b) Epicyclic gear train

c) Additional gear box and clutch system.

iv) Clause no. 6.1.3 (Modification): Cast iron drums shall not be used. Drums shall be fabricated type and stress relieved.

v) Clause no. 6.1.7 (Addition): Extra flexible plough steel wire rope as per IS:2365 with 180 kg/mm² (minimum) strength shall be used. Rope guides shall be made of Aluminium base alloy.

vi) Clause no. 6.1.7.1 (Modification): The minimum factor of safety of wire rope shall not be less than 6. For hoists handling hot metal, factor of safety of wire rope shall not be less than 8.

vii) Clause no. 6.2.1.7 (Modification): Rope sheaves and equaliser sheaves shall be either cast steel or fabricated. Cast iron is not acceptable. Sheaves (except for equalizer) shall be mounted on antifriction bearings.

viii) Clause no. 6.3.1 (Modification): Lifting hooks shall be as per IS: 15560. Hooks shall be proof load tested, marked and duly certified by competent authority.

ix) Clause no. 6.3.3 (Modification): Hook shall be provided with safety latch to prevent accidental removal of slings from the hook.

x) Clause no. 6.3.1(Addition): Suspension fittings if any other than hooks shall be of sufficient strength to afford a static factor of safety of not less than '4'.

xi) Clause no. 7.1 (Addition): Make of bearings shall be SKF/FAG/ NTN only. All bearing housings shall be centre split and of cast steel.

xii) Clause no. 7.3.2 (Modification): Gears shall be made of alloy steel. Cast iron is not acceptable. Gears shall be machined in metric module. Suitable heat treatment shall be done to achieve hardness. However, case carburising of gear teeth is not permissible.

The gear box covers shall be made of cast steel or fabricated from plate. Stress relieving shall be done in case of fabricated gear boxes. Covers will be split at a line which is centre line of all gear shafts.

xiii) Clause no. 7.3.5 (Modification): All gears shall be totally enclosed in oil bath type gear boxes.

xiv) New Clause no. 7.4.1 (Addition): Couplings shall be geared type on all power output shafts. On power input shafts, flexible couplings (pin bush or any other suitable couplings) shall be provided.

xv) Clause no. 7.5.1.1 (Modification): Brake shall be fail safe type. DC Electromagnetic or AC Electro-hydraulic thrustor type brake (with anti drop circuitry for hoist motion) shall be provided for each drive power shaft.

xvi) Clause no. 8 (Addition): The trolley shall be of fabricated construction with carbon steel plates.

xvii) Clause no. 8.1 (Modification): The trolley shall be motor-driven type unless otherwise specified in data sheet. For travel, at least half of the total wheels shall be power

driven. The travel shall be motorised as per the requirements of data sheets. Refer electrical specifications for motor and other electricals.

xviii) Clause no. 8.4.2 (Modification): Cast iron track wheels shall not be used. The trolley wheels shall be of forged steel, mounted on antifriction bearings and shall be single piece type (without tyre).The contact surface of wheels shall be heat treated to a hardness of 250 BHN upto 10 mm depth minimum.

xix) Clause no. 9 (Addition): In case of any conflict between Electrical specifications of Material Requisition/Tender and electrical requirements specified in the above referred Indian Standard, the former shall prevail.

xx) Clause no. 10 (Addition): The motor shall be reversible crane duty type. Unless specified otherwise in electrical data sheet, the cycle duration factor for the motors shall be 40% and motors shall be suitable for 300 start-stop operations per hour. The motors shall have class F insulation.

xxi) Clause no. 11.1 (Modification): Hoist shall be provided with push button pendant switch. Hand rope and chain as a remote control is not acceptable. Pendant height shall be 1200 mm maximum from the operating floor level.

xxii) Clause no. 15.2 (Addition): A back up gravity type limit switch for over hoisting shall be provided for class-4 duty hoist.

xxiii) New Clause no. 15.5 (Addition): Limit switches shall also be provided for over traversing (both sides).

3. 2 Special Requirements for Hazardous Area Hoists

i) All Wheels shall be provided with High Tensile Brass (IS-304)/Aluminium Bronze (IS- 305) tyres.

ii) Any mechanism where two non-lubricated parts mate, one of them shall be of non-ferrous material like HTB as per IS 304 or Aluminium Bronze as per IS 305.

iii) All electrical components/equipments shall meet the requirements of respective area classification.

4.0 INSPECTION AND TESTING

4.1 Equipment shall be subjected to stagewise expediting, inspection and testing at vendor's/sub-vendor's works by purchaser/its authorised inspection agency. Vendor shall submit Quality Assurance (QA) plan before commencement of fabrication. Approved QA plan shall form the basis for equipment inspection.

4.2 Testing at Works

4.2.1 Vendor shall perform tests and inspection necessary to ensure that the material and workmanship conform to the requirement of Clause 20 of IS-3938.

4.2.2 Any or all the tests, at purchaser's option, shall be witnessed by purchaser/its authorised inspection agency. However, such inspection shall be regarded as check-up and shall in no way absolve the vendor of his responsibility.

4.3 Performance Testing and Guarantees

4.3.1 A field performance test shall be conducted by the vendor to demonstrate the performance of the equipment after commissioning in accordance with test procedure prepared as per EIL Standard 7-76-0103.

4.3.2 A field performance test shall be conducted by the vendor to demonstrate the performance of the Hoists after commissioning as per clause 21 of IS-3938. Following parameters shall be guaranteed.

i) SWL of Hoist

ii) Hoisting/Lowering Speed.

4.3.3 All parts of the hoist shall operate satisfactorily with no undue friction, noise or display of any other unfavourable characteristics during the performance test.

4.3.4 All equipment and component parts shall be guaranteed by the vendor against defective material and design for a period as specified in Purchaser's general purchase conditions.

4.3.5 If any defect occurs during the guaranteed period the Vendor shall make all necessary alterations, repairs and replacement at their own cost.

4.3.6 Necessary instruments for the performance testing shall be arranged by the vendor, and shall be tested and calibrated before undertaking the performance test. Only test load shall be provided by purchaser near test site.

5.0 PROTECTION AND PAINTING

5.1 Surface preparation and painting shall be done as defined in Job Specification.

5.2 Stainless steel surfaces, both inside and outside, shall be pickled and passivated.

5.3 Machined and bearing surfaces shall be protected with varnish or thick coat of grease.

6.0 PACKAGING AND IDENTIFICATION

6.1 All packaging shall be done in such a manner as to reduce the volume. The equipment may be dismantled into major components, suitable for shipment and shall be properly packed to provide adequate protection during shipment. All assemblies shall be properly match marked for site erection.

6.2 Attachments, spare parts of the equipment and small items shall be packed separately in wooden-cases. Each item shall be appropriately tagged with identification of main equipment, item denomination and reference number of the respective assembly drawing.

6.3 Detailed packing list in water-proof envelope shall be inserted in the package together with equipment.

6.4 Each equipment shall have an identification plate giving salient equipment data, make, year of manufacture, equipment number, name of manufacturer etc.

7.0 SPARE PARTS

7.1 Vendor shall submit recommended list of spare parts with recommended quantities and itemised prices for first two years of operation of the equipment. Proper coding and

referencing of spare parts shall be done so that later identification with appropriate equipment will be facilitated.

7.2 Recommended spares and their quantities should take into account related factors of equipment reliability, effect of equipment downtime upon production or safety, cost of parts and availability of vendor's service facilities around the proposed location of equipment.

7.3 Vendor shall also submit a list of commissioning spares with quantities. The commissioning spares shall be sufficient for trouble free commissioning of the system at site. Any commissioning spares required during commissioning, over and above, the commissioning spares supplied, shall be made available by the vendor without any cost and time implication to purchaser. If for any reason, during commissioning, vendor needs to utilise spares from 2 years' operation spares, the same shall be replenished by vendor within a reasonable time without any cost implication to purchaser. Any unused commissioning spares shall be handed over to owner.

1.0 GENERAL

This specification outlines the minimum requirements under which the manufacturer shall design, manufacture, test and supply the Chain Pulley Block with or without trolley.

2.0 CODES AND STANDARDS

2.1 This standard is based on following Indian Standard, and the standards referred therein, which shall be deemed to be part of this standard.

IS - 3832	:	Hand operated Chain Pulley Blocks- Specification.

Latest revision of the above-mentioned standard as on the date of enquiry shall be applicable.

2.2 Other international standards may also be acceptable subject to their being equivalent or superior with prior approval of purchaser.

2.3 For provisions not covered by the above codes & standards, applicable engineering practices & norms shall govern.

3.0 TECHNICAL REQUIREMENTS

Technical requirements of Chain Pulley Block shall be as per Indian standards referred in clause 2.1 above, subject to the following additions, deletions and modifications:

3.1 **Addition / Deletion / Modification to IS 3832: 2005 (Along with Amendment no. 1, December 2005)**

i) Clause no. 4.2.1 (Modification): Mechanism class 2 shall be considered for design of chain pulley Block unless otherwise specified in the data sheet.

ii) Clause no. 5.0 (Addition): Chain Pulley Block shall be detachable type suitable for mounting on geared trolleys of the same ratings/capacities, unless otherwise specified in job specification/data sheet.

iii) Clause no. 5.1 (Addition): The frame shall be built from steel plates with bolted/welded construction.

iv) Clause no. 5.2 (Addition): All gears shall be machine cut.

v) Clause no. 5.5 (Modification): Only anti friction bearing shall be used. Bearing shall have L_{10} life of minimum 25000 hrs. Bearings shall be of SKF/FAG/ NTN make only.

vi) Clause no. 5.6 (Modification): The block shall be provided with adequate facilities for lubrication and same shall be clearly indicated in the maintenance manual.

vii) Clause no. 5.7.1 (Addition): Hook(s) (top -if applicable and bottom) shall be provided with safety latches to prevent accidental unhooking unless otherwise stated. .

viii) Clause no. 5.7.1.2 (Modification): First line to be modified as "Bottom hook shall be provided with thrust bearing to enable it to rotate freely under load so as to prevent twisting of the load chain.

ix) Clause no. 5.10.3 (Modification): The length of hand chain shall be such that the lowest point of the suspended loop shall be 400 mm (maximum) above operating level.

x) Clause no. 5.11 (Addition): The trolley for the chain pulley block shall be geared type, fabricated construction, 4 wheeled, driven by hand chain and shall have provision for mounting the chain pulley block. Trolley shall be designed to suit the suitable monorail beam size and the hoisting capacity.

xi) Clause no. 11.1 (Addition): Following shall also be marked on Chain Pulley block:

a) Tag number.

b) "Non Sparking Type" on chain pulley block suitable for hazardous area classification.

