Ministry of Health & Family Welfare
(GOVERNMENT OF INDIA)
Ministry of Health & Family Welfare
Nirman Bhavan, Maulana Azad Road
New Delhi – 110011

Tender for

Supply, Installation, Testing & Commissioning of 33KV Sub-station equipment including Construction of Substation Building of Housing Complex for AIIMS-like Institution under PMSSY at Bhubaneswar (Orissa)

Volume - IV
TECHNICAL SPECIFICATIONS

Tender No. HSCC/PMSSY/BHUBANESWAR/SS/2011

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Supply, Installation, Testing & Commissioning of 33KV Sub-station equipment including Construction of Substation Building of Housing Complex for AIIMS-like Institution under PMSSY at Bhubaneswar (Orissa)

TECHNICAL SPECIFICATIONS

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OF

ELECTRICAL WORKS

1.0 HIGH VOLTAGE PANEL:

The HV panel board shall be metal clad, indoor, floor mounting, free standing type. It shall be totally enclosed dust, damp and vermin proof, powder coated having incoming and out going feeders as per bill of quantity.

Separate earthed compartments shall be provided for circuit breakers, bus bars, relay and instruments, CT & PT and cable boxes, fully and effectively segregating these from one another so that fault in any one compartment do not cause damage to equipment(s) in other compartment(s).

The housing shall be of bolted construction to ensure compact and rigid structure. The sheet steel used shall not be less than 2 mm thick.

The panel shall be bolted together to form a continuous flush front switch gear suitable for front operation of board and for extension at both ends.

The HV panel board shall be designed such that the switchgear, instrument, relays, bus bar, wiring etc are arranged and mounted with due consideration for the following:

i) Facility for inspection, maintenance and repairs of testing terminals and terminals boards for ease of external connection.
ii) Minimum noise and vibrations
- Risk of accidental short circuits and open circuits
- Secured and vibration proof connections for poer and control circuits

iii) Risk of accidental contact and danger to personnel due to live connections.
iv) Mountings at approachable height.

1.1 Circuit Breaker:

The circuit breaker shall be complete with the following:

a) Racking-in/ Racking-out mechanism.
b) Isolating plug and sockets.
c) Mechanical interlocks and safety features.
d) Mechanical ON/ OFF indicators.
e) Minimum of 4 NO and 4 NC auxiliary contacts directly operated by the circuit breaker. Additional NO & NC contacts can be provided with auxiliary contacts.
f) Auto condensation space heaters suitable for operation on 240 V, 1 phase, 50 Hz A.C. for each panel wherever needed.
g) Suitable tripping arrangement.

h) Mechanical counters to assess the total number of operations of the breaker.

The circuit breaker shall be horizontal isolation, horizontal draw out pattern.

The breaker carriage shall be fabricated from steel, providing a sturdy vehicle for the circuit breaker. The carriage shall be mounted on the wheels, moving on guides, designed to align correctly and allow easy movement of the circuit breaker.

1.2 Current transformer:

Dual ratio CT of suitable burden shall be provided with 5 amp secondary current.

The CTs shall confirm to relevant Indian Standards. The design and construction shall be robust to with stand dynamic stresses during short circuit. Secondary terminals shall be brought out suitably to a terminal block which will easily accessible for testing and terminal connections. The protection CT shall be of accuracy class 5 P 10.

The metering CT shall confirm to the metring ratio and accuracy class 0.5.

1.3 Voltage Transformer:

A voltage transformer of burden not less than 100 VA and of proper ratio as specified and shall be provided. The accuracy class of VT shall be 0.5 for incoming feeders and class 1 for out going feeders.

The transformer shall be of cast epoxy rasin construction. HRC fuses/ MCBs shall be provided on both HV and LV sides.

1.4 Wiring:

Wiring shall be carried out with minimum 1.5 Sq. mm FRLS/HFFR insulated copper conductor cables. CT wiring shall be done with minimum 2.5 sq. mm wires with colour code: RYB, gray for auxiliary DC circuit and black for auxiliary AC circuits. The wiring shall be securely fixed and neatly arranged to enable easy tracing of wires. Identification tags shall be fitted to all wires terminals to render identification eassy and to facilitate checking in accordance with IS 375. Necessary terminal blocks and cable entries shall be provided for RTD relay wiring, power supply etc.

1.5 Installation:

The installation work shall cover assembly of panels lining up, grouting the units etc. In case of multi panels switch board after connecting up the bus bar all joints shall be insulated with HV insulation tape or with approved insulation compound. A common earth bar shall be run preferable at the back of the switch board connecting all the sections for connecting the earth system. All protection, indication & metering connections and wiring shall be completed. All relay instruments and meters shall be mounted and connected with appropriate wiring. Calibration checks of units as necessary and required by the licensee like CTs, PTs, energy meters etc shall be completed before pre-commissioning checks are undertaken.

