

BBSIMS

**MINI CASSETTE TYPE SPLIT
AIRCONDITIONING AND ANCILLARY
SUPPLY AND INSTALLATION WORKS
RIGHT WING GROUND AND FIRST FLOOR**

FOR

**BENAZIR BHUTTO SHAHEED
INSTITUTE OF MANAGEMENT SCIENCE DADU**



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BBSIMS DADU, JUNE 2021.

SECTION - 01

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**FOR
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INSTITUTE OF MANAGEMENT SCIENCE DADU**

TENDER

(The tenderers are required to fill in all the blank spaces in the tender, memorandum & various schedules which form part of this tender)

To

BBSIMS C/O IBA COMMUNITY COLLEGE DADU,
PMU OFFICE, NAJAM COLONY,
DADU
SINDH

Dear Sirs,

1. Having examined the tender documents, conditions of contract, specifications, schedules, site conditions and addenda Nos. _____ for the above named works, we, the undersigned offer to supply the whole of the said works in all respects in accordance with the said tender documents, conditions of contract, specifications, schedules, and addenda Nos. _____ and in all respects in accordance with the conditions as far as applicable for the sum named in the memorandum or such other sum as may be ascertained in accordance with the said conditions of contract.

2. In consideration of your agreeing to examine this tender, we undertake if our tender is accepted:

(a) to commence the work within the period named in the memorandum from written orders to commence and to complete whole of the works comprised in the contract within the periods

specified in the memorandum.

- (b) within fifteen days of your requiring us to do so to provide a surety or sureties (to be approved by you) to be jointly and severally bound with us in the sum named in the memorandum for the due performance of the contract under the terms of a performance bond on the form specified in the tender documents with such modifications as you may accept at any time before the expiration of that period.
- (c) to abide and fulfil all the terms and provisions of the said conditions of contract or in default thereof to forfeit and pay to you the sums of money mentioned in the memorandum.

3. The earnest money has been tendered as per details given in the memorandum, the full value of which is to be absolutely forfeited by you, without prejudice to any other rights and remedies which you may have, should we fail to commence the work or execute the performance bond, within the periods specified above, otherwise the said sum of earnest money shall be repaid by you when the performance and bond been duly entered into and executed by us on acceptance of our tender.

4. We hereby confirm that we have examined the contract documents and specifications, have inspected the site and have obtained all the information which may affect this tender. We understand that no claim will be admitted by you which may arise from our pleading ignorance of the nature of works. We further fully understand that the time is the essence of the contract.

5. We agree to abide by this tender for the period stated in the memorandum from the date of opening of the tenders and it shall remain binding upon us and may be accepted in full or part at any time before the expiration of that period.

6. Unless and until a formal agreement is prepared and executed, this tender, together with your written acceptance thereof and tender documents, shall constitute a binding contract between us and shall be deemed for all purposes to be the contract agreement.

7. We understand that certain information applicable to the contract which is the subject of this tender is set forth for ease of reference in the memorandum annexed hereto.

8. We understand that you are not bound to accept the lowest or any tender you may receive, and that you will not defray any expenses incurred by us in tendering.

Dated this-----day of-----2021

Signature-----

in the capacity of-----

duly authorised to sign tenders for and on behalf of

(Full Address)-----

Witness-----

Address-----

Occupation-----

MEMORANDUM

- | | | |
|-----|---|--|
| (a) | Title of work to be endorsed on the sealed package of the tender. | Cassette Type Mini Split A/C
Works Right Wing Ground and First Floor For
BENAZIR BHUTTO
SHAHEED INSTITUTE OF
MANAGEMENT SCIENCE DADU
SINDH. |
| (b) | Tendered price of the works. | Rs.-----

(Rupees-----

-----)

-----) |
| (c) | Validity of tender. | 120 days from tender date |
| (d) | Amount of earnest money. | 2% of total bid value |
| (e) | Validity of earnest money guarantee. | 90 Days |
| (f) | Details of Bank Draft
for earnest money in the name of and payable to
“Sukkur IBA University” | ----- |
| (g) | Percentage of retention money deduction
on gross amount from running and
final bills. | Five percent |
| (h) | Limit of retention money. | Five percent of total contract cost |
| (i) | Minimum amount of interim certificate. | Rs. 300,000.00 |
| (j) | Period of interim certificate. | One Month |
| (k) | Time within which payment to
be made after certificate. | One Month |

(l)	Date of commencement from the written orders to commence.	Immediately
(m)	Time of completion from the written orders to commence.	
	1. All Piping/Ducting and Electrical Wiring etc.	06 Weeks.
	2. All Contractor supplied equipment and allied works	14 Weeks
	3. Painting, Flushing & Miscellaneous Works Of respective installation.	Within 3 Weeks after completion
	4. Testing, Commissioning, Operation, Balancing and handing over of complete systems.	Within 2 Weeks after installation work is completed
(n)	Period of maintenance.	12 months from the date of issuance of Certificate of Substantial Completion of Works .
(o)	Period of test run.	One Month
(p)	Amount of liquidated damages per day in case of non-completion in the periods specified in clause (m) hereof.	Rs. 10,000.00
(q)	Maximum amount of liquidated damages.	10% of total contract value
(r)	Amount of Performance Bond.	10% of total contract value
(s)	Amount of Mobilization Advance payable against furnishing of a Bank/Insurance Co. Guarantee.	Upto 20% of the total cost of materials and installation.
(t)	Against Bill of Landing of imported items	25%
(u)	After equipment installation at site as per Design load	25%
(v)	After testing and commissioning	15%
(w)	After one month test run	15%
(x)	Amount of third party insurance (minimum for any one accident for loss of property and/or life).	Rs.1,000,000.00

(y) Venue of arbitration. Karachi

Dated this-----day of-----2021

Signature-----

in the capacity of-----

duly authorised to sign tenders for and on behalf of

(Full Address)-----

Witness-----

Address-----

Occupation-----

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
				Rs.	Rs.	Rs.	Rs.	Rs.
1	Supply, Installation, DC Inverter, Heat and Cool Cassette Type Air Conditioner, T3 Type compressor for high ambient application , complete with gas charging R410A or R32, and all installation material.							
	(Brands: Mitsubishi/LG/Toshiba/Hitachi/Bosch/Daikin/Samsung or Approved equal							
	a) Cassette AC 1.5 Ton	Nos.	22					
	b) Cassette AC 2 Ton	Nos.	33					
	c) Cassette AC 4 Ton	Nos.	18					
2	REFRIGERANT PIPING (GAS AND LIQUID)							
	a) Refrigerant Piping. Supply and installation of hard drawn seamless following type and sizes Copper refrigerant piping with 1/2" armafex foamed insulation, piping kits, oil traps where necessary, complete with fittings and silver soldered joints. (Pipes to be of Mueller USA or KEMBLA Australia or approved equal.							
	Total Pipe Rout Lengths							
	a) For 1.5 Ton	Rft	1100					
	b) For 2 Ton	Rft	1650					
	c) For 4 Ton	Rft	900					
3	Supply and installation of uPVC Class D condensate drain piping for AC equipments upto drain points 1/4" felt insulation & 8 oz. canvas jacketting, painting & finishing.							
	1+1/2" dia (Main Pipe)	2200	Rft					
	3/4" dia (Connection)	600	Rft					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
4	ELECTRICAL AND CONTROL WORKS							
	a) Supply and installation of all electrical wiring in conduit/cable tray from ODUs to respective indoor units. (Pakistan Cables) as per given SLD for cable sizes.							
	a) For 1.5 Ton	Nos.	22					
	b) For 2 Ton	Nos.	33					
	c) For 4 Ton	Nos.	18					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
5	<p>Providing, Installation, testing and commissioning of AC Main DB as per given SLD, 14 gauge sheet steel fabricated powder coated (80-100 micron) IP67 rating wall mounted/Floor stand recessed type suitable for 3 phase, 415V, 4 wire, 50 Hz, A/C system with phase reversal, Imported Bus Bar, phase failure, surge protection & earth leakage protection as per DB requirement as per following configuration:</p> <p>INCOMING: 1-400 Amps TP, 25 KA, MCCB, 4 Pole. 1-400 Amps TP, 25 KA, MCCB, 4 Pole. (Extra) 3-Phase indication lamps. With fuse Bus bar capacity = 500 amps. at 50°C Neutral bar. Earth bar.</p> <p>OUTGOING : 5-150 Amps T.P, 25 KA, MCBs, 4 Pole 24-20 Amps T.P, 15 KA, MCBs, 2 Pole 2-16 Amps T.P, 15 KA, MCBs, 2 Pole Complete in all respects as per drawing, specification and directed by Engineer in charge. Note: Breakers of DB's should be coordinated/Designed through software from breaker manufacturer.</p>	Nos.	1					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
6	<p>Providing, Installation, testing and commissioning of AC DB-2, 14 gauge sheet steel fabricated powder coated (80-100 micron) IP67 rating wall mounted/Floor stand recessed type suitable for 3 phase, 415V, 4 wire, 50 Hz, A/C system with phase reversal, Imported Bus Bar, phase failure, surge protection & earth leakage protection as per DB requirement as per following configuration:</p> <p>INCOMING: 1-150 Amps TP, 25 KA, MCCB. 4 Pole 3-Phase indication lamps. With fuse Bus bar capacity = 200 amps. at 50°C Neutral bar. Earth bar.</p> <p>OUTGOING : 2-32 Amps T.P, 15 KA, MCBs, 3 Pole 23-20 Amps T.P, 15 KA, MCBs, 2 Pole 2-16 Amps T.P, 15 KA, MCBs, 2 Pole Complete in all respects as per drawing, specification and directed by Engineer in charge.</p> <p>Note: Breakers of DB's should be coordinated/Designed through software from breaker manufacturer.</p> <p>Manufacture: Hussain and CO/Libra/HRA</p>	Nos.	1					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
7	<p>Providing, Installation, testing and commissioning of AC DB-3, 14 gauge sheet steel fabricated powder coated (80-100 micron) IP67 rating wall mounted/Floor stand recessed type suitable for 3 phase, 415V, 4 wire, 50 Hz, A/C system with phase reversal, Imported Bus Bar, phase failure, surge protection & earth leakage protection as per DB requirement as per following configuration:</p> <p>INCOMING:</p> <p>1-150 Amps TP, 25 KA, MCCB. 4 Pole 3-Phase indication lamps. With fuse Bus bar capacity = 200 amps. at 50°C Neutral bar. Earth bar.</p> <p>OUTGOING :</p> <p>7-32 Amps T.P, 15 KA, MCBs, 3 Pole 23-20 Amps T.P, 15 KA, MCBs, 2 Pole 2-16 Amps T.P, 15 KA, MCBs, 2 Pole Complete in all respects as per drawing, specification and directed by Engineer in charge.</p> <p>Note: Breakers of DB's should be coordinated/Designed through software from breaker manufacturer.</p>	Nos.	1					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
8	<p>Providing, Installation, testing and commissioning of AC DB-4, 14 gauge sheet steel fabricated powder coated (80-100 micron) IP67 rating wall mounted/Floor stand recessed type suitable for 3 phase, 415V, 4 wire, 50 Hz, A/C system with phase reversal, Imported Bus Bar , phase failure , surge protection & earth leakage protection as per DB requirement as per following configuration.</p> <p>INCOMING</p> <p>1-150 Amps TP, 25 KA, MCCB. 4 Pole</p> <p>3-Phase indication lamps. With fuse</p> <p>Bus bar capacity = 200 amps. at 50°C</p> <p>Neutral bar.</p> <p>Earth bar.</p> <p>OUTGOING :</p> <p>4-32 Amps T.P, 15 KA, MCBs, 3 Pole</p> <p>32-20 Amps T.P, 15 KA, MCBs, 2 Pole</p> <p>2-16 Amps T.P, 15 KA, MCBs, 2 Pole</p> <p>Complete in all respects as per drawing, specification and directed by Engineer in charge.</p> <p>Note: Breakers of DB's should be coordinated/Designed through software from breaker manufacturer.</p>	Nos.	1					
	Total Amount (B) =						-	-
9	DB-05							

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
10	Main Wiring/Cable: Providing, installing, terminating, testing and commissioning of following size single or multicore CU/PVC/PVC cable 600/1000 volts grades in suitable PVC conduit/cable tray concealed in floor / wall/ ceiling, Complete in all respects as per drawing, specification and directed by Engineer in charge. Manufacture: Pakistan Cable Note. Payment of pvc conduit or cable Tray will be paid separately through following given items.							
	a) 4X240mm ² CU/PVC/PVC + 1x95 mm ² CU/PVC CABLE AS E.C.C	Mtrs.	35					
	b) 4X95mm ² CU/PVC/PVC + 1x50 mm ² CU/PVC CABLE AS E.C.C	Mtrs.	300					
	c) 3x6mm ² CU/PVC/PVC CABLE AS E.C.C From HVAC - DB to respective switches or air conditioner	Mtrs.	2790					
	d) 4x6mm ² + 1x6mm ² CU. PVC CABLE AS E.C.C From HVAC - DB to respective switches or air conditioner	Mtrs.	618					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
11	Conduit: Providing & laying of following sizes of PVC conduit buried in ground or concealed in wall/floor/ceiling as required with all conduit accessories for Electrical / HVAC system, Including excavation, backfilling in ground for conduit, making the opening in wall/slab/floor for crossing the conduit , repairing of dismantled openings of wall/slab/floor , Complete in all respects as per drawing, specification and directed by Engineer in charge.							
	a) 25mm dia pvc class-E conduit	Mtrs.	200					
	b) 38mm dia pvc class-E conduit	Mtrs.	110					
	c) 50mm dia upvc class-D conduit	Mtrs.	35					
	d) 100mm dia upvc class-D conduit	Mtrs.	18					

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
12	G.I Cable Tray/Channel: Providing, laying, cutting, fitting & fixing of following sizes of hot dip galvanized iron, 14 gauge, rectangular, Electrostatic Powder Coated, Dust proof Plain Insulated G.I Cable Tray/Channel with 16 gauge cover, heavy duty brackets, hangers, supports, all required accessories for fixing in wall/ hanging under ceiling/ placing on floor (for support in wires and AC conduits), protection to exposed channel with approved paint & cleaning, Including making the opening in wall/slab/floor , repairing of dismantled openings of wall/slab/floor where ever required , Complete in all respects as per drawing, specification and directed by Engineer in charge. Manufacturer: Cable Tray: Hussain & Co							
	a) 4" X 3"	Mtrs.	388					
	b) 6" X 4"	Mtrs.	369					
	c) 9" X 24"	Mtrs.	99					
13	Handhole: Providing & construction of R.C.C Handhole Size 36"x36" (Inner Dimension) with water proof c.i cover as per drawing Complete in all respects as per drawing, specification and directed by Engineer in charge	Nos.	3					
	Total Tender Cost Rs.							

Item no	Description	Unit	Qty.	Material Cost		Labour Cost		Total Amount
				Rate	Amount	Rate	Amount	
<div>NOTES</div> <div>1. The contract shall be awarded on item rate basis.</div> <div>2. The quantities listed above are generally approximate and are for the guidance of the tenderer only and shall not be taken as actual and correct quantities of work to be executed by the Contractor in fulfillment of his obligations under the contract. The Contractor shall work out the quantities from drawings and mention any deviation in quantities mentioned above. The Contractor shall be paid for the actual quantities of work executed by him ascertained by measurements in accordance, with the contract.</div> <div>3. The Employer may opt to supply any of the materials at site free of cost to the Contractor. The cost of such items shall be deleted from the contract cost. The Contractor shall be responsible for careful storage and consumption of these materials and he will be responsible for any loss or damage thereto. All surplus materials on completion of the installation shall be handed back to the Employer by the Contractor.</div> <div>4. The Employer may opt. to delete any item or increase the quantity of certain items. The cost of deleted items shall be deleted from the Contract cost. The rates quoted shall be firm for the duration of the Contract and the increased/decreased quantities of the items shall be adjusted as per rates quoted.</div> <div>5. (a) In case of air ducting work, the payment for ducting and duct thermal insulation whose rates are given on per square feet basis shall be on basis of the surface area of sheet metal duct. Reducers shall be measured at average size and bends, elbows, etc. at the centerline radius.</div> <div>(b) In case of piping and piping thermal insulation, the payment shall be on Rft basis measured at the centerline of piping at the rate given according to N.B. of piping.</div> <div>6. The work shall be executed in accordance with the drawings, including manufacturers’ drawings and conform with the Tender Specifications complete in all respects as required and to the entire satisfaction of the Engineer/Consultants.</div>								

INSTRUCTIONS TO TENDERERS

01. DOCUMENTS

0101. The following is the list of tender documents issued to each prequalified tenderer:

1. Form of Tender and Memorandum.
2. Schedule of Item wise Prices
or Bill of Quantities (for item rate contracts).
3. Instructions to Tenderers.
4. General Conditions of Contract.
5. Special Conditions of Contract.
6. Specifications.
7. Schedule of Quantities (for lump sum contracts).
8. Schedules.
9. Annexures:
 - A. Specimen of Tender Earnest Money Guarantee.
 - B. Form of Contract Agreement.
 - C. Form of Performance Bond.
 - D. Specimen of Mobilization Advance Bond.
 - E. List of Approved Insurance Companies.
10. Drawings.

0102. All prequalified tenderers are required to acknowledge receipt of the tender documents and confirm that they would be submitting their tender within the stipulated time.

02. TENDERERS TO BE CONVERSANT WITH THE DOCUMENTS

0201. The tenderers will be expected to read all the above documents and be conversant with their contents and when tenders are made it will be inherent in the signing of the tenders that all the documents have been read and understood. Any difficulty experienced in interpreting the documents may be communicated to the Employer and the Engineer in writing and should any written clarification be required it will be made available by the Engineer to all tenderers.

03. ADDENDA

0301. Addenda may be issued, prior to the date set for submission of tenders, to clarify the tender documents or to effect modifications in the contract terms or designs of the works. Every addendum issued will be distributed to each prequalified tenderer to whom tender documents have been issued, and shall become a part of the tender documents. Receipt of each addendum must be acknowledged by the tenderer on the form issued with the addendum.

04. **DOCUMENTS TO BE SUBMITTED WITH TENDER AND GENERAL CONDITIONS APPLICABLE TO TENDER**

0401. The tenderer is required to complete:

- (a) Form of Tender and Memorandum.
- (b) The Schedule of Itemwise Prices (or Bill of Quantities), with every Item legibly priced in ink

and with the columns added up to the exact total amount of the tender (both in words and figures).

0402. The tenderer shall return duly completed and as appropriate to the works following Schedules:

- (a) For lump sum contracts, the Schedule of Item Rates upon which his tender has been based.

This Schedule shall serve to determine any variations and omissions.

(b) For the purpose of assessing day work for labour and/or materials not covered in the above referred, Schedule of Labour Rates shall be completed. On this Schedule the tenderer shall indicate the net cost(s) of labour, together with the percentage(s) he wishes to be applied, to cover all charges, insurance, holidays, use of tools and tackle, over-heads and profit etc.

- (c) The Schedule of Working Hours.

0403. The tenderer shall not make any alteration in the form of tender or to any other of the printed documents.

0404. Each tenderer should submit two copies of his detail quotation complete with necessary details, specifications, manufacturers' technical bulletins for the equipment quoted and manufacturers' capacity and performance guarantee certificates for all the main equipment, and any other plans or drawings required to explain his tender.

0405. The tenderer must only base his tender for supply of brand new equipment and stores of latest standard design and robust construction made according to the latest manufacturing practices.

0406. The tenderer shall quote against each item his minimum and final prices including where required, minimum foreign exchange requirements.

0407. The tenderer shall keep his tender firm and final in all respects and open for acceptance in full or in part for the period stated in the Memorandum from the date of tender opening.

0408. Tenders which are incomplete, conditional, obscure, or containing uncalled additions, erasures, alterations, over writings or irregularities may be rejected.

0409. The tenderer must return to the Consultant all the tender documents and drawings issued to him on or before the tender due date if he is not submitting his tender.

05. **SUBMISSION OF TENDER**

0501. The set of complete tender documents, drawings and addenda addressed to -----

must be delivered in person or sent by registered mail to-----

in plain sealed double package, the inner package endorsed on the outside with the words "Tender for -----
----- due on ----- at-----
-----" so as to reach upto ----- on -----and the tenders will be
opened at ----- on -----in the presence of those tenderers who may be
present at the time of tender opening.

0502. The tenders may be modified, corrected or withdrawn at any time prior to the date set for receipt of tenders upon submission of a request in writing to that effect, signed in the same manner and by the same person(s) who signed the tender.

06. INFORMATION TO ACCOMPANY TENDERS

0601. Each tenderer should check that he has completed and/or supplied the following when submitting his tender:

	<u>Section-03</u>
	<u>Clause No.</u>
(a) Form of Tender and Memorandum.	0401
(b) Schedule of Itemwise Prices or Bill of Quantities.	"
(c) Schedule of Item Rates. (for lump sum contracts)	0402
(d) Schedule of Labour Rates.	"
(e) Schedule of Working Hours.	"
(f) Two copies of detail quotation, etc.	0404
(g) Earnest Money.	07
(h) Nomination of proposed surety/sureties.	0902
(i) Tenderer's constitution.	14
(j) Tenderer's official address.	15

(k)	Preliminary programme of works.	16
(l)	Layout of temporary works.	17
(m)	List of major items of constructional plant.	18
(n)	Requirements of staff, electricity and water.	19
(o)	List of proposed sub-contractors.	20

07. **EARNEST MONEY**

0701. In order to secure the due performance by the tenderer of the obligations undertaken by him, the tender must be accompanied by a deposit as mentioned in the Memorandum.

0702. Each deposit must be made either:

- (a) By a Pay Order or Demand Draft of a scheduled Bank in favour of the Employer.
- (b) By a confirmed and irrevocable Guarantee, specimen annexed, of a scheduled Bank in favour of the Employer which should be valid for the period stated in the Memorandum from the date on which tenders are opened.

0703. No tender will be considered unless it is so secured. This deposit shall be refunded to the tenderers whose tender is not accepted on the expiration of the specified period of validity or at such earlier time as a tender shall have been accepted by the Employer and a Performance Bond furnished by the tenderer whose tender is accepted.

0704. The earnest money provided by the tenderer whose tender is accepted shall be repaid or discharged when the Contract Agreement and Performance Bond have been duly entered into and executed by the tenderer and his surety.

0705. If the tenderer whose tender is accepted fails to provide a Performance Bond and execute the Contract Agreement at his own expense within fifteen days of being requested to do so, the full amount of his earnest money shall stand forfeited, without recourse, and shall be the absolute property of the Employer.

08. **QUANTITIES AND PRICING OF THE SCHEDULE OF ITEMWISE PRICES OR BILL OF QUANTITIES**

0801. The attention of the tenderers is particularly drawn to clause 34 of the General Conditions of Contract. The Bill of Quantities or Schedule of Itemwise Prices must be priced as it stands.

0802. The tenderers should note that:

In the event of there being a discrepancy between the "rate" and "amount" entered for any

item in the Bill of Quantities or Schedule of Itemwise Prices, the "rate" will be taken as correct and the amount will be adjusted accordingly when the tender is being examined.