3.2 For offshore applications, load, hand and trolley chains shall be galvanized.

3.3 **Special Requirements for Hazardous Area Chain Pulley Block**

The materials for non-lubricated rubbing parts shall be of non-sparking type (non- ferrous). The suggested materials for such components are as follows:

	Part/Component	Material of Construction
A	**Lifting Mechanism**	
	Ratchet wheel, chain guides	Solid construction in Aluminium Bronze (IS - 305)/ High Tensile Brass (IS - 304)
	Hand chain wheel	Solid construction of Aluminium Bronze/ High Tensile Brass (IS- 304)/ Phosphor Bronze (IS-28)
	Load chain wheel	Solid construction in Aluminium Bronze (IS - 305)/ High Tensile Brass (IS - 304)
	Hook (Top & bottom)	Bronze coated Forged Steel / bronze coated Forged alloy Steel/Forged Stainless Steel.
B	**Trolley Mechanism**	
	Hand chain wheel guides	Solid construction in Aluminium Bronze (IS-305)/ High Tensile Brass (IS-304)/ Phosphor Bronze (IS-28)
	Hand chain wheel	Solid construction of Aluminium Bronze (IS-305)/ High Tensile Brass (IS-304)/ Phosphor Bronze (IS-28)
	Ungeared and geared wheels	Solid construction in Aluminium Bronze (IS - 305)/ High Tensile Brass (IS - 304) or tyre of Aluminium Bronze (IS-305)/ High Tensile Brass (IS-304) shrunk fitted on core wheel of C55Mn75.

4.0 INSPECTION AND TESTING

4.1 Equipment shall be subjected to stagewise expediting, inspection and testing at vendor's/subvendor's works by purchaser/its authorised inspection agency. Vendor shall

submit Quality Assurance (QA) procedures before commencement of fabrication. Approved QA procedures shall form the basis for equipment inspection.

4.2 Testing at Works

4.2.1 Vendor shall perform operational Proof Test, as a minimum, necessary to ensure that the material and workmanship conform to the requirement of Clause 9.2 of IS- 3832.

4.2.2 The trolley (if applicable) shall be tested for smooth operation under loaded condition.

4.2.3 Certificate of test and examination shall be issued with all the chain pulley blocks as specified in clause 10.2 of IS – 3832.

4.2.4 Any or all the tests, at purchaser's option, shall be witnessed by purchaser/its authorized inspection agency. However, such inspection shall be regarded as check-up and in no way absolve the vendor of his responsibility.

5.0 PROTECTION AND PAINTING

5.1 Surface preparation and painting shall be done as per vendor's standard painting suitable for corrosive industrial environment, unless otherwise specified in the Job Specification.

5.2 Stainless steel surfaces, both inside and outside, shall be pickled and passivated.

5.3 Machined and bearing surfaces shall be protected with varnish or thick coat of grease.

6.0 PACKAGING AND IDENTIFICATION

6.1 All packaging shall be done in such a manner as to reduce the volume. The equipment shall be properly packed to provide adequate protection during shipment. All assemblies shall be properly match marked for site erection.

6.2 Attachments, spare parts of the equipment and small items shall be packed separately in wooden-cases. Each item shall be appropriately tagged with identification of main equipment, item denomination and reference number of the respective assembly drawing

6.3 Detailed packing list in water-proof envelope shall be inserted in the package together with equipment.

6.4 Each equipment shall have an identification plate giving salient equipment data, make, year of manufacture, equipment number, name of manufacturer etc.

7.0 SPARE PARTS

7.1 Vendor shall submit recommended list of spare parts with recommended quantities and itemised prices for first two years of operation of the equipment. Proper coding and referencing of spare parts shall be done so that later identification with appropriate equipment will be facilitated.

7.2 Recommended spares and their quantities shall take into account related factors of equipment reliability, effect of equipment downtime upon production or safety, cost of parts and availability of vendor's service facilities around the proposed location of equipment.

1.0 SCOPE

This specification establishes the Quality Management System requirements to be met by BIDDER for following purpose:

- QMS requirements to be met by suppliers/contractors after award of work/ during contract execution.

2.0 DEFINITIONS

2.1 Bidder

For the purpose of this specification, the word "BIDDER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

2.2 Project Quality Plan

Document tailored from Standard Quality Management System Manual of BIDDER, specifying how the quality requirements of the project will be met.

2.3 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0002	Specification for Documentation Requirements from Contractors
6-78-0003	Specification for Documentation Requirements from Suppliers

4.0 QUALITY MANAGEMENT SYSTEM – GENERAL

Unless otherwise agreed with EIL / Owner, the BIDDER proposed quality system shall fully satisfy all relevant requirements of ISO 9001 "Quality Management Systems – Requirements." Evidence of compliance shall be current certificate of quality system registration to ISO 9001 or a recent compliance audit recommending registration from a certification agency. The quality system shall provide the planned and systematic control of all quality related activities for execution of contract. Implementation of the system shall be in accordance with BIDDER'S Quality Manual and PROJECT specific Quality Plan.

5.0 QUALITY SYSTEM REQUIREMENTS

5.1 BIDDER shall prepare and submit for review / record, Project Quality Plan / Quality Assurance Plan for contracted scope / job. The BIDDER'S Quality Plan shall address all of the applicable elements of ISO 9001, identify responsible parties within BIDDER'S organization, for the implementation / control of each area, reference the applicable procedures used to control / assure each area, and verify the documents produced for each area. The Project Quality Plan shall necessarily define control or make reference to the relevant procedures, for design and engineering, purchase, documentation, record control, bid evaluation, inspection, production/manufacturing, preservation, packaging and storage, quality control at

construction site, pre-commissioning, commissioning and handing over (as applicable) in line with contract requirement and scope of work.

5.2 BIDDER shall identify all specified or implied statutory and regulatory requirements and communicate the same to all concerned in his organization and his sub contractor's organization for compliance.

5.3 BIDDER shall deploy competent and trained personnel for various activities for fulfillment of PO / contract. BIDDER shall arrange adequate infrastructure and work environment to ensure that the specification and quality of the deliverable are maintained.

5.4 BIDDER shall do the quality planning for all activities involved in delivery of order. The quality planning shall cover as minimum the following:

- Resources
- Product / deliverable characteristics to be controlled.
- Process characteristics to ensure the identified product characteristics are realized
- Identification of any measurement requirements, acceptance criteria
- Records to be generated
- Need for any documented procedure

The quality planning shall result into the quality assurance plan, inspection and test plans (ITPs) and job procedures for the project activities in the scope of bidder. These documents shall be submitted to EIL/Owner for review/approval, before commencement of work.

5.5 Requirements for sub-contracting / purchasing of services specified in contract / tender shall be adhered to. In general all outsourced items will be from approved vendors of EIL. Wherever requirements are not specified, or approved sub vendors do not exist, the sub-contractor shall establish and maintain a system for purchasing / sub-contracting to ensure that purchased product / service conforms to specified requirements. Criteria for selection of sub-contractor, evaluation, re-evaluation, maintenance of purchasing data and verification of purchased product (sub-contractor services), constitute important components of this requirement.

5.6 BIDDER shall plan and carry production and service provision under controlled conditions. Controlled conditions shall include, as applicable

a) the availability of information that describes the characteristics of the product
b) the availability of work instructions
c) the use of suitable equipment
d) the availability and use of monitoring and measuring devices
e) the implementation of monitoring and measurement
f) the implementation of release, delivery and post-delivery activities

5.7 BIDDER shall validate any processes for production and service provision where resulting output cannot be verified by subsequent monitoring and measurement. This includes any process where deficiencies become apparent only after the product is in use or service has been delivered.

5.8 BIDDER shall establish a system for identification and traceability of product / deliverable throughout product realization. Product status with respect to inspection and testing requirements shall be identified.

5.9 BIDDER shall identify, verify, protect and safeguard EIL / Owner property (material / document) provided for use or incorporation into the product. If any Owner / EIL property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the EIL / Owner.

5.10 BIDDER shall ensure the conformity of product / deliverable during internal processing and delivery to the intended destination. Requirements mentioned in the tender shall be adhered to.

5.11 BIDDER shall establish system to ensure that inspection and testing activities are carried out in line with requirements. Where necessary, measuring equipments shall be calibrated at specified frequency, against national or international measurement standards; where no such standard exists, the basis used for calibration shall be recorded. The measuring equipments shall be protected from damage during handling, maintenance and storage.

5.12 BIDDER shall ensure effective monitoring, using suitable methods, of the processes involved in production and other related processes for delivery of the scope of contract.

5.13 BIDDER shall monitor and measure the characteristics of the product/deliverable to verify that product requirement has been met. The inspection (stage as well as final) by BIDDER and EIL / Owner personnel shall be carried out strictly as per the ITPs forming part of the contract. Product release or service delivery shall not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by relevant authority and where applicable by Owner / EIL.

5.14 BIDDER shall establish and maintain a documented procedure to ensure that the product which does not conform to requirements is identified and controlled to prevent its unintended use or delivery

5.15 All non-conformities (NCs) / deficiencies found by the BIDDER'S inspection / surveillance staff shall be duly recorded, including their disposal action shall be recorded and resolved suitably. Effective corrective and preventive action shall be implemented by the BIDDER so that similar NCs including deficiencies do not recur.

