



एनएचपीसी लिमिटेड
(नारत सरकार का उद्यम)
NHPC Limited
(A Govt. of India Enterprise)

O/o DGM (Procurement & Contract)
Chamera Power Station Stage-I,
PO: Khairi-176325, Distt: Chamba, (HP)
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CIN No.: L40101HR1975GOI032564

An ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007 & SA 8000: CERTIFIED POWER STATION

No. NH/CPS-I/P&C/W-1409/2023-24/ 1228

Dated: 08/01/2024

संशोधन संख्या(CORRIGENDUM No)-1

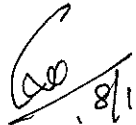
Revised SCC, Technical Specifications & GTP

The following is amended in respect of published NIT No. NH/CPS-1/P&C/W-1409/2023-24/1201 Dated: 02/01/2024 for "Supply, Installation, Testing and Commissioning of PA system at Dam & Power House of Chamera-I Power Station." as below...

Sl. No.	Description of items	Existing clause	To be amended
1	Supply, Installation, Testing and Commissioning of PA system at Dam & Power House of Chamera-I Power Station. e-tender No : 2024_NHPC_788307_1	The matter contents in the page No-105-112 i.e. SCC, Technical specifications & GTP etc. in the bid documents.	The matter contents in the page No-105-112 i.e. SCC, Technical specifications & GTP etc. in the bid documents may be read as per attached Corrigendum No-1.

All other terms and conditions of NIT shall remain unchanged.

This issue with the approval of competent authority.


8/1/24
उप महाप्रबंधक (संविदा)
क्रय व संविदा विभाग



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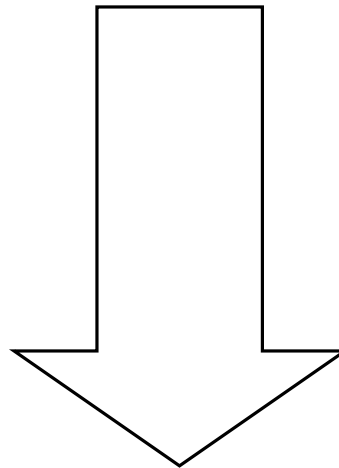
संशोधन संख्या (CORRIGENDUM No)-1

REVISED SCC, Technical specifications & GTP

For

**“Supply, Installation, Testing and Commissioning of PA system at Dam &
Power House of Chamera-I Power Station
(NIT No-NH/CPS-1/P&C/W-1409/2023-24/1201 Dated: 02/01/2024)”**

**Contents mentioned at page No. 105-112 of the bid documents of
above NIT may please be read as given below:**



Special Condition of Contract

1) SALIENT FEATURES OF THE SITE AT CHAMERA POWER STATION-1:-

- a. Location:-** The 540 MW Chamera Power Station-1 is located in District Chamba of Himachal Pradesh and is connected of the nearest railhead Pathankot (Punjab) by 101KM road. Power House is located at Khairi and the Dam is located at Chaura, which is 15KM from Khairi. Dam is linked to the Power House by 16KM road on the right bank of the river Ravi.

Latitude: 32°37'338"N

Longitude: 77°55'225"E

- b. Climate and working period:-** Chamera Power Station-1 has a temperature climate free from extremes of temperature variation. In summer extreme temperature may go 35 degree Celsius and in winter the minimum temperature may fall up to 5 degree Celsius. The months of June to September being monsoon season, heavy rains occur in the project area. Expect during monsoon season, when field work may be restricted, normal working possible round the year.

- 2) SCOPE OF WORK:** The scope of this contract covers "Supply, Installation, Testing and Commissioning of PA System at Dam & Power House of Chamera-I Power Station as per 'Schedule of Quantities & Prices'. The detailed scope of supply & work along with technical specifications has been attached at Annexure-A.

- 3) SITE VISIT & DRAWING APPROVAL:** Representative of firm shall visit the site for actual quantum of work and drawings of equipments shall be submitted for approval to Engineer-In-Charge.

- 4) PRICES & TAXES & DUTIES:** Prices shall be Firm and on F.O.R destination basis i.e. Project Site, Chamera Power Station-1, Khairi, Tehsil-Dalhousie, Distt.-Chamba, H.P., inclusive of charges for packing, handling, forwarding, transportation, insurance and all applicable taxes & duties.

5) PAYMENT TERMS:

- 100% payment of supply, Installation, testing and commissioning charges shall be released within 30 days of successful trial run.
- Payment shall be released through NEFT/RTGS (Electronic Clearing System) and Bank Charges, if any, shall be borne by the supplier.

6) COMPLETION TIME:

The completion time shall be as follows:

Sl. No.	Activity	Period	Remarks
1	Issue of LOA	Zero date	
2	Site visit, design, engineering and submission of drawing for approval	Four weeks	From zero date
3	Approval of drawing by NHPC	One week	From the date of submission of drawing.
4	Delivery, Installation, testing & Commissioning work	Ten weeks	From the date of approval of drawing

5	Trial Run	Two weeks	From the date of completion of Installation, testing & Commissioning work
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- 7) **DEFECT LIABILITY PERIOD:** Any deficiency in workmanship shall be guaranteed / warranted for 01 year from the date of completion of trial run. Any defect/problem arising during defect liability period due to poor workmanship shall be rectified by the supplier/contractor within 07 days at no cost to NHPC.

The scope during the Guarantee/DLP will be as follows:

- a) Any defect(s) in the system/sub-system, found within the Guarantee/DLP period shall be rectified / replaced by the tenderer without any additional cost including replacement of Devices, all spare parts and wiring and labour involved etc. the rates quoted should include all such factors.
- b) Six monthly servicing, maintenance and cleaning of all Devices and equipments.
- c) During Guarantee/DLP period the system will be inspected and checked by deputing a competent, trained service engineer on six monthly basis.