1.6 Testing and commissioning:

Procedure for testing and commissioning of relay shall be in general accordance with good practice.

1.6.1 Factory Tests

The circuit breakers panel shall be subjected to routine tests at manufacturer's works in accordance with the details specified in the relevant IS specifications. These shall however necessarily comprise of the following.

a. Power frequency voltage test on the main power circuit.
b. Verification of the correct wiring/Functional Test.
c. Dielectric test at 1.5kV on the control circuit. Apart form above, the vendor shall submit the routine test certificates for the following equipment.

i. Circuit Breakers
ii. Current Transformers
iii. Voltage Transformers

The vendor shall submit the type test certificate for following along with the offer.

a. Temperature rise test.
b. Impulse & power frequency voltage test
c. Short time current test on circuit breaker.

1.6.2 Site Test

1.6.2.1 General

1. Verification for completion of equipment, physical damage/deformities.
2. Alignment of panel, interconnection of busbars & tightness of bolts & connection etc.
3. Interconnection of panel earth busbar with plant earthing grid.
4. Inter panel wiring between transport sections.
5. Cleanliness of insulators and general Cleanliness of panel to remove traces of dust, water etc.

1.6.2.2 Circuit Breaker & Panel

1. Check for free movement of circuit breaker, lubrication of moving part & other parts as per manufacturers manual.
2. Manual/Electrical operations of the breaker and Functional test as per drawings.
3. Meggar before the Hi Pot test.
4. H.T. Test - Hi Pot test (Power frequency withstand test for one minute at 28kV RMS). At site Hi Pot test is carried out at 80% of 28kV RMS value.
5. Meggar after the Hi Pot test.
6. CT/PT ratio/polarity primary injection test.
7. Secondary injection test on relays to practical characteristics.

2.0 TRANSFORMER:

Transformer shall be suitable for operating at rated capacity continuously at any of the taps under ambient conditions and with the voltage and frequency variations indicated without exceeding permissible temperature rise and without any detrimental effect to any part.

Transformer shall be designed to be loaded as per IS:6600.

Off Load tap changer shall be provided in the transformers.

All windings shall have uniform insulation resistance to earth.

Disconnecting chamber shall be air filled. Suitable cable end box shall be provided for termination of cables. Gland plate for single core cables shall be non-magnetic.

Transformer shall be able to withstand electrodynamic and thermal stresses due to terminal short circuit of the secondary, assuming the primary side is being fed from an infinite bus. All leads and windings in cores shall be properly supported. Short circuits withstand and duration shall be 2 secs. As per IS: 2026.

Short circuit test results for similar transformers shall be furnished.

There shall be a marshalling box for gathering all alarm signals. All alarm shall be wired up to terminal strip provided in marshalling box. 20% spare terminals shall be provided. Armoured cable of 2.5 sqmm cu shall be provided along with suitable size glands for terminating these contacts in marshalling box.

Guides shall be provided to facilitate tanking and untanking of the core with the coil assembly. The details of anchoring of core and coils assembly of tank shall be furnished.

Radiators shall be provided on the tank to facilitate cooling. These shall be detachable type and shall be provided with isolating valves at ends, drain plugs and air release plug. Radiators of 1.2 mm thickness seamless steel tubing or pressed sheet steel.

Means for lifting and jacking of transformer shall be provided.

Class-A insulating material specified in IS:1271 shall be used. Paper insulation shall be new and free from punctures. Wood insulation, wherever used, shall be well seasoned and treated.

The mineral oil shall comply with IS: 335. 10% extra oil in seal tins/ drums shall be supplied.

All valves shall be of globe type. Valve body of carbon steel and trim of 135 cr. Steel.

Oil temp. Indicator for measuring top oil temp. Shall comprise 150mm dial type thermometer pocket and capillary tube jacketed with PVC sleeve. Thermo-meter shall have 2 sets of contacts, one for alarm and the other for trip, and set points can be set by hand. Contacts shall be wired up to marshalling box.

Buchholz relay shall be provided as per IS: 3637. It shall be double float type with two sets of contacts for alarm and trip with facility for testing by injection of air by hand pump and with cock for draining and venting of air. Relay shall be provided with shut off valves on conservator side as well as on tank side.

Alarm and trip contacts shall be suitable for 1A 230 AC.

A marshalling box shall be provided to accommodate all auxiliary devices except those which are to be located directly on transformer. It shall be of dust, weather and vermin proof type of sheet steel 2mm thick and shall have sufficient apace for ease of cabling. 20%extra terminals shall be provided.

