          |
|    | i) Design Documents                     | 02 sets. |
|    | ii) Drawings                            | 04 sets. |
| B. | <i>After Final approval.</i>            |          |
|    | i) Design Documents                     | 02 sets. |
|    | ii) Drawings                            | 04 sets. |
|    | iii) CDs (containing design & drawings) | 01 set.  |

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### 6.0.0 TIME SCHEDULE:

- 6.1.0 After receipt of work order, a detailed schedule giving list of design documents and drawings and their submission dates shall be prepared jointly by BHEL & Design Agency based on concurrent working meeting the construction schedule. This detailed schedule shall be the time schedule of the project and any delays attributable to agency in any activity shall be counted by this schedule. As the design and drawings will be approved by Customer, therefore time taken by customer in approval is also important for early completion of work. The agency is required to interact with customer and ensure minimum approval time.

| TIME SCHEDULE (FOR EACH BUILDING) |   |               |                      |  |                               |
|-----------------------------------|---|---------------|----------------------|--|-------------------------------|
| INPUT BY BHEL                     |   |               | SUBMISSION BY AGENCY |  |                               |
| S. No.                            | Description of Input  | Date of Input | S. No.               | Design /Drawings activity.   | Submission within time (Days) |
|                                   |   |               |                      |  |                               |
| 1                                 | 1. Conceptual plan of building, technical specification and soil report etc.<br>2 .Customer comments/ BHEL instruction. |               | 1                    | <b>Architectural drawings (Lot1):</b> Architectural plans, elevations, sections and finishing schedules. Any other sketch, plan/details required for developing architectural drawings/plans.        |                               |
|                                   |   |               | 1 (a)                | <b>R0 Submission:</b> (Nos of days from receipt of input)  | 20                            |
|                                   |   |               | 1(b)                 | <b>Resubmissions</b> : Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL.(Nos of days for each revision)   | 7                             |
|                                   |   |               | 2                    | <b>Design document:</b> The agency is required to start the design immediately after getting Cat -2 approval of architectural drawings (Lot1) of building or earlier if instructed by BHEL/Customer. |                               |
|                                   |   |               | 2(a)                 | <b>R0 Submission:</b> (Nos of days from cat 2 approval/instruction of BHEL)  | 15                            |
|                                   |   |               | 2(b)                 | <b>Resubmissions</b> : (Nos of days for each revision)   | 10                            |

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|   |  |  |      |  |    |
|---|--|--|------|--|----|
|   |  |  | 3    | <b>Structural drawings (Lot1):</b> All RCC details drawings up to plinth beams i.e foundations, column details ,plinth beams, tie beams if any and staircase dowel bars details etc.   |    |
|   |  |  | 3(a) | <b>R0 Submission:</b> (Nos of days from Cat 2 approval of Design document).  | 15 |
|   |  |  | 3(b) | <b>Resubmissions:</b> Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL.(Nos of days for each revision)  | 7  |
|   |  |  | 4    | <b>Architectural drawings ( Lot2):</b> Door & windows, soak pit ,septic tank , plumbing, water supply, sanitary, toilet/pantry details ,false ceiling drawings and other miscellaneous drawings such as garland drain, plinth protection, ramp, railings, roof treatment etc. Any other drawing required for completion. |    |
|   |  |  | 4(a) | <b>R0 Submission:</b> The agency is expected to put architectural & structural teams parallelly Therefore, work on these drawings can be started based on Cat 2 approval of architectural drawings (Lo1).  | 40 |
|   |  |  | 4(b) | <b>Resubmissions:</b> Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL.(Nos of days for each revision)  | 7  |
| 2 | Cut out, panel placement plan, GIS loading data, underhung cable racks and layout. |  | 5    | <b>Structural drawings (Lot2):</b> All RCC drawings above plinth beams i.e floor lintels, floor slabs, staircase and roof slabs.   |    |
|   |  |  | 5(a) | <b>R0 Submission:</b> (Nos of days from Cat 2 approval of Design document).  | 60 |
|   |  |  | 5(b) | <b>Resubmissions:</b> Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL.(Nos of days for each revision)  | 7  |

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| 3 | Internal cable trench layout | 6    | <b>Structural drawings (Lot3):</b> Grade slab, internal cable trenches, cable pull pit etc as per project requirement.                            |    |
|   |                              | 6(a) | <b>R0 Submission:</b> (Nos days from receipt of input)  | 10 |
|   |                              | 6(b) | <b>Resubmissions:</b> Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL.(Nos of days for each revision) | 7  |

### Notes:

- 1 All inputs shall be provided by e-mails in soft copy .The date of e-mail sent by BHEL shall be considered date of input.
- 2 The agency shall immediately acknowledge the receipt of input.