8) **SPARES/EQUIPMENTS:**

The contractor shall confirm that spare parts/equipments used in the system are of latest design/technology and shall be available in the market for 10 years operation along with manufacturer's support. The Contractor shall provide certificate from manufacturers of major items to be installed regarding the conformity of supply of spares. The Contractor shall also provide the employer with the drawings, catalogues and any other document required by the Employer so as to enable the Employer to identify the recommended spares. Such details will be furnished to the employer along with other technical documents to be submitted for main equipment.

9) **INSURANCE:**

All the material shall be insured by the Contractor during transit, handling, storage and erection of the equipment by the Contractor himself. Storage space shall be provided to the Contractor by CPS-1 at DAM/POWER HOUSE, however the safe storage of the material against any theft/loss shall be the responsibility of Contractor. The claim for any damage/shortage etc. will be lodged and settled by the Contractor with the Insurance Company.

- 10) **ACCOMMODATION:** Free accommodation shall be provided to the team deployed for installation work during the work period, subject to its availability.

- 11) **COMPLIANCE TO STATUTORY LAWS:** Contractor is required to adhere to all statutory laws and labour laws.

- 12) **SAFETY IN WORK:** Carrying out of installation work in Power House & DAM in safe manner shall be the sole responsibility of the contractor. The contractor shall take care of all statutory provisions during the installation work including insurance of the deployed manpower.

13) **Information to Bidders:**

1. Bidder should either OEM or be an Authorized dealer of active components of PA system. Active component shall mean "Remote microphone unit, System Manager, Amplifiers, speakers, IP master station".
2. All Active Components should be from the same manufacturer. All equipment's should be as per the specifications and requirements mention in tender. Bidder has to furnish the make and model of quoted equipment's along with supporting catalogue and technical compliance point wise.
3. The bidder/supplier may visit the site to ensure actual quantum of work.

DETAILED SCOPE OF WORK & TECHNICAL SPECIFICATIONS**1. Scope of work:**

Scope of work under this section covers design, manufacture, quality assurance, supply, installation, testing, commissioning, performance testing and guarantee for one year of 02 nos. public addressing (PA) system for Power House and DAM area as per the specifications hereunder, each complete with all auxiliaries, accessories, spare parts and warranting a trouble free safe operation of the installation.

The scope of work shall be a comprehensive functional system covering all supply and services including but not be limited to following:

Sl. No.	Item Description	Qty for Power House	Qty for DAM site
1	MASTER CONTROL STATION	01 No.	01 No.
2	CENTRAL CONTROL EQUIPMENTS	01 Set	01 Set
3	ADDITIONAL MASTER STATION (REMOTE MICROPHONE)	03 Nos.	Nil
4	OUTDOOR SPEAKER	30 Nos.	15 Nos.
5	INDOOR SPEAKER	11 Nos.	05 Nos.
6	POWER/COMMUNICATION CABLE & CONDUIT PIPE	As per requirement	
7	SPARE	01 No. Speaker of each type	01 No. Speaker of each type

The Public address system shall comprise of:

- Master control station (MCS) including microphone and all accessories required for the system.
- Central control equipments consisting of central switching system (CSS), System manger/Central paging control and amplifier rack, preamplifier, power amplifiers, multi-interface unit and all required accessories as per system requirement.
- The PA system shall be microprocessor controlled software programmable, centralized & Distributed amplifier based system which consists of zones, sub zones and exchange to interface all these zones among themselves.
- System should be capable to support two main channels:
 - i) Page channel:
This provides loud speaking facility and is used to broadcast / announce messages, instructions and to locate field people in the plant. The loudspeakers can be arranged in different groups and the announcements can be made either in individual group or all groups. This channel shall be used in the proposed scheme.

ii) Party channel:

It shall be used for carrying prolonged conversations in private mode, which shall not be heard over the loudspeakers. The system possesses multiple party channels i.e. one dedicated channel for each field handset station. It should also support the loud speaking facility and can be used to broadcast the message to all Zones & any other individual Zone. This channel shall be provided for future use.

- Loud speakers (indoor/outdoor) with wall / column / structure mounting arrangements.
- The system shall be adequately protected from signal and power line noise and meet the surge withstand capability requirements of ANSI C37.90 A/IEEE Standard 472-1989 equivalent.
- The system should meet various statutory compliance issued by Govt. of India in respect of Cyber security.

2. Specific Requirements and layout conditions:

The system shall comprise of two independent P.A systems that shall be installed at Power House and Dam site.

Main panel/ Master control station (MCS) of each public address system shall be located in the control rooms of the Power House and Dam site.

Additional master station shall be provided for Power House i.e. at 03 nos. locations (Switchyard, MAT portal gate & Transformer Gallery) so that 02 way communication/announcement can be done from these areas. These master stations can be connected through existing LAN or separate communication cabling with required accessories may be provided as per scheme.

The indoor and outdoor loud speakers shall be located at various points as per requirement.

The major covered areas of Power House are as follows:

- Power House Block from EL 540.20 to EL 553.50 (Machine floor, Turbine floor, MIV Floor & Runner Removal Floor)
- Transformer Gallery/ Draft Tube gate hall
- Control Room Floor
- Office floor & Battery Room Floor
- Switchyard area including GIS & DG Room
- Cable cum Ventilation Tunnel

The major covered areas of Dam site are as follows:

- CISF Barrier (Towards Khairi)
- CISF Barrier (Towards Banikhet)
- Dam Top
- Under sluice Chamber (Elevation 682 m)
- Transformer & LT panel area
- Radial gates operation area (A Gallery)

- B Gallery ,C Gallery, D Gallery, E Gallery
- Dewatering pit (Elevation 632 m).