09. **FORMAL CONTRACT AND PERFORMANCE BOND**

0901. The tenderer whose tender is accepted will be required to enter into a Contract Agreement in accordance with clause 0501 of the General Conditions of Contract, and to provide a surety or sureties in accordance with clause 0502 of the General Conditions of Contract and to jointly execute a Performance Bond, specimens annexed.

0902. Tenderer shall submit with his tender the names and addresses of the proposed surety/sureties for the Performance Bond and particulars of the modifications (if any) which he would seek to make in the annexed specimen of the Performance Bond.

10. **TIME OF COMPLETION**

1001. The Contractor shall be required to complete the works progressively within the times stipulated in the Memorandum of the tender. Time shall be the essence of the contract.

11. **VISIT TO SITE**

1101. The tenderers should visit the site and satisfy themselves as to the accessibility thereof, the local conditions, the construction and occupation of the buildings, the full extent and nature of the operations, the conditions affecting the supply of labour, carriage, carting, unloading, storage and safe custody of materials, the scaffolding, tackle and tools necessary, the supply of light, power and water and the execution of the contract generally. Claims on the grounds of want of knowledge in such respects or otherwise shall not be admitted.

12. **SUPPLY OF MATERIALS BY THE EMPLOYER**

1201. The Employer reserves the right to supply any of the materials required for the execution of the works. The Contractor shall take deliveries of these goods at site, unpack, examine and store them, give receipt in detail and return all empty cases, packing, etc. from whence the materials were dispatched.

1202. The Contractor shall be responsible for safe storage and for any loss or damage caused to the materials handed over to him.

13. **INCLUSIONS AND INCIDENTALS**

1301. The tenderer will include for providing materials and incidentals which may be inferred from drawings and/or specifications, in order to ensure a complete and perfect installation although the same may not be expressly indicated or mentioned.

14. **CONSTITUTION OF ORGANIZATION TENDERING**

1401. The tenderer must deliver to the Employer with his tender, copies notarially authenticated of

the documents defining the constitution of the company or firm by which the tender is submitted, so as to show by what persons and in what manner a contract may be entered into by the company or firm and what persons would be directly responsible for the due performance of the contract and can give valid receipt on behalf of the company or firm. The tender shall be signed only by such person(s).

1402. Any correction or alteration in the tender must be signed in full by the same person(s) who signed the tender for and on behalf of the tenderer.

1403. Tender must be signed or sealed or otherwise executed in such a manner that it will be binding on the tenderer. Tenders not so executed may be rejected.

15. **TENDERER'S ADDRESS TO BE SUPPLIED**

1501. The tenderer must give with his tender the address at which notice may validly be served on him. National Tax Number Certificate also to be supplied.

16. **PRELIMINARY PROGRAMME OF WORKS**

1601. Tenders must be accompanied by a preliminary Programme of Works consisting of a bar chart.

1602. The bar chart must show the order in which the tenderer proposes to construct the various parts of the works, and the dates on which it is proposed that the several principal operations or features will be started and completed.

17. **LAYOUT OF TEMPORARY WORKS**

1701. Tender must be accompanied by drawing(s) showing the tenderer's proposed layout of temporary works, including the layout of his construction camps, maintenance shops, store yards, offices, etc.

18. **CONSTRUCTIONAL PLANTS**

1801. The tender must be accompanied by a descriptive list of the major items of constructional plant which the tenderer proposes to use on the contract. The capacity, expected output, power and type of motive power must be given where applicable. The description must include details of the age, condition, location and ownership of each item or in the case of items proposed to be purchased, the expected delivery dates.

19. **LABOUR AND STAFF REQUIREMENTS**

1901. The tenderer must furnish separate lists of approximate number of labourers, semi-skilled workmen, skilled workmen, foremen, supervisors, engineers and staff that the tenderer proposes to employ during the period of construction.

1902. The tenderer must give the maximum electric power and daily water quantity which he will require during construction period.

20. **LIST OF PROPOSED SUB-CONTRACTORS**

2001. Tenders must be accompanied by a list stating those parts of the works or temporary works which the tenderer proposes to sub-let.

21. **SPECIFICATIONS**

2101. The Contractor shall execute the works with materials in accordance with the specifications or if not specified, in accordance with the latest British/American Standard Specifications or Codes of Practice. All materials which, in the opinion of the Engineer are unsound and/or do not meet with the above conditions shall be immediately dismantled and/or removed from site by the Contractor at the request of the Engineer and replaced by appropriate approved material(s) without claim by or extra payment to the Contractor.

2102. The specifications are to be read in conjunction with the latest relevant British/American Standard Specifications and Codes of Practice. It shall be inherent in the interpretation of all clauses of the contract documents that wherever British Specifications or Codes are referred to they shall be deemed to be the British or American Specifications or Codes and vice-versa. Where differences or contradictions appear to arise between the British and American Specifications or Codes, these differences or contradictions shall be referred to the Engineer for a decision.

2103. When there is any deviation between any item or material offered and the above standards, the tenderer shall clearly draw attention to all such deviations and no such item or material shall be supplied by the Contractor without prior written approval of the Engineer.

22. **DRAWINGS**

2201. Unless expressly stated, drawings prepared by the Engineer or Consultant shall not be binding as to detail.

2202. All drawings accompanying the specifications, are to explain each other and are to be considered as a whole. Any work(s) indicated on the drawings and not specifically mentioned in the specifications and vice-versa are deemed to be included.

2203. The tenderer will, before tendering, carefully examine all drawings and specifications forming part of the tender and should any technical or other discrepancy appear, he will immediately inform the Engineer to obtain his ruling.

2204. The tenderer shall carefully check the sizes of the plant rooms and sufficiency of shaft, passage and trench sizes shown in the drawings for various installations and confirm that the offered

equipment, systems, piping, ducting, wiring etc. can be installed in the respective spaces allocated for the same.

2205. Structural drawings and details can be inspected at the site upon written application being made to the Engineer.

23. **SHOP DRAWINGS**

2401. The tenderer is to include for the preparation of all shop drawings (working drawings) which will be required for the proper execution of the works. All working drawings shall be submitted to the Engineer or Consultant for approval before executing the work.

24. **FINAL AS-INSTALLED DRAWINGS**

2401. After completion of the installation, the Contractor is to provide reproducible transparencies (quality to be approved by the Consultant) and three copies each of as-installed drawings showing runs and locations of all the plants, equipment, systems, piping, electric wiring, controls, components, etc. giving all necessary details of the work as actually installed including buried work.

25. **TRAINING OF EMPLOYER'S STAFF**

2501. The Contractor shall make suitable arrangement at his own cost to train the operational and maintenance staff of the Employer during the installation and maintenance periods according to the General Conditions of Contract.

26. **INSPECTION**

2601. The Employer reserves the right to arrange inspection of all the items prior to their dispatch through an Inspector appointed by the Employer. The inspection will be comprehensive for quality and quantity including supervision of packing and loading of inspected goods. The inspection charges will be borne by the Employer. The tenderer need not, unless otherwise stated, make any provision for the Inspector's fees in his tender. The Employer shall, however, not make any extra payment to the Contractor or his suppliers for any expense incurred by them in connection with the inspection.

27. **PRICES**

2701. The tenderer shall give a firm price for the supply of all items and materials (free delivery at site) and the cost of manufacture, fabrication, construction, assembly, installation, testing, commissioning and adjusting etc. to complete the works in working order in all respects.

2702. The Contractor shall be responsible, without additional charge to the Employer, for maintenance and servicing of the complete installation for the period of maintenance named in the Memorandum after the issue of Certificate of Substantial Completion by the Engineer. The Contractor shall during the period of maintenance, service the complete systems atleast once a month according to a

schedule approved by the Engineer and carry out one complete annual servicing and overhauling of the complete systems near the end of the period of maintenance.

2703. In case of lump sum contracts (as specified in the tender documents), the tenderer shall give a total lump sum price for the complete works as specified and required and total price should be given without any extra or additional items or alternatives.

2704. Import of Equipment and Materials by the Employer.

(a) In case it is specified in the Schedule of Itemwise Prices or Bill of Quantities, that the Employer shall directly import some items required for the work, the tenderer shall quote his minimum prices for these items in foreign currencies on C&F Pakistan Port basis.

(b) The Employer shall establish irrevocable and confirmed letters of credit in favour of the Contractor's foreign suppliers and arrange clearances of these items at his own cost and deliver the same at site to the Contractor for completing the work.

(c) The tenderer shall give confirmed periods of shipments for the imported items and in case of any delay by the Contractor (or his suppliers), liquidated damages shall be imposed according to the conditions of contract.

(d) The Contractor shall be responsible for safe storage and any loss or damage caused to the imported items handed over to him by the Employer. All surplus items on completion of work shall be handed over to the Employer in good condition by the Contractor.

28. **PAYMENTS**

2801. Running payments in respect of the cost of the local items, equipment and materials and labour charges shall be made to the Contractor according to the progress of the work on the certificate of the Engineer in terms of the evaluations based on the break-up of the tender and of the percentages thereof. Retention money and other amounts shall be deducted from the gross amount of each Bill according to the terms of the contract. Not more than one running Bill would be submitted by the Contractor in one month and the minimum billing amount would be as named in the Memorandum.

29. **ACCEPTANCE**

2901. Promptly after opening of the tenders, the Employer will undertake a detailed study and appraisal of the tenders submitted. The Employer does not bind himself to award the contract to the lowest or to any tenderer but will take into careful consideration the tenderer's price and other applicable factors. Once the Employer has arrived at a decision regarding the award of the contract, successful tenderer will be informed in writing of the Employer's intent to enter into a contract for the performance of the works. The successful tenderer will be required to attend the Office of the Engineer within a week of the date of receipt

of such Notice of Award, with proper power of attorney for the purpose of entering into and executing a Contract Agreement in the form annexed in the tender documents with such alterations or additions thereto as may be required to cover the works.

30. **RIGHTS**

3001. The Employer reserves the right to reject any or all tenders without assigning any reason thereof, and to waive any formalities in the tenders received (such as deviation in the use and presentation of the specified tender documents and forms), if it appears to be in the best interests of the Employer to do so.

3002. The tender documents and drawings are the exclusive property of “BBSIMS DADU”, , and are subject to be recalled and must not be used, lent, copied or reproduced by anybody without their written permission.

GENERAL CONDITIONS OF CONTRACT

01. DEFINITIONS

0101. In construing the contract, these conditions, other documents and the interpretations, the following words and expressions shall have the meaning herein assigned to them, except where the subject or context otherwise requires.

0102. "Owner"/"Employer" means benazir bhutto shaheed institute of management science, and shall include their administrative and legal rep., assigns or successors.

0103. "Engineer" means The **PROJECT ENGINEER, BBSIMS DADU.** or such other person(s) appointed for this purpose by the Employer for the time being or from time to time to perform the duties set forth in clause 07 hereof and notified in writing to the Contractor.

0104. "Consultant" means **BBSIMS'S, Authorized Engineer,** and includes their duly authorized representatives or such other person(s) as may be appointed for this purpose by the Employer and notified in writing to the Contractor.

0105. "Engineer's Representative" means the person(s) for the time being or from time to time duly appointed by the Engineer to act under the instructions of the Engineer to perform the duties set forth in clause 08 hereof and notified in writing to the Contractor.

0106. "Contractor" means the tenderer whose tender has been accepted by the Employer and shall include his legal and personal representatives, successors and permitted assigns.

0107. "Contractor's Agent" means the person or Project Engineer duly appointed by the Contractor and approved by the Engineer to perform the duties set forth in clauses 1102 and 1103 hereof.

0108. "Main Contractor" means the Building Contractor appointed by the Employer to carry out the Building construction work.

0109. "Contract" means the Agreement contained in the Contract Agreement and the documents set out in the Contract Agreement as forming part thereof.

0110. "Contract Price" means the sum named in the paragraph of the tender subject to such additions thereto or deductions therefrom as may be made under the provisions of the contract.

0111. "Retention Money" means the sums retained pursuant to clause 36 hereof.

0112. "Site" means the site of the works and the lands, other places, building and erections thereon, over, under, in or through which the works are to be executed or carried out and any other land (inclusively) as aforesaid allotted by the Employer to the Contractor's use.

0113. "Works" means all the works to be executed in accordance with the contract and includes the whole of the works, materials, matters and things required to be done, furnished and performed by the Contractor under the contract.

0114. "Temporary Works" means all temporary works of every kind required in or about the

construction, completion or maintenance of the works.

0115. "Programme of Works" means the programme of works submitted by the Contractor and approved by the Engineer pursuant to clause 09 hereof including any amendments thereto from time to time approved by the Engineer.

0116. "Material" includes all plants, equipment, instruments, materials, commodities, articles and things required to be furnished under the contract for incorporation in the works.

0117. "Constructional Plant" means all appliances, equipment, tools, instruments or things of whatsoever nature required in or about the execution, completion or maintenance of the works or temporary works but does not include materials or other things intended to form or forming part of the permanent works.

0118. "Specifications" mean the specifications included in the contract. The nomenclature of all the items in the Bill of Quantities or Schedules of Itemwise Prices, Rates and Quantities shall be read with and will include the detail description in the relevant parts of the specifications. In case there is no definite provision in the specifications, then British/American Standard Specifications and Codes of Practice shall be followed in the same order.

0119. "Drawings" mean the drawings referred to in the contract or specifications and any modifications of such drawings prepared by the Consultant and approved by the Engineer and such other drawings as may from time to time be furnished to the Contractor as approved by the Engineer.

0120. "Commissioning" means putting the complete plant and equipment into full operational service, and compliance with the specifications as set forth in these documents.

0121. "Tender Date" means the date by which the tenders are required to be delivered to the Employer.

0122. "State Laws" has the meaning assigned in clause 14 hereof.

0123. "Suspension Order" has the meaning assigned in clause 31 hereof.

0124. "Variation Order" means an order made pursuant to the provisions of clause 32 hereof.

0125. "Certificate of Completion" means a certificate given pursuant to the provisions of clauses 3005 and 3007 hereof.

0126. "Period of Maintenance" has the meaning assigned in clause 3501 hereof.

0127. "Approved" means approved in writing including subsequent written confirmation of previous oral approval, and "Approval" means approval in writing including such written confirmation.

0128. "Notice in Writing" has the meaning assigned in clause 42 hereof.

0129. "Month" means a calendar month.

0130. The singular includes the plural and vice versa. The masculine includes the feminine and vice versa. Words importing persons include firms, companies or other bodies corporate.

02. EXTENT OF CONTRACT

0201. The contract comprises the manufacture, supply, construction, assembly, installation, completion, testing, commissioning, adjusting and maintenance of complete works including supply of all materials, plants and equipment as per requirements of design contained in the contract drawings, specifications and documents.

0202. And except in so far as the contract otherwise provides, the provision of all labour, materials, constructional plant, temporary works and everything whether of a temporary, permanent or incidental nature required in and for such manufacture, supply, construction, assembly, installation, completion, testing, commissioning, adjusting and maintenance so far as the necessity for providing the same is specified in or can reasonably be inferred from the contract.

03. ASSIGNMENT AND SUB-LETTING

0301. The Contractor shall not assign the whole of the contract or any part thereof or any benefit or interest therein or thereunder without the prior written consent of the Employer.

0302. The Contractor shall not sub-let the whole of the contract. Except where otherwise provided by the contract, the Contractor shall not sub-let any part of the contract without the prior consent of the Engineer (which shall not be unreasonably withheld) and such consent if given shall not relieve the Contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents, servants, or workmen as full as if they were the acts or defaults or neglects of the Contractor, his agents, servants or workmen. Provided always that the provision of labour on piecework basis shall not be deemed to be subletting under this clause.

04. CONTRACT DOCUMENTS

0401. The contract shall be read, construed and interpreted according to the English language and shall operate in conformity with the laws of the Islamic Republic of Pakistan.

0402. Except if and to the extent otherwise provided by the contract the provisions of these conditions of contract shall prevail over those of any other documents forming part of the contract. Subject to the foregoing the several documents forming the contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions directing in what manner the work is to be carried out. Provided always that if in the opinion of the Engineer compliance with these instructions is the cause of any expense which by reason of any such ambiguity or discrepancy the Contractor did not and had reason not to anticipate, the Engineer shall certify and the Employer shall pay such additional sum as may be reasonable to cover such expense.

0403. The drawings shall remain in the sole custody of the Engineer but two copies thereof

shall be furnished to the Contractor free of cost. The Contractor shall provide and make at his own expense any further copies required by him.

0404. One copy of the drawings shall be kept by the Contractor on the site and the same shall at all reasonable times be available for inspection and use by the Engineer, Consultant, Engineer's Representative and by any other person authorised by the Engineer in writing.

0405. The Consultant/Engineer shall supply to the Contractor from time to time during the progress of the works such further drawings, specifications and instructions as shall be necessary for the purpose of the proper and adequate execution and maintenance of the works and the Contractor shall carry out and be bound by the same. The Contractor shall give adequate notice in writing to the Engineer or the Consultant for issue of any such further drawings, specifications or instructions that the Contractor may consider necessary.

0406. The Contractor shall prepare at his own expense any shop drawings (working drawings) which will be required for the proper execution of the works or for interpretation of the Engineer's drawings for the use of his employees. The Contractor shall submit the shop drawings to the Consultant for approval before any work is carried out.

0407. The Contractor shall check all drawings immediately they are supplied to him and promptly notify the Engineer and Consultant if any errors or omissions are discovered.

0408. The contract drawings and such other drawings as may be furnished to the Contractor during the progress of the works shall be considered as illustrating the specifications. If the Contractor shall find any discrepancy in or divergence between the contract specifications, drawings and/or Bill of Quantities or Schedule of Quantities, he shall immediately refer the same in writing to the Engineer and specifically apply in writing for any necessary instructions from the Engineer in relation thereto.

0409. None of the documents hereinbefore mentioned shall be used by either of the parties hereto for any purpose other than the contract and neither the Employer nor the Contractor shall divulge or use except for the purpose of this contract any information in the priced Schedules of Item wise Prices or Item Rates or Bill of Quantities.

0410. The Contractor shall retain in his office all necessary drawings, data and calculations for the works in methodical manner and shall produce them whenever required by the Engineer, Consultant or Engineer's Representative.

05. **GENERAL OBLIGATIONS**

0501. The Contractor shall when called on to do so enter into and execute a Contract Agreement at his own cost in the form annexed with such modifications as may be approved by the Employer.

0502. The Contractor shall provide a surety or sureties approved by the Employer to be jointly

and severally bound with the Contractor to the Employer for the due performance of the contract by the Contractor under the terms of a Performance Bond, specimen annexed and approved by the Employer in the amount specified in the Memorandum of the tender.

0503. The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender and the rates and prices shall except in so far as it is otherwise expressly provided in the contract cover all his obligations under the contract and all matters and things necessary for the proper completion and maintenance of the works.

0504. The Contractor shall execute, complete and maintain the works in strict accordance with the contract to the satisfaction of the Engineer and the whole of the materials, plant, equipment and labour, other things to be provided by the Contractor pursuant to the contract and the mode, manner and speed of execution and maintenance of the works are to be of a kind and conducted in a manner to the satisfaction of the Engineer.

0505. The Contractor shall comply and adhere strictly to the Engineer's instructions and directions on any matter (whether mentioned in the contract or not) touching or concerning the works. The Contractor shall take instructions and directions only from the Engineer or (subject to the limitations of clause 08) from the Consultant and Engineer's Representative.

06. **RETURN OF DOCUMENTS**

0601. The tender documents, specifications and drawings are to be returned by the tenderers to the Engineer without fail on the tender due date whether the tender is submitted or not.

07. **POWERS OF THE ENGINEER**

0701. The Contractor shall carry out the works under the directions of the Engineer and to his satisfaction. The directions and approvals given on site by the Consultant and Engineer's Representative shall be deemed by the Contractor as that of the Engineer (subject to the limitations of clause 08).

0702. The Engineer/Consultant's decision in respect of quality of materials and workmanship and interpretation of the specifications will be final and shall be accepted by the Contractor. Any other matters may be referred to arbitration by the Contractor if he wishes to dispute the Engineer's decision upon such matters.

0703. The Engineer may from time to time give further instructions and directions as may be necessary for the guidance of the Contractor and the proper execution of the works. The Engineer may alter the situation, or vary the form or character of any of the work in the contract or omit or add to the works.

0704. If any verbal instructions, directions or explanations involving a variation are given to the Contractor or his Agent upon the works by the Engineer, Consultant or Engineer's Representative, such instructions, directions or explanations shall be confirmed in writing by the Contractor to the Engineer within

seven days and, if not dissented from in writing by the Engineer to the Contractor within a further seven days, shall be deemed to be the Engineer's instructions.

0705. If compliance with the Engineer's instructions involve the Contractor in loss or expense beyond that provided for in or reasonably contemplated by the contract, then, unless such instruction were issued by reason of some breach of the contract by the Contractor, the amount of such loss or expense shall be ascertained by the Engineer and shall be added to the contract price.

0706. If within seven days after receipt of a written notice from the Engineer requiring compliance with the Engineer's instructions, the Contractor does not comply therewith, the Employer may employ and pay other persons to execute any work whatsoever which may be necessary to give effect to such instructions and all costs incurred in connection therewith shall be recoverable from the Contractor by the Employer as a debt or may be deducted by him from any monies due or to become due to the Contractor under the contract.

0707. Such variations, omissions or additions will not vitiate the contract and will be the subject of adjustment to the contract price if it is the cause of any difference in expense.

0708. The Engineer/Consultant will have the power to withhold the issue of any certificate for interim payment if the works are not being carried out to his satisfaction.

0709. In measuring, valuing, deciding or certifying, the Engineer is not intended to act as an arbitrator, but as an Engineer acts by his skill and from his knowledge of the facts and incidents connected with the contract and in so far as any facts are not within his own knowledge, the Engineer shall be at liberty to inform himself by inquiry of Consultant or any other person or as he may consider necessary. The Engineer shall at all times be considered to be aware of all facts necessary for him to form his own opinion, make his measurements or valuations, give his decisions and order, make his requisitions or give or refuse his certificate and he shall be at liberty to certify at such times and in such manner as in his discretion he may think proper and he shall not be bound to give any reason for or any particulars of his certificate or any reason for his not certifying.

08. **DUTIES AND POWERS OF THE ENGINEER'S REPRESENTATIVE**

0801. The duties of the Engineer's Representative are to watch and supervise the works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to relieve the Contractor of any of his duties or obligations under the contract, nor to make any variation order except as expressly provided in the contract, nor to order any work involving delay or any extra payment by the Employer.

0802. Subject as aforesaid the Engineer's Representative shall have any of the powers and authorities vested in the Engineer which the Engineer may for the time being have delegated in writing to the Engineer's Representative. The Engineer shall furnish to the Contractor a copy of all such written

delegations of powers and authorities and also of any revocation thereof. Any written instruction or approval given by the Engineer's Representative to the Contractor within the terms of such delegations (but not otherwise) shall bind the Contractor and the Employer as though it has been given by the Engineer.

