

## **Annexure –I**

### **Scope of work of Architect (as per the agreement signed by the Architect)**

#### **3. DETAILED SCOPE OF WORK**

The detailed scope of works for Architect/ Consultant shall comprise of the following for all the required Buildings/ Structures/ External & Internal Services/ Systems for the complete project but not limited to:

##### **3.1 ARCHITECTURAL, CIVIL, SANITARY AND STRUCTURAL WORK.**

3.1.1 Ascertain Employer's requirements and examine site constraints & potential for individual buildings, external and internal systems/services and prepare brief for Engineer/PMC's review/recommendations and Employer's approval including conceptual/ control designs/drawings/ documents and incorporate required changes, if any.

3.1.2 Study of project requirements and control drawings and preparation of design philosophy, basis & criteria for individual buildings, structures, external and internal services & systems for Engineer/PMC's review/ recommendations and approval from Employer.

3.1.3 Study and interpretation of soil investigation report and finalize input data for structural and foundation design for individual buildings/ structures/ equipments etc.

3.1.4 Preparation of detailed architectural working drawings including but not limited to, dimensioned plans, elevations, internal layout, sections, details etc for individual buildings/ structures.

3.1.5 Preparation of door/ window schedules, fitting schedules, finishing schedules, colour schemes, flooring patterns, reflected ceiling plans, ironmongery, joinery, installation details etc. for individual buildings/ structures/ equipments/ internal services etc.

3.1.6 Furnish necessary architectural norms, calculations etc to corroborate architectural detailing work.

3.1.7 Preparation of architectural and construction details such as fixing details, installation details, joinery, inserts, cut-outs, pockets, standard details and other construction details as required by site Engineers for successful completion of the project.

3.1.8 Study of input data and preparation of design calculations, schematic drawings and construction drawings for all external services, individual buildings pertaining to internal services such as:

3.1.8.1 External & Internal Plumbing System.

3.1.8.2 External & Internal Sewerage Piping System.

3.1.8.3 External & Internal Waste Water Piping System.

3.1.8.4 External and Internal rain Water System.

3.1.8.5 Connection of Internal Services Systems with external services network.

3.1.8.6 Furniture for R&D laboratories, Auditorium & other buildings.

3.1.9 The detailed working drawings to include flow/schematic diagrams, plans, elevations, sections, blow-ups etc for individual services complete with material take off.

3.1.10 Designate a qualified Structural Engineer, who shall be wholly and singly responsible for structural soundness and safety of the buildings/ structures design under its scope.

3.1.11 Preparation of detailed structural analysis & structural design calculations (including seismic design as applicable) based on design output, preparation of detailed structural drawings.

3.1.12 Collection of input data from Employer/Manufacturers/vendors and design structural foundations (including dynamic analysis as applicable) for individual plant & equipment to be installed. The structural designs to cater for specialized requirements pertaining to special equipments.

3.1.13 Preparation of bar bending schedules and/or detailed reinforcement drawings sufficient to enable the contractor to procure the steel from the market and cutting/bending and placing of the reinforcement..

3.1.14 Preparation of fabrication/ construction/ shop drawings including material take off etc. complete.

3.1.15 Detailed design, considering load data, Noise and Vibrations of equipments, drawings, cost estimates and specifications to cover all civil works associated with installation of all mechanical/ electrical equipment, services and systems.

3.1.16 Preparation of detailed specifications and data sheets for materials, work items, systems and services etc.

3.1.17 Preparation of detailed quantity estimates supported by detailed measurement sheets/ material take off sheets based on detailed drawings.

3.1.18 Preparation and submission of detailed cost estimates for buildings, structures, services & systems based on latest CPWD Schedule of Rates with necessary indices and correction slips, if any, applied thereupon. Preparation of rate analysis for the items, which are not available in CPWD-SOR, based on market rate quotations. Any deviation in quantity, items also to be supported by rate analysis. Also preparation of abstract of quantities building wise or package wise, as required.