The PA system shall cover all operational area of power house complex including outdoor switchyard area and Dam site area as per layout attached at Annexure-B & C. The layout is for illustration purpose only, the bidder/supplier may visit the site to ensure actual quantum of work.

Any item not mentioned specifically in the technical specifications but required to complete the system shall be deemed to be included.

3. Rating and functional Characteristics:

Capacity and bandwidth ($\pm 3\text{Db}$) for outdoor wall/ column mounted horn type loudspeakers shall be at least 30 W (rms) and 250-10 KHz respectively having power matching capability to 30W, 15W, 10W.

Capacity and bandwidth ($\pm 3\text{Db}$) for indoor wall / column mounted cone type loudspeakers shall be at least 30W (rms) and 80-20 KHz respectively. The speaker system shall have Woofer & Tweeter.

4. Performance Testing & Guarantee:

The PA system shall along with all auxiliaries and accessories shall be capable of performing intended duties under specified conditions. The Contractor shall guarantee the reliability and performance of the individual equipments as well as of the complete system for a period of one year from the date of completion of trial run.

5. Design and construction:

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable. The supplier shall ensure the conformity of these standards and submit a conformity certificate for equipments under supply.

Standards	Description
IEC 60065	Audio, video and similar electronic apparatus safety requirements
IS 10426	Specification for public address amplifier.
IS 1881	Code of practice for outdoor installation of public address system
IS 1882	Code of practice for outdoor installation of public address system
IS 9302	Characteristics and method of measurement for sound systems equipment
IEC 60326	Printed Boards
IEC 60446	Basic and safety principles for man- machine interface, marking and identification, identification of conductors by colour or numerals
IEC 60478	Stabilized power supplies, DC output
IEC 60870-5	Tele- control equipment and systems
EN 54-16	Voice alarm control and indicating equipment

6. Detailed Technical Requirements:

6.(A) PA system in Power House.

(i) Master Control Station (MCS) / Remote Microphone Unit

Elegant remote microphone in desk enclosure and with gooseneck microphone.

“Upto 13 free-programmable buttons, talk-button” or “minimum 7 inch touch screen” with features of zone paging, group paging, all zone paging etc.

Easy operation through pre-programmed functions:

- Manual paging to selectable areas and group call.
- Choosing background music.
- Activation of pre-programmed paging's of any source to any zone.
- Indication of specific faults with acknowledge and reset button.

Operating-, fault- and level indication.

Build-in loudspeaker to monitor the pre-programmed start/end chime if applicable.

Adjustable microphone and loudspeaker level.

Monitored data and audio lines as well as the pre-amplifier in accordance with EN 60849, EN54-16 and ISO 7240-16.

(ii) System Manager

The voice alarm system meets the standards EN-54-4, EN54-16& CE, ROHS in all topics relevant for this system.

The voice alarm system is equipped with digital low-loss amplifiers to keep energy costs and heat generation low. In case of loss of the AC-mains supply voltage, the amplifiers of the voice alarm system switch to an energy saving standby mode to reduce the required current consumption resulting in a minimum battery capacity required.

The voice alarm system has a modular layout, which allows scaling the system individually to the requirements of each application. Future extensions of the system can be realized easily. Almost any complexity of audio distribution needed can be achieved. Up to 64 speaker lines can be connected to one amplifier to build a cost efficient one-bus system, or up to 32 speaker lines can be switched between two amplifiers realizing non-interrupted background music in zones not addressed by paging calls. It is also possible to assign an individual amplifier to each AB speaker line offering a separate audio channel for each zone. These three methods can be combined according to the requirements.

In maximum configuration, the voice alarm system supports up to 64 emergency or 256 general remote microphones in any combination and 512 speaker lines can be connected. Up to 128 audio channels may be used individually at the same time.

The voice alarm system or server has the capability to store and play emergency and general announcements.

The voice alarm system can be installed centralized or distributed. In a distributed installation, all separate components are interconnected redundant, and all transmission paths are surveyed continuously. In case of a path failure, the network switches over to a reserve path within 10 milliseconds so that the interruption of the audio transmission will hardly be audible. The connection between the different locations can be done by single- and multi-mode glass fibre cables or CAT5 copper cables. Distances up to 30 km can be covered by the use of single-mode glass fibre cable. In total, up to 32 separate locations can be realized.

The user can change the volume of general input sources as well as output amplifiers by control inputs and by the remote microphones.

The speaker line surveillance can be done by impedance monitoring or with end-of-line modules. A failure of each speaker line is indicated separately.

The system can easily be configured with a Windows® based software. This also provides the online indication of the system status as detailed fault information, current routing and activation of control inputs and outputs. Up to 10000 event and failure logs can be downloaded from the system.

(iii) Class D modular Power Amplifier

Amplifier module with highly efficient digital class-D amplifier with an output power of 500 watts and internal low-loss voltage converter of advanced switching technology.

Lightweight through floating speaker line output without transformer.

Output voltage switchable between 70 and 100 volts.

Fuse easily accessible from the back.

Ventilation with easy to clean filter.

(iv) Power Supply Manager

The Power Supply Manager shall supply DC power to individual public address/voice alarm system components. The Power Supply Manager shall be EN54-4 complied. It shall combine two built-in power source units with a high-performance charger. Battery capacity shall be such that it can operate the system for minimum one hour. The removable terminal block shall save installation/maintenance time. If the Main AC power supply is down, the module switches automatically to auxiliary battery power. Fuse shall be able to be replaced from the rear panel without uninstalling the unit from a rack. The Power Supply Manager shall operate on 220-230 AC, 50/60Hz, supply DC Power.