0803. Provided always as follows:

- (a) Failure of the Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down or breaking up thereof.
- (b) If the Contractor shall be dissatisfied by reasons of any decision of the Engineer's Representative he shall be entitled to refer the matter to the Engineer who shall thereupon confirm reverse or vary such decision.

09. **PROGRAMME OF WORKS**

0901. The Contractor shall within thirty days after the acceptance of his tender submit in writing:

- (a) For approval of the Engineer and Consultant a Programme of Works in the form of a bar chart showing the order of precedence and method in which he proposes to carry out the works, and
- (b) For the information of the Engineer and Consultant full particulars of the organization and staff by which he proposes to direct and administer his performance of the contract.

0902. The Programme which the Contractor is required to furnish shall be such as to allow the completion of the whole works by the completion date given in the Memorandum of the tender.

0903. The Programme shall cover the full period of works from the date of the acceptance of the tender to the completion of installation, commissioning, testing, adjusting and handing over of the complete works in working order. The Programme shall cover the sequence of work for all items showing separately in each case the time allowed for manufacturing, shipment, delivery to site, fabrication, construction, assembly, installation, testing, commissioning, adjusting, commencement of regular operation and handing over of the complete works in working order.

0904. The Programme should aim at completion of one fourth, one half and three fourths of the whole of the works before one fourth, one half and three fourths respectively of the whole time has elapsed.

0905. The Programme submitted by the Contractor shall be amended if any part or whole of it is not to the satisfaction of the Engineer and Consultant and it shall not be carried into effect until it has been approved (in an amended form if necessary) by the Engineer and Consultant.

0906. If the Engineer and Consultant under the provision of this clause require the Contractor

to amend his Programme of Works, the Contractor shall not thereby be entitled to any adjustment in contract price or to any extension of time.

0907. The Contractor may at any time during the period of the contract submit to the Engineer and Consultant for their approval proposals for amending the Programme of Works. Such amendments shall not be carried out into effect unless they have been approved by the Engineer and Consultant.

0908. The Contractor shall furnish in writing such further information concerning his arrangements for the carrying out of the works and of the constructional plant or temporary works he intends to supply, use or construct and of his arrangements for the direction and administration of his performance of the contract as the Engineer or Consultant may from time to time require.

0909. The submission to or approval by the Engineer or Consultant of such Programme or the furnishing of such particulars or information shall not relieve the Contractor of any of his duties or responsibilities under the contract.

10. **LIQUIDATED DAMAGES FOR DELAY**

1001. If the Contractor shall fail to complete the works within the time prescribed by the clause 30 hereof then the Contractor shall pay to the Employer the sum stated in the Memorandum of the tender as liquidated damages for such default and not as a penalty for every day which shall elapse between the time prescribed by clause 30 hereof and date of completion of the works subject to the maximum amount of liquidated damages stated in the Memorandum of the tender. The Employer may without prejudice to any other method of recovery deduct the amount of such damages from any moneys in his hands due to or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the works or from any other of his obligations and liabilities under the contract.

1002. The Contractor shall be required to arrange shipments of imported items progressively as per the programme prescribed in the contract. Provided the Employer has established confirmed and irrevocable letters of credit in favour of the foreign suppliers of the Contractor in time in accordance with the contract, the shipment period(s) shall not be extended and in case any shipment is delayed, the completion period of the works will not be extended and the Contractor shall be liable to pay liquidated damages, as per clause 1001 hereof, for the delay he causes in the completion of the works.

1003. If before the completion of the whole of the works, any part of the works has been certified by the Engineer as completed pursuant to clause 3005 hereof and occupied or used by the Employer, the liquidated damages for delay shall, for any period of delay after such certification, be reduced in proportion which the value of the part so certified bears to the value of whole of the works.

1004. To ensure good progress during the execution of the works, the Contractor shall be bound to complete one fourth, one half and three fourths of the whole of the works before one fourth, one half and three fourths respectively of the whole time allowed in the contract has elapsed. In the event of the

Contractor failing to comply with the Engineer's instructions for progressive completion within respective times, he shall be liable to pay liquidated damages, as per clause 1001 hereof, for the delay he causes.

11. CONTRACTOR'S SUPERINTENDENCE, AGENT AND EMPLOYEES

1101. The Contractor shall give or provide all necessary superintendence for the proper fulfilling of the Contractor's obligations under the contract.

1102. A competent and duly authorised Agent (Project Engineer or Representative) of the Contractor approved by the Engineer (which approval may at any time be withdrawn) and who shall have full authority to act for and bind the Contractor is to be constantly at the site of work and shall give his whole time to the superintendence of the works.

1103. The Agent shall receive on behalf of the Contractor directions and instructions from the Engineer or (subject to the limitations of clause 08) the Consultant or Engineer's Representative.

1104. Correspondence between the Contractor or the Agent and the Engineer, Consultant or the Engineer's Representative shall be in English.

1105. The Contractor shall provide and employ on the site for the purpose of or in connection with the contract:

- (a) Only such Engineers, Supervisors, technical assistants as are skilled and experienced in their respective callings and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise, and
- (b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely performance of the contract.

1106. The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the site the Agent or any other person employed by the Contractor or any sub-contractor who in the opinion of the Engineer mis-conducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Engineer to be undesirable and such person shall not be again employed for the purpose of or in connection with the contract without the written permission of the Engineer. Any person so removed shall be replaced immediately by a competent substitute approved by the Engineer.

12. WATCH AND CARE OF WORKS

1201. Except as otherwise specifically provided in the contract the Contractor shall make all arrangements for the security and protection of persons and property or for the safety or convenience of persons it is necessary or required by the Engineer or Engineer's Representative or by any duly constituted authority, and provide and maintain all lights and watching.

1202. From the commencement to the completion of the works the Contractor shall take full responsibility for the care thereof and of all temporary works, materials, constructional plant and other

things brought on the site by the Contractor for the purposes of the contract and in case any damage loss or injury shall happen to the works or any such materials or constructional plant or other things from any cause whatsoever (save and except the excepted risks e.g. outbreak of war or act of invasion) he shall at his own cost replace, repair and make good the same so that at completion the works shall be in good order and condition and in conformity in every respect with the requirements of the contract and the Engineer's instructions. In the event of any such damage loss or injury happening from any of the excepted risks the Contractor shall, if and to extent required by the Engineer and subject always to the provisions of clause 39, replace repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the works occasioned by him in the course of any operation carried out by him for the purpose of complying with his obligations under clause 35 hereof but without prejudice to the provisions of this clause as to cases in which the cost of work shall be paid for by the Employer.

1203. The Contractor shall indemnify and keep indemnified the Employer against all losses and claims for injuries or damages to any person or any property whatsoever which may arise out of or in consequence of the performance of the contract and against all claims, demands, proceedings, damages, costs, charges and expenses, whatsoever in respect of or in relation thereto.

13. **PROTECTION OF WORKS AND MATERIALS**

1301. The Contractor shall be responsible for any damage caused by his operatives or agents to the buildings, works being executed under this contract, or the contents of the buildings, and shall make good such damage at his sole expense.

1302. The Contractor shall be responsible for arranging for such mechanical protection as he deems necessary to all or part of his works, plant or equipment or that supplied to him by the Employer liable to damage by weather, frost, traffic or other causes and until such time as the works shall be taken over by the Employer.

1303. Any such damage(s) as may occur through negligence of the Contractor, will be corrected and/or made good at his own expense.

14. **COMPLIANCE WITH STATUTES, REGULATIONS ETC.**

1401. The Contractor shall conform in all respects with the provisions of all Federal, Provincial and local laws, regulations or orders or other laws for the time being in force in Pakistan including all regulations and by-laws, if any, of local or other duly constituted authority within Pakistan which may be applicable to the performance of the contract and the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the works or any temporary works (which are herein referred to as "State Laws") and shall give all notices and pay all fees, charges, rates and taxes (collectively referred herein as fees) required to be given or paid thereby and shall keep the Employer indemnified against all penalties and liability of any kind for the breach of any of the

same provided that such fees, if not expressly included in the contract price, shall be added to the contract price.

15. **INSTRUMENTS AND TOOLS**

1501. The Contractor shall supply and maintain such sufficient instruments, tools and equipment for the use of his staff that are required to enable him to fulfil his obligations under the contract.

16. **SUPPLY OF PLANT, MATERIALS AND LABOUR**

1601. Except where otherwise specified the Contractor shall, at his own expense and risk, supply and provide all the constructional plant, temporary works, scaffolding and ladders etc., tools, instruments, materials for temporary and permanent works, labour (including the supervision thereof), transport to and from the site and in and about the site and other things of every kind required for the purposes of or in connection with the contract.

17. **ISSUED AND UNFIXED MATERIALS**

1701. Where the work provides for the use of any special description of materials to be issued by the Employer or if it is required that the Contractor shall use certain materials to be provided by the Employer, the Contractor shall be supplied with such materials as required from time to time to be used by him for purposes of the contract only, and the value of the full quantity of materials so supplied at the rate specified in the said schedule of materials may be set off or deducted from any moneys then due or thereafter become due to the Contractor under the contract or otherwise or from the retention money. All such materials supplied to the Contractor and all items imported for the works for which the Employer has made payment to the foreign suppliers, shall remain the absolute property of the Employer and shall not, on any account, be removed from the site of the work and shall at all times be open to inspection by the Engineer. Any such materials unused and in perfectly good condition at the completion or termination of the contract shall be returned to the Employer's stores if by a notice in writing the Engineer shall so require. The Contractor shall have no claim for compensation on account of any such materials so supplied to him being unused by him or for any wastage or damage to any such materials.

18. **SETTING OUT**

1801. The Contractor shall be responsible for the true and proper setting out of the works in relation to points, lines and levels of reference given by the Engineer in writing or at site and for the correctness of the position, levels, dimensions and alignments of all parts of the works and for the provision of all necessary instruments, tools, appliances and labour in connection therewith. If, at any time during the progress of the works, any error shall appear to arise in the position, levels, dimensions or alignment of any part of the works, the Contractor on being required to do so by the Engineer, Consultant or the Engineer's Representative shall at his own expense rectify such error to the satisfaction of the Engineer, Consultant or the Engineer's Representative unless such error is based on incorrect data supplied in writing by the

Engineer, Consultant or Engineer's Representative in which case the expenses of rectifying the same shall be borne by the Employer. The checking of any setting out or of any line or level by the Engineer, Consultant or the Engineer's Representative shall not in any way relieve the Contractor of his responsibilities for the correctness thereof. The Contractor shall carefully protect and preserve all bench marks, sight rails, slogs, takes, battens, boards, stakes and other things used in setting out.

19. **LIGHTING**

1901. The Contractor shall provide sufficient lighting to ensure that in all places where work is in progress (particularly during night time):

- (a) Safe working conditions are provided for both the Contractor's personnel and personnel of the Engineer, Consultant and Engineer's Representative.
- (b) The works can be constructed in complete compliance with the contract.
- (c) A complete inspection of all works in progress can be made by the staff of the Engineer, Consultant and Engineer's Representative.

1902. The minimum intensity of illumination on ground or working surfaces to be provided for various operations or work areas shall be as approved by the Engineer.

20. **ELECTRIC AND WATER SUPPLY**

2001. The Employer shall arrange for the supply of metered electricity and metered water for the Contractor upto the site of work. The Contractor shall bear all expenses for connection and distribution to and about the site from these sources as well as for the consumption and directly pay all monthly consumption bills. All expenses, loss and damage suffered by the Contractor as a result of any interruption or breakdown of electric or water supply shall be borne by the Contractor.

21. **COORDINATION WITH OTHER CONTRACTORS**

2101. The Contractor shall arrange and administer the contract and the Programme of Work, incorporating the programme of Building construction and all other services of the works so as to complete the works as a whole within the time stipulated in the contract.

2102. The decision of the Engineer shall be final and binding on the Contractor in case of dispute or difference of opinion arising between various contractors in relation to the responsibilities and scope of work required under mutual coordination.

22. **OPPORTUNITIES FOR OTHER CONTRACTORS**

2201. The Contractor shall in accordance with the requirements of the Engineer afford all reasonable opportunities for carrying out their work to any other contractors employed by the Employer and their workmen and to the workmen of the Employer and of any other duly constituted authorities who may be employed on or near the site for any work not included in the contract or of any contract which the

Employer may enter into in connection with or ancillary to the contract. If, however, the Contractor shall, on the written request of the Engineer, make available to any such other contractor or to the Employer or to any such authority, any roads or ways for the maintenance of which the Contractor is responsible or permit the use by any such of the Contractor's scaffolding or ladders or tools or instruments or other plant on the site or provide any other service of whatsoever nature for any such, the Employer shall pay to the Contractor in respect of such use or service such sum as shall in the opinion of the Engineer be reasonable.

23. **BUILDER'S WORKS**

2301. The formation of channels, brick work etc. will be carried out free of charge for the Contractor by the Main Contractor unless otherwise specified.

2302. All shop drawings which may be necessary for the Main Contractor to carry out the above referred works shall be supplied to him by the Contractor.

2303. The Contractor is, however, responsible for the proper marking out of such work at site, for ensuring that all brackets and sleeves etc. are correctly built in and supply of templates if required. The Contractor will supply and fix foundation or anchor bolts or sleeves before concrete is poured.

2304. Provision and fixing of brackets, clips, supports, stays, sleeves, hangers etc. to be fixed to wood, iron, masonry, concrete or other such materials shall be the responsibility of the Contractor. Special application in writing must be made to the Engineer and approval received before any structural steel work is cut or drilled.

24. **INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES**

2401. All operations necessary for the execution of the works and for the construction of any temporary works shall so far as compliance with the requirements of the contract permits be carried on so as not to interfere unnecessarily or improperly with the public convenience or the access to use and occupation of public or private roads and foot paths or to or of properties whether in the possession of the Employer or of any other person and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such interference.

25. **SITE CLEARANCE**

2501. The Contractor shall at all times keep the site free from obstruction and shall at any time if directed by the Engineer or Engineer's Representative store or dispose off any constructional plant and surplus materials and clear away and remove from the site any wreckage or rubbish or temporary works no longer required.

2502. On the completion of the works the Contractor shall except and otherwise specifically provided, clear away and remove from the site all constructional plant, temporary works, surplus materials,

wreckage and rubbish of every kind and shall reinstate and leave the whole of the site and the works clear and in a workman like condition to the satisfaction of the Engineer.

2503. In case of any failure on the part of the Contractor to comply with the provisions of this clause, the Engineer may by notice in writing to the Contractor require him to remove such constructional plants, temporary works, surplus materials, rubbish etc. from the site within the time specified in such notice and in the event of the Contractor failing to comply with any such notices, the Engineer may remove the same at the Contractor's expense or sell them by auction or private sale on account of the Contractor at his risk. Any receipts and the certificates from the Engineer as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the Contractor.

26. **LABOUR/WORKERS**

2601. The Contractor shall make all arrangements in connection with the recruitment, supervision, transport, accommodation and feeding during transport, quarantine and all other matters whatsoever in connection with the employment of labour and supervisory staff provided that the Contractor shall not recruit or attempt to recruit persons in the service of the Employer, Engineer, Consultant or Engineer's Representative.

2602. Except as may be otherwise specifically stated the Contractor shall provide on the site an adequate supply of drinking and other water for the use of labour and supervisory staff.

2603. The Contractor shall at all times take all requisite precautions and use his best endeavors to prevent any riotous or unlawful behavior by or amongst the labourers and others employed by him or his sub-contractors for the purpose of or in connection with the contract and for the preservation of peace and the protection of the inhabitants and the security of property on or in the neighborhood of the site.

2604. In respect of all labour directly or indirectly employed by the Contractor for the performance of the works, he shall comply with or cause to be complied with, all rules framed by the Federal and Provincial Governments and any local body from time to time for the employment of labour including the protection of health and sanitary arrangements for the workers.

2605. The Contractor shall maintain at site proper attendance registers to record the attendance of his employees and submit a return in detail at the end of every week to the Engineer's Representative showing:

- (a) The numbers of several classes of labour employed by him on the works during the period,
- (b) Their working hours,
- (c) Details of any accidents during the period indicating extent of damage and injury, and

- (d) Details of constructional plant.

The Contractor's Agent shall show the attendance registers to the Engineer or Engineer's Representative whenever so instructed.

27. **FACTORY ACTS AND LABOUR LAWS**

2701. The Contractor shall, in relation to the works executed under this contract, comply with the provisions of the Factories Act 1937 and 1948 and West Pakistan Industrial and Commercial Employment (Standing Orders) Ordinance 1968 and other Federal and Provincial Laws concerning employment of workers, and statutory amendments or additions thereof, and any regulations or orders made thereunder affecting the works.

28. **DAY WORK**

2801. No works are to be executed as day work unless specifically ordered as such, and if so ordered, day work sheets indicating name(s) of operatives, time and materials employed shall be submitted in triplicate for signature by the Engineer's Representative at or before the expiration of the week in which such day work shall have been carried out.

29. **MATERIALS AND WORKMANSHIP**

2901. All materials and workmanship shall be of the respective kinds described in the contract and in accordance with the Engineer/Consultant's instructions and approval and shall be subjected from time to time to such tests at such places and at such times as the Engineer/Consultant may direct. The Contractor shall provide such assistance, labour and materials as are required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the works for testing as may be selected and required by the Engineer/Consultant. The Contractor must submit samples of materials to the Engineer/Consultant for approval well before the same are required for the works. The Contractor shall carry out the work only with such materials which have been approved by the Engineer/Consultant.

2902. All samples shall be supplied by the Contractor at his own cost unless otherwise provided for in the contract.

2903. The Employer, Engineer, Consultant and Engineer's Representative and any person authorised by any of them shall at all times and for all purposes have access to the works and temporary works and to the site and to all factories, workshops and places where work is being prepared or where materials are manufactured or from where articles, machinery or equipment are being obtained for the works and the Contractor shall afford every facility for and every assistance in or obtain the right to such access.

2904. No work shall be covered up or put out of view without the approval of the Engineer or the Consultant and the Contractor shall afford full opportunity for the Employer, Engineer, Consultant or

Engineer's Representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer's Representative whenever any such work or foundation is or are ready or about to be ready for examination and the Engineer's Representative shall as soon as practicable during normal working hours, attend for the purpose of examining and measuring such work or of examining such foundations.

2905. The Contractor shall uncover any part or parts of the works or make openings in or through the works or sources for detecting the cause of any defect, imperfection or fault in the works as the Engineer may from time to time direct and shall reinstate and make good after such uncovering, opening or searching to the satisfaction of the Engineer. If any part of the works has been covered up or put out of view after compliance with the requirements of clause 2904 and if the defect, fault or imperfection is one for which the Contractor is not liable under the contract the expenses of uncovering, openings or searching and reinstating and making good shall be borne by the Employer but in any other case all such expenses shall be borne by the Contractor and shall, if paid by the Employer, be recoverable from the Contractor by the Employer or may be deducted by the Employer from the moneys due or which may become due to the Contractor.

2906. The Engineer/Consultant shall have power to order in writing from time to time:

- (a) The removal from the site within such time or times as may be specified in the order of any materials which in the opinion of the Engineer/Consultant are not in accordance with the contract,
- (b) The substitution of proper and suitable materials, and
- (c) The removal and proper re execution (notwithstanding any previous test thereof or interim payment therefor) of any work which in respect of materials or workmanship is not in the opinion of the Engineer/Consultant in accordance with the contract.

30. **COMMENCEMENT, DELAYS AND COMPLETION**

3001. The Contractor shall commence work on the site within the period named in the Memorandum of the tender after the receipt by him of an order in writing to this effect from the Engineer and shall proceed with the same with due expedition and without delay and complete whole of the works within the period named in the Memorandum of the tender and the progress of the works should be as mentioned in the approved Programme of Works except maintenance of the works which shall be completed thereafter in the period named in the Memorandum.

3002. The shipment of the imported items shall be effected within the period named in the Memorandum of the tender provided the Employer has established confirmed and irrevocable letters of credit in favour of the foreign suppliers of the Contractor in time in accordance with the terms of the contract and the Contractor shall be responsible for any delay on the part of his suppliers.

3003. Should the rate of progress of work be at any time in the opinion of the Engineer/Consultant too slow to ensure the completion of the works by the prescribed time or extended time for completion the Engineer/Consultant may so notify the Contractor in writing and the Contractor shall thereupon take such steps as the Contractor may think necessary and the Engineer may approve to expedite progress so as to complete the works by the prescribed time or extended time for completion.

3004. If in the opinion of the Engineer the works be delayed:

- (a) by force majeure, or
- (b) by consequences whether direct or indirect of war hostilities (whether war be declared or not), invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war or disorder, or
- (c) by reason of any exceptionally inclement weather, or
- (d) by reason of civil commotion, local combination of workmen, strike or lockout affecting any of the trades employed upon the works, or
- (e) by reason of Engineer's instructions given in pursuance of clause 32 hereof, or
- (f) because the Contractor has not received in due time necessary instructions from the Engineer for which he shall have specifically applied in writing, or
- (g) by delay on the part of other contractors or tradesmen engaged by the Employer in executing work not forming part of this contract, or

the Contractor shall have been delayed or impeded or prevented whether by the Employer or otherwise howsoever in the completion of the works or any part thereof whether such delay or impediment, prevention occur before or after the time or extended time fixed for completion,

then provided the Contractor shall without delay have given to the Engineer notice in writing containing full and detailed particulars of his claim for an extension of time,

the Engineer shall on receipt of such notice but not otherwise grant to the Contractor from time to time in writing either prospectively or retrospectively such extension of the time fixed by the contract for the completion of the works or part thereof as may be reasonable. The Contractor shall do all that may reasonably be required to the satisfaction of the Engineer to proceed with the works.

3005. As soon as in the opinion of the Engineer the works shall have been substantially completed and shall have satisfactorily passed any final test that may be prescribed by the contract (excluding any ambient related (such as summer/winter) tests specified in the Memorandum which would be normally conducted during the period of maintenance), the Engineer shall, on receiving a written undertak-

ing by the Contractor to finish any outstanding work during the period of maintenance, issue to the Contractor a Certificate of Substantial Completion in respect of the works and period of maintenance of the works shall commence from the date of such certificate. Provided that the Engineer may give such a certificate with respect to any part of the works before the completion of the whole and shall upon the written application of the Contractor give such a certificate with respect to any substantial part of the works which has been both completed to the satisfaction of the Engineer and occupied or used by the Employer and when any such certificate is given in respect of part of the works, such part shall be considered as substantially completed and the period of maintenance of such part shall commence from the date of such certificate. Provided also that Certificate of Substantial Completion given in accordance with the foregoing provisions of any part of the works occupied and used as aforesaid shall not be deemed to certify completion of any ground or surfaces requiring reinstatement unless such certificate shall expressly so state.

3006. No certificate of completion shall be given nor shall the work be considered to be complete until the Contractor shall have removed from the premises on which the work has been executed all scaffolding, ladders etc., surplus materials and rubbish and cleaned off the dirt from those parts of the building where the work has been executed or of which he may have had possession for the purpose of the execution thereof, nor until the work shall have been measured and recorded by the Engineer's Representative and checked by the Engineer/Consultant which measurement shall be binding and conclusive against the Contractor. If the Contractor shall fail to comply with the requirements of this clause as to removal of scaffolding etc. and cleaning off the dirt on or before the date of completion of works the Engineer may at the expense of the Contractor remove and dispose off such scaffolding etc. and clean off such dirt as aforesaid and the Contractor shall forthwith pay to the Employer the amount of all expenses so incurred and the said amount shall be a debt due from the Contractor to the Employer, and the Contractor shall have no claim in respect of such scaffolding etc. and surplus materials as aforesaid except for any such actually realised by the sale thereof.