### 7.0.0 PAYMENT SCHEDULE:

| <u>S.No.</u>  | <u>Condition</u>  | <u>Payment</u>                       |
|---|---|--------------------------------------|
| <b><u>Item No 1A/ 1B/ 1C &amp; 1D of Sch./BOQ of Items (Annexure I)</u></b> |   |                                      |
| 1(a)  | On approval (at least Cat 2 i.e. approved with comments) of architectural drawings (Lot1).                            | 15% of quoted rate on prorata basis. |
| 1(b)  | On approval (at least Cat 2 i.e. approved with comments) of architectural drawings (Lot2).                            | 10% of quoted rate on prorata basis. |
| <b><u>Item No 1A/ 1B &amp; 1C of Sch./BOQ of Items (Annexure I)</u></b>     |   |                                      |
| 2   | On approval (at least Cat 2 i.e. approved with comments) of design documents.   | 10% of quoted rate on prorata basis. |
| 3(a)  | On approval (at least Cat 2 i.e. approved with comments) of all structural drawings up to plinth beams.(Lot1)         | 20% of quoted rate on prorata basis. |
| 3(b)  | On approval (at least Cat 2 i.e. approved with comments) of all balance structural drawings above plinth beams.(Lot2) | 30% of quoted rate on prorata basis  |

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| 3(c)   | On approval (at least Cat 2 i.e. approved with comments) of all balance structural drawings above plinth beams.(Lot3)   | 5% of quoted rate on prorata basis   |
| <b>Item No 1D of Sch./BOQ of Items (Annexure I)</b>                  |   |                                      |
| 2  | On approval of all design documents & drawings in Cat-I.  | 15 % of quoted rate.                 |
| 3(a)   | On approval (at least Cat 2 i.e approved with comments) of all foundation/structural drawings/Line diagrams (Lot1)  | 20% of quoted rate on prorata basis. |
| 3(b)   | On approval (at least Cat 2 i.e. approved with comments) of connection design & drawing of Column/ Rafter /Beam ,Bracings in Elevation & Roof plan etc.(Lot2) | 20% of quoted rate on prorata basis  |
| 3(c)   | On approval (at least Cat 2 i.e. approved with comments) of miscellaneous details/design & drawings.(Lot3)  | 10% of quoted rate on prorata basis  |
| <b>Item No 1A/ 1B/ 1C &amp; 1D of Sch./BOQ of Items (Annexure I)</b> |   |                                      |
| 4  | On submission of all design documents & drawings in Cat-I .   | 10 % of quoted rate.                 |
| <b>Item Bo. 2 of Sch./BOQ of Items (Annexure-I)</b>                  |   |                                      |
| ( i )  | On submission of claim after completion of visit.   | 100% of quoted rate.                 |

| ANNEXURE-I  |  |      |                 |         |           |          |           |                    |
|---|--|------|-----------------|---------|-----------|----------|-----------|--------------------|
| <b>BILL OF QUANTITIES</b><br><b>Name of Work: Civil Design Consultancy work of Substation Control room/GIS Buildings.</b> |  |      |                 |         |           |          |           |                    |
| Sl. No  | Description  | Unit | QUANTITY        |         |           |          |           | Unit Rate ( In Rs) |
|   |  |      | TANTRASCO       | NTPC    | TSGENCO   | TANGEDCO | Total Qty |                    |
|   |  |      | Vellalaviduithi | Patratu | Yadadri   | Udangudi |           |                    |
|   |  |      | Package-A       |         | Package-B |          |           |                    |
| 1   | Preparation & submission of design documents & drawings of following Switchyard Control Room/GIS/Other buildings including their approval from BHEL/Customer based on input from BHEL  |      |                 |         |           |          |           |                    |
| A   | Single storey RCC Control room: (Areas given below shall be sum total area of all the floors. For working out area, outer wall to outer wall dimensions shall be considered)   |      |                 |         |           |          |           |                    |
| (i)   | Greater than 100sqm but less than equal to 500sqm  | LS   |                 | 1       |           |          | 1         | 118600             |
| B   | Double storey RCC Control room: (Areas given below shall be sum total area of all the floors. For working out area, outer wall to outer wall dimensions shall be considered)   |      |                 |         |           |          |           |                    |
| (i)   | Greater than 500sqm but less than equal to 1000sqm   | LS   |                 |         |           | 1        | 1         | 188000             |
| (ii)  | Greater than 1000sqm but less than equal to 1500sqm  | LS   | 1               |         |           |          | 1         | 288000             |
| (iii)   | Greater than 1500sqm but less than equal to 2500sqm  | LS   |                 | 1       | 1         |          | 2         | 301987             |
| C   | Single Storey RCC GIS Building : (Storey height upto 15 meter .Area given below shall be floor area. For working out floor area, outer wall to outer wall dimensions shall be considered)                                    |      |                 |         |           |          |           |                    |
| (i)   | Greater than 1000sqm but less than equal to 1500sqm  | LS   |                 |         |           | 1        | 1         | 408000             |
| D   | Single Storey Structural steel/Pre engineered GIS Building ( Storey height upto 15 meter .Area given below shall be floor area. For working out floor area, outer wall to outer wall dimensions shall be considered)         |      |                 |         |           |          |           |                    |
| (i)   | Greater than 1500sqm but less than equal to 4000sqm  | LS   |                 | 1       |           |          | 1         | 1150000            |
|   | Note: The area of Mumty /stair head room shall not be considered in the above buildings area.  | LS   |                 |         |           |          |           |                    |
| 2   | Visit to Site / Customer's / Consultant's Office   |      |                 |         |           |          |           |                    |
| (i)   | LS Allowance per day including boarding, lodging, local conveyance, etc., all inclusive. (BHEL shall pay to & fro Ist AC fare from Bidder's headquarters to Site/Customer's /Consultant's office for each visit separately.) | day  | 6               | 8       | 6         | 10       | 30        | 10744              |
| Total Amount  |  |      |                 |         |           |          |           | -                  |