All steel surfaces exposed shall be treated with suitable anti –trust, anti – corrosive paints

Bushing insulator shall be rated for max. System voltage and shall be as per IS. Bushing shall be enclosed in terminal box and shall be detachable from outside the tank. Separate neutral bushing shall be provided for earthing the neutral. When LT cable box is provided, a neutral bushing shall be brought out for solid earthing.

Transformer efficiency shall not be less than 98% at full load.

Transformer should be suitable for parallel operations. Both transformers shall have same percentage impedance & other characteristics for parallel operation of the transformers as per IS: 10028.

2.1 List of fittings:-

Oil sampling valves.

Filter valves with plug

Radiator shut off valves on top and bottom.

Buchholz relay shut-off valves

Oil temp. indicator and alarm.

Magnetic oil level gauge with min.&max. marking and shall have contact for low level.

Oil conservator complete with drain plug and oil filling hole with cover.

Buchholz relay with air release device and alarm and trip contacts.

Silica gel breather with oil seal and connecting pipe.

Explosion vent

Bidirectional rollers

Marshalling box

Rating plate

Diagram& terminal; marking plate

Lifting & Haulage lugs

Jacking pad

Earthing terminals

Air release device

Base channel with towing holes *(39 mm dia holes)

Off circuit tap changer with locking device .

Air filled disconnecting chambers.

Top filter valve with blanking plate.

Winding temperature alarm.

Neutral CT.

2.3 SOAK PIT

Soak pit for oil filled transformer shall be made are per IS 10028 (Part II) 1981 with up to dated amendments. Sump shall be formed in the transformer room and shall be connected to soak pit outside the transformer room with a pipe. All the civil works required for the soak pit shall be done by the contractor and the cost shall deemed to be included in quoted rates of the transformer item.

2.4 INSPECION

i) The transformer shall be inspected on arrival as per the inspection manual of the supplier
ii) Shall be examined of any sign of damage and special attention shall be given to the following parts.

Oil tank and cooling tubes
Bushes crakes or broken
Oil sight glass

2.5 INSTALLATION

i) The transformer shall be installed as per transformer manual of the transformer supplier and conforming to Indian standards.
ii) The transformer is to be erected on suitable size M.S channels embedded in the cement concrete flooring including providing & fixing the channel. The transformer supplied shall be lifted by all lifting lugs for the purpose of avoiding imbalance in transit.
iii) The transformer wheels shall be locked by suitable locking arrangement to avoid accidental movement of the transformer.
iv) The transformer cable end boxes shall be sealed to prevent absorption of moisture.
v) The transformer natural earthing and body earthing shall confirm to Indian Standard.

2.6 FACTORY TEST

The transformer shall be subjected to test as laid down in IS 2026 at factory / manufacturing unit prior to dispatch of the transformer to the site.
All original test certificates shall be furnished.

2.7 TESTING AT SITE

Prior to commissioning of the transformer the following tests shall be performed

i) Insulation resistance of the winding between phases and earth of H.V and M.V side.
ii) Winding resistance of all the winding on all tap positions shall be taken.

iii) Di-electric strength of the transformer oil shall be checked in accordance with India standards. In case the test is not satisfactory, the oil shall be filtered till proper dielectric strength of oil is obtained.

iv) The supplier gives sufficient advance information about the test schedule to enable the owner to appoint his representative.

3.0 Four Pole Structure:

Supply, erection testing and commissioning of four pole structure with suitable SMB structure with ISA bracing etc suitable for installing AB switches, lightening arrester, drop out fuses etc as per requirement of state electricity board. This includes supply of above items with pin/ disc insulators etc as per the requirements of State Electricity Board.

Copper earthing, GI plate earthing, 33KV, 433 V danger notice plate, Rubber mat, Fire bucket, Shock treatment chart, First Aid box , Fire extinguishers, Hand gloves etc are also in the scope.

4.0 DATA MANUAL AND DRAWINGS TO BE FURNISHED BY THE TENDERER:

The successful tenderer would be required to submit the following drawings with in 15 days of award of work for approval before commencement of installation:

a) General arrangement drawings of equipment like HT panel, transformers

b) Details of foundations for the equipments and the weight of assembled equipments.

c) Cable layout between HT panel board and transformers & LT panel etc.

d) Any other drawings necessary for the job.

5.0 INSTRUMENTATION MANUL

The successful bidder shall submit three copies of manual of complete instructions for the installations, operations, maintenance including preventive maintenance 7 trouble shooting together with all the relevant data sheets, spare part catalogue etc.

6.0 INSPECTION AND TESTING:

All major equipments i.e. HT Panel, transformers, HT cables shall be offered for initial inspection at manufacturer's works before dispatch. The successful tenderer shall give advance notice of minimum two weeks regarding the dates proposed for such tests to the HSCC. The equipment will be inspected at the manufacturer's premises, before dispatch to site. The testing of equipments will be done based on BIS/ CPWD requirements.