5.16 All deficiencies noticed and reported by EIL / Owner shall be analyzed by the BIDDER and appropriate corrective and preventive actions shall be implemented. BIDDER shall intimate EIL / Owner of all such corrective and preventive action implemented by him.

5.17 BIDDER should follow the standards, specifications and approved drawings. Concessions/Deviations shall be allowed only in case of unavoidable circumstances. In such situations Concession/deviation request must be made by the BIDDER through online system of EIL eDMS. URL of EIL eDMS is http://edocx.eil.co.in/vportal.

5.18 BIDDER shall have documented procedure for control of documents.

5.19 All project records shall be carefully kept, maintained and protected for any damage or loss until the project completion, then handed over to EIL / Owner as per contract requirement (Refer Specification Nos. 6-78-0002 - Specification for Documentation Requirements from Contractors and 6-78-0003 - Specification for Documentation Requirements from Suppliers), or disposed as per relevant project procedure.

6.0 AUDITS

BIDDER shall plan and carry out the QMS audit for the job. Quality audit programme shall cover design, procurement, construction management and commissioning as applicable including activities carried out by sub-vendors and sub-contractors. This shall be additional to the certification body surveillance audits carried out under BIDDER'S own ISO 9001 certification scheme.

The audit programmes and audit reports shall be available with bidder for scrutiny by EIL / Owner. EIL or Owner's representative reserves the right to attend, as a witness, any audit conducted during the execution of the WORKS.

In addition to above EIL, Owner and third party appointed by EIL/Owner may also perform Quality and Technical compliance audits. BIDDER shall provide assistance and access to their systems and sub-contractor / vendor systems as required for this purpose. Any deficiencies noted shall be immediately rectified by BIDDER.

7.0 DOCUMENTATION REQUIREMENTS

BIDDER shall submit following QMS documents immediately after award of work (Within one week) for record / review by EIL / Owner.

- Organization chart (for complete organization structure and for the project)
- Project Quality Plan/Quality Assurance Plan
- Job specific Inspection Test Plans, if not attached with PR
- Job Procedures
- Inspection/Test Formats

In addition to above QMS documents, following documentation shall be maintained by the BIDDER for submission to EIL / Owner on demand at any point of time during execution of the project.

- Quality Manual
- Certificate of approval for compliance to ISO: 9001 standard
- Procedure for Control of Non-conforming Product
- Procedure for Control of Documents
- Sample audit report of the QMS internal and external audits conducted during last one year
- Customer satisfaction reports from at least 2 customers, during the last one year
- Project QMS audit report
- Technical audit reports for the project
- Corrective action report on the audits

Documents as specified above are minimum requirements. BIDDER shall submit any other document/data required for completion of the job as per EIL/Owner instructions.

1.0 SCOPE

This specification establishes the Documentation Requirements from Contractors

All documents/data against the Tender / Contract shall be developed and submitted to EIL/Owner by the contractor for review / records, in line with this specification.

2.0 DEFINITIONS

2.1 Contractor

For the purpose of this specification, the word "CONTRACTOR" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products and services. The word is considered synonymous to bidder, supplier or vendor.

2.2 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0001	Specification for Quality Management System Requirements from Bidders

4.0 DOCUMENTATION REQUIREMENTS

4.1 Documents/Data to be submitted by the Contractor

4.1.1 The contractor shall submit the documents and data against the Tender/Contract as per the list specified in respective Tender/Contract.

4.1.2 Review of the contractor drawings by EIL would be only to review the compatibility with basic designs and concepts and in no way absolve the contractor of his responsibility/contractual obligation to comply with Tender/Contract requirements, applicable codes, specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the contractor without any extra cost or time, whether or not comments on the same were received from EIL during the drawing review stage.

4.1.3 Unless otherwise specified, submission of documents for Review/Records shall commence as follows from the date of Fax of Intent / Letter of Intent/ Fax of Acceptance (FOA)/ Letter of Acceptance (LOA):

QMS	- 1week
Drawing/Document Control Index	- 2weeks
Other Documents/Drawings	- As per approved Drawing/Document Control Index/Schedule

4.1.4 Documents as specified in Tender/Contract are minimum requirements. Contractor shall submit any other document/data required for completion of the job as per EIL/Owner instructions.

4.2 Style and Formatting

4.2.1 All Documents shall be in ENGLISH language and in M.K.S System of units.

4.2.2 Before submitting the drawings and documents, contractor shall ensure that the following information are properly entered in each drawing:

Tender Number
Name of Equipment / Package
Equipment / Package Tag No.
Name of Project
Owner
Main Contractor (if work is sub-contracted)
Drawing / Document Title
Drawing / Document No.
Drawing / Document Revision No. and Date

4.3 Review and Approval of Documents by Contractor

4.3.1 The Drawing/Documents shall be reviewed, checked, approved and duly signed/stamped by contractor before submission. Revision number shall be changed during submission of the revised contractor documents and all revisions shall be highlighted by clouds. Whenever the contractor require any sub- contractor drawings to be reviewed by EIL, the same shall be submitted by the contractor after duly reviewed, approved and stamped by the contractor. Direct submission of sub-contractor's drawings without contractor's approval shall not be entertained.

4.4 Document Category

4.4.1 Review Category

Following review codes shall be used for review of contractor Drawings/Documents:

Review Code 1	-	No comments. Proceed with manufacture/ fabrication/ Construction as per the document.
Review Code 2	-	Proceed with manufacture/ fabrication/ Construction as per commented document. Revised document required
Review Code 3	-	Document does not conform to basic requirements as marked. Resubmit for review
R	-	Document is retained for Records. Proceed with manufacture/ fabrication
V	-	Void

4.5 Methodology for Submission of Documents to EIL/Owner

4.5.1 Document Control Index (DCI)

Contractor shall create and submit Document Control Index (DCI) for review based on PO/PR/MR along with schedule date of submission of each drawing/document on EIL eDMS. The DCI shall be specific with regard to drawing/document no. and the exact title. Proper sequencing of the drawings/documents should be ensured in schedule date of submission.

4.5.2 **Submission of Drawings/Documents**

Drawings/documents and data shall be uploaded on the EIL eDMS Portal. The detail guidelines for uploading documents on EIL eDMS Portal are available on following URL

http://edocx.eil.co.in/vportal

4.5.3 **Statutory Approvals**

Wherever approval by any statutory body is required to be taken by Contractor, the Contractor shall submit copy of approval by the authority to EIL.

4.5.4 **Details of Contact Persons of Contractor**

After placement of order contractor shall assign a Project Manager for that order. The details are to be filled online through the portal. The details include e-mail address, mailing address, telephone nos., fax nos. and name of Project Manager. All the system generated emails pertaining to that order shall be sent to the assigned Project Manager.

4.5.5 **Schedule and Progress Reporting**

Contractor shall submit monthly progress report and updated procurement, engineering and manufacturing status (schedule vs. actual) every month. First report shall be submitted within 2 weeks from FOA/LOA. In case of exigencies, EIL/Owner can ask for report submission as required on weekly/fortnightly/adhoc basis depending upon supply status and contractor shall furnish such reports promptly without any price implication. Format for progress report shall be submitted by the contractor during kick off meeting or within one week of receiving FOA/LOA, whichever is earlier.

4.5.6 **Quality Assurance Plan/Inspection and Test Plan**

Inspection and test plans attached if any, to the tender are generic and indicative only. Immediately after receipt of the order, contractor shall submit within one week of receiving FOA/LOA, job specific ITPs based on the indicative ITPs. Further, contractor shall also submit Quality Assurance Plan for project activities in the scope of contract, starting from manufacturing to handing over/ commissioning, these plans shall cover/identify the activities, relevant procedure, if any, code of conformance, resources for performance and checking/monitoring, approval requirements and authority, records to be generated and audit scope by EIL/Owner.

For EPCC/LSTK/Package contracts, the contractor shall prepare a list of items/ equipments and their inspection categorization plans for all items included in the scope of supply immediately after receipt of order and obtain approval for the same from EIL. The items shall be categorized into different categories depending upon their criticality for the scope of inspection of TPIA and/or EIL.

4.5.7 **Inspection Release Note (IRN)/ Inspection Certificate (IC)**

Contractor shall ensure that all documents viz. documents reviewed, manufacture's test certificate etc., mentioned in Inspection Release Note(IRN), issued by EIL/third party against the materials supplied by contractor., are sent to EIL along with the IRN.

IRN/ IC shall be issued by EIL Inspector/ third party inspection agency only after all the drawings/documents as per DCI are submitted and are accepted under review code-1 & code R. Material/Equipments dispatch from contractor's/sub vender's works shall not commence till above condition is met.

Note: Non fulfilling above requirement shall result into appropriate penalty or with-holding of payment as per conditions of Tender/Contract.

4.6 Final Documentation

4.6.1 As built Drawings

Shop/Site changes made by contractor after approval of drawings under 'Code 1' by EIL and deviations granted through online system , if any, shall be marked in hard copies of drawings which shall then be stamped 'As-built' by the contractor. These 'As-built' drawings shall be reviewed and stamped by EIL Inspector/Site engineer/TPIA also. Format for completeness of final documents (Format No. 3-78-0004) is attached with this specification. Contractor shall prepare scanned images files of all marked – up 'As – built' drawings. Simultaneously contractor shall incorporate the shop/site changes in the native soft files of the drawings also.

4.6.2 As built Final Documents

As built final documents shall be submitted as listed in Tender/Contract.

4.6.3 Packing/Presentation of Final Documents

Final Documents shall be legible photocopies in A4, A3 size only. Drawings will be inserted in plastic pockets (both sides transparent, sheet thickness minimum 0.1 mm) with an extra strip of 12 mm wide for punching so that drawings are well placed.