3007. Subject to the provisions of clause 35 hereof the Engineer shall issue to the Contractor Certificate of Final Completion of Works on satisfactory completion of the period(s) of maintenance and when the Contractor shall have fulfilled all his obligations for the works under the terms of the contract.

31. **SUSPENSION OF WORKS**

3101. The Contractor shall on the written order of the Engineer (herein referred to as a "Suspension Order") suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer. The extra cost including all wages to be paid on the site, salaries, depreciation and maintenance of plant, site and general overhead costs of the contract incurred by the Contractor in giving effect to any Suspension Order shall be borne and paid by the

Employer unless such suspension is:

- (a) otherwise provided for in the contract, or
- (b) necessary for the proper execution of the work, or
- (c) by reason of weather conditions (or conditions due to weather conditions) affecting the quality of the works, or
- (d) by reason of some default on the part of the Contractor, or
- (e) necessary for the safety of the works or any part thereof.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives notice in writing of his intention to claim to the Employer within fifteen days of the Suspension Order. The Engineer shall settle and determine such extra payment to be made to the Contractor in respect of such claim as shall in the opinion of the Engineer be fair and reasonable.

32. **VARIATIONS**

3201. The Contractor shall not make any variation in the works except in accordance with a written Variation Order.

3202. The Engineer may from time to time make any variation of the form, quality or quantity of the works or any part thereof as he may think necessary and for that purposes, by a written Variation Order may order the Contractor to do and the Contractor shall do any of the following:

- (a) Increase or decrease the quantity of any work included in the contract.
- (b) Omit any such work.
- (c) Change the character or quality or kind of any such work.
- (d) Change the levels, lines, position and dimensions of any part of the works.
- (e) Execute additional or substituted work of any kind necessary for the completion of the works.

3203. No Variation Order shall in any way vitiate or invalidate the contract but shall be taken into account in ascertaining the contract price.

3204. For the removal of doubt, it is declared that any increase or decrease of the estimated quantities set out in the Bill of Quantities ascertained by measurement in accordance with the provisions of clause 34 is not a variation within the meaning of this clause.

3205. The Engineer shall determine what adjustment (if any) of the contract price shall be made in respect of work done or omitted pursuant to a Variation Order. All such work shall be valued at the rates and prices set out in the Bill of Quantities or Schedules of Itemwise Prices and/or Item Rates if in the

opinion of the Engineer the same shall be applicable. If the Bill/ Schedules do not contain any rate or price applicable to such work, then suitable rates and prices based upon the rates and prices contained in the Bill/Schedules shall be agreed between the Engineer and the Contractor or in default of agreement shall be fixed by the Engineer.

3206. If, by reason of any Variation Order, the rate or price contained in the Bill of Quantities or Schedules of Itemwise Prices and/or Item Rates for any item, is in the opinion of the Engineer rendered unreasonable or inapplicable then a suitable rate or price based upon the rates and prices contained in the Bill/ Schedules shall be agreed between the Engineer and the Contractor or in default of agreement shall be fixed by the Engineer.

3207. No adjustment of the contract price under clause 3205 or variation of rate or price under clause 3206 shall be made unless as soon as practicable and not later than sixty days from the date of the Variation Order notice shall have been given in writing:

- (a) By the Contractor to be Engineer of his intention to claim extra payment or a varied rate or price, and
- (b) By the Engineer to the Contractor of his intention to vary a rate or price as the case may be.

33. **CLAIMS**

3301. The Contractor shall send to the Engineer after the end of each month an account containing full and detailed particulars of all sums (other than those included in the monthly statements submitted by the Contractor pursuant to clause 3601) to which the Contractor may consider himself to have become entitled during that month and no claim for payment of any such sum shall be allowed which has not been included in such particulars provided that the Engineer may authorise payment to be made in respect of any claim notwithstanding the failure of the Contractor to comply with this condition if the Contractor has at the earliest practicable opportunity notified the Engineer that he intends to make such claims.

34. **MEASUREMENTS**

3401. In case of contract awarded on item rate basis, the Contractor shall be paid on basis of the actual quantities executed by him ascertained by measurement in accordance with clause 3403 at the unit prices quoted by him as incorporated in the contract. The quantities set out in the Bill of Quantities are estimated quantities only and they shall not be taken as actual and correct quantities of work to be executed by the Contractor in fulfillment of his obligations under the contract.

3402. In case of contract awarded on lump sum cost basis, the quantities set out in the Schedule of Quantities are estimated quantities only and they shall not be taken as the actual and correct quantities of work to be executed by the Contractor in fulfillment of his obligations under the contract. The

Contractor shall be responsible for executing the complete works as specified and required in accordance with the contract. In such contract the operation of clause 3403 shall apply to "Variations" only.

3403. The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value of works in accordance with the contract. He shall, when he requires any work to be measured, give notice to the Contractor's Agent who shall forthwith attend or send a qualified agent to assist the Engineer or Engineer's Representative in making such measurements and shall furnish all particulars required by either of them. Should the Contractor not attend or neglect or omit to send such Agent, then the measurement made by the Engineer or approved by him shall be taken to be correct measurement of the work. For the purpose of measuring any work to be measured by records, the Engineer's Representative shall prepare records month by month of such work and the Contractor as and when called upon to do so in writing shall within fifteen days attend to examine and shall sign the same when so agreed and if the Contractor does not so attend to examine and agree with any such records they shall be taken to be correct. If after examination of such records the Contractor does not agree with the same or does not sign the same as agreed they shall nevertheless be taken to be correct unless the Contractor shall, within fifteen days of such examination lodge with the Engineer's Representative for decision by the Engineer notice in writing of the respects in which such records are claimed by him to be incorrect.

35. **MAINTENANCE AND DEFECTS**

3501. The expression "Period of Maintenance" shall mean the Period of Maintenance named in the Memorandum of the tender calculated from the date of substantial completion of the works certified by the Engineer in accordance with clause 3005 or in the event of more than one certificate having been issued by the Engineer under the said clause from the respective dates so certified.

3502. To the intent that the works shall at or as soon as practicable after the expiration of the period of maintenance be delivered upto the Employer in as good and perfect a condition (fair wear and tear excepted) to the satisfaction of the Engineer as that in which they were at the commencement of the period of maintenance, the Contractor shall execute all such work of repair, amendment, reconstruction, rectification, making good of defects, imperfection, shrinkages or other faults as may be required of the Contractor in writing by the Engineer during the period of maintenance or within thirty days after its expiration as a result of an inspection made by or on behalf of the Engineer prior to its expiration.

3503. All such work shall be carried out by the Contractor at his own expense if the necessity thereof shall in the opinion of the Engineer, be due to the use of materials or workmanship not in accordance with the contract or to neglect or failure on the part of the Contractor to comply with any obligation expressed or implied on the Contractor's part under the contract. If in the opinion of the Engineer such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for by the Employer as if it were additional work.

3504. During the period of maintenance the Contractor shall if required by the Engineer in writing search for the cause of existence of any defect, imperfection or fault under the directions of the Engineer. Unless such defect imperfection or fault shall be one for which the Contractor is liable under the contract, the cost of the work carried out by the Contractor in searching as aforesaid, shall be borne by the Employer. But if such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of clause 35 hereof.

3505. (a) The Contractor shall be responsible during the period of maintenance for remedying without undue delay any defects or faults which may develop under the conditions provided for in the contract and under proper use and arising from faulty materials or design or workmanship. If it becomes necessary, for the Contractor to replace or remove any defective part of the plant or equipment under this clause the provisions hereof shall apply to the parts so renewed or replaced. If the Contractor, when called upon to do so, fails to remedy such defects within a reasonable time, the Employer is empowered to instruct other parties to carry out the work at the expense of the Contractor.

(b) Such action by the Employer will not prejudice any other right which the Employer may have against the Contractor in respect of such defect.

3506. In the event of any defect occurring or being discovered in the works during the period of maintenance and due to faulty materials or design or workmanship supplied by the Contractor the period of maintenance shall continue until the cause of the defect has been discovered and remedied to the satisfaction of the Engineer.

36. **STATEMENTS, CERTIFICATES AND PAYMENTS**

3601. The Contractor shall submit to the Engineer after the end of each month a statement showing the estimated contract value of the equipment and materials delivered at site and works executed upto the end of the month and the Contractor will be paid monthly on the certificate of the Engineer, the amount due to him subject to a retention of the percentage named in the Memorandum of the tender until the amount retained shall reach the "limit of retention money" if any, named in the said Memorandum (hereinafter called the retention money) provided always that no monthly interim certificate shall be issued for less sum than that named in the Memorandum of the tender.

3602. One half of the retention money shall become due and shall be paid to the Contractor when the Engineer shall certify in writing in accordance with clause 3005, that the works have been substantially completed and the other half shall be paid to the Contractor thirty days after the expiration of the period of maintenance notwithstanding that at such time there may be outstanding claims by the Contractor against the Employer. Provided always that if at such time there shall remain to be executed by

the Contractor any works ordered during such period pursuant to clause 35 hereof the Employer shall be entitled to withhold payment until the completion of such works or so much of the second half of the retention money as shall in the opinion of the Engineer represent the cost of the works so remaining to be executed.

Provided further that in the event of different maintenance periods having become applicable to different parts of the works pursuant to clause 30 hereof the expression "expiration of the period of maintenance" shall for the purpose of this clause be deemed to mean the expiration of the latest of such periods.

3603. The Consultant shall verify the monthly bill submitted by the Contractor for interim payments and the Engineer's Representative shall take the requisite measurements for the purpose of verification of the bill. The Consultant shall verify the bill within fifteen days from the receipt of the bill along with requisite measurements. The Consultant shall make necessary adjustments in the bill.

3604. The Contractor shall submit all bills on the form prescribed by the Engineer and which can be obtained on application from the Engineer's Representative. The bills shall be prepared in quadruplicate in the name of the Employer and submitted to the Consultant for scrutiny and verification and onward transmission to the Engineer with their payment certificate.

3605. The Engineer/Consultant may by any certificate make any correction or modification in any previous certificate which shall have been issued by him and shall have power to withhold any certificate if the works or any part thereof are not being carried out to his satisfaction. The Engineer/Consultant shall also have powers to make adjustments by deductions for any correction or modification in any previous certificate from the subsequent bills.

3606. All intermediate payments against monthly certificates shall be regarded as payments by way of advance against the final payment only and not as payment for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the contract or any part thereof in any respect or the accruing of any claim nor shall it conclude, determine or affect in any way the powers of the Engineer under the contract or any of them as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the contract.

3607. The Contractor shall give in his tender firm price for the supply of equipment and materials (free delivery at site) and the cost of manufacture, fabrication, construction, assembly, installation, completion, testing, commissioning, adjusting, maintenance, etc. to complete the works in working order in all respects.

3608. The contract for the works shall be either on item rate basis or on lump sum cost basis as specified in the tender documents. The Contractor shall fill in the rates and prices in the Bill of Quantities or

Schedule of Item wise Prices and Schedule of Item Rates and submit the same along with his tender for reference for making progressive payments against running bills to be submitted by the Contractor.

3609. No claim from the Contractor on account of fluctuations in the market rates will be entertained during the currency of this contract for any item of work executed under this contract.

3610. The final bill shall be submitted by the Contractor within two months of the completion of the works unless otherwise allowed by the Engineer. Failing the submission of the final bill the work will be got measured by the Engineer at the expense of the Contractor and the measurement so taken will be binding on the Contractor.

3611. The amount due to the Contractor under any certificate issued by the Engineer pursuant to this clause or to any other term of the contract shall be paid by the Employer to the Contractor within thirty days after such certificate has been delivered to the Employer.

3612. The payments due to the Contractor will be made either by credit to his account with his Bank or direct to him.

3613. Import of Equipment and Materials by the Employer.

(a) If specified in the Bill of Quantities or Schedule of Item wise Prices, the Employer may opt to import some equipment and materials on his own import license. The Contractor shall give his minimum C&F Pakistan Port prices for such items in foreign currencies in his tender.

(b) On award of the work the Contractor shall submit C&F cost proforma invoices in foreign currencies and supporting documents to the Employer thru the Engineer subject to the maximum of the foreign exchange amount quoted in his tender, to enable the Employer to establish irrevocable letters of credit confirmed by respective foreign Banks in favour of each foreign Manufacturer/ Supplier of the Contractor.

(c) The payment shall be made to the foreign Manufacturer/ Supplier by the Bank on production of the following negotiable documents for each shipment:

(1) Original invoice showing item wise prices.

(2) Manufacturer/Supplier's Guarantee/Warranty as specified in the Special Conditions of Contract.

(3) Packing List, bill of lading, receipt for ocean freight and other relevant shipping documents.

(d) The Contractor shall supply at least five complete sets of non-negotiable shipping documents to the Employer for each shipment well before the arrival of the ship at Pakistan Port to enable the Employer to take necessary action for arranging insurance and clearance of the consignment.

(e) The Employer shall arrange the insurance of the imported items from

Manufacturer/Supplier's warehouse to site, clearance of the consignments at Pakistan Port and delivery to site at his cost. The Employer shall pay import license fees, all Bank charges, insurance premiums, import duty and surcharges, sales tax, Port Trust charges, octroi charges or any other Federal, Provincial or local surcharge, tax or levy etc. for the imported items.

(f) The Contractor shall assist the Employer for the insurance survey of the consignments. He shall inspect the consignment jointly with the Insurance Surveyor and Engineer's Representative and immediately send to the Employer and Engineer a report regarding the loss and/or damage to any item and the cost of replacement and/or repair thereof.

(g) The Employer shall hand over the imported items to the Contractor at site for completing the works. The Contractor shall be responsible for careful storage and consumption of these items and he will be responsible for any loss or damage thereto. All surplus items on completion of the work shall be handed over to the Employer by the Contractor. The Contractor shall also hand over all packing materials to the Employer. The Contractor shall maintain complete account of the receipt and consumption of the imported items handed over to him and submit the same to the Engineer for verification.

(h) The shipping period as required by the Employer and confirmed by the Contractor in his tender shall be the essence of the contract and any delay will be to the Contractor's account. The Employer shall normally establish the letters of credit within one month of the receipt of the necessary documents from the Contractor duly approved by the Engineer and in case of any delay on the part of the Employer, the period beyond one month shall be added to the shipment period specified in the contract.

37. **INCOME TAX AND REIMBURSEMENTS**

3701. The Contractor shall be responsible for the payment of all Pakistan income tax, super tax and other taxes on income arising out of the contract and the rates and prices stated in the priced tender, Bill of Quantities and Schedules of Item wise Prices and Item Rates shall be deemed to cover all such taxes.

3702. The Contractor shall pay directly royalties, rent and other payment or compensation (if any) for getting any materials, plant, equipment, tools and instruments required for the works or temporary works.

3703. Any element of Federal, Provincial or local duty or tax inherent in the price of locally procured items required for the works or temporary works shall be deemed to be included in the rates and prices stated in the priced tender, Bill of Quantities and Schedules of Item wise Prices and Item Rates and will not be separately reimbursable.

38. **INSURANCES**

3801. **INSURANCE OF WORKS, ETC. - CONTRACTOR'S ALL RISK POLICY**

A. Without limiting his obligations and responsibilities under the contract, the Contractor shall insure in the joint names of the Employer and the Contractor against all loss or damage from whatever

cause arising, other than the excepted risks, for which he is responsible under the terms of the contract and in such manner that the Employer and Contractor are covered for the period of contract and are also covered during the period of maintenance for loss or damage arising from a cause, occurring prior to the commencement of the period of maintenance, and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations for rectification of defects during the period of maintenance.

(a) The works for the time being executed to the estimated current contract value thereof with the materials for incorporation in the works at their replacement value including the replacement cost of all material supplied by the Employer whether at a price or free.

(b) The Constructional plant and other things brought on the Site by the Contractor at the replacement value of such constructional plant and other things.

(c) The temporary works.

B. Such insurance shall on behalf of the Contractor be taken out by the Employer meeting with all the requirements of the Contractor's All Risk Policy approved by the Employer. The premium of all such policies shall be paid by the Employer on behalf of the Contractor to the Insurance Co. and the cost of taking out such Policies shall be deducted from the Contractor's Bills. However, the Contractor shall be responsible for all such insurance and risks as per Clause 1501, 1301, 1401, 1402 and 1601 for which the Policies shall be taken out by the Employer on Contractor's behalf.

3802. DAMAGE TO PERSONS AND PROPERTY

A. The Contractor shall indemnify and keep indemnified the Employer and the Consultant against all losses and claims for injuries or damage to any person or any property whatsoever, which may arise out of or in consequence of the construction and maintenance of the works and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to injuries or damage to persons in the adjoining properties or the said properties which are the unavoidable result of the execution or maintenance of the works in accordance with the contract.

B. The Contractor is not allowed to claim any personal liability for or with regard to any matter or thing which can be made binding hereby for the Employer, Employer's Representative or the Consultant from either the Employer, Employer's Representative nor from the Consultant or from any of his staff.

C. In the event of any claim being made against the Employer in respect of any matter for which the Contractor is liable under this Clause, the Employer or the Consultant's Representative shall promptly notify the Contractor, who shall at his own expense undertake all negotiations in connection with such claims and any litigation that may arise therefrom.

3803. The Employer will save harmless and indemnify the Contractor from and against all claims, demands, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the proviso to clause 3802 hereof.

3804. **THIRD PARTY INSURANCE**

A. Before commencing the execution of the Works the Contractor, but without limiting his obligations and responsibilities under Clause 13 hereof, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the Employer, or to any person, including any employee of the Employer by or arising out of the execution of the Works or in the carrying out of the Contract, otherwise than due to the matters relating to adjoining properties referred to in the provision to Clause 13 hereof.

B. **Minimum Amount Of Third Party Insurance**

Such insurance shall be effected with an insurer and in terms approved by the Employer, and for at least the amount stated in the Memorandum of the Tender.

C. **Provision To Indemnify Employer**

The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the Employer and Consultant, the insurer will indemnify the Employer and the Consultant against such claims and any costs.

D. The Employer, shall on behalf of the Contractor take out these Insurance Policies and shall pay the Insurance Premium to the Insurance Co. This cost would be deducted from the Contractor's Bills.

The insurance that Contractor shall maintain in accordance with Clause 1401 and 1402 shall include, but not limited to the following:

(a) Comprehensive General Bodily Injury Liability Insurance.

(b) Broad form Property Damage Liability Insurance, including adjoining properties and existing factory premises.

(c) Automobile Bodily Injury and Property Damage Liability Insurance.

3805. **INSURANCE AGAINST ACCIDENT, ETC. TO WORKMEN**

A. The Contractor shall insure against such liability with an insurer approved by the Employer, and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall, when required, produce to the Employer or the Consultant or the Employer's Representative, such policy of insurance and the receipt for payment of the current premium. Provided that if the Contractor fails to take out such a policy or keep it in force, the Employer shall take out such a policy on behalf of the Contractor and pay all premiums and the cost of taking out such a policy shall be deducted

from the Contractor's Bills.

B. The Contractor (or his sub-contractor where applicable) shall effect insurances referred to in clauses 3801, 3804 and 3805 hereof or any other insurances required under the contract with an insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) and the Contractor (or his sub-contractor) shall whenever required produce to the Employer the policy or policies of insurance and the receipts for payment of current premiums.

C. If the Contractor shall fail to effect and keep in force the insurances referred to in clauses 3801, 3804, and 3805 hereof or any other insurances which he may be required to effect under the terms of the contract then and in any case the Employer may effect and keep in force any such insurance(s) and pay such premium(s) as may be necessary for that purpose and from time to time, deduct the amount so paid by the Employer as aforesaid from any moneys due or which become due to the Contractor or recover the same as debt due from the Contractor.

39. **SPECIAL RISKS**

3901. Notwithstanding anything in the contract contained, the Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of destruction of or damage to the works (save to work condemned under the provisions of clause 2906 prior to the occurrence of any special risk hereinafter mentioned) or temporary works or to the property whether of the Employer or third parties or for the consequences whether direct or indirect of war hostilities (whether war be declared or not), invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war or (otherwise than among the Contractor's own employees) riot, commotion or disorder (hereinafter comprehensively referred to as the "special risks") and the Employer shall indemnify and save harmless the Contractor against and from the same and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising thereout or in connection therewith and shall compensate the Contractor for any loss of or damage to the property of the Contractor used or intended to be used for the purpose of the contract (including property in transit to the site) and occasioned directly by special risks and for the purpose of this clause, the expression "property of the Contractor" shall include any constructional plant brought on to the site by the Contractor.

3902. If during the currency of the contract there shall be an outbreak of war which whether financially or otherwise materially effects the performance of the contract, the Contractor shall, unless and until the contract is terminated under the provision in this clause contained, use his best endeavours to complete the contract provided always that the Employer shall be entitled at any time after such outbreak of war to terminate the contract by giving notice in writing to the Contractor and upon such notice being given, the contract shall (save as to the rights of parties under this clause and the operation of clause "Settlement of Disputes" hereof) terminate.

3903. If the contract shall be terminated under the provisions of clause 3902 hereof, the Contractor shall be paid by the Employer (in so far as such amounts or items shall not have already been covered by payments on account made to the Contractor) for all work executed prior to the date of termination at the rates and prices provided in the contract and in addition:

- (a) The amounts payable in respect of any preliminary items so far as the work or service comprised therein has been carried out or performed.
- (b) The cost of materials or goods reasonably ordered for the works or temporary works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such material or goods becoming the property of the Employer upon such payment being made by him.
- (c) A sum to be certified by the Engineer being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the works in so far as such expenditure shall not have been covered by the payments otherwise in the clause 3903 hereof.

3904. Provided always that against any payments due from the Employer under the clause 3903 hereof the Employer shall be entitled to be credited with any outstanding balance due from the Contractor and any other sums which at the date of termination were recoverable by the Employer from the Contractor under the terms of the contract.

40. **TRAINING OF EMPLOYER'S PERSONNEL**

4001. The Contractor shall make suitable arrangement at his own cost to train the operational and maintenance staff of the Employer during the installation and maintenance period at site, his office and workshop. The Contractor shall if so desired by the Employer, also arrange training facilities at his Manufacturers/Suppliers' offices and factories from whom the equipment and materials for the works are procured without any charge to the Employer for the training facilities, except for salaries, travelling and living expenses of the Employer's personnel which expenses shall be borne by the Employer.