(v) Multi Interface Unit

Universal interface for connecting to external systems, configurable/programmable for:

-Announcements, activated 2 audio inputs for the supply of background music or control inputs

-2 Audio outputs for the transmission of announcements in external audio systems (E.g. PA systems),

-2 Leased line connections

-16 Control inputs for zone control for externally-powered announcements, dial-up, receiving a busy signal of an external audio system, switching on control output

Automatic system diagnosis (every 20 seconds) of receivers, teaching units, IP Intercoms and universal interface for network status, CPU error, synchronization problems and missing receivers.

Including system software for Windows.

“The intended features of multi interface system can be inbuilt in the other equipment i.e. System Manager etc. The equipment in this case must fulfill all the technical requirements as above.”

(vi) IP Master Station

The IP master station unit is designed for use with packet intercom system (IP network compatible intercom system) that employs the packet audio technology and can be connected to an existing local area network (LAN) or wide area network (WAN).

Network shall be made possible using RJ45 connection via switching hub. Connecting the station to a switching hub with PoE functionality or withusing an AC adapter. Network interface shall be I/F

10BASE-T/100BASE-TX (Automatic-Negotiation) Auto MDI/MDI-X compatible Network Protocol TCP/IP, UDP, ARP, ICMP, HTTP, RTP, IGMP.

The IP master station shall be able to connect to fibre-optic networks without restriction on operation distance and shall be possible to broadcast up to 8 paging destinations using unicast transmission and up to 191 in multicast.

By connecting the IP master station unit to a LAN via its RJ45 connector shall make it possible to broadcast conversation and paging calls between IP stations. An emergency message can be programmed into the IP master station and broadcast to a pre-programmed zone with the key operation or external control input. The IP master station shall employ echo cancellation and will allow hands-free duplex operation without the need to lift the handset.

The IP master station shall be able to initiate an all-call page to all other stations simultaneously to all programmed paging groups within the system. It shall be possible to remove stations, through programming, from receiving all-call and restrict any station from initiating an all-call. The master station shall permit up to 8 BGM sources.

The master station shall also perform the following features: Voice calling, Automatic connection, Continuous call, One-touch dialing, Call hold, Automatic call forwarding, Emergency paging, Scan monitoring, Three-party conference and many more.

The IP multifunctional master station shall have a 2 line, 16-alphanumeric character information LCD display. LCD display and a headset terminal plus an external speaker terminal employing circuitry that prevents acoustic feedback or echo generated when the voice output from the internal speaker enters the microphone. The IP Master station shall include dedicated software that will enable centralised control and log verification and system maintenance from a personal computer. Line supervision can also be performed using a personal computer and Internet browser.

The IP master station can be desk mounted or mounted to a wall using an optional wall-mounting bracket.

(vii) Paging Horn Speaker

Weather-resistant pressure chamber loudspeaker compliant with IP65 in 100 V design, oval horn made of powder-coated aluminum, driver cover made of ABS plastic, swiveling bracket made of stainless steel for precise alignment of the speaker, rear selector switch for power matching.

(viii) 30W Wall Mount Universal Speakers

Speaker box with elegant softline design fits into modern architecture. High quality 2-way speaker in a bass reflex enclosure suitable for flush-mounting/ surface-mounting wall/ceiling speaker with optional bracket or on an optional floor stand, including 100V-transformer, Woofer and tweeter designed for both music reproduction and high intelligibility, rotary switch for power adjustment including low impedance selection on the rear. Low resonance ABS enclosure with removable metal grille in the same color as the body, with U-brackets for tilt and pan.

6.(B) PA system in DAM

(i) System Manager (Voice Alarm System with inbuilt Amplifier 240W)

Digital microprocessor-controlled voice alarm compact amplifier for voice alarm, announcements and background music. Integrated audio inputs, 8-level priority control, voice alarm control, power amplifier, circular dial and complete monitoring according to EN 54-16.

6 switchable and adjustable volume speaker outputs with a total of 240-Watt nominal power output. Three microphone / audio carrier inputs with switchable sensitivity as well as two stereo audio carrier inputs with volume control and tone control on front panel, one input switchable sensitivity and volume control back to prevent an intentional or unintentional adjustment, two speaking bus lines for up to four external stations.

Front mounted acoustic and electronically monitored fire brigade microphone (first microphone) with control panel for controlling the alarm: emergency one and out, range selection, selection of evacuation and warning text. Fault indication with plain text display/LED indicator of the occurred error, acoustic signal and reset button.

Password-protected setting the equalizer settings, language, password many more. and display relevant system information via menu on alphanumeric two-line display or via LED indicator

LAN connection for system programming and read out of the log with detailed event and error messages to diagnose locally or to remote diagnosis.

8 universally usable inputs and 8 universally usable control outputs; 6 separate inputs for alarm control of the BMZ with switchable monitoring, one with 24-volt control (polarity); three separate control outputs with relay contacts for feedback to the BMZ: collective fault signal (changeover contact), emergency (changeover contact) and activated CPU off (make contact). Each line output a switching relay for example external volume control in 3- and 4-wire technology.

An appropriate additional amplifier can be used as a rescue and announcement enhancer, in the second case, announcements are made without the interruption of background music in durchsagelose areas can be made. The monitoring of the additional amplifier is taken over by the compact amplifier. Extension of the system up to 60 areas with suitable extension amplifiers possible.

(ii) Power Amplifier 240W

The booster amplifier shall operate on 220 – 240 V AC or 24 V DC power, and shall control and mix 1 balanced (screw terminal) Line in and 1 unbalanced (screw terminal) 100 V Line inputs. Outputs shall be balanced Loop out and balanced high and low impedance (floating) Speaker out. The amplifier shall meet the following performance criteria: Power output shall be 240 W at less than 1% THD (at 1 kHz, 1/3 rated power). Frequency response shall be 50 Hz to 20 kHz (+/-3 dB), with an S/N ratio of over 60 dB. Bass Tone Control shall be +/-10 dB at 100 Hz, and Treble Tone Control shall be +/-10 dB at 10 kHz. It shall be possible to bypass the master volume to make emergency announcements. Power, signal and peak indicators, and fan cooling ventilation shall be provided. The panel shall be ABS black resin, and the case black steel plate.