3.1.19 Preparation of detailed ' Bill of Quantities' for Tender purposes for individual buildings/ structures and a consolidated statement thereof.

3.1.20 Preparation of list of recommended makes/ manufacturers for recommendations & approval of Engineer/ PMC.

3.1.21 Preparation of “As-built” drawings (on the basis of actual construction at site) including services and structures.

### **3.2 ELECTRICAL WORKS**

Load estimation and optimisation, design of system/ equipment, selection, description, Preparation of technical specifications, calculations, BOQ, drawings, SLD, schematics, blank data sheets recommended vendors list, rate analysis (with back up offers), cost estimates, obtaining clearances and certificates from statutory authorities wherever required for the following works:

#### **3.2.1 INTERNAL ELECTRIFICATION WORKS FOR INSTITUTIONAL BUILDINGS**

The major items shall include:

Lighting calculations for different buildings, Lighting & telephone layout drawings, conduit layout drawings, Mounting details of lighting fixtures and other fittings, Load calculations for internal electrification, DB/ SDB details of different circuits for lighting fixtures, fans, exhaust fans, sockets etc., earthing and Lightning protection system calculations & drawings, cable sizing details, cable schedule. Details of protection switch gear, calculation of breaking capacity of upstream tripping, assessment of requirement of residual current circuit breaker and other special requirement of switch gear for scientific equipment's along with specific requirement of zero halogen fire retardant and flame proof cables and switchgear in laboratory.

#### **3.2.2 CENTRALISED UPS SYSTEM FOR INSTITUTIONAL BUILDINGS**

The major items shall include:

Sizing calculations of UPS, Floor wise UPS power distribution drawing, cables, conduits and cable tray. Layout drawing for cables, conduit and cable trays.

#### **3.2.3 AUDIO-VISUAL SYSTEM AND SOUND REINFORCEMENT SYSTEM FOR INSTITUTIONAL BUILDINGS**

The major items shall include:

Conference room projection system, microphone, amplifier, speakers DVD Player, acoustics, cables, conduits, cable trays and floor-wise layout drawings and system layout drawings.

#### **3.2.4 INTERNAL COMMUNICATION SYSTEM FOR INSTITUTIONAL BUILDINGS**

Detailing of internal communication system. Design and distribution drawing of PABX Line.

#### **3.2.5 ACCESS CONTROL SYSTEM (PC BASED) FOR MULTI LEVEL ACCESS FOR INSTITUTIONAL BUILDINGS**

The major items shall include:

Card reader and biometric device, system and application software, cables, conduits and floor-wise layout drawings and system layout drawing.

#### **3.2.6 LOCAL AREA NETWORKING FOR INSTITUTIONAL BUILDINGS**

The major items shall include:

Topology of net working, local area networking (Structured cabling), cables, conduits, raceways, sockets and layout drawings floor wise.

### **3.3 MECHANICAL WORKS**

Design and preparation of system/equipment description, Technical specifications, BOQ, GA & layout drawings, data sheets and calculations ensuring compliance with the latest codes/standards as applicable, detailed cost estimates, rate analysis with back-up quotations, obtaining clearances from statutory authorities, wherever applicable, any other information required to be included to complete the specification for the following works

#### **3.3.1 Lifts**

3.3.1.1 Preparation of Technical specification considering the relevant code / Standard with capacity calculations, technical particulars with material of construction of various items.

3.3.1.2 Preparation of layout drawings indicating the location of lifts , shaft , pit, machine room & floor levels .

3.3.1.3 Preparation of bill of quantities .

3.3.1.4 Preparation of blank data sheet to be filed by vendors .

3.3.1.5 Traffic Analysis .

3.3.1.6 Preparation of specification of panels & other electrical equipments.

#### **3.3.2 LPG Systems**

3.3.2.1 Preparation of Technical specifications , Technical particulars indicating the material of construction of various component with back-up capacity calculations of the systems .