41. **REMEDIES AND POWERS**

4101. If the Contractor shall become insolvent or have an order admitting a petition in insolvency made against him or shall present his petition in insolvency or shall make an arrangement with or assignment in favour of his creditor or shall agree to carry out the contract under a committee of inspection of his creditors or (being a corporation) shall go into liquidation (other than voluntary liquidation for the purposes of amalgamation or reconstruction) or if the Contractor shall assign the whole of the contract or any part thereof without the consent in writing of the Employer first obtained or shall have an execution levied on his goods or if the Engineer shall certify in writing to the Employer that in his opinion the Contractor:

- (a) has abandoned the contract, or

- (b) without reasonable excuse has failed to commence the works or has suspended the progress of the works for fourteen days after receiving from the Engineer written notice to proceed, or
- (c) has failed to proceed with the works with due diligence, or
- (d) has failed to remove materials from the site or to pull down and replace work for fourteen days after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer, or
- (e) is not executing the works in accordance with the contract or is persistently or flagrantly neglecting to carry out his obligations under the contract, or
- (f) has to the detriment of good workmanship or in defiance of the Engineer's instructions to the contrary sub-let whole or any part of the contract,

then the Employer may after giving fourteen days notice in writing to the Contractor enter upon the site and expel the Contractor without releasing the Contractor from any of his obligations or liabilities under the contract or effecting the rights and powers conferred on the Employer or the Engineer by the contract and the Employer may himself complete the works or may employ any other contractor to complete the works and the Employer or such other contractor may use for such completion so much of the constructional plant, temporary works and materials which have been brought at site by the Contractor as the Employer or such other contractors may think proper and the Employer may at any time sell any of the said constructional plant, temporary works and unused materials and apply the proceeds of sale in or towards the satisfaction of the sums due or which may become due to him from the Contractor under the contract.

4102. The Engineer shall as soon as may be practicable after such entry and expulsion by the Employer, fix and determine and shall certify what amount (if any) had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the contract and what was the value of any unused or partially used materials, any constructional plant and temporary works which have been taken over by the Employer on the site under clause 4101 hereof.

4103. If the Employer shall enter and expel the Contractor under this clause the Employer shall not be liable to pay to the Contractor any money on account of the contract until the expiration of the period of maintenance and thereafter until the costs of completion and maintenance, damages for delay in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums (if

any) as the Engineer may certify would have been due to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him then the Contractor shall upon demand pay to the Employer the amount of such excess and it shall be recoverable by the Employer as a debt due from the Contractor accordingly.

4104. The Contractor shall if so required by the Employer or Engineer within fourteen days of any of the events referred to in clause 4101 hereof assign to the Employer without further payment the benefit of any agreement for the supply of materials and/or for the execution of any works for the purpose of this contract but on the terms that a supplier or Sub-Contractor shall be entitled to make any reasonable objection to any further assignment thereof by the Employer and the Employer may pay the supplier or sub-contractor for any such materials supplied or works executed under such agreement (whether the same be assigned as aforesaid or not) before or after the said determination the amount due by such agreement in so far as it has not already been paid by the Contractor.

4105. If the Contractor shall fail duly to observe or perform any requirement instruction direction or order of the Engineer duly made or given in accordance with the contract or shall otherwise fail to fulfil any obligation imposed upon him by the contract the Employer may without prejudice to any other rights or remedies he may have, himself or by his servants or agents remedy such default and all expenses consequent thereon or incidental thereto shall be borne by the Contractor and shall be recoverable from him or may be deducted by the Employer from any moneys due or which may become due to the Contractor.

4106. In any case in which any of the powers conferred upon the Employer or the Engineer by clause 41 hereof shall have become exercisable and the same shall not be exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such power shall notwithstanding be exercisable in the event of any future case of default by the Contractor, for which the Contractor shall have rendered himself liable to pay compensation and liability of the Contractor for past and future compensation shall remain unaffected.

4107. In the event of any of the above courses being adopted by the Employer or the Engineer, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account of or with a view to the execution of the works or the performance of the contract.

42. **ISSUE OF NOTICES**

4201. Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by registered post to or delivering the same at the Contractor's principal office.

4202. Any notice to be given to the Employer under the terms of the contract shall be served by sending the same by registered post to or delivering the same at the Employer's principal office.

4203. Any notice to be given to the Engineer under the terms of the contract shall be served by

sending the same by registered post to the Engineer's office.

43. **CONSTRUCTIONAL PLANTS**

4301. The Employer shall permit the Contractor the exclusive use of all constructional plants, temporary works and materials brought to the site by the Contractor in and for the execution, completion or maintenance of the works until the occurrence of any event which gives the Employer the right to exclude the Contractor and proceed with the completion of the works without him.

4302. The Contractor shall not remove any constructional plant, temporary works or materials or any part thereof from the site without the written consent of the Employer (which consent shall not be unreasonably withheld) when the same is no longer immediately required for the purpose of execution or completion of the works.

4303. If the Contractor fails to remove any constructional plant, temporary works or materials within such reasonable time after completion of the works as may be granted to him by the Engineer, then the Employer may:

- (a) Sell by auction or private sale any such constructional plant, temporary works and materials as aforesaid on account of the Contractor at his risk, and
- (b) Return at the Contractor's expense and risk any hired plant or hire purchased plant to the person from whom the same was hired by the Contractor,

and after deducting, from any proceeds of sale the costs, charges and expenses of and in connection with such sale and in connection with return as aforesaid, shall pay the balance (if any) to the Contractor but to the extent that the proceeds of any sale are insufficient to meet all such costs, charges and expenses, the excess shall be deducted from any moneys due or which may become due to the Contractor or recover the same as a debt due from the Contractor. Any receipts and the certificates from the Engineer as to the expenses of any such return and the amount of proceeds and expenses of any such sale shall be final and conclusive against the Contractor.

4304. The Employer shall not, at any time, be liable for the loss or injury to any of the constructional plants, temporary works or materials which have been brought to the site by the Contractor.

4305. The Contractor shall, when entering into any sub-contract, incorporate in such sub-contract (by reference or otherwise), the provisions of this clause in relation to the constructional plants, temporary works and materials brought to the site by the sub-contractor in such a manner that the Employer shall have the same rights in respect thereof as if these were brought at site by the Contractor.

44. **GENERAL**

4401. If the Contractor or any of his sub-contractor agent or servant shall offer or give or agree to offer or give to any person any bribe, gift, gratuity or commission as an inducement grant or reward for doing or forbearing to do any action in relation to the contract or any other contract with the Employer or for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other

contract with Employer then the Employer may enter upon the site and expel the Contractor therefrom and the provisions of clause 41 hereof shall apply as if such entry and expulsion had been made pursuant to that clause. Notwithstanding, the Contractor shall indemnify the Employer against any liability resulting from such bribes, gifts, gratuities or commissions made or attempted by the Contractor or any of his sub-contractors agents or servants.

4402. Subject to any provision to the contrary contained in the contract, none of the permanent work shall save as hereinafter provided be carried out during the night, or on Sundays or Public holidays without notification by the Contractor in writing to the Engineer and Engineer's Representative. If the Contractor in order to keep his programme of work as set in clause 09 hereof requires to carry on the work during night or on Sundays or Public holidays which he shall do at his entire expenses and risk without claiming any compensation or additional payment, he shall notify to the Engineer and Engineer's Representative the period during which he intends to do so to enable the Engineer's Representative to arrange proper supervision. Due to the weather conditions or to maintain continuity of the work, the Engineer's Representative may require the work to be continued during night or on Sundays or Public holidays and the Contractor shall make suitable arrangements in this respects without claiming any compensation or additional payment.

4403. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of the Employer without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

4404. In the case of a tender by partners, no change in the constitution of the firm shall be effected nor a new partner shall be added therein without the written approval of the Employer.

4405. The Contractor shall correspond with the Employer whenever necessary, through the Engineer.

4406. The Contractor shall save harmless and indemnify the Employer from against all claims and proceedings for or on account of infringement of any patent rights, designs, trade-mark or name or other protected rights in respect of any plant, machine, equipment, work or material used for or in connection with the works or temporary works or any of them and from and against all claims demands proceedings damages costs charges and expenses whatsoever in respect thereof or in relation thereto.

45. **SETTLEMENT OF DISPUTES**

4501. All questions and disputes between the parties to the contract other than those in which the decision certificate and/ or opinion of any person is expressed by the contract to be final and conclusive, shall be referred to the arbitration and final decision of a single arbitrator agreed and appointed by both the parties, or in case of disagreement, to the arbitration of two arbitrators one to be appointed by each party which arbitrators shall before proceeding with the reference, appoint an umpire.

4502. The arbitrator, the arbitrators, or umpire shall have power to open up, review and revise any certificate, opinion, decision, requisition or notice save in regard to the accepted matters referred in clause 4501 hereof, and to determine all matters in dispute which shall be submitted to him or them and of which notice shall have been given, and his/their award shall be final, conclusive and binding on the parties.

4503. Unless the parties otherwise agree such reference shall not take place until after the substantial completion or abandonment of the works or determination of the contract.

4504. The provisions of Arbitration Act 1940 and any statutory modification thereof and rules framed thereunder shall be deemed to apply to and be incorporated in this contract.

4505. The cost of every reference and award respectively shall be in the discretion of the arbitrator or arbitrators or the umpire, who shall determine the amount thereof, and shall direct by whom and to whom and in what manner the same shall be borne and paid.

4506. Reference to the Employer for arbitration shall be made in writing by the Contractor specifying clearly all such questions and disputes not later than three months after the completion of the works. Failure to make such a reference shall be deemed that the Contractor has waived all claims in this respect. The parties shall appoint the arbitrator/arbitrators within two months of such reference being made.

4507. The Employer and the Contractor hereby also agree that an arbitration under this clause shall be condition precedent to any other action at law. The venue of arbitration and any other action shall be the city named in the Memorandum of the tender.

46. **MOBILIZATION ADVANCE**

4601. The Employer at his sole discretion may allow advance payment of a sum of money as Mobilization Advance to the Contractor for the procurement and transport of Plants, Equipment and materials required for the works (inclusive of any temporary works). The decision of the Employer regarding non-payment or payment and the amount thereof shall be final and conclusive. The Employer shall recover the amount of the Mobilization Advance paid to the Contractor by proportionately deducting the same in installments, number to be fixed by the Employer, from the payments due to the Contractor against the running bills submitted by the Contractor and verified by the Engineer.

4602. The Contractor shall furnish an irrevocable and confirmed Bond, specimen annexed in the tender documents, from a scheduled Bank for the amount of the Mobilization Advance so that in case of any default by the Contractor as determined by the Engineer whose decision shall be final and conclusive in this respect, the Guarantor shall forthwith pay the outstanding amount of the Mobilization Advance to the Employer on demand and without any reference to the Contractor.

4603. The Employer at his sole discretion may allow the Contractor to furnish such a Bond from an approved Insurance Company instead of a scheduled Bank and the decision of the Employer shall be final and conclusive in this respect.

47. **PRICE VARIATIONS**

4701. Notwithstanding anything to the contrary stated in these conditions, the Employer may at his sole discretion allow variation (increase or decrease) in the prices and rates contained in the priced Bill of Quantities and Schedules of Itemwise Prices, Item Rates and Labour Rates provided the Engineer certifies that there has been a variation in any of the taxes, duties or charges leviable on any plant, equipment and materials required for the works by an act, rule or regulation (hereinafter collectively referred as "State Acts") of Federal or Provincial Governments or any Local Body or duly constituted Authority within Pakistan (hereinafter collectively referred as "State Bodies") or there has been a variation by a State Act in the basic wages or allowances or benefits payable to the labour or charges or contributions payable to any State Body by the Contractor. The variation may be made as a percentage of the relevant price or rate included in the contract or as a lump sum. The decision of the Employer shall be final and conclusive.

4702. The Contractor shall within a reasonable time of his becoming aware of any variation in the prices or rates due to a State Act, give notice thereof in writing to the Engineer stating that the same is given pursuant to this clause together with all information relating thereto to support his claim.

4703. The variation allowed by the Employer in prices or rates shall reflect the actual amount of variation payable by the Contractor and shall not include any profit margin or markup by the Contractor on the amount of the variation.

4704. The Contractor shall, for the purpose of this clause, keep such books of accounts and other documents as are necessary to show the amount of any increase claimed or any reduction available and shall allow inspection of the same by authorised representative of the Employer or Engineer and furnish any documents which the Employer or Engineer may require to verify his claim.

4705. Provided always that any increase so payable is not in the opinion of the Engineer, whose decision shall be final and conclusive, attributable to delay in the execution of the works by the Contractor.

4706. Notwithstanding any claim lodged by the Contractor for increase in prices or rates under this clause, the Contractor shall proceed diligently with execution of the works and complete it within the contract time prescribed by clause 30 hereof.

48. **SAFETY AND PROTECTIVE MEASURES**

4801. The Contractor shall take necessary and reasonable precautions to reduce and minimise

the risk of injury to or loss of life of personnel in the execution of work. He shall comply with all applicable government safety and security laws, regulations and Ordinances as well as LUMS safety guide for contractors employees which is treated as part of the contract agreement.

4802. The Contractor shall furnish and issue approved safety helmets to all workmen and authorized personnel during the course of hazardous construction of all types, and safety goggles, belts, gloves and shoes whenever required.

4803. The Contractor shall provide for the handling of Gas cylinders and all other materials equipment in a manner that will not be dangerous to the health and safety of personnel. Cranes and Hoists to be used at Site should have the current test certificates available for inspection.

4804. The Employer's/Consultant's Representative may order immediate stoppage of work if in his opinion adequate safety measures have not been taken and if there is a danger to human life or injury and to works and adjoining properties. No compensation in terms of amount and time for such delays or loss if incurred shall be made to the Contractor.

4805. The Contractor shall provide well equipped First Aid Kits, duly approved by the Consultants Representative, to render first aid in case of any accidents or any other cause involving injury to any workmen. The Contractor shall have on site at least one man who is well experienced in giving first aid treatment. The cost of maintenance and giving first aid treatment shall be borne by the Contractor.

4806. Whenever in the opinion of the Consultant's Representative it is necessary for the protection of other personnel, the Contractor shall remove any of his employees found to be suffering from a contagious disease, either to hospital or permanently away from the Site area. Any contagious disease, when discovered, shall be immediately reported to the Consultant's Representative. The Contractor if required by the Consultant's Representative shall subject all his employees to regular medical examination and produce satisfactory evidence of their being free from any contagious diseases.

49. **PROTECTION & COVERING UP**

4901. The Contractor shall properly cover up and protect until taken over by Employer any section or portion of the Works liable to damage or injury by exposure to the weather and shall take every reasonable precaution to protect any section or portion of the Works not taken over by Employer against damage from any cause. The protection & covering up not only includes his works but also those of the nominated sub-contractors or specialist contractors.

4902. All damages to any section or portion of the works that shall not have been taken over by Employer which shall arise from or be occasioned by any act of the Contractor or his nominated Sub-

Contractor, or by failure of the Contractor to comply with any obligation imposed on him, shall be made good by and at the sole cost of the Contractor to the satisfaction of the Employer/ Consultant failing which Employer/Consultant shall have option to get all such works done at the cost of Contractor through other agency or agencies.

4903. The Contractor shall before all the works have been taken over indemnify the Employer in respect of all damage or injury occurring to any person or to any property (other than property forming part of the works) and against all actions, suits, claims, demands, costs, charges and expenses arising in connection therewith which shall be occasioned by the negligence of the Contractor or any Sub-Contractor, or by defective design (other than a design made, furnished or specified by the Employer and for which the Contractor has disclaimed responsibility in writing within a reasonable time after the receipt of the Consultant's instructions), materials or workmanship but not otherwise.

4904. If while the Contractor is on the site for the purpose of making good a defect, there shall occur any damage or injury to the works or to any other property or to any person, the Contractor's liability in respect thereof shall be the same as if the said damage or injury had occurred before any part of the works had been taken over.

4905. In respect of personal injury or damage to property conferring on a person other than the Employer the liability of the Contractor to the Employer for any such act or default shall not exceed the Contract price.

4906. In the event of any claim being made against the Employer arising out of the matters referred to in and in respect of which the Contractor is liable under this Clause, the Contractor shall be promptly notified thereof and may at his own expense conduct all negotiations for the settlement of the same and any litigation that may arise thereof, the Employer shall not unless and until the Contractor shall have failed to take over the conduct of the negotiations or litigation make any admission which might be prejudicial thereto. The conduct by the Contractor of such negotiations or litigation shall be conditional upon the Contractor having first given to the Employer such reasonable security and shall from time to time be required by the Employer to cover the amount ascertained or agreed or estimated as the case may be, of any compensation, damages, expenses and costs for which the Employer may become liable. The Employer shall at the request of the Contractor, afford all reasonable assistance for any such purpose. The Contractor shall indemnify the Employer against all actions, suits, claims, amends, costs or expenses arising in connection with injuries (other than such as may be attributable to the Employer his agents or servants) suffered by persons employed by the Contractor or his Sub-Contractors on the Works, whether at common Law or under

any Statutes in force at the date of the Contract dealing with the question of the liability of Employer for injuries suffered by employees.

50. **CONSTRUCTION SITE**

5001. Within the area, which is defined as the Site the Contractor shall carry out and perform the construction of the works, and subject to the approval of the Employer will be permitted to construct temporary buildings and works, which he may require for the construction of the works. If the Contractor wishes to use other land for camps or for other contract purposes, the Contractor shall make all necessary arrangements thereof and shall pay all rentals or other costs connected therewith.

The Site of the factory premises is however to be kept as clear as possible, to facilitate rapid progress of the work and no employees of the Contractor, unless authorised by the Employer/Consultant will be permitted to live on the site.

ANNEXURES

A. SPECIMEN OF TENDER EARNEST MONEY GUARANTEE

KNOW ALL MEN BY THESE PRESENTS that ----- (name and address) ----- (hereinafter called the "Tenderer" which expression shall include its successors and permitted assigns) and ----- (name and address) ----- (hereinafter called the "Guarantor" which expression shall include its successors and assigns) are jointly and severally held firmly bound in the sum of Rs.----- (Rupees----- only)

to ----- (name and address) ----- (hereinafter called the "Employer" which expression shall include its successors, assigns and legal representatives).

WHEREAS the Tenderer has submitted the accompanying Tender dated ----- for ----- (hereinafter called the "works") to the said Employer, and

WHEREAS the Employer has required as a condition for considering the said tender that the Tenderer deposit with the Employer either by a Pay Order or Demand Draft of a scheduled Bank in favour of the Employer or by a confirmed and irrevocable Guarantee (Bond) for an amount of Rs.----- (Rupees----- only)

conditioned that in the event of failure of the Tenderer to abide by his Tender for a period of ----- days from ----- (date of opening of Tender) ----- and if the Tender is accepted to execute the Contract Agreement for the said works and furnish the required Performance Bond, the entire sum becomes payable immediately to the Employer as liquidated damages and not as penalty for the Tenderer's failure to perform.

NOW THE CONDITIONS OF THE above written Bond are such that:

1. If the Tenderer fails to abide by his Tender for the period mentioned and if the Tender is accepted by the Employer then the Tenderer fails to sign the Contract Agreement and provide a Performance Bond within ----- days of being requested to do so in accordance with the conditions of tendering, the Guarantor hereby unconditionally and irrevocably undertakes to pay forthwith the sum of Rs.----- (Rupees----- only) to the Employer within three days after a demand is made by the Employer without any question and without any reference of any nature whatsoever to the Tenderer and irrespective of any dispute existing between the Tenderer and the Employer in respect of the acceptance or rejection of the Tender and irrespective of the pendency of any dispute before any Arbitrator or in any Court of Law.

2. In the event of the Tenderer fulfilling the aforesaid obligations as certified by the Engineer who will be the sole and exclusive judge in this respect, this Guarantee will come to an end as the purpose would have

been served.

3. The certificate of the Engineer that the Tenderer has failed to comply with the conditions or any of them herein mentioned shall be final, conclusive and binding on all the parties and the Employer will be entitled to demand forthwith from the Guarantor the aforesaid sum on the issuance of the said certificate.

4. That the liability of the Guarantor shall not be discharged until such time that a release has been granted to the Guarantor in writing under the signature of the Engineer.

5. That the liability of the Guarantor shall not be affected at any time by any forbearance or indulgence being given to the Tenderer or by his death or insolvency.

6. That the payment under this Bond shall be made by the Guarantor in the name of the Employer and a receipt issued by the Employer shall discharge the Guarantor from his liability to the Employer under this Bond.

7. That any notice or demand under this Bond may be made by the Employer and may be left at the Guarantor's address mentioned herein or at any changed address as may be communicated by the Guarantor to the Employer in writing against receipt of the Employer, or the said notice of demand may be sent by registered post to the Guarantor addressed as aforesaid and shall be deemed to have been given at the time when it should have been delivered in due course of post and a certificate signed by the Employer that the envelope containing the notice was posted shall be conclusive.

8. This Bond shall remain in force upto ----- for the amount of Rs.----- (Rupees -----
-----only).

IN WITNESS WHEREOF the Guarantor and the Tenderer have signed and sealed this Bond on this -----
----- day of -----.

Signed, sealed and delivered
by -----

Signed, sealed and delivered
by -----

for and on behalf of

(Guarantor)

for and on behalf of

(Tenderer)

in the presence of

(name and designation)

in the presence of

(name and designation)

B. FORM OF CONTRACT AGREEMENT

THIS AGREEMENT made and entered at ----- on this ----- day of ----- by and between -----(name and address)----- (hereinafter called the "Employer" which expression shall include its successors, assigns and legal representatives) of the one part and ----- --- (name and address) ----- (hereinafter called the "Contractor" which expression shall include its successors, legal representatives and permitted assign) of the other part.

WHEREAS the Employer is desirous for the manufacture, supply, assembly, construction, installation, completion, testing, commissioning, adjusting, balancing and maintenance of certain works, viz., -----

(hereinafter called the "works") and has caused his Authorized Engineer, (hereinafter called the "Consultant/Designer") to prepare specifications, schedules, and drawings detailing and describing the works.

WHEREAS, under the procedure, tenders have heretofore been received by the Employer for the works and the tender of the Contractor for the works has been accepted by the Employer.

NOW THEREFORE, for and in consideration of the promises, covenants, agreements hereinafter contained and to be performed by the parties hereto, the said parties hereby covenant and agree as follows.

1. In this Agreement words and expressions shall have the same meaning as are respectively assigned to them in the General Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and be read and constructed as part of this Agreement, viz.,

- (a) The said Tender No.----- dated ----- and Memorandum, as amended herein.
- (b) The General Conditions of Contract.
- (c) The Special Conditions of Contract.
- (d) The Specifications.
- (e) The Drawings.
- (f) The Schedule of Itemwise Prices.
- (g) The Schedule of Quantities.
- (h) The Schedule of Item Rates.
- (i) The Schedules of labour rates and working hours.

- (j) The Instructions to Tenderers.
- (k) Addenda Nos. (if any).
- (l) The letter of Award of Work No.----- dated ----- and all related correspondence mentioned therein.
- (m) -----

3. In consideration of the covenants and agreements to be kept and performed by the Contractor, and for the faithful performance of this contract, and the completion of the works embraced therein, according to the specifications, drawings and conditions herein contained and referred to, the Employer shall pay and the Contractor shall receive and accept as full compensation for everything furnished and done by the Contractor under this Agreement, the contract price at the time and in the manner prescribed by the contract.