Copies of all documents of routine and type test certificates of the equipment, carried out at the manufacturer's premises shall be furnished to the Engineer-in-charge.

After completion of work in all respects the contractor shall offer the installation for testing and operation.

7.0 COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS:

All works shall be carried out in accordance with relevant regulation, both statutory and those specified by the Indian standards related to the works covered by this specification. In particular, the equipment and installation will comply with the following:

i) Indian Electricity Rules
ii) B.I.S. and CPWD standards as applicable
iii) Workmen's compensation Act
iv) Statutory norms prescribed by local bodies, Power supply company, CEA etc.

After completion of the installation, the same shall be offered for inspection by the representative of Central electricity Authority/ state Electricity Authority as the case may be. The Contractor will extend all help including test facilities to the representative of the Authority. The observations of the Authority will be attended by the Contractor. The installation will be commissioned only after getting clearance from Authority.

Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable regulations and safety codes.

8.0 Battery Charger Panel :

Battery & battery charging panel for providing 110V DC, 20 Amps to various devices in the HT panel. The DC operated devices are:

- Spring charging motor,
- Tripping coil,
- Closing coil
- Indicating lamp
- Relays, etc.

Panel will comprise of the following:

- Float/ Boost charger suitable for charging SMF batteries and simultaneously supplying DC power to load.
- SMF batteries of 40 Ah capacity to provide backup to load.
- 3 Ph/1Ph isolation transformers.
- One set essential commissioning spares.
- Batteries: The system shall have SMF batteries of 40 Ah capacity for backup mounted on a separate rack.

Battery charging equipment:

It comprises of float/boost charger and other components. The charger shall be a full wave bridge rectifier with SCR's/ diodes selected of liberal rating. The float charger shall be suitable for floating the batteries and capable of supplying a DC continuous load 20 Amps. The boost charger shall be suitable for floating the batteries and capable of supplying a DC continuous load of 20 amps. The boost charger shall be suitable for boost charging the discharged batteries as well as supplying power to the load.

Input voltage:	415V, +10%, & -15%
Phase:	3 Ph, 4 wire.
Frequency:	50Hz $\pm$ 5%
Output:	110V DC, 25 Amps
Regulation:	$\pm$ 1 % for a load variation from 0-100%
AC ripple in O/P:	Less than 2 %

System description:

Under normal conditions the charger shall be connected to the load bus and floating the batteries. In case of mains power failure the battery shall automatically start supplying load. Upon power supply resumption the boost charger shall charge the batteries there shall be auto-change over for charger between boost & float mode of charging. In case of second time mains failure during boost charging, provision shall be made to keep the DC supply continuous.

Construction:

The batteries shall be accommodated in battery rack. The battery charging equipment comprising of float/boost charger and other components shall be housed in a common cubicle of 1.6mm thick powder coated sheet steel of approved shade. The panel shall be indoor type. Panel shall be provided with louvers on both sides for proper ventilation. The louvers shall be backed by fine wire mesh to make the cabinet dust/vermin proof. The cubicle shall be floor mounted.

Components:

The system components shall be of superior quality and high reliability so as to ensure efficient and trouble free operation.

Metering:

- Ammeter for charger o/p current
- Input AC voltmeter.
- Ammeter for discharge/ charge current of the battery.
- Voltmeter for o/p DC voltage.

Protection:

Adequate protection shall be provided against overload, short circuit, load DC over/under voltage, battery earth fault, and thermal overload etc.

Indications:

Panel ON/OFF, battery on discharge, auto/ manual mode, AC mains on/off.

9.00 BUS DUCT

9.01 SCOPE

This section covers manufacture, supply, installation, resting and commissioning of sandwich insulated bus trunking. And rising mains, indoor/ out door type.

9.02 Supply voltage

415/ 440 Volt, 3 pahse, 4 wire, 50 Hz AC supply.

9.03 Standards for compliance:

IS:8623/ 1993 I & II and IEC 60439/ I & II.

9.04 Construction:

The enclosure will be made from CRCA sheet steel powder coated of approved shade. Bus bars would be of high conductivity aluminium in "Sandwich" construction and the conductors will be individually insulated with halogen free, fire retardant class– F – epoxy insulation. No drilling of Bus bar is permitted. Length of the section will be limited to maximum three metre. Bus bar of one section will be connected to bus bar of adjacent section by uni-block joint system removable as separate sub-assembly, so that it can be inserted or removed with out disturbing the adjacent sections.

9.04.1 Technical Parameters:

Bus trunking shall be designed to withstand short circuit current of 50 KA for one second.