3.3.2.2 Preparation of P&I diagram.

3.3.2.3 Preparation of blank data sheet to be filed by vender.

3.3.2.4 Preparation of bill of quantities .

3.3.2.5 Preparation of general layout drawings indicating the gas system and piping layout drawings with gas cylinders station room layout .

#### **3.3.3 Liquid Nitrogen supply system Including Liquid Nitrogen Plant**

3.3.3.1 Preparation of Technical specifications , Technical particulars indicating the material of construction of various component with back-up capacity calculations of the systems .

3.3.3.2 Preparation of P&I diagram.

3.3.3.3 Preparation of blank data sheet to be filed by vender.

3.3.3.4 Preparation of bill of quantities .

3.3.3.5 Preparation of general layout drawings indicating the gas system and piping layout drawings with gas cylinders station room layout .

### **3.3.4 Compressed Air System**

Only localized arrangements is required in certain area .

### **3.3.5 Internal Piping for Steam / Hot Water supply system through Boiler**

3.3.5.1 Preparation of Technical Steam / Hot Water piping , pipe lining and other components .

3.3.5.2 Preparation of Capacity & Size calculations consisting the relevant codes and standards.

3.3.5.3 Preparation of bill of quantities and technical particulars .

3.3.5.4 Preparation of flow diagram of Steam / Hot Water piping, pipe lining .

3.3.5.5 Preparation of installation drawings indicating the locations of each component.

3.3.5.6 Data sheet to be filled by vender.

### **3.3.6 Vacuum Lines System**

Detailing to be done for localized arrangements required in certain area

### **3.3.7 Fume Exhaustion System & Specialised Ventilation system to Cater to BSL-3&BSL-4**

3.3.7.1 Technical Specifications.

3.3.7.2 Preparation of Capacity & Size calculations consisting the relevant codes and standards.

3.3.7.3 Preparation of bill of quantities, technical Data sheet and technical particulars .

3.3.7.4 Preparation of flow diagram

3.3.7.5 Data sheet to be filled by vender.

### **3.3.8 HVAC Systems**

3.3.8.1 It will be for various labs, Auditorium , Animal House , Administration Building , Lecture Theatre , Lab. & Engineering Services Building , Library , Other Areas as required by NABI. There are certain areas such as BSL Labs and rooms which require special Air conditioning.

3.3.8.2 Preparation of technical specifications of the system with capacity calculation along with basis for calculations.

3.3.8.3 Preparation of technical particulars of each component of the system indicating their material of construction.

- 3.3.8.4 Heat load calculation for summer and winter.
- 3.3.8.5 Layout of each building showing the location of each components of the system.
- 3.3.8.6 Ducting layout and plant room layout, AHU & ducting size calculations.
- 3.3.8.7 Preparation of SLD, scheme GA drawing for the electrical panel, control desk and specification of electrical equipment.
- 3.3.8.8 Blank data sheets of components, system to be filled by vendors.
- 3.3.8.9 Any other Buildings/services as directed by PMC/Owner.

### **3.4 EXTERNAL SERVICES**

The overall scope of work covers the following :-

- 3.4.1 Site evaluation, analysis of architectural character, social issues & heritage.
- 3.4.2 Feasibility study.
- 3.4.3 Preliminary proposal for development and their impact on immediate environs.
- 3.4.4 Volumetric study and urban form recommendations including pedestrian / vehicular movement and parking.
- 3.4.5 Architectural control guidelines and their approval from the statutory bodies.
- 3.4.6 Concept design of services and their inner connectivity, preliminary & detailed drawings, designs, specifications, detailed estimates, working drawings, and periodic supervision for ensuring smooth progress of work for scope of work.
- 3.4.7 Landscape architecture, site planning, suitability & appraisal, landform including preparation of detailed design & drawings of landscaping elements, open space design, plant structure, illumination design, street furniture and graphic design and signage's.
- 3.4.8 Conceptual & detailed design, specifications, estimates of non-conventional use of energy (wherever applicable).
- 3.4.9 Conceptual & detailed design, specifications, estimates of rain water harvesting of the entire site along with its approval from the concerned bodies (if any).
- 3.4.10 Recycling of waste water, its appraisal, suitability study & preparation of detailed design / schemes along with specifications & estimates.
- 3.4.11 Preparation of detailed design schemes alongwith estimates, specifications, implementation methodology and facilitating NABI for getting concerned approvals ( if any) for garbage disposal & solid waste management.
- 3.4.12 Preliminary Concept Design Stage :
  - Study of existing land use in and around the project area.
  - Study of contextual issues, socio-cultural aspects, landscape features and built form etc.
  - Study of existing infrastructure, accessibility, circulation pattern and parking.