4. The Contractor, at his own proper cost and expense, shall do all work and furnish all labour, equipment, materials, tools, machinery and supplies for the manufacture, assembly, construction, installation, completion, testing, commissioning, adjusting, balancing and maintenance of the said works as outlined and described in the specifications, schedules and drawings except such equipment and materials which are to be furnished by the Employer.

5. The maintenance of a rate of progress in the works, which will result in its completion within the specified time, is an essential feature of this contract, and the Contractor agrees to proceed with all due diligence and care at all times to take full precautions to ensure the time of completion as defined herein. The said works shall be started on the date shown in the Memorandum of the tender and the Contractor shall have the works called for under the contract fully completed within the times stated in the Memorandum of the tender except for maintenance which shall be completed in the period named in the said Memorandum after issuance of Certificate of Substantial Completion.

6. The term the "Consultant" in this Agreement and conditions of contract shall mean the said BBSIMS'S DESIGN ENGINEER, or in the event of their dissolution or in any way ceasing to be the Consultant for the purpose of this contract, such other person(s) as may be nominated or appointed for this purpose by the Employer and notified in writing to the Contractor.

IN WITNESS whereof the parties hereto or herein have hereinto set their respective hands and seals on the day the month and the year first above-mentioned.

Signed, sealed and delivered
by -----

Signed, sealed and delivered
by -----

for and on behalf of

(Employer)

for and on behalf of

(Contractor)

in the presence of

(name and designation)

in the presence of

(name and designation)

C. FORM OF PERFORMANCE BOND

THIS BOND is executed at ----- on this -----day of ----- by -----(name)----- having its registered Office at -----(full address)----- (hereinafter called the "Surety" which expression shall include its successors and assigns) and----- (name)-----whose registered Office is at -----(full address)----- (hereinafter called the "Contractor" which expression shall include its successors and permitted assigns) in favour of - ----- (name and address) ----- (hereinafter called the "Employer" which expression shall include its successors and assigns).

WHEREAS the Contractor by an Agreement which shall be signed between the Employer of the one part and the Contractor of the other part (hereinafter called the "contract") has agreed for the manufacture, supply, construction, assembly, installation, completion, testing, commissioning, adjusting, balancing and maintenance of certain works as therein mentioned viz. ----- (hereinafter called the "works") in conformity with the provisions of the said contract.

AND WHEREAS one of the conditions of entering into Contract Agreement is that the Contractor shall provide to the Employer a Performance Bond in the sum of Rs. ----- (Rupees ----- only) for due fulfillment of the contract.

AND WHEREAS, the Surety has agreed to give to the Employer this Performance Bond on the terms and conditions mentioned hereinafter.

NOW THEREFORE, THIS BOND WITNESSETH:

1. That the Contractor shall duly perform and observe all the terms, provisions, conditions, stipulations and his obligations contained in the contract according to the true purport, intent and meaning thereof or as may be determined by the Employer who shall be the Sole Judge in the matter.
2. In the event of default being committed by the Contractor of which the Engineer shall be the sole exclusive judge, the Surety shall satisfy and discharge within three days after demand of all the damages sustained by the Employer on account of the default of the Contractor, as may be solely and exclusively determined by the Engineer, without any reference of any nature whatsoever to the Contractor and without

any question whatsoever and whether or not the Contractor disputes his liability in respect thereof and whether or not any arbitration or Court case is pending in respect of the dispute.

3. That the liability of the Surety under this Performance Bond shall be upto the amount of Rs.-----
------(Rupees -----
-----only)

and this Bond shall become null and void if the Contractor has carried out the works and also performed his obligations strictly in accordance with the contract to the full satisfaction of the Engineer, who will be the sole and exclusive judge to determine whether or not the Contractor has carried out the works and fulfilled his obligations in accordance with the contract.

4. The Engineer can complete that portion of the works, which the Contractor has not commenced or not satisfactorily executed, upto the amount of the Performance Bond, at the expense of the Surety.

5. That the liability of the Surety shall not be discharged until such time that a release has been granted to the Surety in writing under the signature of the Engineer.

6. No alteration in the terms of the said contract made by agreement between the Employer and the Contractor or in the extent or nature of the works to be executed thereunder and no allowance of time by the Employer or the Engineer under the said contract nor any forbearance or forgiveness in or in respect of any matter or thing concerning the said contract on the part of the Employer or the Engineer shall in any way release the Surety from any liability under this Bond.

7. That the payment under this Bond shall be made by the Surety in the name of the Employer and a receipt issued by the Employer shall discharge the Surety from his liability to the Employer under this Bond.

8. That any notice or demand under this Bond may be made by the Employer and may be left at the Surety's address mentioned herein or at any changed address as may be communicated by the Surety to the Employer in writing against receipt of the Employer, or the said notice of demand may be sent by registered post to the Surety addressed as aforesaid and shall be deemed to have been given at the time when it should have been delivered in due course of post and a certificate signed by the Employer that the envelope containing the notice was posted shall be conclusive.

9. This Bond shall remain in force upto ----- for the amount of Rs.----- (Rupees -----
-----only).

IN WITNESS WHEREOF the Surety and the Contractor have signed and sealed this Bond on the day the
month and the year mentioned above.

Signed, sealed and delivered
by -----

Signed, sealed and delivered
by -----

for and on behalf of

(Surety)

for and on behalf of

(Contractor)

in the presence of

(name and designation)

in the presence of

(name and designation)

Note:

The Surety may be a scheduled Bank or an approved Insurance Company.

D. SPECIMEN OF MOBILIZATION ADVANCE GUARANTEE

To

-----,
-----,
-----,
-----.

Dear Sirs,

WHEREAS you have entered into a contract with ----- (name and address) ----- (hereinafter called the "Contractor" which expression shall include its successors and permitted assigns) for -----
----- (hereinafter called the "works").

AND WHEREAS at our request and at the request of the Contractor you have agreed to advance to the Contractor a sum of Rs.----- (Rupees-----
-----only) to be used by the Contractor for the procurement and transport of Plants, Equipment and materials for the said works (inclusive of any temporary works).

NOW THEREFORE we do hereby agree, undertake and guarantee:

1. That the Contractor shall use the advance amount of Rs.----- (Rupees-----
-----only) for the purpose of procurement and transport of Plants, Equipment and materials for the works inclusive of any temporary works as defined in the Contract Agreement dated ----- entered into between you and the Contractor.
2. That the Contractor shall repay the above said advance amount to you either by getting the same deducted from his running bills as per the General Conditions of Contract or from his own resources.
3. In the event of the Contractor failing to utilize the advance for the purpose for which it has been given by you and/or the Contractor failing to make the payment of the same to you as per the General Conditions of Contract, we hereby guarantee the payment of the amount of Rs.----- (Rupees-----
-----only) or such other amount as may be outstanding against the Contractor within three days after demand made by you on us without any question or without any reference of any nature whatsoever to the Contractor and irrespective of existence of any dispute between you and the Contractor and irrespective of pendency of any dispute with

the Contractor before any Arbitrator or any Court of Law.

4. That a demand certifying that the Contractor has failed to utilize the advance for the purpose for which it has been given and/or has failed to repay the same and signed by the Engineer will be conclusive against the Contractor and against us which certified demand shall not be questioned by us for any reason whatsoever and it would be sufficient authority for us to make the payment to you.

5. That our liability under this Guarantee shall stand reduced automatically to the extent of the adjustment made from the running bills of the Contractor and a certificate signed by the Engineer to this effect shall be conclusive and binding on us.

6. That the payment hereunder shall be made by us under this Guarantee in your name and a receipt issued by you shall be sufficient that the payment has been made to you hereunder.

7. That our liability under this Guarantee shall not be discharged until such time that a release has been granted to us in writing under the signature of the Engineer.

8. That no alteration in the terms of the said contract made by agreement between you and the Contractor or in the extent or nature of the works to be executed thereunder and no allowance of time by you or the Engineer under the said contract nor any forbearance or forgiveness in or in respect of any matter or thing concerning the said contract on your part or on part of the Engineer shall in any way release us from any liability under this Guarantee.

9. That any notice or demand under this Guarantee may be left at our address mentioned hereinafter or at any changed address as may be communicated by us to you in writing against your receipt, or the said notice of demand may be sent by registered post to us addressed as aforesaid and shall be deemed to have been given at the time when it should have been delivered in due course of post and your certificate that the envelope containing the notice was posted shall be conclusive.

10. That you shall have collective and/or several right to recover the full amount under this Guarantee from us which shall be paid by us to you as per Clause 6 hereof.

11. That this Guarantee shall remain binding on us and we shall be liable to you and/or your successors-in-

interest or assigns.

12. This Guarantee shall remain in force upto ----- for the amount of Rs.----- (Rupees --
-----only).

Signed, sealed and delivered on this-----day of-----
by ----- and by -----

for and on behalf of

(Guarantor)

in the presence of

(name and designation)

(name and designation)

E. LIST OF APPROVED INSURANCE COMPANIES

1. Adamjee Insurance Company Ltd.
2. Alpha Insurance Company Ltd.
3. EFU General Insurance Ltd.
4. Habib Insurance Company Ltd.
5. Muslim Insurance Company Ltd.
6. New Jubilee Insurance Company Ltd.
7. National Insurance Corporation.

Notes

1. The Guarantor or Surety may be a scheduled Bank. If specified in the Tender Notice/Memorandum, the Guarantor or Surety may be from amongst above listed approved Insurance Companies.
2. All Guarantees or Bonds must be on requisite judicial stamp papers of required value, must be fixed with the seal of the Guarantor/Surety and signed by atleast two authorised Executives of the Guarantor/Surety and executed in a manner that the same are binding on the Guarantor/Surety/Tenderer/Contractor.
3. Any insurances required for the works shall be arranged from amongst above listed approved Insurance Companies.

SPECIAL CONDITIONS OF CONTRACT

01. GENERAL CONDITIONS OF CONTRACT

0101. The General Conditions of Contract shall be carefully studied by each tenderer before submitting his tender. Nothing stated herein shall waive any part of the General Conditions of Contract unless specifically stated herein. Where clauses of General Conditions of Contract are repeated in this section, it shall be only for calling special attention to them and/or as a further qualification, and it shall not mean as omitting any other clause or clauses of the General Conditions of Contract.

02. SCOPE OF WORK

0201. The accompanying specifications and drawings are intended to provide all Air Conditioning and ancillary works right wing ground and first floor for the Site and Building(s) referred in the specifications and drawings, and the contract on item rate cost basis is intended to provide all materials and labour necessary for manufacture, supply, construction, assembly, installation, completion, testing, commissioning, balancing and adjusting and maintenance of the complete mechanical systems and ancillary works, making them ready for operation in all respects and training of the Employer's personnel.

0202. (a) The general scope of work is detailed and shown in the BOQ/specifications and drawings. Furthermore included are all interconnecting piping, valves and fittings and electric wiring between and for various items of plant, equipment, controls and accessories.

(b) The Employer shall not be responsible for supply at site any Equipment and services.

0203. Within the general scope of work the following items are specifically included without limitation:

(a) All equipment stated in Bill of Quantity

(b) All refrigerant and condensate piping/air ducts/ associated electrical and control wiring etc.

(c) Painting of equipment, piping, etc. and system components and all other incidentals to make the mechanical systems and ancillary works installation complete and perfect and ready for operation in every respect.

(d) Commissioning, testing, balancing and adjusting of all the plants, equipment and systems except the equipment for which the Employer is responsible.

(e) Test run of the complete plants and systems in next summer after the completion of commissioning, balancing and adjusting of equipment and systems.

(f) Servicing and maintenance of complete installation during the period of maintenance.

0204. The Contractor shall give written guarantee that all the equipment and materials supplied under the contract shall be brand new, of robust construction and standard manufacture, and that the

materials and workmanship will be of best class, will be installed in a practical and first class manner, that the plants and systems will be complete for satisfactory operation, nothing being omitted by way of labour and material required to make them so although not specifically shown or mentioned in the drawings or specifications, and that these will be delivered to the Employer in well working order, complete and perfect in every respect.

0205. The Contractor shall furnish all the required equipment, plants, devices, controls, etc. required to complete the works under applicable local codes or regulations.

0206. The specifications are to be read in conjunction with the latest relevant British/American Standard Specifications and British/American Standard Codes of Practice. It shall be inherent in the interpretation of the contract documents that wherever British Specifications or Codes are referred to, they shall be deemed to be the British or American Standard Specifications or Codes and vice versa. Where differences or contradictions appear to arise between the British and American Standard Specifications or Codes, these differences or contradictions shall be referred to the Engineer for a decision.

0207. In case any item or material offered deviates from the above standards, the tenderer shall clearly draw attention to all such deviations and no such item or material shall be supplied by the Contractor without prior written approval of the Engineer.

0208. The Contractor shall execute the works with materials in accordance with the specifications. All materials which in the opinion of the Engineer are not sound and/or do not meet with the above conditions, shall be immediately dismantled and/or removed from site by the Contractor at the request of the Engineer and replaced by appropriate approved materials without claim by or extra payment to the Contractor.

0209. The tenderer shall carefully check the sizes of the plant rooms, the pipe and duct passages and trenches, the pipe and duct shafts as shown in the drawings and confirm that his equipment, piping, ducting, wiring, etc. can be installed within the respective spaces allocated for the same.

03. **RESPONSIBILITIES OF THE EMPLOYER AND CONTRACTOR**

0301. The Employer shall not provide any equipment, stores, materials, etc. to the Contractor for the purpose of completing the works or temporary works except where otherwise specified in the contract.

The respective responsibilities of the Employer and the Contractor for the ancillary works shall be as detailed below.

0302. Builders Work.

(a) The Employer shall arrange all slab, beam and structural openings.

(b) The Contractor shall arrange all excavations, pipe trenches and backfilling, unless specified to be the Employer's responsibility.

(c) All wall openings, cuttings, chases, patching and making good shall be done by the Contractor. Only finishing and painting shall be arranged by the Employer after the Contractor had completed his work.

(d) All foundations for equipment mounting supplied by Contractor will be constructed by the Contractor who will also provide vibration isolators for isolation from the Building structure as required (and/or specified).

(e) The Contractor will supply and fix all necessary foundation and anchor bolts, concrete inserts, sleeves, brackets, clips, supports, stays, hangers, and hardware required for the complete installation. The Contractor shall supply and fix foundation and anchor bolts, concrete inserts and pipe sleeves before concreting. The Contractor will also be responsible for plugging of slab, wall and ceiling openings for all items and fittings where plugging has to be done by special plugs, screws or materials.

(f) The Contractor shall arrange for lifting of all equipment and materials to the respective plant rooms and locations. The Contractor will be responsible for any damage to the Building finishing. He shall ensure that no damage is caused to the structure.

0303. Electrical Work.

(a) The Contractor will be provided electric supply points, 380 volts, 3 phase, 4 wire alongwith two earthing points, in the Utility Area for water booster set and other electrically operated equipment.

(b) The Contractor shall be responsible for supply and installation of the complete onward electric wiring and earthing work for all plants, equipment and automatic controls. He shall also check and confirm that the specified ratings of the supply points meet the requirements of his plants and equipment.

(c) The responsibility of the Employer would be limited to provide the electric supply points and earthing points as detailed above and shown in the drawings.

0304. The Employer will arrange without charge to the Contractor, the supply of electricity, water and fuel during the commissioning, starting, testing and adjusting of the complete plants and during the Test Runs. The Contractor shall be responsible for the supply of all other materials and labour required in this connection.

0305. It will be the responsibility of the tenderer to clearly mention in detail any other particular work excluded by him in his tender but necessary to complete the works in all respects for satisfactory, efficient and trouble free operation.

04. **COORDINATION**

0401. The Contractor shall acquaint himself fully with the requirements of the programme of work execution and the requirements of contractors. It shall be the responsibility of the Contractor to schedule his work so as to complete the work within the required time and without causing delay in the completion of the entire project.

05. **GUARANTEES**

0501. The Contractor shall guarantee the performance of the plant and equipment offered by him.

0502. The Contractor shall give to the Employer a written guarantee for the complete works against defective materials and faulty workmanship for the period of maintenance as specified in the Memorandum from the date of issue of Certificate of Substantial Completion by the Engineer. All defects of material or workmanship found in the work during the period of maintenance shall be removed and defective items replaced or repaired by the Contractor to the satisfaction of the Engineer without any additional cost to the Employer.

0503. The Engineer shall inform the Contractor in writing in what respect any portion of the works, installation is defective. If any defect be not remedied within reasonable time by the Contractor, the Employer may proceed to do the defect rectification work at the Contractor's risk and expense but without prejudice to any other rights which the Employer may have against the Contractor in respect of such defects.

0504. In case the replacements, repairs or renewals are of such a character as may affect the functionality of installation, the Engineer shall have the right to give to the Contractor within one month from such replacements, repairs or renewals notice in writing that a test be carried out to check the efficiency and performance of the system and it shall be the duty of the Contractor to ensure that the efficiency and performance of the plant or equipment conform with the specified requirements.

0505. In the event of any defect of material or workmanship occurring or being discovered during the period of maintenance, the period of maintenance shall continue until the cause of the defect has been discovered and remedied to the satisfaction of the Engineer.

06. **MANUFACTURERS/SUPPLIERS' GUARANTEES/WARRANTIES**

0601. Manufacturer/Supplier's Guarantee/Warranty, specimen given below, for each equipment is an essential document to be supplied to the Employer before claiming payment for that equipment. The Guarantee/Warranty shall be duly sealed and signed by an authorised Executive of the Manufacturer/Supplier.

0602. (a) The Contractor may obtain the Guarantee/Warranty from the Manufacturer/Supplier and submit the same to the Engineer/Consultant before claiming payment for the equipment in his bill, or

(b) The Manufacturer/Supplier shall furnish the Guarantee/Warranty as an essential part of the documents submitted to the Bank to claim payment against the letter of credit established by the Employer.

0603. The form of Guarantee/Warranty shall be:

"We hereby guarantee that the stores supplied are produced new in accordance with the

contract specifications and that the materials used whether or not of our manufacture are in accordance with the latest appropriate standard specifications,the contract specifications and of good workmanship throughout. We shall replace free of cost FOB Factory or repair any part of the equipment for either a period not exceeding 12 calendar months after it has been taken over on completion of installation as certified in the Completion Certificate issued by the Employer or a period of 24 calendar months from the date of despatch from our Factory, whichever is shorter, which would be found defective due to material or faulty workmanship or in any way not in accordance with the contract specifications.

Our responsibility shall be limited to replace/ repair any part or parts of the stores found to be defective in workmanship or material provided the equipment is operated and maintained by the Employer in accordance with the generally approved practices and provided the Employer informs us in writing as soon as such defect becomes apparent.

Our obligation shall be to replace or repair any part or parts found defective FOB Factory and we shall not be responsible for any consequential damage or liability. We shall also not be responsible for any work done, equipment or part(s) supplied or repaired by others or for any loss, damages or expenses arising from such work, equipment, part(s) or repairs.

Signature and Seal-----

Manufacturer/Supplier's Name and

Address-----

Date-----"

0604. Wherever guarantees of operating capacity and efficiency, proper functioning, durability and the like are called for and/or wherever it is specified that the manufacturer shall furnish necessary technical manuals, drawings, performance data, test certificates, etc. and shall supervise the starting up of the equipment and adjustments after installation and starting up, and etc., and maintain it for the required period and perform similar other duties and services, the Contractor shall be held responsible for performance of the specified services for the actual conditions of the installation and he shall be held responsible for any default on the part of his suppliers/manufacturers/principals.

07. **DRAWINGS, TECHNICAL DATA AND MANUALS TO BE SUPPLIED**

0701. The Contractor when preparing any detailed shop drawings shall carefully check for all clearances, field conditions, avoidance of any hindrance with architectural features and proper coordination with all other services of the Building. Each shop drawing submitted by the Contractor shall include a certificate by the Contractor that all related conditions on the site relevant to that particular installation had been checked and that no conflict existed. The Engineer/Consultant shall not approve any shop drawing submitted by the Contractor without such a certificate.

0702. Manufacturers' performance data, performance and other test certificates and shop

drawings for all main equipment giving complete information regarding dimensions, materials and other details confirming the adequacy of the equipment to be supplied shall be submitted to the Engineer/Consultant for approval.

0703. All shop drawings etc. correct and conforming with the contract requirements, shall be submitted to the Engineer/Consultant sufficiently in advance of actual requirements to allow ample time for checking and approval and no claim for extension of the contract time will be considered by reasons of the Contractor's failure to submit the correct drawings etc. in time. The Contractor will submit eight copies of final corrected shop drawing for approval out of which 3 duly approved copies would be returned to him.

0704. The Contractor shall clearly point out the differences, if any, between the details submitted and the requirements of the contract in covering letters sent with the submitted documents and drawings. He should also give reasons for his request for substitution so that if substitution is approved by the Engineer, necessary action may be taken for price adjustment. The Contractor will not otherwise be relieved of his responsibility for executing the works in accordance with the contract.

0705. After completion of the installation work, the Contractor is to provide reproducible transparencies (quality to be approved by the Consultant) and 3 copies each of as-installed drawings showing runs and location of all the plant, equipment, controls, piping, ducting, electric wiring, buried work, etc. giving all necessary details of the works as actually installed.

0706. Technical Manuals.

The Contractor shall supply seven sets of printed manufacturers' installation, commissioning, operation, servicing and maintenance manuals, technical catalogues and detail spare parts manuals in English language for all items for the guidance of the Employer's operators in operation, servicing and maintenance of the plants and equipment.

One set shall be supplied to the Consultant for scrutiny and approval well before shipment of the items by the manufacturers/suppliers.

Each set shall be hard bound in volumes as directed by the Consultant.

After approval by the Consultant, balance six hard bound sets shall be supplied to the Engineer simultaneously with or before the arrival of the items at site.

0707. In case of any question regarding the Contractor's responsibility for preparation and supply of any detail shop drawings, data, as-installed drawings, technical manuals, etc., the Engineer's decision shall be final and binding as to the requirements of the shop drawings, data, as-installed drawings, technical manuals, etc. for the works.

0708. The approval by the Engineer/Consultant of any submitted data, shop drawings, performance curves, test certificates for any item, arrangement and or layout shall not relieve the Contractor from any responsibility regarding the performance of the contract. Such approval shall not also relieve the Contractor from responsibility of error of any sort in the submitted data and shop drawings, etc.

CASSETTE TYPE ROOM AIRCONDITIONERS

01. Air cooled electrically operated DC-Inverter, Refrigerant-**R410A** split cassette type room air conditioners of minimum capacities as specified in the Schedule of Equipment OR on the drawings. The air conditioner to for T3 operating conditions.

02. The air conditioners shall comprise weather proof outdoor condensing unit and ceiling suspended cassette type indoor evaporator unit provided with rubber-in-shear type vibration isolators for installation.

The condensing unit to be complete with compressor, air cooled condenser, fan, fan motor, automatic and safety controls and all accessories.

The evaporator unit to be complete with cooling coil, fan, fan motor, cleanable air filter, drain pan, condensate drain lift up mechanism with overflow prevention, automatic and safety controls, and all accessories. The unit shall be suspended above false ceiling and have a decorative access door cum supply/return air grille, with 4-way supply air throw and powder coated finish for exposed installation in the room.