Final Documentation shall be bound in hard board plastic folder(s) of size 265 mm x 315 mm ($10^1/_2$ inch x $12^1/_2$ inch) and shall not be more that 75 mm thick. It may be of several volumes and each volume shall have a volume number, index of volumes and index of contents of that particular volume. Where numbers of volumes are more, 90mm thickness can be used. Each volume shall have top PVC sheet of minimum 0.15 mm thick duly fixed and pressed on folder cover and will have 2 lever clips. In case of imported items documents, 4 lever clip shall also be accepted. All four corners of folders shall be properly metal clamped. Indexing of contents with page numbering must be incorporated by contractor. Spiral/Spico bound documents shall not be acceptable. As mentioned above, books should be in hard board plastic folders with sheets punched and having 2/4 lever clips arrangement.

Each volume shall contain on cover a title block indicating Tender No., name of project, name of customer, package equipment tag no. & name (if applicable). Each volume will have hard front cover and a reinforced spine to fit thickness of book. These spines will also have the title printed on them. Title shall include also volume number (say 11 of 15) etc.

4.6.4 Submission of Soft copies

Contractor shall submit to EIL, the scanned images files as well as the native files of drawings/documents, along with proper index.

In addition to hard copies, contractor shall submit electronic file (CD-ROM) covering soft copies of all the final drawings and documents, all text documents prepared on computer, scanned images of all important documents (not available as soft files), all relevant catalogues, manuals available as soft files (editable copies of drawings/text documents, while for catalogues/manuals/proprietary information and data PDF files can be furnished).

All the above documents shall also be uploaded on the EIL eDMS portal.

4.6.5 **Completeness of Final Documentation**

Contractor shall get the completeness of final documentation verified by EIL/TPIA and attach the Format for Completeness of Final Documentation (Format No. 3-78-0004) duly signed by EIL or TPIA as applicable to the document folder.

COMPLETENESS OF FINAL DOCUMENTATION

Name of Supplier/Contractor	:	
Customer	:	
Project	:	
EIL's Job No.	:	
Purchase Order No./ Contract No.	:	
Purchase Requisition No./ Tender No.	:	Rev. No. :
Name of the Work/ Equipment	:	
Tag. No.	:	
Supplier's/ Contractor's Works Order No.	:	

Certified that the Engineering Documents/ Manufacturing & Test Certificates submitted by the supplier are complete in accordance with the Vendor Data Requirements of Purchase Requisition.

Signature	:	Signature	: .....
Date	:	Date	: .....
Name	:	Name	: .....
Designation	:	Designation	: .....
Department	:	Department	: .....

Supplier/Contractor

EIL/TPIA

अनुमोदित/APPROVED
हस्ताक्षर/Sign
नाम/Name:
दिनांक/Date:

1.0 SCOPE

This specification establishes the Documentation Requirements from Suppliers.

All documents/data against the PO / PR / MR shall be developed and submitted to EIL/Owner by the suppliers for review / records, in line with this specification.

2.0 DEFINITIONS

2.1 Supplier

For the purpose of this specification, the word "SUPPLIER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to bidder, contractor or vendor.

2.2 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0001	Specification for Quality Management System Requirements from Bidders

4.0 DOCUMENTATION REQUIREMENTS

4.1 Documents/Data to be Submitted by the Supplier

4.1.1 The Supplier shall submit the documents and data against the PO/PR/MR as per the list given in respective PO/PR/MR.

4.1.2 Review of the supplier drawings by EIL would be only to review the compatibility with basic designs and concepts and in no way absolve the supplier of his responsibility/contractual obligation to comply with PR requirements, applicable codes, specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the supplier without any time and cost implications, irrespective of comments on the same were received from EIL during the drawing review stage or not.

4.1.3 Unless otherwise specified, submission of documents for Review/Records shall commence as follows from the date of Fax of Intent / Letter of Intent/ Fax of Acceptance (FOA)/ Letter of Acceptance (LOA):

QMS	- 1 week
Drawing/Document Control Index	- 2 weeks
Other Documents/Drawings	- As per approved Drawing/Document Control Index/Schedule

4.1.4 Documents as specified in PO/PR/MR are minimum requirements. Supplier shall submit any other document/data required for completion of the job as per EIL/Owner instructions.

4.2 Style and Formatting

4.2.1 All Documents shall be in ENGLISH language and in M.K.S System of units.

4.2.2 Before forwarding the drawings and documents, contractor shall ensure that the following information are properly mentioned in each drawing:

Purchase Requisition Number
Name of Equipment / Package
Equipment / Package Tag No.
Name of Project
Client
Drawing / Document Title
Drawing / Document No.
Drawing / Document Revision No. and Date

4.3 Review and Approval of Documents by Supplier

4.3.1 The Drawing/Documents shall be reviewed, checked, approved and duly signed/stamped by supplier before submission. Revision number shall be changed during submission of the revised supplier documents and all revisions shall be highlighted by clouds. Whenever the supplier require any sub-supplier drawings to be reviewed by EIL, the same shall be submitted by the supplier after duly reviewed, approved and stamped by the supplier. Direct submission of sub-supplier's drawings without contractor's approval shall not be entertained.

4.4 Document Category

4.4.1 Review Category

Following review codes shall be used for review of supplier Drawings/Documents:

Review Code 1	-	No comments. Proceed with manufacture/ fabrication as per the document.
Review Code 2	-	Proceed with manufacture/fabrication as per commented document. Revised document required.
Review Code 3	-	Document does not conform to basic requirements as marked. Resubmit for review
R	-	Document is retained for Records. Proceed with manufacture/fabrication.
V	-	Void

4.5 Methodology for Submission of Documents to EIL/Owner

4.5.1 Document Control Index (DCI)

Supplier shall create and submit Document Control Index (DCI) for review based on PO/PR/MR along with schedule date of submission of each drawing/document on EIL eDMS. The DCI shall be specific with regard to drawing/document no. and the exact title. Proper sequencing of the drawings/documents should be ensured in schedule date of submission.

4.5.2 **Submission of Drawings/Documents**

Drawings/documents and data shall be uploaded on the EIL eDMS Portal as per DCI. The detail guidelines for uploading documents on EIL eDMS Portal are available on following URL

http://edocx.eil.co.in/vportal

4.5.3 **Statutory Approvals**

Wherever approval by any statutory body is required to be taken by Supplier, the Supplier shall submit copy of approval by the authority to EIL.

4.5.4 **Details of Contact Persons of Supplier**

After placement of order supplier shall assign a Project Manager for that order. The details are to be filled online through the portal. The details include e-mail address, mailing address, telephone nos., fax nos. and name of Project Manager. All the system generated emails pertaining to that order shall be sent to the assigned Project Manager.

4.5.5 **Schedule and Progress Reporting**

Supplier shall submit monthly progress report and updated procurement, engineering and manufacturing status (schedule vs. actual) every month, beginning within 2 weeks from FOA/LOA. In case of exigencies, EIL/Owner can ask for report submission as required on weekly/fortnightly/adhoc basis depending upon supply status and supplier shall furnish such reports promptly without any price implication. Format for progress report shall be submitted by the Supplier during kick off meeting or within one week of receiving FOA/LOA, whichever is earlier.

4.5.6 **Quality Assurance Plan/Inspection and Test Plan**

Inspection and test plans (ITP) attached if any, to the MR/PR are to be followed. However for cases wherein ITPs have not been attached with MR/PR, Supplier shall submit within one week of receiving FOA/LOA, the Quality Assurance Plan for manufacturing, covering quality control of critical bought out items/materials, inspection & testing at various stages of production, quality control records and site assembly & testing as may be applicable to the specific order and obtain approval from concerned Regional procurement Office of EIL/third party inspection agency, as applicable.

For Package equipment contracts, the supplier shall prepare a list of items/ equipments and their inspection categorization plan for all items included in the scope of supply immediately after receipt of order and obtains approval for the same from EIL. The items shall be categorized into different categories depending upon their criticality for the scope of inspection of TPIA and/or EIL.

4.5.7 **Inspection Release Note (IRN)/ Inspection Certificate (IC)**

IRN/ IC shall be issued by EIL Inspector/ third party inspection agency on the basis of successful inspection, review of certificates as per specifications & agreed quality plan (as applicable) and only after all the drawings/documents as per DCI are submitted and are accepted under review code-1 or code R. Supplier shall ensure that necessary documents/manufacturing and test certificates are made available to EIL/TPIA as and when desired.

Note: Non fulfilling above requirement shall result into appropriate penalty or with-holding of payment as per conditions of PO/PR/MR.

4.5.8 **Transportation Plan**

Transportation Plan for Over Dimensional Consignments (ODC), if any, shall be submitted within 2 weeks of receiving FOA/LOA, for approval. Consignment with parameters greater than following shall be considered as over dimensional.

Dimensions: 4 meters width x 4 meters height x 20 meters length

Weight : 32 MT

4.6 **Final Documentation**

4.6.1 **As Built Drawings**

Shop changes made by Supplier after approval of drawings under 'Code 1' by EIL and deviations granted through online system , if any, shall be marked in hard copies of drawings which shall then be stamped 'As-built' by the supplier. These 'As-built' drawings shall be reviewed and stamped by EIL Inspector/ TPIA also. Supplier shall prepare scanned images files of all marked – up 'As – built' drawings. Simultaneously Supplier shall incorporate the shop changes in the native soft files of the drawings also.

4.6.2 **As Built Final Documents**

As built final documents shall be submitted as listed in PO/PR/MR.

4.6.3 **Packing/Presentation of Final Documents**

Final Documents shall be legible photocopies in A4, A3 size only. Drawings will be inserted in plastic pockets (both sides transparent, sheet thickness minimum 0.1 mm) with an extra strip of 12 mm wide for punching so that drawings are well placed.

Final Documentation shall be bound in Hard board Plastic folder(s) of size 265 mm x 315 mm ($10^1/_2$ inch x $12^1/_2$ inch) and shall not be more that 75 mm thick. It may be of several volumes and each volume shall have a volume number, index of volumes and index of contents of that particular volume. Where number of volumes are more, 90mm thickness can be used. Each volume shall have top PVC sheet of minimum 0.15 mm thick duly fixed and pressed on folder cover and will have 2 lever clip. In case of imported items documents, 4 lever clip shall also be accepted. All four corners of folders shall be properly metal clamped. Indexing of contents with page numbering must be incorporated by supplier. Spiral/Spico bound documents shall not be acceptable. As mentioned above, books should be in hard board plastic folders with sheets punched and having 2/4 lever clips arrangement.