- Prepare report on site evaluation and analysis with basic approach to circulation, activity distribution and interconnectivity and external linkages including rough estimate of the project cost based on allowable FAR.
- Furnish report on measures required to be taken to mitigate the adverse impact, if any, of the proposed development on its immediate environs.

#### 3.4.13 Preliminary Planning Stage :

- Preparation of concept design of the area showing circulation Pattern, zoning of various land uses, and relevant details, development strategy.
- Assessment of utility services and their inter-connectivity.
- Preparation of three-dimensional form in relation to open spaces, model showing the proposal and surrounding areas.
- Submission of model and conceptual design to the NABI/ Statutory bodies for approval & ensure compliance with codes, standards and legislation, as applicable and carry out necessary changes as may be required.
- Obtaining approvals from the municipal & other local authority for the master plan.

#### 3.4.14 Detailed Design Stage :

- Preparation of drawings showing the common facilities for circulation, parking, open spaces and external architectural form.
- Preparation of drawings showing architectural controls, features, specifications and obtaining statutory approvals.

These shall include all floor plans, sections and elevations for all buildings to sufficiently explain the Urban design.

- Assessment of impact of development plan and its immediate environs.

It shall further be supplemented by large scale details and models of the proposed architectural vocabulary along with information on selection of materials and construction techniques.

- The architect shall prepare schematic network of all services and its interconnectivity including water supply, drainage, sewerage, electrical, communication, fire detection and fire fighting, garbage disposal, rain water harvesting, recycling of waste water, irrigation system, use of solar energy and other services as may be indicated by NABI. The architect shall also prepare an integrated layout plan of NABI campus showing all the services. The architect shall also obtain approval of schemes of all services from the concerned local statutory authorities.

The architect shall provide necessary preliminary design calculation and designs, reports, etc. for the above referred services as may be required for obtaining NABI/ Statutory approval.

Preparation of necessary details and drawings showing landscape, street furniture and graphic signage including site appraisal and suitability, site-planning, land form and grading, surface drainage design and water management, irrigation design, open space design-roads,

parking, hard & soft areas, walls, gates, & fences, design of plant structures & feature, garden furniture design, illumination design, graphic design and signage, co-ordination of external services, inspection & evaluation of construction works along with detailed estimate and specifications.

- Furnish urban design report including implementation strategy.
- Prepare detail designs of various external elements & components.
- Presentation of urban design study and submission of design, drawings, calculations, reports etc. to the statutory bodies for approval and ensure compliance with codes, standards and legislation, as applicable and carry out necessary changes as may be required.
- Fire fighting & detection, garbage disposal etc. separately.
- Furnish modified project cost.

The architect shall prepare preliminary estimates of all buildings & services works on the basis of plinth area rates / Delhi schedule of rates of CPWD for Chandigarh / Mohali.

#### **3.4.15 Implementation stage**

- Review and certification of detailed architectural design of each of the constituent components for construction or development within the area under urban design, before approval by the statutory authorities.
- Supply to the employer such further drawings, specifications or details which may be required for proper execution of work.
- Obtain employer's approval for any material deviation in design, cost, working drawings, schedule and specifications from the approved scheme.