(iii) Remote Microphone

Digital station in the attractive design with Gooseneck microphone and wind to connect to Voice alarm amplifier of management. The keypad is easy to identify acceptable labelling Strip and easy to clean. Min. 10 programmable buttons with activation indicator led for area and text option from the text store. Digital control signals, audio signals, and power supply via bus line. Input socket for external power supply, socket for connecting a headset speaking with preload for electret microphones. Integrated Mic Preamps with switchable compressor and adjustable microphone sensitivity, floating balanced output.

Automatic triggering of a pre and/or post gongs from 4 different 1-4 sound effects by the talk button can be programmed, display by LED during the Gong.

Operational, engaged and talking advertisement for activation.

Monitoring speaking points connecting to the ELA management amplifier. Indicator for connection failures to the ELA management system.

(iv) Paging Horn Speaker

Weather-resistant pressure chamber loudspeaker compliant with IP65 in 100 V design, oval horn made of powder-coated aluminum, driver cover made of ABS plastic, swiveling bracket made of stainless steel for precise alignment of the speaker, rear selector switch for power matching

(v) 30W Wall Mount Universal Speakers

Speaker box with elegant softline design fits into modern architecture. High quality 2-way speaker in a bass reflex enclosure suitable for flush-mounting/ surface-mounting wall/ceiling speaker with optional bracket or on an optional floor stand, including 100V-transformer, Woofer and tweeter designed for both music reproduction and high intelligibility, rotary switch for power adjustment including low impedance selection on the rear. Low resonance ABS enclosure with removable metal grille in the same color as the body, with U-brackets for tilt and pan.

(vi) Backup Power Supply

Battery capacity shall be such that it can operate the system for minimum one hour. If the Main AC power supply is down, the module switches automatically to auxiliary battery power.

7. Cables:

Cables for use in communication shall be of FRLS PVC sheathed cables and shall conform to latest edition of Indian / international standards. Cable shall be laid in existing cable trays. Wherever cable trays are not available, cable shall be laid in 25 mm PVC conduit pipe. The interference factor in the communication cable shall be taken care by the supplier. Cable shall be suitable for installation as follows:

- Above ground in open air location (tray/ducts) in tropical, humid and corrosive atmosphere prevalent in power plant.
- Direct buried in underground trenches conduits with uncontrolled back fill and possibility of flooding by water and chemicals.
- Laid underground in RCC lined cable trenches with possibility of flooding by water.

8. Drawings and documents:

The contractor shall submit all the drawings and documents in accordance with technical requirements. The Contractor shall submit Two (2) copies (or as required) of drawings along with copy in electronic form media. The Contractor shall furnish Two(2) sets of O&M manuals in properly bound hard copy which shall include GA drawing, Power and Control Schematic, Wiring Diagrams, recommended operation and maintenance procedures, testing & installation guide lines. All instruction data etc. shall pertain only to the equipment supplied. The contractor shall also provide the soft copy of the manuals.

All the drawings and documents shall be submitted in presentable folders properly bound and catalogued for easy retrieval / reference. All drawings shall be digitally printed/ plotted. Ammonia print/ blue print shall not be accepted.

9. Specific packaging, handling and storage requirements

The packaging and storage of electronic and electrical equipment shall be strictly in accordance with internationally accepted standards. Electronic equipment shall be packaged, shipped and stored in anti-static packing. All packages shall be stored Indoor. Packages containing electronic equipment shall be stored in humidity controlled environment.

Guaranteed Technical Particulars:

The equipments/components shall meet following technical requirements. Higher technical specifications shall be acceptable.

A. Master Control Station(MCS)/Remote Microphone Unit i.e. Item 6.(A).i

S.No.	Parameters	Specification	Compliance
	Technical specification of Remote Microphone		
	Make and Model	To be quoted by bidder	
	Power Source	24 V DC (operating range: 15 to 40 V DC, supplied from the voice evacuation frame) or DC input power supply connector (when the optional AD-246 power supply unit used). Usable DC power supply plug: and non-polarity type.	
	Operation	Function key, Emergency/all-zone emergency broadcast key, Talk key or min. 7 inch touch screen with all features	
	Current Consumption	240 mA or less	
	Audio Output	0 dB*, 600 Ω , balanced	
	External Microphone Input	1xAUX	
	Distortion	1% or less	
	Frequency Response	100 Hz to 16KHz	
	Signal to Noise Ratio	60 dB or more	
	Microphone	Unidirectional electret condenser microphone	
	Chime	Built inside (PCM sound source), monitoring possible using monitor speaker	
	Level Control	Microphone sensitivity control, Monitor speaker volume control, Chime (adjustable using the software)	
	Maximum Cable Length	1200 m (3937.01 ft)	
	Number of Connectable Extension Units	Max. 7 units	
	Monitor Speaker	Built-in type	
	Indicator	Power indicator, Failure indicator, Status indicator, Selection indicator, Emergency indicator, Broadcast status indicator, Microphone indicator	
	All Accessories as required	As per requirement	

B. System Manager i.e. Item 6.(A).ii

S.No.	Parameters	Specification	Compliance
1	Technical specification		
	Make and Model	To be quoted by bidder	
	Power Source	20 – 33 V DC, removable terminal block (4 pins) or 230V AC	
	ATT/Control Output/Input	8 outputs, no-voltage make contact, relay contact (NC, NO, C), control current: 2 mA to 5 A, withstand voltage: 125 V AC, 40 V DC Connector: Removable terminal block (12 pins) ... 2	