Each volume shall contain on cover a Title Block indicating package Equipment Tag No. & Name, PO/Purchase Requisition No., Name of Project and Name of Customer. Each volume will have hard front cover and a reinforced spine to fit thickness of book. These spines will also have the title printed on them. Title shall include also volume number (say 11 of 15) etc.

4.6.4 **Submission of Soft Copies**

Supplier shall submit to EIL, the scanned images files as well as the native files of drawings/documents, along with proper index.

In addition to hard copies, Supplier shall submit electronic file (CD-ROM) covering soft copies of all the final drawings and documents, all text documents prepared on computer, scanned images of all important documents (not available as soft files), all relevant catalogues, manuals available as soft files (editable copies of drawings/text documents, while for catalogues/manuals/proprietary information and data, PDF files can be furnished).

All the above documents shall also be uploaded on the EIL eDMS portal.

4.6.5 **Completeness of Final Documentation**

Supplier shall get the completeness of final documentation verified by EIL/TPIA and attach the Format for Completeness of Final Documentation (Format No. 3-78-0004) duly signed by EIL Inspector or TPIA as applicable to the document folder.

1.0 INTRODUCTION

As a part of engineering services, EIL procures different types of Package Units for various Projects, for and on behalf of the Owner/Purchaser. The vendor is required to design, engineer, manufacture/procure, inspect, test and supply to site, and also in many cases construct/erect, commission and Performance test the Package Units before handing over the same to Owner/Purchaser, based on Process and Technical requirements defined in the Inquiry/Order document.

2.0 PURPOSE

This document provides instructions to Vendor for Site Performance Guarantee (PG) Requirements for Package Units and shall form a part of the contract, wherever site performance guarantee test is specified in the Inquiry/Order document. The aim is to provide clarity to the Vendor as well as the Commissioning team on site performance guarantee parameters, their measurements during PG Test, and the acceptance of the Package Unit by the Owner/Purchaser after the successful PG Test.

3.0 SCOPE

The requirements of this standard are applicable for all Package Units including LSTK Bid Packages, which require Performance Guarantee Test, after installation and commissioning of the unit at site.

4.0 DEFINITIONS

4.1 "Vendor" means the person(s), company, organization from whom EIL procures products/services as a part of services rendered to the Owner/Purchaser. "Contractor", "Supplier" are considered synonymous to "Vendor".

4.2 "Owner" means the person(s), company, organization to whom EIL is rendering services for the Project.

4.3 "Purchaser" means the person(s), company, organization which awards order for the Package Unit on the Vendor.

5.0 PERFORMANCE GUARANTEE TESTING AT SITE

5.1 General

5.1.1 The overall performance testing of the completely assembled/erected Package unit as a whole shall be carried out at site to establish the performance guarantee parameters specified in Inquiry/Order document. In addition, certain critical equipment/sub-packages may also be performance tested at site if so specified in Inquiry/Order document. The duration of site performance guarantee run shall be as defined in the Inquiry/order document.

The measured parameters, where necessary, shall be adjusted to account for the variation in ambient/operating conditions actually prevailing at site during performance testing, before comparing it with the guaranteed value.

5.1.2 Performance test shall be carried out as per relevant Codes, Standards and Specifications. The Vendor shall submit the following during detail engineering and the same shall be subject to Owner/Purchaser's approval:

- Detailed Test procedure including measurement tolerances, if applicable, calculations/ correction curves for changes in ambient/ operating conditions, and complete test layout, etc.

- Site Performance Guarantee Test Proforma completed in line with enclosed format 7-76-0103-F1.

- Vendor shall list out parameters to be measured and corresponding installed instrument type and tag no. to be used for measurements. Any instrument/measurement device, (required for testing) not installed at site, shall be arranged by vendor. Vendor shall furnish list of such instruments alongwith instrument details.

- Log sheets indicating all parameters that are to be recorded.

- Method of computation of test results including interpretation of test results.

5.2 Test Instruments

All necessary test instruments required for measuring the performance guarantee parameters shall be arranged by the vendor free of charge. These instruments shall be tested & calibrated from reputed test houses like National Physical Laboratories (NPL), Institute for Design of Electrical Measuring Instruments (IDEMI), Electronics Regional Test Laboratories (ERTL) or any other test house approved by the Owner. All test instruments shall have valid calibration reports. The Vendor shall furnish calibration certificates before putting them to use and also, wherever applicable, after completion of the PG test.

5.3 Performance Guarantee Parameters

Guarantee performance parameters shall be as defined in the Process/Mechanical data sheets, Specification, etc. included in the Inquiry/Order document.

5.4 Repair/Rectification/Modification

5.4.1 In case the unit fails to meet the guaranteed parameters, the Vendor shall carryout, necessary repair, rectification and modification within the time frame defined in the contract or as mutually agreed with the Owner/Purchaser, at his own risk and cost to establish the guaranteed parameters in the final performance test. All costs involved for above activities i.e. supply of manpower, materials, consumables and machines etc. shall be to Vendor's account.

5.4.2 Inspite of repair/rectification, incase the guaranteed performance parameters are not met, penalty/rejection as defined in the contract document for shortfall from guaranteed performance parameters shall be applied.

6.0 SITE PERFORMANCE GUARANTEE TEST PROFORMA

Typical Proforma shown in enclosed Format 7-76-0103-F1, shall be used for assessment of Performance guarantee parameters during site PG test.

7.0 ATTACHMENTS

Format No. 7-76-0103-F1 : SITE PERFORMANCE GUARANTEE TEST PROFORMA.

इंजीनियर्स इंडिया लिमिटेड (भारत सरकार का उपक्रम) ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

SITE PERFORMANCE GUARANTEE TEST PROFORMA

DOCUMENT No.

Client : *
Package Unit/System: *

Project/Location : *
Order No. : *

EIL Job No. : *
Vendor : *

1. **PACKAGE OPERATING CONDITION (FOR GUARANTEE):**

Operating Parameter	Values as per Inquiry/Order	Value (Actual at site)
*	*	

2. **PERFORMANCE :**

SITE PERFORMANCE TEST PROCEDURE DOC. NO: *

TEST PERIOD:

Parameter (1) *	Measuring Unit (2) *	Guaranteed Value (3) *	Permissible Tolerance (4) *	Measured Value at site (5)	Value after correction for site conditions (6)	Deviation (6) w.r.t.- (3)	Remarks (Acceptable-Y/N) (7)
a)							
b)							
c)							
d)							
e)							

Vendor's Representative
Date

Owner's Commissioning Incharge
Date

Owner

Date

* TO BE FILLED-UP AND/OR DEVELOPED BY VENDOR & SUBMITTED ALONGWITH PERFORMANCE TEST PROCEDURE.

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3. OBSERVATIONS:

4. CONCLUSIONS :

Vendor's Representative
Date

Owner's Commissioning Incharge
Date

Owner

Date

Copy : Engineer-In-Charge.

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PART-A (ARCHITECTURAL)

1.0 GENERAL

1.1 This document describes the broad scope of work and supply of LSTK CONTRACTOR for Architectural works.

1.2 This document shall be read in conjunction with the remainder (such as specifications, scope of works, design basis, drawings, applicable codes and standards etc) of the Bid document.

1.3 Requirements and provisions of design, drawings, specifications etc. contained in Bid document are conceptual in nature defining minimum requirements and are in no way exhaustive.

The above shall not relieve the LSTK CONTRACTOR from ensuring correctness of his deliverables and other activities and any changes required for this purpose (after award of work) are deemed to be included in the LSTK CONTRACTOR's scope of work, supply, execution and contract value/ price.

LSTK CONTRACTOR shall develop his Design and Detail Engineering and shall complete all activities in his scope of work and supply meeting all the provisions, requirements and criteria of Bid document.

1.4 During the tendering/ bidding stage, LSTK CONTRACTOR shall review and verify the contents of Bid document and shall ensure his clear understanding of requirements, provisions and criteria of the same.

For this purpose, LSTK CONTRACTOR shall point out any errors, omissions, contradictions, or discrepancies etc. with suggestive rectification for review & necessary action/ decision before award of the job.

1.5 After award of work, it shall mean that LSTK CONTRACTOR has fully understood and accepted the provisions of Bid Document and has undertaken to fully comply with them.

1.6 There shall be no time and cost implication to the OWNER or COMPANY and PMC for design, detail engineering, construction, execution, installation and other activities performed by the LSTK CONTRACTOR required for completing the job due to any upward revisions and/ or additions of quantities, specifications, sizes etc. given in the specifications and drawings etc. required to be made during execution of the works meeting all the provisions, requirements and criteria of Bid Document.

2.0 DEFINITIONS

2.1 For definition of Architectural terminologies reference shall be made to National Building Code (NBC) and applicable referenced codes and standards.

3.0 SCOPE OF SUPPLY & WORK

3.1 Scope of supply & work of the LSTK CONTRACTOR shall be pertaining to all the required buildings such as:

- Reception and officer's canteen including rest room and first aid (minimum 250 sq. m).
- Administration Building (minimum 85 sq. m)
- Laboratory (minimum 80 sq. m)
- Guard Room (minimum 3.75 sq. m)

- Covered Storage shed (minimum 200 sq. m)
- Utility and maintenance workshop shed (minimum 300 sq. m)
- Pump Houses
- Sub Station (minimum 100 sq. m)
- Weigh bridge office
- Other non-plant/ process building not listed in any other category

3.2 Buildings listed in clause 3.1 above are not exhaustive. Requirement of buildings shall also include:

3.2.1 Any other building/ buildings indicated in Plot plan, scope of work & specification etc. of other disciplines.

3.2.2 Any other building/ buildings required to meet the Operational, Maintenance, HSE (Health, safety & Environmental), Licensor's and statutory Requirements.