The unit to have cooling or cooling-heating systems; heating cycle to be either reverse cycle type or with electric heater, as specified in the Schedule of Equipment.

The unit to have wall mounted microprocessor Controller with on-off switch, multi speed fan control and cooling (or cooling-heating) thermostat with settings to cover full comfort range.

03. The Contractor to complete refrigerant piping and electric wiring and earthing from the electric supply point between the indoor and outdoor units and charge the unit with refrigerant and oil. The refrigerant circuit to include liquid line sight glass-moisture indicator, filter drier, line valve, etc. The refrigerant piping to be correctly sized as recommended by the unit manufacturer to suit the total distance and height between the indoor and outdoor units. The piping to be hard drawn copper tubing with silver soldered joints, type L/K for low/high pressure sides. The low temperature piping to be insulated with 1/2" thick flexible foamed plastic insulation protected with specified jacketting.

04. The units to be of Toshiba/LG/SAMSUNG/Hitachi/Daikin/Mitsubishi manufacture or approved equal.

05. The tenderer to submit following information for the units offered by him:

- (a) Net cooling-heating capacities under specified conditions.
- (b) The salient technical features of the units including control panel.
- (c) Manufacturer's complete technical literature.

MOTOR CONTROL CENTRES/DBs & ELECTRIC WIRING

01. The Contractor will be responsible for complete electric wiring and earthing of the plant, equipment and controls. The Employer shall only provide 3 phase and neutral, 4 wire electric supply point(s) with two earthing points, and 1 phase, neutral and earth, 3 wire electric supply point(s) at locations shown in the drawings and detailed elsewhere in the documents.

02. The electrical work shall be carried out by licensed workmen authorised to undertake such works under the provisions of the Electricity Act 1910 and Pakistan Electricity Rules 1937.

03. The installation in general shall be carried out in conformity with the latest relevant British Standard Specifications and Codes, VDE, IEC and IEE Recommendations and latest edition of Regulations for the Electrical Equipment of Buildings by The Institution of Electrical Engineers, UK as adopted in Pakistan by Pakistan Standards Institution. Any special requirements of Electric Supply Co. and The Electric Inspector shall be complied with. The Contractor shall be responsible for making the required applications, submitting the Test Certificates and for getting the installation passed by The Electric Inspector of the Government.

04. The climatic conditions shall be temperatures between 2°C (min) and 45°C (max) with max. relative humidity 90%, unless lower min. and higher max. temperatures are specified elsewhere in the documents.

05. The electric wiring shall be carried out in MS or G.I. conduits as specified, 18g G.I. sheet metal trunking or cable trays, or G.I. (medium weight) piping as specified and/or shown in drawings. All wiring buried in floor or exposed to weather to be in G.I. piping (mw). MS conduit to be of 16g, given anti rust coating and then painted with black enamel paint.

Conduits buried in slabs or walls may be PVC conduits or PVC Class D pipes as specified in the drawings.

Sheet metal trunking or cable trays installed indoor shall have ventilation slots; those installed in Building shafts shall have removable covers and installed outside shall be of weather proof construction with removable covers.

The wire sizes shall be selected for satisfactory operation at atleast 45°C ambient temperature derated according to installation method and grouping as envisaged.

06. The terminal connections for motors and where required for starters, shall be made in flexible conduit. The terminal wiring for 230 volt, 1 phase below 0.5 HP motors (such as for fan-coil units, small ventilation-exhaust fans) and their starter control switches can be exposed PVC insulated and sheathed wiring, connections protected within the terminal box so that no live lead is exposed.

07. The wiring for electric/electronic automatic controls shall preferably be with single conductor wire which may be PVC insulated within metal conduits, exposed shielded or exposed PVC insulated.

lated and sheathed wiring in accordance with the recommendations of the control manufacturer. The live connections shall be protected by the cover plates to avoid any hazard. The wiring outside the plant rooms or fan-coil unit enclosures must be in conduit to avoid any mechanical damage.

08. All Motor Control Centres (MCCs) or Control Boards shall be Factory fabricated of an approved listed manufacturer.

09. On each Motor Control Centre (MCC), the incoming supply shall have a circuit breaker for 20 amps and above rating and circuit breaker or disconnect switch with fuses for lower rating.

The circuit breaker shall be of high rupture capacity, heavy continuous duty, moulded case type (MCCB) for 1000amps and below rating and air-breaker (ACB) type for rating above 1000 amps. The circuit breaker shall have adjustable magnetic short circuit trip and adjustable thermal overload trip. In MCCs with multi circuit outgoings, the incoming MCCB of 100amp and above or ACB shall have high and low voltage release, rated 415 volt $\pm 20\%$ adjustable range. The MCCB or ACB to be manually reset after trip.

The minimum rupture capacities (IEC 157-1 P-1 rating or IEC 947-2 Icu rating) at 415 volt of MCCBs shall be as follows:

Upto 30 amp rating		10 KA
40 to 225	"	25 "
250 to 400	"	30 "
500 to 600	"	35 "
800	"	50 "
1000	"	65 "

Miniature Circuit Breakers (MCB) shall have minimum rupture capacity of 5KA (1-phase) and 10KA (3-phase) and to have off-on-reset switch with handle. The 3-phase MCB shall make or break all 3 circuits simultaneously. MCB may be used for single phase circuits upto 30amp rating. 3-phase MCB may be used for motors 4HP and below or for general power supply circuit 20amp and below.

The disconnect switch shall be rotary type. The fuses shall be HRC time lag link type according to BS 88:1952 and ASTA-20 certified. Two sets of replacement HRC fuses shall be supplied as spare for each disconnect switch.

Each outgoing individual circuit shall have a ACB or MCCB or MCB or disconnect switch with fuses according to rating limits specified above. The outgoing for each motor circuit shall be provided with:

- 1-phase MCB for single phase motors upto 1HP.
- 3-phase MCB for 3-phase motors 4HP and below.
- MCCB for " " above 4HP.

10. Single phasing preventer relay shall be provided for each 3 phase circuit of 1 HP and

above rating as part of motor starter.

11. The Contractor shall supply and install necessary Motor Control Centres (MCCs), Control Boards, circuit breakers, disconnect switches, fuses, MCBs, earthing, etc. to complete the work. It is required, where possible, to mount all circuit breakers, disconnect switches, fuses, starters, contactors and relays, etc. in one machine room on one MCC for ease of operation.

12. The MCCs shall be of design and construction to provide easy access to all internal components for servicing and replacement. The large size MCCs to have multi panel type construction. The MCC shall have hinged access doors at the front, swing not exceeding 450 mm, and of design that all work of servicing, maintenance, replacement, additions and alterations can be carried out from the front without requiring access from the back. The back panels shall be bolted and easily removable. The MCC to have protected bus bars and indicator name plates for all items. A pocket shall be provided for keeping electric wiring diagrams.

All circuits shall be numbered and tags fixed with the wires for identification.

The MCCs to be installed outside shall be of weather proof construction.

The motor starters shall comply with the requirements specified elsewhere in the documents.

The main MCC in the central plant room shall have one 30amp 3 phase service outlet with MCB and 4 pole quick disconnect coupling, and two 15 amp 3 pin single phase service outlets with MCB and on-off switch.

Reproducible transparencies and 3 sets of complete detail wiring diagrams for each MCC shall be supplied to the Employer and one plastic coated set to be kept in a pocket in the respective MCC.

13. The Contractor shall submit schematic electric wiring diagrams, manufacturer's construction drawings, component selection lists with manufacturers' technical literature for all components proposed to be used to the Consultant for checking and approval before the fabrication of MCCs and Control Boards is commenced. The work will be carried out only in accordance with the approved drawings and components.

14. All components and wires shall be selected/sized with required derating for site ambient and altitude as specified and close grouping within the enclosed space of a MCC or Control Board.

15. Each Motor Control Centre shall have three phase indicating lights, incoming supply voltmeter with 7 position phase selector switch, three ammeters one for each phase if more than one outgoing and total load 30 KW (40 HP) and above, an incoming ACB or MCCB according to load, a MCCB or MCB for each outgoing according to circuit rating, motor starters, ammeters, indicator lights, etc.

All starters/contactors for motors and equipment operation control shall have rotary type hand/off/auto switch. With HOA switch in "auto" position the motor/equipment shall be remote operated

from the MCC so designated or Building DDC System as specified, "hand" position would permit local operation and testing, while the "off" position would ensure that all circuits are de energized for servicing and checking.

16. Wires and Cables shall be of Pakistan Cables Ltd./ Pioneer Cables Ltd./AGE Industries Ltd./Newage Cables Ltd. manufacture or approved equal.

The steel conduits shall be of Hilal or IIL, PVC conduits of Shavyl or Galco and PVC Class D pipes of Dadex-Eternit or Shavyl, manufacture or approved equal.

MCCBs & ACBs of ABB, Fuji, Hitachi, Merlin Gerin or Terasaki, Contactors and Starters of ABB,Fuji, Hitachi, National, Siemens, Square D or Telemecanique, and MCBs of ABB, Emzed-Kopp, Hitachi or Merlin Gerin, manufacture or approved equal. ACBs, MCCBs, MCBs, Contactors and Starters shall be of listed Manufacturers' country of origin and not substitutes.

PIPING

01. All refrigerant piping shall be refrigerant service quality hard drawn copper piping with silver soldered joints, providing flanged where necessary for easy dismantling, particularly flanged joints shall be provided for equipment, strainer-driers and other specialities. In tight locations and for connections with equipment, the Consultant may allow soft copper tubing with flare or compression joints for sizes upto 16mm OD.
02. The refrigerant pipes shall be properly sized and graded to secure easy circulation of refrigerant without excessive pressure drop, to permit return of oil to the compressor and to prevent slugging of liquid refrigerant to the compressor. The distance, bends and height difference between the compressor and the evaporator shall be taken into account when sizing the pipes.
03. The Contractor shall provide all stop valves, checks valves, expansion valves, filter-driers, sight glasses and other specialities as are required for proper operation and control of the refrigerant system.
04. All pipe work shall be so arranged and assembled as to prevent undue strain or leaks caused by expansion and contraction. Vibration isolators shall be provided at the compressor suction and discharge connections to prevent strain or leaks due to transmission of compressor vibrations to the piping.
05. All pipes shall be properly supported on clamps, hangers etc. of approved design. Supports shall be designed to permit free expansion and contraction to minimise vibrations. All hangers, clamps etc. for piping shall be provided with rubber in shear or equivalent anti vibration supports to prevent transmission of vibrations to the building structure. No pipe shall be suspended from other pipes. MS or GI hangers or sleeves shall not come in contact with the copper pipes.
06. The horizontal pipe hangers shall be supported from building steel framing or concrete inserts of sufficient strength. All vertical pipes shall be supported by heavy clamps resting on the building structure.
07. In general horizontal copper pipes, 25mm OD and below shall be supported at not more than 2m centres and above 25mm OD at maximum 2.5m centres. MS or GI pipes 25mm and smaller shall be supported at centres not more than 2m apart and at 3m centres for pipes between 25 to 80mm. Supports shall be provided as near as possible to the valves, strainers, tees, elbows, other special fittings and equipment connections. The pipes shall not be supported by the equipment.
08. Hangers for insulated piping shall have broad contact area so as not to damage insulation by load concentration. The hangers shall also support insulated pipes without piercing the insulation.
09. During installation, adequate temporary supports shall be provided so that the piping is not strained or supported by the equipment.
10. The low temperature (suction and LP liquid) pipes shall be insulated with 25mm thick flexible foamed plastic insulation average minimum density 80 Kg/cum. The insulation shall be fixed with

adhesive recommended by the manufacturer and all joints sealed with adhesive and covered with 40mm wide self-adhesive PVC waterproof tape of approved quality, and protected by a jacket of 8oz canvas fixed with approved adhesive and joints lapped atleast 40mm. External and weather exposed piping shall be further protected with a jacket of 28g GI sheet.

11. The condensate drain piping shall be insulated by 6mm thick felt protected with are 8oz canvas jacket.

12. All pipes passing through floors or walls shall have 20 gauge G.I.sleeves for the full depth of the finished floor construction or thickness of the finished wall and extending 6mm beyond the finished face of the structure on both sides. The sleeves shall allow atleast 6mm clearance to finished (insulated) pipe size. The Contractor shall fill the gap with soft material to prevent contact between the piping and the sleeve but allow free movement of piping. The Contractor shall be responsible for supplying, locating and setting of all necessary pipe sleeves.

13. The pipe ends shall be kept tightly closed during installation to prevent entry of dirt and moisture into the piping system.

14. On completion of the piping installation, the same shall be pressure and leak tested as specified elsewhere in the specifications.

15. The schedule of piping shall be as follows:

(a) Refrigerant pipes.

Hard drawn seamless copper piping according to ASTM B-88, Type L for working pressure below 10bar and Type K for higher working pressures.

The soft annealed seamless copper tubing according to ASTM B-280 suitable for refrigeration service.

PIPE INSULATION

01. No insulation shall be applied to any system of piping or to any surface until all foreign matter has been removed from the surface to be insulated and until the piping has been tested, made tight, cleaned out and made operable. All insulation shall be applied in a manner consistent with good practice and methods. Sectional covering shall be applied with all end joints broken. All longitudinal joints shall be top and bottom but staggered between sections. Insulation shall be continuous through floors, walls, partitions, etc. except where otherwise indicated or specified. Where the application of insulation will cover nameplates attached to equipment, the insulation shall be recessed so as to expose the name or rating plate. Where space will not permit application of sectional insulation on pipes in a wall or slab chase, the chase shall be packed full of 85% magnesia, specified density mineral wool or fiberglass and protected with cover plates on both sides as approved by the Engineer/Consultant.

02. Piping shall be insulated with preformed/premoulded/foamed sections of type and thickness as specified in the Schedule of Insulation.

03. The insulation shall be of inorganic material bonded together by non-water soluble fire retardant resin, chemically neutral and not to cause or accelerate corrosion of steel, stainless steel, copper or aluminium, compatible with normal building materials, biologically inert not to breed or sustain molds, fungus, bacteria or rodents, water repellent and not to absorb moisture from ambient air, non-hygroscopic and non-capillary, not to crack or shrink while permitting expansion and contraction of piping.

Insulation may be of following types:

Type	Material	Density Kg/m ³	Temp. Range °C	Thermal Conductivity (K) W/mK
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I-1	Rockwool	100 or 120	(-) 150-750	50°C-0.041
I-2	Cellular Glass	128	0-480	50°C-0.052
I-3	Fiberglass	64 or 96	(-) 50-450	50°C-0.035
I-4	Flexible elastomeric foamed plastic	60	(-) 50-125	32°C-0.040
I-5	Foamed Polyurethane	45	(-) 30-100	25°C-0.025

Types I-1, 2 & 3 shall be non-combustible as per ASTM E136-82.

Type I-4 to have flame spread rating of 25 or less and smoke developed rating of 50 or less as per ASTM E84-91.

Type I-5 shall be fire retardant self extinguishing type.

04. The chilled water piping insulation shall have 2 ply vapour barrier of .0007" aluminium foil and 44 lbs. natural kraft with fiberglass yarn reinforcement and flame retardant adhesive (Type ASJ). Type I-1, 2, 3 & 5 shall have factory applied vapour barrier forming a hinge along one side and an overlap along the other. The field applied vapour barrier shall be fixed fully with the insulation with approved quality adhesive recommended by the manufacturer and both longitudinal and circumferential joints shall be lapped at least 40mm. Great care will be exercised that the vapour barrier is not damaged/pierced during installation and any damage shall be repaired with the same quality vapour barrier.

05. The insulation shall be fully fixed to the piping with approved adhesive compound recommended by the manufacturer and approved by the Engineer/Consultant. Resin based adhesive compounds shall be used and mineral oil based adhesive shall not be used. Adhesive to be Zahabiya Excel Bond ZGPA Special 7/223, Foster 30-45, or approved equal.

06. Each pipe shall be insulated separately with specified pipe insulation and gaps, if any, shall be filled with the same insulation material. All circumferential and longitudinal joints shall be sealed with at least 50mm wide self-adhesive tape of approved quality. In case of chilled water piping, PVC impregnated canvas vapour seal tape or Polyethylene coated cloth high moisture resistant tape or Aluminium foil pressure sensitive tape shall be used. The tape shall be pressed down firmly to ensure an efficient seal and smoothed out to avoid any gaps and wrinkles.

07. The flexible foamed plastic insulation shall be thoroughly sealed with adhesive and all joints covered with 40mm wide self-adhesive PVC water proof tape of approved quality.

08. Where specified, the piping shall be insulated with 85% magnesia in layers not thicker than 25mm till the required thickness is achieved. 18g MS 20mm mesh wire netting shall be stretched over the piping, securely wired in place and then the first layer of insulation shall be applied. Each layer shall have wire netting. 15mm thick finish coat shall be mixed 50% by weight with Portland cement and troweled into wire netting to form smooth and hard finish. After full drying of the insulation a coating of hard setting compound shall be applied. It shall then be painted.

09. All specialties (valves, fittings, flanges, etc.) shall be insulated with thickness not less than adjoining straight pipe insulation thickness. In case of chilled/hot water piping, equal/ oversized sections of preformed insulation shall be used duly mitred and trimmed to tailor-fit the specialties. In case of rockwool or fiberglass pipe insulation, semi-rigid blanket of same material may be used instead of mitred sections for insulating the specialties. Loose scrap blanket insulation shall not be used for this purpose.

The insulation shall be fully covered with self adhesive tape specified above to form a complete seal. In case of chilled water piping, a thick coating of liquid vapour seal Foster 60-25 or approved equal shall then be applied.

The valves and strainers shall be insulated separately from the adjoining straight pipe insulation and openable insulation boxes shall be formed with 28g. G.I. or aluminium sheet cladding so that the valves and strainers can be easily serviced.

10. All insulated piping within the Building shall have a jacket of 8 oz canvas fixed with the insulation with water & vapour proof, washable, anti fungus type Zahabiya Sealing Adhesive Coat ZSAC-10/55 and joints lapped atleast 40mm and sealed. The jacketing shall be immediately given two coats of same compound ZSAC-10/55 which is not to be diluted, except when essential with upto 5% demineralised water only.

11. The insulation and 8 oz. canvas jacket shall be further mechanically secured with the piping with 20mm wide soft aluminium bands, generally spaced at 450mm and on either side of elbows, tees, branch-offs, valves and specialties.

12. The insulated piping in the plant rooms and near the equipment at levels 2m and below shall be further protected with a jacket of 28g G.I. or aluminium sheet.

13. External and weather exposed insulated piping shall be further protected with an external jacket as specified in the Schedule of Materials. The external jacket may be of 28g G.I. or aluminium sheet.

14. Insulated piping buried in ground shall be protected as specified in the Schedule of Materials.

15. The hangers, guides, rollers, clamps, etc. shall not pierce the insulation. The insulation on steam and condensate return piping shall be protected by wooden saddles and on all other piping it shall be protected by metal shields. For piping above 50mm NB size insulated with fiberglass, etc. or foamed polyurethane insulation, full section of premoulded cork insulation or minimum 96Kg/cum. density fiberglass preformed insulation of thickness equal to the main insulation shall be used at the supports, hangers, etc.

16. The cellular glass insulation shall be of Pittsburgh Corning Foamglass, fiberglass insulation of ACI/Arabian Fiberglass/Izocam/Johns-Manville/Kimco manufacture or approved equal. The foamed polyurethane insulation and rockwool insulation of Pakistan Insulations Ltd. manufacture or approved equal. The flexible foamed plastic insulation to be of Aerofoam/Aeroflex/Foamflex/Insulflex or approved equal.

17. The tenderer shall confirm the type and thickness of insulation offered and give complete technical details of insulation, vapour barrier, covering jacket, finishing and adhesive, and supply manufacturers' technical bulletins.

INSTALLATION

01. The Contractor shall be responsible for the supply, manufacture, fabrication, assembly and installation of all the above items and all other items, accessories and materials required to complete the installation and make the plant ready for operation in all respects.

02. The installation work shall include all rigging, setting, assembling, aligning and grouting necessary to prepare each of equipment and its integral parts for normal continuous operation in locations shown on drawings and special attention shall be paid to all installation notes on the drawings and instructions in the manufacturers' technical bulletins.

03. The Contractor shall arrange for progressive shipment of equipment/materials with emphasis on early delivery for the items to be installed in the occupied areas. The shipments should commence and be completed within the periods specified in the Memorandum.

04. The Contractor shall be required to complete the work in all respects on floorwise basis. All work in an occupied floor will be completed and tested in all respects and then the Contractor will not be allowed to do any other work in that floor or interfere with the building finishing work of the Main Contractor except for the final testing and adjustment when the complete plant is commissioned and operated.

05. The Contractor shall be required to complete the installation in the occupied areas progressively and the entire installation within the times stipulated in the Memorandum.

06. The Contractor shall follow the procedures outlined in manufacturers' instruction books for handling, setting, assembling, installing, aligning, grouting etc. of equipment. For equipment not supplied with instruction books, the Contractor shall follow standard practices that are acceptable to the Engineer/manufacturer taking all precautions to prevent damage to the equipment. The Contractor shall advise the Engineer of the installation procedure to be followed for each equipment and shall keep the Engineer informed as to the progress of the installation.

07. Equipment which is not weather proofed or which may be designated by the Engineer as subject to damage if exposed to the elements shall be covered and protected with tarpaulins or other approved means.

08. All equipment such as pumps, motors, refrigeration machines, air compressors, etc. shall be set carefully to the proper line and elevation and aligned, then bolted down and grouted in place.

09. After the piping has been installed, the coupling halves connecting driving and driven portions of equipment shall be checked for alignment. Wherever misalignment is found, the coupling halves shall be disconnected and the equipment shall be realigned. Piping or duct work which is connected to any equipment shall be supported by adequate hangers or other supports and shall be entirely free of any supporting assistance by the equipment. When the alignment is correct, the equipment shall be drilled and dowelled to the base plate. Accurate records shall be kept for the aligning of all rotating equipment.

10. Coupling bolts shall not be installed permanently until the correct direction of rotation has been established for the equipment. Wherever the manufacturer has not provided a directional arrow or marker, the Contractor shall provide the same.

11. Equipment subject to expansion or contraction due to heat or handling hot or cold fluids shall be rechecked after operation under design service conditions for a minimum of 24 hours and if necessary shall be realigned.

12. All uncrating, unpacking, cleaning, degreasing, removal of skids, protective covering and inspection prior to installation shall be performed by the Contractor. Due diligence and extreme care shall be exercised to prevent distortion and damage when unloading and moving equipment to its proper location. Ropes or slings shall be attached to the equipment as recommended by the manufacturer and in such a manner that the weight is properly distributed without abnormal strain on the equipment.

13. All equipment shall be inspected prior to start-up by the Contractor. All work required to satisfy the inspection at the time of start-up such as but not limited to unbolting of covers, access doors, special scaffolding for inspection, removal of foreign matter, removal of belt guards, tightening of hold down bolts and flanges, etc. shall be performed by the Contractor.

14. All required protection of shafts, flanges and similar parts of the equipment by grease coating or otherwise shall be provided.