	Analog Link	Number of Connectors: 1 input, 1 output Connector: RJ45 connector Connection Cable: Shielded Category 5 twisted pair cable (CAT5-STP) or greater Maximum Cable Distance: 800 m (2624.67 ft)	
	Audio Input 1, 2, 3, 4	4 inputs	
	Control Input 1, 2	16 inputs, no-voltage make contact input, open voltage: 24 V DC, short-circuit current: 2 mA, Fault Detection System: Short circuit, Open circuit, Method: Voltage detect, Connector: RJ45 connector, Connection Cable: Shielded Category 5 twisted pair cable (CAT5-STP) or greater,	
	Digital Signal Processing		
	Delay	For each amplifier output, 0 – 2730 ms (0.021 ms steps)	
	Feedback Suppression Function (FBS)	7 filters (auto), Settable for each audio input and Remote LINK (A/B)	
	Emergency Control IN	Input 2: Isolated voltage input, –24 to +24 V Connector: RJ45 connector Connection Cable: Category 5 twisted pair cable (CAT5) or greater	
	Indicators	Power, LAN, Fault	
	LAN	Number of Connectors: 2 (LAN A, LAN B)	
	Module Slot	Number of modules: 4 DA CONTROL LINK ... 4, DA OUTPUT LINK ... 4 (Used only when a power amplifier module is installed)	
	Operation	Fault Control Switch ...2 (ACK/RESET) Test Switch ...1 (LAMP TEST) Setting Switch: ID NUMBER, RESET, IMPEDANCE, Setting (internal front panel)	
	Program Timer	Weekly program method Daily program: 50 events, 10 types Holiday program: 50 types	
	Speaker Line	4 channels, 1 Earth terminal Maximum Voltage/Current: 100Vrms, 5 Arms Connector: Removable terminal block (17 pins) ... 1 Fault Detection System: Short circuit, Open circuit, Ground fault, Method: Impedance or End of line	
	Standby Amplifier Input/Output	Input: 1, Output: 1 Maximum Voltage/Current: 100Vrms, 5 Arms Connector: Removable terminal block (2 pins) ... 2	
	Time Adjustment	Control input, NTP	

C. Class D modular Power Amplifier i.e. Item 6.(A).iii

S.No.	Parameters	Specification	Compliance
1	Technical specification of Amplifier		
	Make and Model	To be quoted by bidder	
	Power Source	31 V DC or 230V AC	

	Amplification System	Class D	
	Power Consumption	100 W at 31 V DC	
	Rated Output	500 W (at 100 V line)	
	Output Voltage	100 V, 70 V: selectable	
	Minimum Impedance Load	20 Ω (at 100 V line), 14 Ω (at 70 V line), 10 Ω (at 50 V line)	
	Maximum Capacitive Load	0.5 μ F	
	Number of Channels	1	
	Input	1	
	Output	1	
	Frequency Response	40 Hz to 20 kHz: -5 to +1 dB (at 100 V line, 30 dB* output)	
	Distortion	1% or less (at 100 V line, rated output, 1 kHz)	
	Signal to Noise Ratio	80dB or more (at 100 V line, A-weighted)	
	All Accessories as required	As per requirement	

D. Power Supply Manager i.e. Item 6.(A).iv

S.No.	Parameters	Specification	Compliance
1	Technical specification of Voice alarm controller		
	Make and Model	To be quoted by bidder	
	Power Source	220 – 230 V AC, 50/60 Hz	
	Emergency power backup	Minimum 1 hour battery backup for operation of PA System.	
	All Accessories as required	As per requirement	

E. Multi Interface Unit i.e. Item 6.(A).v

S.No.	Parameters	Specification	Compliance
1	Technical specification of Multi-Interface Unit		
	Make and Model	To be quoted by bidder	
	Power Source	230 V AC, 50/60 Hz	
	Power Consumption	19 W (180 mA) (at rated), 24 W (230 mA) (max.)	
	Audio Output	Output: 1outputs (2 P/output), Max. 0 dB (*1), 600 Ω or less	
	Contact Input	16 inputs, no-voltage make contact input, open voltage: 12 V DC, short-circuit current: 10 mA, removable terminal block (18 pins)	
	Network Section	Network protocol: TCP/IP, UDP, HTTP, RTP, ARP, ICMP, IGMP Audio packet transmission system: Unicast, Multicast	
	Level Control	Microphone sensitivity control, Monitor speaker volume control, Chime (adjustable using the software)	
	Maximum Cable Length	1200 m (3937.01 ft)	

	Number of Connectable Extension Units	Max. 7 units	
	Indicator	Power indicator, Failure indicator, Status	
	Indicator	Network LNK/ACT indication, Status lamp, Power-on indication lamp	
	Installation Method	Rack, Desk mount	

F. IP Master Station i.e. Item 6.(A).vi

S.No.	Parameters	Specification	Compliance
1	Technical specification of IP Master Station		
	Make and Model	To be quoted by bidder	
	Power Source	Power supply device that complies with IEEE802.3af standard or 12 V DC (supplied from the AC adapter (option))	
	Power Consumption	Use of the AC adapter (12 V DC): 2.5 W (station only) Use of the PoE (48 V DC): 3 W	
	Speech Method	Hands-free or handset conversation	
	Audio Frequency Range	300 Hz - 7 kHz	
	Hands-free	Speaker: 5.7 cm (2.24) cone-type Microphone: Omni-directional electret condenser microphone	
	Handset	Receive path: Dynamic type, Send path: Electret condenser microphone	
	Network Section	Network protocol: TCP/IP, UDP, HTTP, RTP, ARP, ICMP, IGMP Audio packet transmission system: Unicast, Multicast Number of paging destinations: Unicast (max. 16), Multicast (max. 191) Connector: LAN: RJ45 connector (PoE compatible) Voice sampling frequency: 16 kHz, 8 kHz (controllable on the software) Audio delay time: 80 ms, 320 ms (controllable on the software)	
	Display	LCD: Alphanumeric characters (min 16 characters x 2 lines)	
	Indication	Status lamp	
	All Accessories as required	As per requirement	