3.3 Scope of supply & work of the LSTK CONTRACTOR shall broadly consist of:

3.3.1 Data collection.
3.3.2 Design & detail engineering.
3.3.3 Procurement and supply of all materials, labour, equipment, tools and tackles etc.
3.3.4 Construction, Execution, Installation and supervision.
3.3.5 Obtaining approvals from Statutory and Approving Authorities,
3.3.6 Preparation of As-built drawings, documents
3.3.7 Co-ordination
3.3.8 Any other incidental and other activities not explicitly mentioned but required to meet the requirements of the project.

3.4 Data collection

3.4.1 LSTK CONTRACTOR shall visit the site & facilities and collect data required for carrying out his scope of work.

3.5 Design & Detail Engineering

3.5.1 Design & Detail Engineering shall meet the requirements of Design Basis, Job Specification, Drawings, Standards, Specifications, Reference codes etc contained in the Bid Document.

3.5.2 Design & Detail Engineering shall include conceptual design, finalization of design, Review by COMPANY or OWNER and PMC, preparation & submission of deliverables, Re-submission after incorporation of changes, revisions & review comments, obtaining approval for execution, resolution of conflicts and necessary co-ordination with all related parties.

3.5.3 LSTK CONTRACTOR shall submit deliverables for Review, approval, information etc. to COMPANY or OWNER, PMC in accordance with provisions of bid document and contract or agreed methodology.

a. Deliverables shall be revised and resubmitted incorporating comments from COMPANY or OWNER, PMC or any other design, engineering requirements until they are reviewed, approved or accepted for construction, execution and installation.

b. Review, approval, acceptance of deliverables by PMC, COMPANY or OWNER shall not relieve the LSTK CONTRACTOR from ensuring correctness of his deliverables.

c. Any incorrectness, non-compliance with Design Basis, Job Specification, Drawings, Standards, Specifications, Reference codes etc noticed at any stage shall be corrected by LSTK CONTRACTOR irrespective of review, approval, acceptance of deliverables by PMC, COMPANY or OWNER without any time and cost implication to them.

3.5.4 LSTK CONTRACTOR shall prepare and submit all drawings, specifications and other deliverables required for execution of the job as indicated elsewhere in Bid document and Contract.

a. Deliverables shall be prepared using approved software in agreed format and shall be complete in all respect indicating document or drawing number, revision number, purpose of issue, signature of Performer, Checker and approver.

b. Drawings shall be prepared in 1:100 scale. For details the scale shall be 1:25. Key plans may be in larger but in legible scale.

c. Deliverables shall be submitted in requisite number of copies and approved media (Hard and soft copies) as indicated elsewhere in the Bid document, Contract.

3.6 Construction, Execution, Installation

3.6.1 LSTK CONTRACTOR shall construct, execute, and install the work in accordance with approved design and drawings, specifications, directions of Engineer-In-Charge etc. meeting the requirements of Bid Document.

3.6.2 Construction, execution, Installation shall include:

a. Procurement, Supply of all materials, Labor, Equipment, Tools & Tackles, safety gear & measures etc.
b. Dismantling of existing works if required.
c. Protection of existing works/ facilities as required.
d. Rectification of damaged works etc.
e. Disposal of debris, storage of retained items etc.
f. Handing over the buildings and other works in complete, neat, clean and operable condition.
g. Supervision

3.7 Approvals from statutory Authorities

3.7.1 LSTK CONTRACTOR shall design and execute the works in accordance with requirements of Statutory Authorities and obtain approvals from them.

3.7.2 Approvals from following Authorities are envisaged.

a. Local Panchayat, Municipal, Development Authorities as applicable.
b. Factory Inspector, Department of Industrial safety & Health.
c. Department of Fire & Emergency Services.
d. Regional, City or Town Planning Authority if applicable.
e. Airport Authority if applicable.
f. Any other Authority having jurisdiction.

3.7.3 LSTK CONTRACTOR shall prepare drawings & documents necessary for obtaining approvals from statutory authorities.

3.7.4 LSTK CONTRACTOR shall make necessary changes, modifications etc. in design and execution if required for obtaining approvals from statutory authorities.

3.7.5 LSTK CONTRACTOR shall perform all liaising & co-ordination activities with required parties, Authorities etc. as required for obtaining approvals from Statutory Authorities.

3.8 As-built drawings

3.8.1 LSTK CONTRACTOR shall prepare and submit As-built drawings in approved software and in requisite number of copies and approved media (Hard and soft copies) as indicated elsewhere in the Bid document, Contract.

3.9 Co-ordination

3.9.1 LSTK CONTRACTOR shall do all co-ordination activities required for completion of the job with COMPANY or OWNER, PMC, SUB CONTRACTORs, MANUFATURERS, SUPPLIERS, VENDORS & other agencies.

3.9.2 Co-ordination by LSTK CONTRACTOR shall also include presentation to COMPANY or OWNER, PMC as required for finalization of building design and other issues.

PART-B (STRUCTURAL)

1.1 SCOPE OF SUPPLY/ WORK

The scope of Civil and Structural works under this contract shall include design, detailing, supply and construction of all relevant civil and structural works required for successful completion of works for **Food Grain Storage Silo Project** of M/s Central Warehousing Corporation, Nabha as per layouts enclosed with the Bid document or as may be required during detailed engineering by contractor. **All latest CPWD specifications and Indian Standards (IS Codes) to the extent applicable or required to carry out above works shall be deemed to be part of this contract.**

1.2 Brief scope of work include (but not limited to) design, detailing, supply and construction of foundation / substructure & super structure (wherever applicable) for following entities. However this list is only indicative in nature and in no way exhaustive.

1.2.1. All storage silos and their foundations along with supporting system for sweep auger, associated instruments etc.
1.2.2. Tippler (hydraulic truck unloader), hopper, grizzly foundation / pit.
1.2.3. Dump truck unloading hopper, grizzly foundation / pit.
1.2.4. Shed for above truck unloading system. Minimum eaves height of 10m.
1.2.5. All RCC tunnels for conveyors including conveyer foundations / supporting structure.
1.2.6. All underground or above ground hoppers foundation and grizzly supports.
1.2.7. All pre storage silos.
1.2.8. All bucket elevator supports / foundations along with housing structure, bottom pit, chute support structure and enclosed sheeting.
1.2.9. Conveyor supporting trestles.
1.2.10. Conveyor supporting structure along with conveyor hood & walkway.

1.2.11. Process tower along with supports for all equipments / hoppers etc. This tower shall be covered with sheeting all round.

1.2.12. Truck loading system. This includes foundation and supporting structure for truck loading silos and associated conveyers.

1.2.13. Wagon loading system. This includes foundation and supporting structure for shipping silos, hoppers, weigh hoppers etc.

1.2.14. Shed for wagon loading system.

1.2.15. Bagging silos along with shed and associated machineries, i.e. bagging warehouse.

1.2.16. Operator room for truck and wagon loading system.

1.2.17. Electronic weigh bridges with operator cabin.

1.2.18. Sampler system and Laboratory.

1.2.19. Foundations for all equipments and platforms on/ around equipments say pumps, exhaust vents, motors, valves, diesel day tanks, exhausts etc.

1.2.20. All cable supports/ trenches. Pipe supports for bore well lines, fire water lines etc.

~~**1.2.21.** Liquid retaining underground firewater reservoir and firewater pump house as per the requirement of concerned fire department. This shall also include drinking water sump and pumps.~~

~~**1.2.22.** Utility shed. Minimum eaves height 10 meter.~~

~~**1.2.23.** Covered bag storage shed. Minimum eaves height 10 meter.~~

~~**1.2.24.** Laboratory, office and control room building.~~

~~**1.2.25.** Reception and officer's canteen building.~~

~~**1.2.26.** Security rooms.~~

~~**1.2.27.** Substation, diesel generator and associated facilities. Minimum size 100 Sq. m.~~

~~**1.2.28.** Any other building specified elsewhere in the contract.~~

~~**1.2.29.** Sewerage/septic tank.~~

1.2.30. Temporary barricading/ chain link fencing of the construction area as specified by Client / Engineer-In-Charge of suitable height.

1.3 Design, detailing, supply and construction of monorails or other overhead cranes/ electric hoists of required capacity for operating and maintenance of equipments in truck and rail loading systems or other structures.

1.4 Foundation design shall be as per Soil investigation report (attached elsewhere in the Tender).

1.5 Preparation of fabrication drawings for all structural steel works using 3D CAD modeling software and bar bending schedules for all RCC works before construction is taken up.

1.6 Painting to structural steel shall be as per EIL Job specification no. A951-000-79-41-PLS-01.

1.7 Providing Bi-polar concrete penetrating corrosion inhibitor admixture in all concrete works.

~~**1.8** Providing electro forged hot dip galvanized MS gratings, Handrails on platforms/ stairs.~~

1.9 Water proofing and damp proofing wherever specified / directed by Engineer-in-charge.

1.10 Obtaining statutory approval from local authorities such as Municipal Corporation Development Authorities, Inspector of Factories, RITES and any other concerned authorities before starting the works at site.

1.11 Furnishing activity wise work program and taking necessary approvals from the related department in the warehousing complex before carrying out any activity in existing structure. Any statutory approval, if required, shall also be taken.

1.12 All other civil structural works forming part of scope of works of other disciplines attached elsewhere in this bid package.

1.13 Documentation of "**AS BUILT**" drawings/ details for all works as specified elsewhere in this Bid package.

1.14 Any other civil and structural works required/ directed by Owner/ Owner's representative/ Resident Construction Manager for the satisfactory and successful completion of the Project.

2. SPECIFIC REQUIREMENTS:

Apart from the conditions mentioned in the latest CPWD Specifications, and relevant latest Indian Standards (IS Codes) the following shall be strictly adhered to.

2.1 Contractor shall make necessary arrangement for placing the anchor bolts in position before concreting. Whenever there are more than four foundation bolts, these shall be fixed by using template. In case bolts are not available at site at the time of casting of foundation, proper pockets shall be left as per direction of the Owner/Owner's representative's Resident Construction Manager.