Bus bar system should be designed for high temperatures withstand capability of 55 degree Celsius over 50 degree Celsius as normal operating temperature.

Insulation voltage 1.1 KV
Bus trunking will be suitably chosen to give permissible voltage drop.

Rated impulse withstand voltage 12 KV at 1000 volt.

Single bolt bridge system to be incorporated.

Plug in boxes

Plug in boxes will be of draw out type. Contacts will be of silver plated copper and spring loaded. Earth connection will be the first to make and last to break during insertion and withdrawl. Pluf in boxes will be made from 1.6 mm CRCA sheet steel powder coated. Inside the plug in Boxes MCCB or SFU with the fuses will be located as per requirements. The operating handle will be interlocked with plug in box cover so that MCCB can be operated only with the suitable cover in closed position. The plug in box will be interlocked with bus bar trunking so that it can not be inserted or removed with the plug in box lid open. MCCB/ SFU will be of 4 pole type unless otherwise specified in BOQ. Short circuit breaking capacity of MCCB in PIB should be same as that of bus trunking i.e. 50 KA.

9.05 List of test to be carried out:

9.05.1 Routine tests:

i. Verification of insulation resistance.
ii. Inspection of assembly, interlocks, locks etc.
iii. Dielectric test.

Copies of the following certificate should be submitted:

i. Verification of temperature rise limits
ii. Verification of di-electric properties.
iii. Verification of short circuit strength.
iv. Verification of degree of protection.
v. Insulation resistance test with 500 volt megger. The insulation resistance shall be not less than 100 mega ohm.

10.0 List of Approved manufacturers:

1.	33 KV VCB Panel Board:	Siemens/ Alsthom/ Crompton Greaves/ ABB/Schneider-Areva
2.	Transformer:	Crompton Greaves/ Alsthom/ Schneider- Areva, /Bharat Bijlee
3.	33 KV XLPE Cable:	Universal/ NICCO/ CCI/ Incab
4.	LT Cables:	Universal/ NICCO/ CCI/ Incab/ Rallison/Polycab
5.	Bus Duct:	L&T/Siemens/ABB/ GE/Schneider
6.	Cable joint kit	Raychem , 3M, Cabseal

TECHNICAL SPECIFICATIONS

OF

CIVIL WORKS

TECHNICAL SPECIFICATIONS

CIVIL WORKS

1.0 **GENERAL:-**

1.01 The specifications and mode of measurements for Civil and Plumbing works shall be in accordance with C.P.W.D. specifications 2009 Volumes I and II with up to date correction slips unless otherwise specified in the nomenclature of individual item or in the specifications. The entire work shall be carried out as per the C.P.W.D. specifications in force with up to date correction slips upto the date of opening of tender.

1.02 For the item not covered under CPWD Specifications mentioned above, the work shall be executed as per latest relevant standards/codes published by B.I.S. (formerly ISI) inclusive of all amendments issued thereto or revision thereof, if any, upto the date of opening of tenders.

1.03 In case of B.I.S. (formerly I.S.I) codes/specifications are not available, the decision of the Engineer based on acceptable sound engineering practice and local usage shall be final and binding on the contractor.

1.04 However, in the event of any discrepancy in the description of any item as given in the schedule of quantities or specifications appended with the tender and the specifications relating to the relevant item as per CPWD specifications mentioned above, or in drawings the former shall prevail.

1.05 In general the building floor to floor height is 5.00 mtr unless specified otherwise in the drawing. However, the rates for different items of work shall be for up to 5.0 m floor to floor height at all levels, lifts, leads and depths of the building except where otherwise specified explicitly in the item of work or in special conditions appended with the tender. All works above the top most terraces (main) shall be paid under the level existing below (i.e. machine room, mumty etc)

1.06 The work shall be carried out in accordance with the architectural, structural, plumbing and electrical drawings etc. The drawings shall have to be properly co-related before executing the work. In case of any difference noticed between the drawings, final decision, in writing of the Engineer shall be obtained by the contractor. For items, where so required, samples shall be prepared before starting the particular items of work for prior approval of the Engineer and nothing extra shall be payable on this account.

1.07 All materials to be used on works shall bear I.S. certification mark unless specifically permitted otherwise in writing. In case I.S. marked materials are not available (not produced), the materials used shall conform to I.S. Code or CPWD specifications, as applicable in this contract.