G. System Manager(Voice Alarm System with inbuilt Amplifier 240W) i.e. Item 6.(B).i

S.No.	Parameters	Specification	Compliance
1	Technical specification of Voice alarm controller		
	Make and Model	To be quoted by bidder	
	Power Source	230 V AC, 50/60 Hz	
	Power Consumption	600 W (with rated output signal), 260 W (according to EN60065)	
	Rated Output	240 W	
	Frequency Response	50 Hz - 20 kHz, ± 3 dB (at 1/3 rated output)	
	Distortion	0.7 % or less (at rated output, 1 kHz)	

	Signal-to-Noise Ratio	70dB or more	
	Audio Input/Output Characteristic	Sampling frequency: 48 kHz A/D D/A converter: 24 bit	
	Input	Input 1 - 3: -50 dB* (MIC)/-10 dB* (LINE) (changeable), 600 Ω , electronically balanced, combined XLR connector (female)/phone jack Input 4: -50 dB* (MIC)/-10 dB* (LINE) (changeable), 600 Ω , electronically balanced, removable terminal block (14 x 2 pins) BGM 1 - 2: -10 dB*, 10 k Ω , unbalanced, RCA pin jack External amplifier input: 100 V line, removable terminal block (14 pins)	
	Output	Speaker output 1 - 2: Max. (240 W) per output Speaker output 3 - 6: Max. (120 W) per output Speaker output 1 - 6: Total within 240 W, removable terminal block (14 pins) Allowable minimum load: 500 Ω (20 W) at 100 V line for speaker line failure detection Direct output: Direct output from internal or external amplifier, removable terminal block (16 pins) Recording output BGM/Paging: 0 dB*, 10 k Ω , unbalanced, RCA pin jack	
	Remote Link	Input 1 - 2: Connecting the Remote Microphone. RJ45 female connector Maximum distance: Total 800 m (874.89 yd) between this unit and remote microphones Link cable: Category 5 Shielded Twisted-Pair straight cable (CAT5-STP)	
	Network I/F	10BASE-T / 100BASE-TX (selectable by automatic negotiation), RJ45 female connector Maximum distance: 100 m (109.36 yd) between this unit and a switching hub Link cable: Category 5 Shielded Twisted-Pair straight cable (CAT5-STP)	
	Voice Alarm Extension Link	Output: Connecting the Voice Alarm Extension through RJ45 female connector Maximum distance: 800 m (874.89 yd) Link cable: Category 5 Shielded Twisted-Pair straight cable (CAT5-STP)	
	General Control	Input 1 - 8: No-Voltage make contact input, open voltage: 24 V DC, short-circuit current: 2 mA or less, removable terminal block (14 x 2 pins) Output 1 - 8: Isolated open collector output, withstand voltage: 30 V DC, operating current: 10 mA or less, removable terminal block (14 x 2 pins)	
	Emergency Control	Input 1 - 5: No-Voltage make contact input, open voltage: 24 V DC, short-circuit current: 2 mA or less, RJ45 female connector Input 6: Isolated voltage input, Inactive: -24 V \pm 20 %, Active: +24 V \pm 20 %, RJ45 female connector Status out: Relay contact output, withstand voltage: 40 V DC, operating current: 2 - 300 mA, RJ45 female connector	
	ATT Control	Relay contact 1-6, 125 V AC or 30 V DC, total under 5 A, removable terminal block (16 pins)	

H. Power Amplifier 240W i.e. Item 6.(B).ii

S.No.	Parameters	Specification	Compliance
1	Technical specification of Power Amplifier		
	Make and Model	To be quoted by bidder	
	Power Source	220 - 240 V AC, or 24 - 30 V DC	
	Power Consumption	238 W (EN60065), 520 W (AC operation at rated output), 15 A (DC operation at rated output)	
	Rated Output	240 W	
	Tone Control	Bass: ± 10 dB at 100 Hz Treble: ± 10 dB at 10 kHz	
	Indicator	Power, signal, peak	
	Ventilation	Fan cooling	
	Number of Channels	1	
	Input	Line in: 0 dB*, 10 k Ω , balanced, screw terminal 100 V line in: 40 dB*, 330 k Ω , unbalanced, screw terminal Power remote control: Make contact	
	Output	Loop out: 0 dB*, 10 k Ω , balanced, screw terminal Speaker out: Balanced (floating) High impedance: 42 Ω (100 V), 21 Ω (70 V) Low impedance: 4 Ω (31 V)	
	Frequency Response	50 - 20,000 Hz (± 3 dB)	
	Distortion	Under 1% at 1 kHz, 1/3 rated power	
	Signal to Noise Ratio	Over 60 dB	
	All Accessories as required	As per requirement	

I. Remote Microphone i.e. Item 6.(B).iii

S.No.	Parameters	Specification	Compliance
1	Technical specification of Remote Microphone		
	Make and Model	To be quoted by bidder	
	Power Source	24 V DC (operating range: 14 – 28 V DC) Power input jack: Non-polarity type Usable power input plug*1: Outer diameter $\phi 5.5$ mm, inner diameter $\phi 2.1$ mm, length 9.5 mm	
	Operation	Function key, Emergency/all-zone emergency broadcast key, Talk key	
	Current Consumption	100 mA or less	
	Audio Output	0 dB*2, 600 Ω , balanced	
	Distortion	1% or less	
	Frequency Response	100 Hz – 20 kHz	
	Signal to Noise Ratio	60 dB or more	
	Microphone	Unidirectional electret condenser microphone	
	Key Extension	Number of keys: 10 Function: "Broadcast zone selector" or "Automatic general broadcast Announcement Start" (Either function is assigned to individual keys by the dedicated software.)	
	Connection Cable and Connector	Category 5 Shielded Twisted-Pair straight cable, RJ45 connector	