2.2 Contractor to ensure isolation of structures/ equipment with difference of temperature for free expansion while providing interconnecting platform and for connection to stair structures.

2.3 Contractor shall ensure lateral stability by providing box/built-up sections for columns wherever it is not feasible to provide vertical bracing in either direction.

2.4 All structures shall be designed as per provisions of the latest edition of IS: 1893.

2.5 All designs, detailing & construction shall strictly conform to enclosed standards, specifications & drawings.

2.6 Sequence of construction is to be shown on the AFC drawings by indicating construction joints wherever required.

2.7 Steel structures may be fabricated in fabrication yard within warehousing complex. Fabrication yard to be developed by the bidder/ contractor.

2.8 Contractor shall depute his concerned Civil-Structural Design Engineer to Owner/Owner's representative's review office as and when required for review of his documents. During such reviews involving computer aided analysis/design/drafting of structures, the contractor shall make his own arrangement of Personal Computer (PC) in the form of Lap-top in the premises of Owner/Owner's representative's review office. This is required to expeditiously resolve all the comments including those involving the use of PC by contractor in his submission. The contractor shall ensure that these PC's are fully operational along with necessary software already loaded including the input/output/drawing files of the structures being reviewed. The contractor shall revise and re-submit the analysis/design and drawings as required during review.

2.9 The minimum projection of pedestals supporting any steel structure / column bases shall be 300 mm/ 150 mm above the high point of pavement/ finished grade/ finished floor level whichever is higher, for outdoor and indoor located pedestals respectively.

2.10 All underground pits, tunnels, basements etc. (excluding appurtenances of storm water/effluent collection system, cable trench, and pipe trench) shall be of leak-proof RCC construction using approved make of water-proofing compounds.

2.11 The minimum grade of reinforced cement concrete to be used for super-structure & sub-structure (in case otherwise specified in Geotechnical Recommendations, higher grade shall be followed for sub-structure) shall be **M25 (design mix)** as per IS:456 based on Moderate exposure condition.

2.12 Cement shall be **43 Grade Ordinary Portland Cement (OPC)** conforming to IS: 8112 to be arranged from main producers (Main producer as defined in Cl.no.27.1(1) of CPWD manual).

2.13 A minimum 75 mm thick lean concrete of grade 1:5:10 (nominal mix) shall be provided under all RCC foundations (except under base slab of liquid retaining structures). The lean concrete shall extend 50 mm beyond the foundation edges on all sides. Otherwise the thickness and extension shall be as per design requirement.

2.14 High Strength deformed steel bars (TMT) of Grade **Fe500D** shall be used as reinforcement for all structures to be arranged from main producers (Main producer as defined in CPWD manual). 18 gauge black soft annealed SWG wire shall be used for binding of reinforcement bars.

2.15 Structural steel shall be Grade **E250 Quality BR/B0** conforming to IS:2062.

2.16 **Verification of foundation loading data for all equipments/structures/stacks etc, which form part of the comprehensive packages supplied by the respective vendors, shall be entirely the responsibility of Contractor. Contractor shall ensure that wind/ seismic loadings are strictly in line with the basic wind pressures/site spectra curves enclosed with this bid package.**

2.17 The **Net Safe Bearing Capacity of Soil** considered for the design of foundation shall be mentioned in drawings for all structures and equipments.

3.0 SCOPE OF SUPPLY OF MATERIALS

All materials (consumable / non-consumable) required for execution of Civil - Structural works under this contract shall be in the scope of contractor.

4.0 ADDENDUM TO STRUCTURAL SPECIFICATIONS

Sl. No	Specification No.	Clause No.	Title of Document
1	6-68-0022	Cl.3.7.1 (b)	"Brick Masonry of Class 5.0 as per IS:1077" shall be read as "Brick Masonry of Class 7.5 as per IS:1077"

PART-C (CIVIL & U/G PIPING)

1.0 SCOPE OF WORK

The scope of work of this package tender involves design, detail engineering, preparation of drawings, reviewed and obtaining approval from PMC/ Owner, fabrication, erection, installation, construction, painting, testing, commissioning, trial runs, performance guarantee,

supply of all materials, items, equipment, transportation, labor, consumables, tools and tackles, civil works etc. required for completion of job as per latest CPWD specifications, data sheets, drawings, latest IS codes, IRC codes & good engineering practice accepted by client and direction of Engineer-in-charge in all respect of all the Civil works.

2.0 DETAILED SCOPE OF WORK

2.1 SITE GRADING AND MICRO GRADING

LSTK Contractor scope includes clearing and stripping of the area, cutting of trees including uprooting of vegetation, roots etc. and disposal of the shrubs, bushes, roots etc. as per specifications and directions of Engineer- in-Charge. Tree cutting will be in Contractor scope, however necessary approval is by CWC.

Micro grading and site finish after completion of work to achieve final finish shall be by Contractor. Micro-grading shall be done by the LSTK contractor up to required levels. Grading shall be done as per specifications/ standards. Filling/ Cutting required to bring the site up to the finished levels is in the scope of Contractor. Extra earth required to make up to paved/ finished levels shall be arranged by the contractor from the approved borrow areas (borrow area shall be arranged by Contractor at its own cost)

Storage facilities will be designed minimum 200 mm above maximum flood level.

Contractor shall assess the lead by physically visiting the site. Disposal of surplus/ unserviceable earth by Contractor to disposal areas (disposal area shall be arranged by Contractor at its own cost and disposal area shall be approved by local authorities, Approval from local authorities to be taken by LSTK Contractor).

2.2 STORM WATER DRAINS

The storm water collected from the proposed facilities shall be conveyed to the Main storm water drains outside plant vide network of drains, pipe (RCC) culverts and RCC box culverts. Storm water drainage system shall be designed for rainfall intensity of minimum 75 mm/hr. The levels of the drains shall be fixed such that storm water is efficiently drained off without any water logging. Storm water drains shall be designed to cater the requirement of rain water. Adequate drainage arrangement shall be provided to avoid accumulation of water in unloading area. Roof drains from buildings and structures shall be routed to main storm water drain outside plant. Discharge from battery room shall be connected to neutralization pit. Outlet of neutralization pit shall be connected to storm water drain. Repairing of existing drains/ culverts damaged during course of construction, drain cuttings due to road crossings and its repair shall be in the scope of contractor. Culverts on approach road, on existing drains shall be provided by contractor. The culverts shall be designed to suit the type of traffic movement envisaged for operation and maintenance of the facilities. Additional culverts shall be provided (if required) to cross the new/ existing roads to connect the drains to main storm water drain is in the scope of contractor. RCC drain shall be provided in and around paved area & Brick masonry drain in other and rest of the area. Contractor's scope also include all tunnels which will be equipped with drainage slopes, sump pits and sump pumps (1 Working + 1 Standby) and sensing and monitoring instrumentation for auto on/off of pumps and ventilation system. Pumps shall discharge the collected water to the storm water drains. All items required to pump water from sump to the storm water drain including pumps, piping, fittings, valves, accessories etc. is under the scope of Contractor. Pump sizing shall be done considering the incoming flow to sump.

Pump head shall be adequately designed to meet the requirement. However, pump head shall be minimum 1.5 Kg/cm2 g, minimum capacity: 2 cum/hr.)

~~2.3 RCC PAVEMENT~~

~~Contractor shall design the pavement sections based on geotechnical reports.~~

~~Extent of heavy duty RCC pavement shall be ascertained by the contractor and heavy duty pavement shall be designed/ provided for required crane weight or any other heavier crane proposed to be used by the contractor for erection and maintenance. The sub-grade below the RCC pavement shall be designed, treated and prepared as per Geo-Technical reports/ CBR values.~~

~~2.4 ROADS, APPROACH ROADS, FOOTPATH AND OTHER FACILITY ETC.~~

~~Construction of new roads, approach roads to facilities and cutting of existing roads for all underground services and making good the same (including any additional material required) is in Contractor's scope. Dismantling of any existing roads (including disposal of unserviceable material to disposal areas, disposal area to be arranged by Contractor) for constructing new facilities is in Scope of Contractor. Approach roads to each facility and at any other place required as per detail engineering, execution, operation, maintenance, commissioning is in scope of Contractor.~~

~~All roads shall be designed for loading envisaged during construction, operation and maintenance and as per geotechnical reports. The sub-grade below roads shall be designed, treated and prepared as per Geo-Technical report. Truck parking, Car parking and scooter parking area shall be provided with bituminous pavement.~~

~~Any widening/ strengthening of existing road, construction of new road, modification of existing road to enable transport of equipment, tools etc. during the course of construction, erection and maintenance works at site shall be done by Contractor at no extra cost. The work shall be carried out in consultation with Owner/PMC.~~

~~Any work permits required for the same shall be obtained by the contractor. Storm water culverts, cable crossings, electric/ instrumentation road crossings on roads shall be in the Contractor's scope of work. LSTK contractor shall provide foot path, walkways, cross overs to facilities like hydrants, valve operating areas etc.~~

2.5 CABLE CROSSING

All electrical/ instrument cables crossing the main/approach roads, suitable road crossings by pipes, ducts/ culverts as per specifications shall be provided as per Electrical/ Instrumentation requirements. Crossings shall be designed for envisaged crane loads or likely heavier load required for erection, operation and maintenance.

2.6 RCC TRENCHES

a) Cable trenches

RCC Electrical/ Instrument cable trenches with pre-cast RCC covers shall be provided as per electrical/ instrumentation requirements. Trenches shall be designed to withstand envisaged crane movement load/ likely heavier load required for erection, operation and maintenance.

b) Fire water pipe trenches

Fire water pipe trenches shall be sand filled with pre-cast RCC cover provided for all U/G firewater headers in paved areas. Trenches in crane movement area shall be designed to

maintenance and operation. Pipe shall be laid on 100mm thick sand layer in FW trench. All underground fire water headers shall be provided with corrosion protection tape coating as per specification. Above ground pipe shall be painted with 2 coats of anti corrosive fire red paint as per IS: 2932 and conforming to shade no. 536 of IS: 5, over 2 coats of red oxide zinc chromate primer or single coat of aluminum paint.