In such cases the Engineer shall satisfy himself about the quality of such materials and give his approval in writing. Only articles classified as "First Quality" by the manufacturers shall be used unless otherwise specified. All materials shall be tested as per provisions of the Mandatory Tests in CPWD specifications and the relevant IS specifications. The Engineer may relax the condition regarding testing if the quantity of materials required for the work is small. Proper proof of procurement of materials from authentic manufacturers shall be provided by the contractor to the satisfaction of Engineer. Grade of cement used shall be OPC 43 Grade unless otherwise specified explicitly. The contractor shall get the Design Mix for RCC done by the labs approved by OWNER only. Reinforcement Steel used shall be of TMT Fe-500 unless otherwise specified.

1.08 In respect of the work of the sub-agencies deployed for doing work of electrification, air-conditioning, external services, other building work, horticulture work, etc. for this project and any other agencies simultaneously executing other works, the contractor shall afford necessary coordination and facilities for the same. The contractor shall leave such necessary holes, openings, etc. for laying / burrying in the work pipes, cables, conduits, clamps, boxes and hooks for fan clamps, etc. as may be required for the electric, sanitary air-conditioning, fire fighting, PA system, telephone system, C.C.T.V. system, etc. and nothing extra over the agreement rates shall be paid for the same.

1.09 Unless otherwise specified in the bill of quantities, the rates for all items of work shall be considered as inclusive of pumping out or bailing out water if required for which no extra payment will be made. This will include water encountered from any source such as rains, floods, or due to any other cause whatsoever.

1.10 Any cement slurry added over base surface (or) for continuation of concreting for bond is added its cost is deemed to have in built in the item unless otherwise/explicitly stated and nothing extra shall be payable or extra cement considered with consumption on this account.

1.11 The rate for all items in which the use of cement is involved is inclusive of charges for curing.

1.12 The contractor shall clear the site thoroughly of all scaffolding materials and rubbish etc. left out of his work and dress the site around the building to the satisfaction of the Engineer before the work is considered as complete.

1.13 Rates for plastering work (excluding washed grit finish on external wall surfaces) shall include for making grooves, bands etc. wherever required and nothing extra shall be paid for the same.

1.14 The rates quoted for all brick/concrete work shall be deemed to include making openings and making good these with the same specifications as shown in drawings and/or as directed. No extra payment shall be made to the contractor on this account.

1.15 Rates for all concrete/plaster work shall include for making drip course moulding, grooves etc. wherever required and nothing extra shall be paid for the same.

1.16 Rates for flooring work shall include for laying the flooring in strips/as per sample or as shown in drawings wherever required and nothing extra shall be paid for the same.

1.17 The drawing(s) attached with the tender documents are for the purpose of tender only, giving the tenderer a general idea of the nature and the extent of works to be executed. The rates quoted by the tenderer shall be deemed to be for the execution of works taking into account the "Design Aspect" of the items and in accordance with the "Construction Drawings" to be supplied to the Contractor during execution of the works.

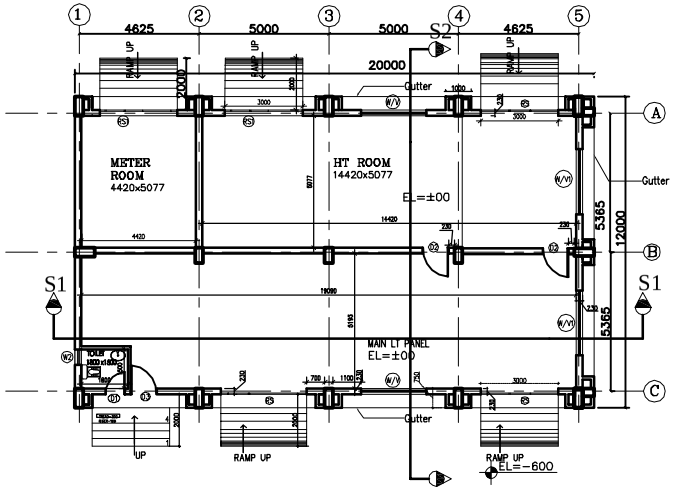
1.18 The quoted rate shall be for finished items and shall be complete in all respects including the cost of all materials, labour, tools & plants, machinery etc., all taxes, duties, levies, octroi, royalty charges, statutory levies etc. applicable from time to time and any other item required but not mentioned here involved in the operations described above. The client/OWNER/Employer shall not be supplying any material, labour, plant etc. unless explicitly mentioned so.

1.19 On account of security consideration, there could be some restrictions on the working hours, movement of vehicles for transportation of materials and location of labour camp. The contractor shall be bound to follow all such restrictions and adjust the programme for execution of work accordingly.