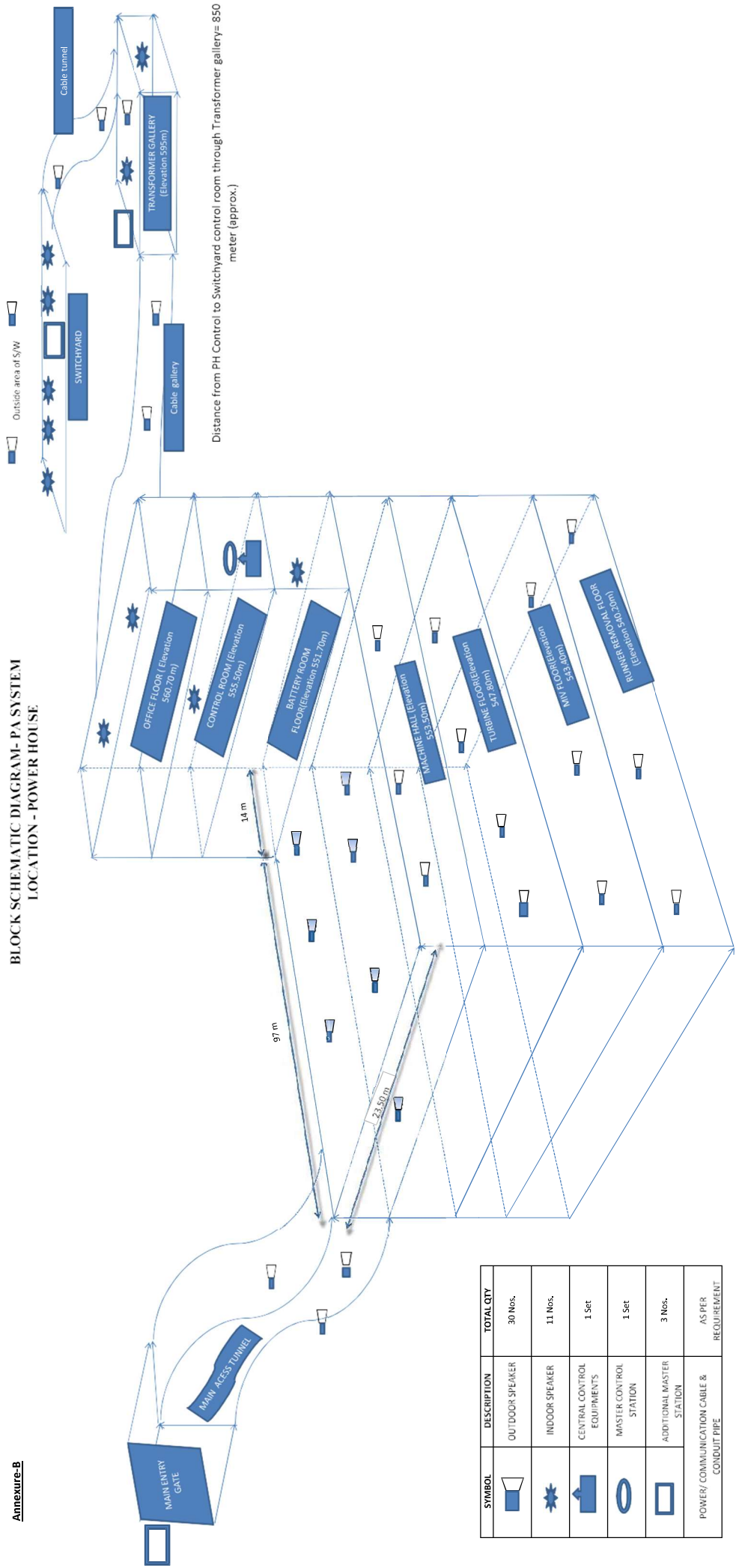
J. Paging Horn Speaker i.e. Item 6.(A).vii & 6.(B).iv

S.No.	Parameters	Specification	Compliance
1	Technical specification of Paging Horn Speaker		
	Make and Model	To be quoted by bidder	
	Rated Input	30 W	
	Rated Impedance	8 Ω or better	
	Sound Pressure Level	113 dB (1 W, 1 m at 500 Hz to 2.5 kHz peak level)	
	Frequency Response	250 Hz - 10 kHz	
	Polarity	Hot: Black, Com: White	
	Dust/Water Protection	IP65	
	Finish	Horn flare: Aluminium, powder coating Reflector horn and rear cover: ABS resin, off-white Bracket, screws and bolts: Stainless steel Speaker cable: Polyvinyl chloride insulated cabletyre cable	

K. 30W Wall Mount Universal Speakers i.e. Item 6.(A).viii & 6.(B).v

S.No.	Parameters	Specification	Compliance
1	Technical specification of Universal Speaker		
	Make and Model	To be quoted by bidder	
	Enclosure	2-way bass-reflex type	
	Rated Input	30 W	
	Rated Impedance	8 Ω or better	
	Sound Pressure Level	90 dB (1 W, 1 m)	
	Frequency Response	80 Hz - 20 kHz	
	Speaker Component	Woofer and tweeter	
	Dust/Water Protection	IPX4 (can be installed vertically or horizontally)	
	Finish	Enclosure: ABS resin Net: Surface treated steel plate, powder coating Bracket: Surface treated steel plate, Powder coating	

BLOCK SCHEMATIC DIAGRAM- PA SYSTEM
LOCATION - POWER HOUSE



BLOCK SCHEMATIC DIAGRAM- PA SYSTEM
LOCATION - DAM SITE