15. The Contractor shall furnish and install extension handles, extension oil cups or such similar fittings or appliances for lubrication, etc. of all equipment where same is not easily accessible, unless otherwise specified or shown on the drawings.

16. Interferences. The Contractor shall coordinate the work of the different trades in order that interference between mechanical, electrical, architectural and structural work will be avoided. Piping, ducts, etc. shall be kept as close as possible to ceilings, walls, columns etc. in order to take up minimum space and all off-sets, fittings etc. required shall be furnished and installed by the Contractor without additional expense to the Employer. In case interference develops, the Engineer will decide which equipment, piping, etc. shall be relocated, regardless of which was first installed.

PAINTING

01. The Contractor shall paint all equipment, ducting, piping, hangers, bracing and other surfaces exposed to air as specified and he shall also be responsible for all finish painting. The minimum number of coats are specified hereinunder but sufficient coats shall be given to achieve desired finish.
02. To the extent possible the Contractor will carry out the painting alongwith completion of installation particularly in the occupied areas to avoid interference later on with other contractors or Building completion schedule.
03. Material for painting shall be high grade products of well known approved manufacturers and when approved shall be delivered on the site in original unbroken packages bearing the maker's name and brand. Paints of approved colour only shall be used for each application.
04. Unplatted steel and iron and primed hardware shall match the work to which it is attached, unless otherwise directed.
05. Stainless steel devices shall not be painted.
06. All surfaces shall be clean, dry and free from dust at the time any coating is applied. Base coats provided by others shall be in good condition and the surfaces well covered by touching any bare or abraded spots. Base coats on works subject to close inspection shall be rubbed smooth.
07. Interior painting shall not be done when temperature is below 0°C. Enamel shall not be applied when temperature is below 20°C. Exterior painting shall not be done in frosty, foggy or damp weather or when temperature is below 10°C.
08. All cloth and cotton waste that might constitute fire hazards shall be placed in closed metal containers or destroyed each day. Upon completion of work, all containers shall be removed from the site and destroyed in an approved manner. Paint spots, oil or stains upon adjacent surfaces shall be removed.
09. All equipment and motors shall be painted with three coats of enamel paint in the factory and shall be carefully cleaned and oiled after installation. In case the original paint has been damaged, fresh coats of enamel paint to match the original paint shall be given.
10. All duct, pipe and equipment MS hangers and supports shall be thoroughly wire brushed and given one coat of Buxly Corroless-S primer or approved equal and one coat of synthetic enamel paint before installation. MS hangers and supports visible in the occupied areas, plant rooms and other locations shall be given finish coat of synthetic enamel paint on completion of installation.
11. The interior of all ducts and outlet boxes at the back of air grilles, registers and diffusers shall be painted with two coats of dull black paint.
12. All MS ducting, piping and surfaces and unpainted equipment required to be insulated shall be thoroughly wire brushed and applied one coat of black asphalt paint before insulation is fixed.
13. All uninsulated MS piping, MS ducting and surfaces, MS manufacture and unpainted fan

casings, chambers and equipment shall be thoroughly wire brushed, given one coat of Buxly Corroless-S primer or approved equal and finished with two coats of synthetic enamel paint.

14. All uninsulated GI ducting and piping concealed or in plant rooms shall not be painted. The visible G.I. ducting and piping in the occupied areas shall be given two coats of synthetic enamel paint.

15. All 8 oz weight canvas jacketed insulated ducting and piping shall be given two coats of anti fungus water & vapour proof washable type Zahabiya Sealing Adhesive Coat ZSAC-10/55 or approved equal.

In locations where the insulated ducting and piping is exposed and visible within the Building, such as plant rooms, working spaces, basements, attics, passages and occupied areas, these shall then be given two finishing coats of synthetic enamel paint.

16. All ducting and piping with Venture Clad 1577CW jacket-cladding shall not be painted.

17. The ducting and piping shall be painted according to a colour code approved by the Consultant for identification. Where full painting is not specified, colour code strips shall be painted at intervals. Symbols and flow directional arrows shall also be stencilled according to a Schedule approved by the Consultant.

18. All wood surfaces coming in contact with the Building structure shall be given a heavy coat of solignum anti termite wood preservative paint. All other concealed wood surfaces shall be given one coat of anti fungus water repellent primer. All boards made of wood chips, etc. shall be given one coat of anti fungus water repellent black paint on the inner surfaces. All visible surfaces shall be given dull mat finish with synthetic enamel paint.

CHARTS AND TAGS

01. The Contractor shall supply reproducible transparencies and four copies each of charts or diagrams showing outline plans of the structure and describing essential features of all the components of the installed systems for the purpose of identifying location of all control points, valves, etc. for easy operation, maintenance and servicing.
02. The Contractor shall provide identifying brass tags for all valves, controls etc. with numbers corresponding to those given in the charts or diagrams specified above. The 20g brass tags shall be atleast 30mm dia, the numbering shall be stamped and tags fastened to the controls and valves with brass chains and hooks.
03. The Contractor shall supply reproducible transparencies and four copies each of charts indicating Schedules of daily start-up and shut down, emergency shut down, Schedules of servicing and maintenance, lubrication points and schedule, and a Chart listing equipment model and serial Nos., conditions of operation, normal settings of automatic and safety controls, data of accessories and motors, manufacturer's name and address and reference Nos. of technical and spare parts catalogues supplied to the Employer.
04. One set of charts and diagrams shall be mounted in glass frame and permanently fixed according to the Engineer's directions.
05. The Contractor shall submit to the Consultant for approval the list of charts, diagrams etc. which he proposes to supply. The quality of reproducible transparency sheets shall be as approved by the Consultant.

CLEANING, TESTING AND ADJUSTING

01. The Contractor shall during construction properly cap all pipe and duct open ends to prevent the entrance of dirt etc. Each piping and ducting circuit shall be flushed/blown through after completion of installation and again immediately before the testing and commissioning of the Systems, for as long a time as necessary to thoroughly clean that circuit.

02. All air ducting sections shall be given a pressure test before fixing insulation and cutting openings for air devices. Any opening made shall be sealed off with air tight metal caps or any other convenient device for giving the pressure test.

The ducts shall be pressurised with a rotary blower or nitrogen cylinder:

- (a) Low pressure ducts upto 50mm wg.
- (b) Medium pressure ducts upto 150mm wg, and
- (c) High pressure ducts upto 250mm wg.

All seams and joints shall be checked and all audible and noticeable leaks repaired in a good workmanlike manner by filling the joint/seam with a sealant, Zahabiya Soft Special ZSP-1191 with a sealing gun or approved equal, corner cavities filled with Zahabiya sealing gum ZSG-12/99. Sealant preferably applied from inside of the joint so that the air pressure tends to force the sealant into the joint.

The Contractor shall follow SMACNA procedure to carry out final measured leakage test for medium or high pressure ducting. A cfm leakage upto 10% of the volume of the duct section under test shall be permissible.

03. All steam and water piping shall be tested with a hydraulic pressure of 1-1/2 time the operating pressure, but not less than 3.5 bar for LP steam and 10 bar for water or at pressures approved by the Consultant, for sufficient time to detect leaks and defects.

Piping for gaseous systems shall be tested with dry air at 1-1/2 time the operating pressure but not less than 3.5 bar.

All leaks and defects shall be made good in a proper workman-like approved manner. If necessary, piping shall be taken down and reerected and any make shift or temporary repair of leaks will not be permitted. In final test the pressure shall be maintained for atleast three hours.

04. All pneumatic piping shall be tested at a pressure of 1-1/2 time the operating pressure but not less than 2 bar on the low side and 6 bar on the high side. Any leaks shall be made good. In final test the pressure shall be maintained for atleast six hours.

05. All refrigerant piping shall be tested with dry nitrogen at a pressure 1-1/2 time the operating pressure or at the test pressure limits fixed by the manufacturer. Refrigerant-22 systems shall be tested at 10/20 bar on the low/high sides respectively but air cooled Refrigerant-22 high side at 27 bar. The pressure shall be maintained for sufficient time to detect leaks and defects. All leaks and defects shall be

made good in proper workman like approved manner. If necessary the piping shall be taken down and re-erected and any make shift or temporary repair of leaks will not be permitted. The pressure shall be maintained for atleast 24 hours in the final test. The system shall subsequently be given 975 mbar vacuum test for sufficient time to detect leaks and defects. Final vacuum shall be maintained for atleast 24 hours.

06. The Contractor shall test (including megger tests for insulation values, and continuity of circuits) all electric motors, electric wiring and earthing and furnish test records to the Engineer.

07. After the entire installation has been completed, the Contractor shall operate the equipment under normal working conditions making all necessary adjustments in the equipment, plants, balancing valves, automatic controls, air vents, pressure reducing valves, air dampers, air devices, etc. until all requirements of performance are met.

08. All water circulating systems shall be properly balanced for the specified flow through each circuit/equipment.

09. Air Balancing.

All air systems shall be adjusted and operated for as long a time as necessary to test air flow in all parts of a system and the Contractor shall make all necessary adjustments to obtain proper and uniform air distribution throughout the Building, meeting the specified design requirements. The Contractor shall arrange for this purpose high quality instruments and meters duly calibrated and certified by the manufacturer and having all necessary probes, jets, scoops and collectors for measuring supply, return, fresh and exhaust air velocities and cfm, static pressure and total pressure in the ducts, plenums, fans, airhandling equipment, supply, return, fresh and exhaust air devices (grilles, registers, diffusers and louvers). The suggested instruments are Alnor Series 6000-P Velometer or Alnor Compu Flow Electro Manometer with Micro Printer, Cambridge-Alnor PMS Meter and Dwyer combination Manometer-Air Velocity Meter. The Contractor shall inform the Consultant about the instruments he proposes to use.

Air balancing and testing shall not begin until the system has been completed and is in full working order.

The Contractor shall submit to the Consultant for approval the biodata of his Engineer or the specialist Subcontractor to be deputed for the work.

The Contractor shall follow the following procedure:

(a) Prior to start of air balancing, the Contractor shall check:

The rotation of all fans.
Verify that all fire dampers are open.
All balancing dampers (including dampers in mains, branches and air devices) are fully open.
Splitter dampers are in normal position.
All automatic dampers adjusted for summer operation.

- All filters are clean.
All coils are in normal operation.
- (b) The Contractor shall proceed with the air balancing as follows:
- Test and adjust fan rpm to design requirements.
- To meet the design specified cfm requirements, after preliminary balancing and damper adjustment, it may be necessary to re-adjust fan speed by adjusting or replacing variable or fixed pitch pulleys.
Check that fan motor is not overloaded.
- Make pitot tube traverse of main supply air duct at 150mm centres in straight duct sections and obtain design cfm at fans.
- Test, adjust and record system suction and discharge static pressures.
- Test and adjust each system for supply air, return air, fresh air and exhaust air cfm.
- Adjust all dampers in main and branch supply, return, fresh and exhaust air ducts to obtain design cfm for each system and zone.
- Test and adjust each air device regarding fpm and cfm within 10% of design requirements. Each air device shall be identified as to location and area.
- (c) The test data shall be recorded in forms to be approved by the Consultant. After completion of final testing and balancing, complete record of all final readings shall be prepared and submitted to the Consultant in duplicate for approval.
- (d) The Consultant shall spot check finally balanced air systems with the submitted record and if the specified requirements are met, they will issue a Certificate of acceptance to the Contractor.

TEST RUNS

01. The Contractor shall be required to carry out test run(s) as specified in the Memorandum of Tender after the issue of the Certificate of Substantial Completion for the complete works by the Engineer. The period for the test run(s) would be designated in writing by the Engineer. The test run observations shall be recorded in duplicate by the Contractor on printed log sheets approved by the Consultant. The Contractor shall depute an experienced Site Engineer and sufficient skilled labour for taking and recording test run observations. The normal plant operation shall be carried out by the Employer's Operators.
02. The Employer shall only provide without charge to the Contractor water, electricity and fuel for the test run(s) and the Contractor shall be responsible for the supply of all tools and instruments etc. required to take and record the test run observations.
03. The log sheets shall be jointly signed by the Employer's Representative and Contractor's Site Engineer. The Contractor shall hand over one set of log sheets to the Employer's Representative every day.
04. The Contractor's Project Engineer shall check and prepare a summary of observations on printed forms approved by the Consultant in quadruplicate at the end of each test run week. One set each shall be supplied to the Engineer, Consultant and Employer's Representative within one week of the conclusion of the corresponding test run week.
05. The Engineer shall check the performance of the plant(s) during the test run(s). If the plant(s) performance meets the specified requirements, the Engineer shall issue a Certificate of satisfactory completion of test run(s) to the Contractor.

MAINTENANCE

01. The Contractor shall be responsible without additional charge to the Employer for maintenance and servicing of the complete plant during the period of maintenance named in the Memorandum after the issue of the Certificate of Substantial Completion by the Engineer.

02. The Contractor shall be responsible for arranging all tools, instruments and Technical Staff including Specialist Technicians/Engineers required for the work. The Employer shall be responsible to supply all materials and spare parts required for the work excluding parts defective due to manufacturing defect which shall be replaced by the Contractor under the terms of the contract.

03. The Contractor shall service the complete plant regularly according to the Schedule of Servicing and Maintenance as approved or amended by the Consultant but not less than once a month during the operational seasons. The servicing and maintenance shall be carried out by competent skilled labour under supervision of a qualified Engineer.

The Contractor shall take a certificate of satisfactory completion of monthly servicing from the Employer's Representative.

04. The Contractor shall carry out annual servicing, maintenance and overhauling of the complete plant at the end of the operational season and make the plant ready for operation in all respects well before the commencement of the next operational season. On receiving notification from the Contractor that annual servicing, etc. is nearing completion, the Consultant shall check the work carried out and give directions to the Contractor for completion of outstanding work, if any.

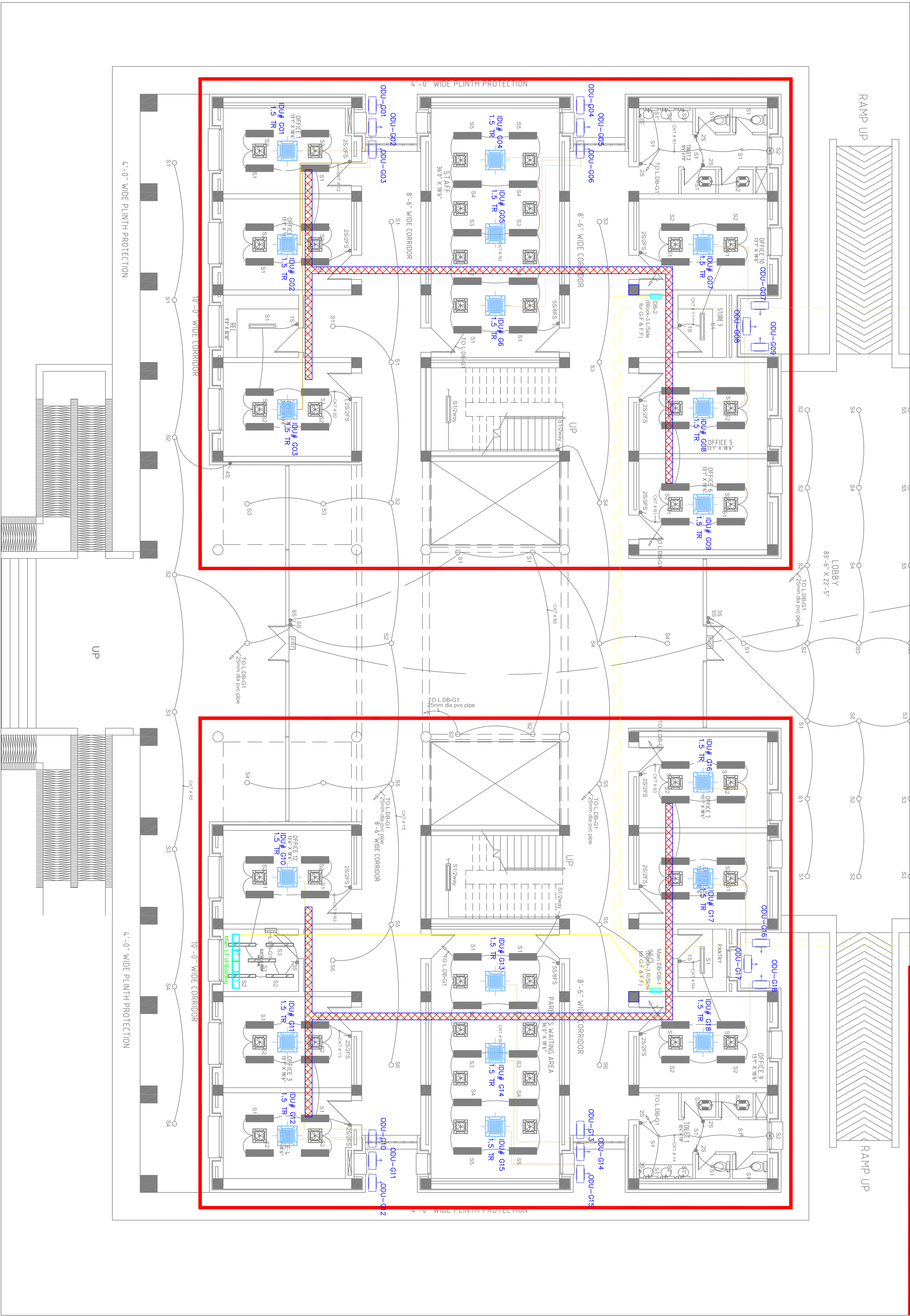
05. On satisfactory completion of annual servicing, maintenance and overhauling of the complete plant, the Engineer shall issue a Certificate of satisfactory completion to the Contractor.

SPECIAL TOOLS AND INSTRUMENTS FOR MAINTENANCE

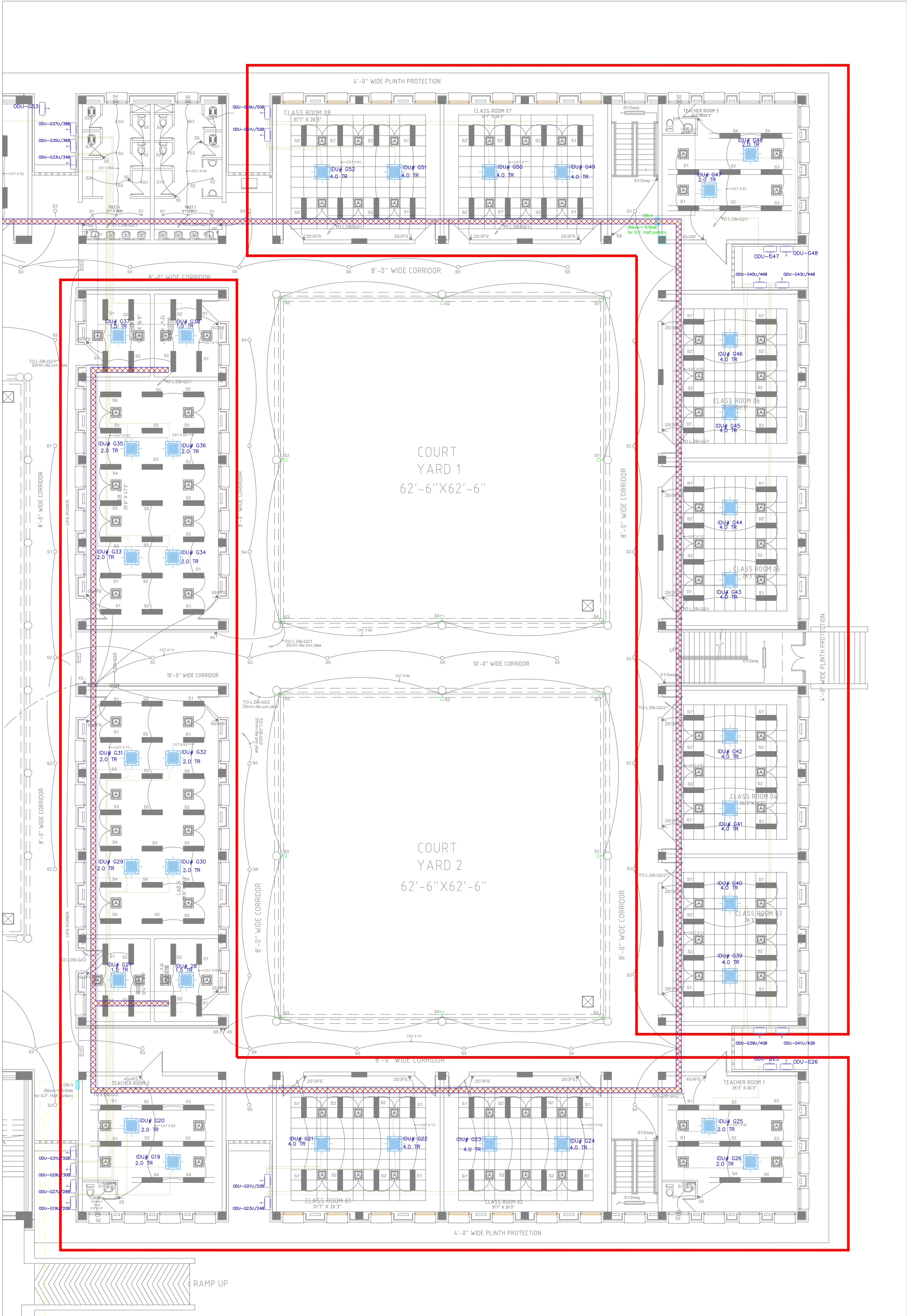
01. The Contractor shall supply to the Employer all necessary special tools and instruments required for proper operation, servicing and maintenance of the complete plant.
02. The tenderer shall give a complete List of special tools and instruments included in his tender.
03. Amongst others, following shall be included without limitation:
- (a) Tong Tester of suitable range with Amp, Volt and ohm scales.
 - (b) Phase Tester.
 - (c) Sling psychrometer with 140mm long 0-50°C range thermometers.
 - (d) Electric motor driven high pressure air blower for cleaning.
 - (e) One set each of open end, ring and adjustable spanners.
 - (f) One set each of flat and Phillips head screw drivers.
 - (g) Set of hammers.
 - (h) Two pliers with flat and pointed nose.
 - (i) One set of cleaning and washing tanks for air filters.

SPARE PARTS

01. The tenderer shall include the price of complete set of spare parts for all items supplied by him required for two years operation for the specified operating hours. In particular, spares shall be provided for electrical equipment, fuses, controls, instruments, bearings, flexible couplings, belts, gaskets, O-rings, etc. without which the equipment would become non-operative.
02. The tenderer shall give a complete List of all the spare parts included in his tender.



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Drawing Title			
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Drawn By		Date	
MA		MARCH-2021	
Checked By		Revision No	
IA		0	
Scale		Drawing No	
3/16"=1'-0" ON A0		AC-01	



REV.		DATE	
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BENAZIR BHUTTO SHAHEED INSTITUTE OF MANAGEMENT SCIENCES DADU			
Drawing Title			
GROUND FLOOR OFFICES AIR CONDITIONING LAYOUT PLAN			
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MA		IA	
Scale		Revision No	
1/8"=1'-0" ON A0		0	
Date		Drawing No	
MARCH-2021		AC-02	