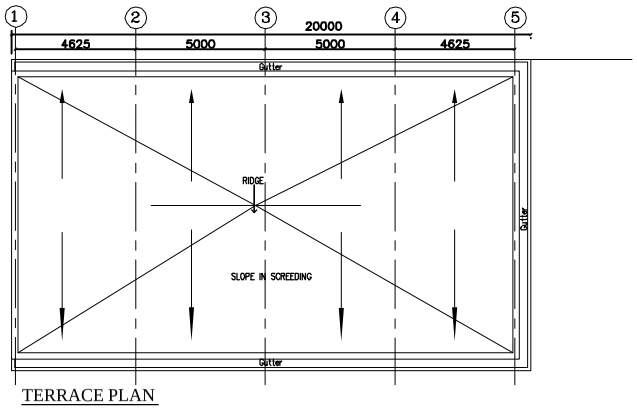
1.20 The contractor has to ensure co-ordination with Institute authorities to maintain the smooth functioning / operation of existing Institute without disruption during the execution of work. This may require working rescheduling the normal working hours, working in restricted period etc. Nothing extra shall be payable on this account.

He shall also ensure that all work sites within the Institute complex are properly cordoned off by means of barricades and screens upto a height of 3.0 m above ground level. The contractor shall use painted CGI sheets which are in good condit ion mounted on steel props.

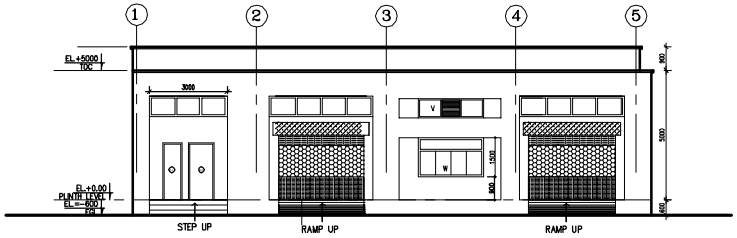
1.21 Stacking of materials and excavated earth including its disposal shall be done as per the directions of the Engineer-in-Charge. Double handling of materials or excavated earth if required shall have to be done by the contractor at his own cost.



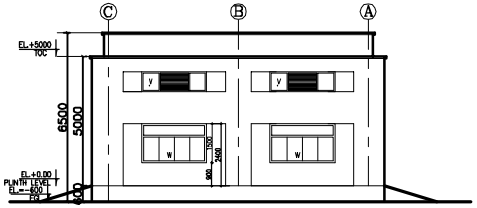
SUB STATION PLAN



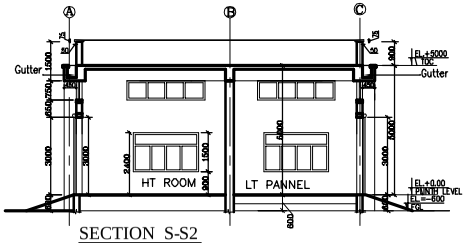
TERRACE PLAN



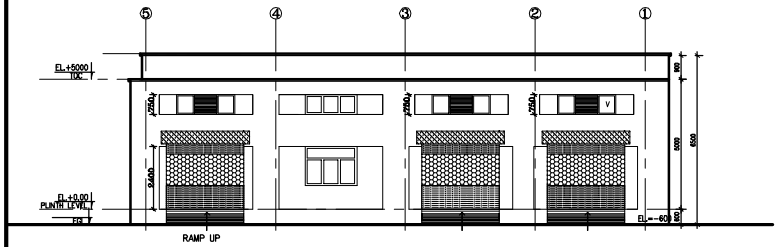
FRONT ELEVATION



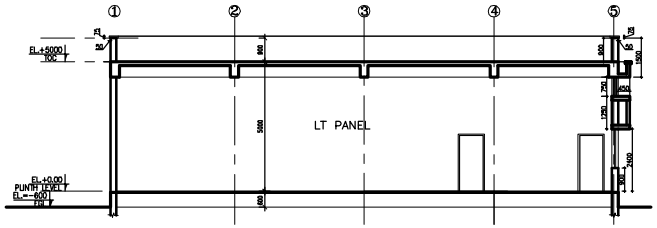
RIGHT SIDE ELEVATION



SECTION S-S2



REAR ELEVATION



SECTION S-S1

NOTES

1.	D1	750 X 2200	000	2200	
2.	D2	1000 X 2200	000	2200	
3.	D3	1200x2200	000	2200	
4.	RS1	3000 X 3000	100	3000	
5.	V	12000X600	3800	4400	
6.	V1	30000*250	2200	3950	
7.	W1	2500X2300	900	2300	
8.	W2	600X1000	1200	2200	

REV	DATE	DESCRIPTION

REVISION

PROJECT

AIIMS HOUSING
BHUBANESWAR

TITLE

TENDER DRAWING
SUB-STATION

Floor Plans,Elevations & Sections

HSCC/ /006/TD/SS/040/R
Drawing No.