2.11 RADIOGRAPHY

At least 10% of all welded joints shall be radiographically tested. Out of which 50% of welded joints so selected for radiography shall be field joints.

2.12 MISCELLANEOUS

- All underground pipes passing through crane movement area shall be checked & provided for the concrete encasing requirement by Contractor.
- All underground carbon steel pipes shall be provided with corrosion protection coating as per specification.
- P&ID's, datasheets, drawings etc. of various facilities/ items, as enclosed with the bid for civil works are minimum requirement and for reference purpose only. However contractor to finalize the same during detail engineering. No extra claim w.r.t. to time and cost shall be entertained on account of any modification during detail engineering.
- Dewatering works wherever required for all civil works and underground piping works.
- For piping being laid from underground to aboveground, tape coating shall be done minimum of up to 500 mm from the High Point of Pavement (HPP)/ Finished Grade Level (FGL).
- Any other civil and structural works required/directed by Owner/Owner's representative's Resident Construction Manager for the satisfactory and successful completion of the project.
- All construction approaches, culverts, chain link fencing all around construction area as required is in scope of contractor. After construction of facilities, chain link fencing shall be dismantled & taken away by Contractor.
- Damage to existing storm water drains, roads, culverts and any other facility caused during construction activities by contactor shall be repaired and restored to original condition.
- Necessary coordination like collecting necessary data, levels, including visits to site etc. shall be in the contractor scope.
- Contractor to own and maintain in continuous satisfactory use of all existing facilities like Roads, right of way or utilities there on. Any suitable temporary or permanent diversion required or any shifting of Electric lines, water pipes, Telephone cables including all formal interaction with respective authorities is in Contractor's scope.
- Approval of the facilities within contract scope for approval of Fire protection system and any other statutory and local body approval shall be obtained by Contractor. Contractor to comply with the requirement of these authorities irrespective if it is mentioned or not in the bid package & shall form part of contractor's scope of work including preparation of required drawings/ documents. Contractor shall comply with the requirement of local bodies including preparation of required drawings/ documents. Any modification suggested/ commented by statutory authorities/ local bodies shall be complied by contractor without any time and cost implication. Any drawings, documents required for obtaining statutory approvals before starting of the job and during start-up is in the scope of the contractor. Contractor shall arrange for the inspection of the works by the concerned authorities and will undertake necessary coordination and liaison required and shall not be entitled to any extension of time for any delay in obtaining such approvals. Any deficiency (ies) as pointed out by any

such authority shall be rectified by contractor at no extra cost to the owner. The inspection and acceptance of the works by such authorities shall, however, not absolve the contractor from any of its responsibilities under this Contract. Deficiency (ies) pointed out if any, by Owner/PMC, the same shall be rectified by contractor at no extra cost and time implication to the owner. No extension of time shall be granted for meeting the requirement and/or obtaining approval of statutory authorities.

2.13 GENERAL

The CONTRACTOR'S design and engineering activities listed below are the minimum requirements to be complied with:

- Preparation of Process Flow Diagram (PFD)/ Piping & Instrumentation Diagram (P&ID's) and equipment data sheets.
- Preparation of material take-off, material requisitions and purchase requisition of bought out items.
- Design calculations for the respective fire protection system, U/G Piping systems and other Civil activities.
- Installation drawings and documents.
- Taking approval from statutory authorities.
- Operating maintenance and spare parts manuals wherever applicable.
- In case of any conflicts in this document/Design Basis/specifications/ statutory requirements, whichever is more stringent, shall govern.

3.0 SCOPE OF SUPPLY

OWNER'S SCOPE OF SUPPLY

Nil

CONTRACTOR'S SCOPE OF SUPPLY

- All items consumables/non consumables required to complete the job.
- All tools tackles, plant machinery etc. to complete the job.
- Erection and commissioning spares.

1.0 SCOPE OF SUPPLY/ WORK

Railway siding shall be constructed in accordance with the norms, specifications and standards prescribed by the Ministry of Railways from time to time with respect to the Civil Works, Rail Tracks, platforms and other structures. Bidder's scope will also include complete Design, Engineering including certification and approval from Railway Authorities. Obtaining post construction approval from Railways Authorities, if any, is also included in Bidders scope. Bidder's brief scope in this regard is as given below:

a. Bidder to study existing Railway Track Layout and carrying out modification in existing Railway Track by way of slewing the track and laying additional track of about 300 meter in length within chainage 2184.54 to Chainage 2018.60, as per layout enclosed, from the point of view of making it suitable for loading the grain.

b. Modification indicated above within the given Chainage is indicative and minimum. Successful bidder will work out actual chainage length for carrying out modification. Any increase in modification length will be at no extra cost and time to bidder.

c. Successful bidder's scope will include all Design, Engineering, approval from Railway authorities and furnishing 6 No. prints of approved Drawings to Client / PMC.

d. Bidder is advised to visit and study the site and will reroute any existing service, if any and causing obstruction to proposed Railway Track without any cost and time implication.

e. Bidder's scope will further include:

- Preparation of formation width suitable for Railway Track as per approved design.
- Bidder will be allowed to use existing ballast, concrete slippers, 90 Lb. rail, fastener hooks, fish plate etc. complete. However, bidder shall replace any damaged / unserviceable and inadequate material at site with fresh and additional material without any additional cost.
- All signals, crossings etc. required complete in all aspects for revised railway track as per specifications.
- Designing of suitable drainage system.
- Preparation of general arrangement drawings in accordance with Indian Railways Code of practice
- Bidder shall finally deliver revised Railway Track suitable for proposed loading and will obtain post construction approval, if any, from Railway authorities.

PART-A

(ARCHITECTURAL)

PART 1: ARCHITECTURAL DESIGN BASIS

A.1.0 SCOPE

This document shall establish the minimum criterion to be followed for the design of various Plant, Non-Plant Buildings & Sheds. Architectural design shall be in accordance with the following codes and industry standards.

A.1.1 REFERENCED PUBLICATIONS

1. National Building Code of India – 2005
2. Latest CPWD specification
3. Factory Law/ State Govt. Factory Acts
4. Local Municipality or any other Authority's Bye-laws as applicable.
5. Bye-laws of Town & Country Planning Organization
6. BPE (Bureau of Public Enterprises) Norms
7. BIS (Bureau of Indian Standards) Codes
8. Indian Electricity Rules
9. Any other applicable Law, Rules, Standard as referred in respective clause.

Note: All codes & standards shall be latest revision with all amendments issued there to. However, effort shall be made for effective utilization of space and facilities for cost effective design.

A.2.0 STANDARD SPECIFICATIONS CODES & PRACTICES

EIL Engineering design incorporates Codes and Standards as referred in the design philosophy of respective engineering disciplines as well as applicable EIL standards and specifications.

A.3.0 GENERAL /DESIGN CONSIDERATION

A.3.1 ARCHITECTURAL DESIGN

Architectural design of the buildings shall be in accordance with this Design Basis and references as stated above to meet the functional requirements.

A.3.2 BUILDING REQUIREMENTS

A.3.2.1 SPATIAL REQUIREMENTS

Spatial requirements of the buildings shall mainly be decided based on the activities to be performed in the building, equipment/panel layout and consequent occupancy pattern, clearances, maintenance and safety requirements. The objective of spatial arrangement shall be to satisfy functional requirements, physical comfort, and safety regulations as well as aesthetics. Requirement of services/utilities such as air conditioning, LAN etc. shall be finalized as per Owner's specific requirement.

Spatial requirements inside a building shall be decided based on activities to be classified as follows, which shall be provided in all the buildings/sheds.

A.3.2.1.1 Functional Spaces

Functional areas of any building/shed are constituted by the main activity areas for which the building is to exist. Various spaces/rooms shall be judiciously sized and shall be integrated logically to generate the total building plan taking into account the following parameters.

- Activities, group of activities and consequent workflow pattern.
- Site conditions i.e. dimensions, contours etc.
- Climatic conditions vis-a-vis orientation.

- Site Planning (solar geometry, approaches, adjoining facilities, safety standards etc.)
- General arrangement of equipments
- Health, safety & environmental standards & regulations.
- Lighting and ventilation.
- Acoustics.
- Building utilities, amenities & Services.
- Security.
- Economy.
- Aesthetics.
- Statutory requirements
- Any specific requirement pertaining to particular buildings.
- All other established Architectural design parameters.

The objective of spatial arrangement shall be to satisfy functional requirements and physical comfort and safety regulations as well as aesthetics which has significant role in creating a favorable working and living condition.

A.3.2.1.2 Circulation Spaces

Following spaces are classified as circulation spaces. These spaces shall be provided for integrating various types of spaces and as means of access/exit.

- Corridors & passages.
- Staircases.
- Elevators.
- Entrance lobby/ Foyer including Reception & waiting.
- Gangway/walkways.
- Equipment loading/unloading platforms.
- Emergency Exits.
- Ramps for physically challenged and equipment entry/exit as applicable.

A.3.2.1.3 Amenity Spaces

Following spaces are classified as amenity spaces.

- Toilet (Gents & Ladies).
- Drinking Water Facility.
- Locker & Change room.
- Rest room/Lunch room.
- Wash rooms & space for drying clothes.
- Canteen/ Pantry room.
- First-aid room.

Out of the above-mentioned areas, Toilet & Drinking Water enclosure shall be mandatory requirement for all buildings with human occupancy. Other requirements shall be provided as specified.

A.3.2.1.4 Utility Spaces

The requirements of Utility spaces are generated due to provision of services like Air-conditioning, pressurization, firefighting, electrical, telephone etc. Following are the examples. These spaces shall be provided as per specified building services.

- Air-conditioning plant room
- Air handling rooms
- Pressurization blower plant room
- Electrical distribution panel rooms
- Service Ducts
- Fire Fighting Equipment room
- Telephone Exchange Equipments room
- UPS room
- Battery room

However following are the limiting sizes/ dimensions for various purposes, which are to be adhered to.