HSCC/263	1:100	Dec'11
Job No.	Scale	Date
App by	Rev. by	Prep. by

HSCC (INDIA) LIMITED
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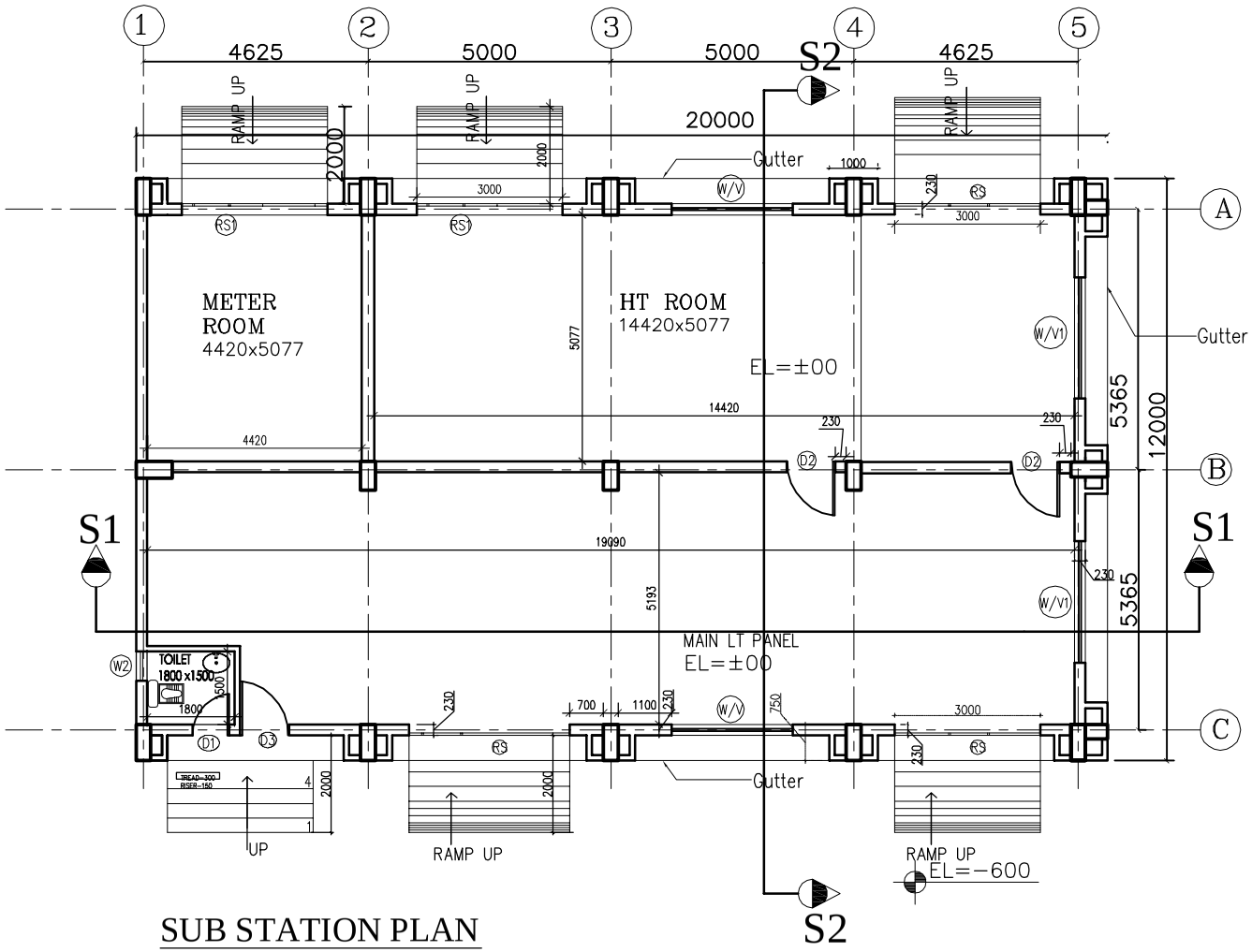

SUB STATION PLAN

NOTES

1.	D1	750 X 2100	000	2100	
2.	D2	1000 X 2200	000	2200	
3.	D3	1200x2200	000	2200	
4.	RS1	3000 X 3000	100	3000	
5.	V	12000600	3800	4400	
6.	V1	30000750	2000	3950	
7.	W1	2500X2300	900	2300	
8.	W2	600X1000	1200	2200	

REV	DATE	DESCRIPTION

REVISION

PROJECT

AIIMS HOUSING
BHUBANESWAR

TITLE

TENDER DRAWING
SUB-STATION

Ground Floor Plan

HSCC/ /006/TD/SS/039/R
Drawing No.

HSCC/263	1:50	Dec'11
Job No.	Scale	Date
App by	Rev. by	Prep. by

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END OF VOLUME-IV