ADDENDUM – I
TO
BIDDING DOCUMENTS
FOR

Planning, Design and Construction of Mother & Child Hub at Diamond Harbour Government Medical College & Hospital in the State of West Bengal on Turnkey Basis

Bid Reference No.: WBMSCL/NIT- 295/2021 Dated –25.08.2021

SECTION 5.3

SCHEDULE OF FINISHES

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	FLOORING	WALL FINISH
		Description	Description
	MOTHER & CHILD HUB BUILDING		
1	**ENTRANCE LOBBY & EMERENCY ENTRANCE LOBBY**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
2	**CORRIDOR & LOBBY**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
3	**LIFT LOBBY**	Granite Stone with borders in different shade	Acrylic Emulsion paint upto soffit of the slab
4	**OPD CHAMBER, COUNSELING ROOM, PPU, FAMILY WELFARE ROOM, IMMUNIZATION ROOM, PHYSIOTHERAPY ROOM, PROCEDURE & TREATMENT ROOM, DOCTOR'S ROOM, NURSE'S ROOM, SPEECH THERAPY ROOM & OTHER ROOM**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
5	**LABORATORY, SAMPLE COLLECTION ROOM**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
6	**TOILETS**	Ceramic tiles	Acrylic Emulsion paint upto soffit of the slab
7	**SEMINAR ROOM, LIBRARY,TEACHING CORNER, ANTENATAL ROOM**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
8	**RECEPTION, WAITING AREA, ENQUIRY COUNTER, NURSES STATION**	Granite Stone with borders in different shade	Acrylic Emulsion paint upto soffit of the slab
9	**PHARMACY**	Full body Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
10	**X-RAY ROOM, CITY SCAN SHOULD IN CONFIRMITY WITH AERB REGULATION**	Full body Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
11	**DARK ROOM**	Full body Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
12	**USG ROOM, MRI ROOM ROOM,STERILE ROOM**	Full body Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
13	**ECO ROOM, EEG ROOM, ECG ROOM**	Full body Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
14	**STAIRCASE WITH SS HAND RAIL**	Granite Stone	Acrylic Emulsion paint upto soffit of the slab
15	**OT AREA,LABOUR ROOM & Other Equivalent Room**	Designed Granite Stone flooring	Granite clading upto ceiling

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	FLOORING	WALL FINISH
		Description	Description
16	**HDU,ICU,NICU,SNCU,PICU & Other Equivalent Room**	Full body Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
17	**RECOVERY ROOM**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
18	**AUDIOMETRY ROOM**	Premium quality Double Charged Designer Vitrified tiles	Acoustic Wall Panelling upto false ceiling & Putty over plaster above false ceiling
19	**OFFICE**	Premium quality Double Charged Designer Vitrified tiles	Acrylic Emulsion paint upto soffit of the slab
20	**WARD**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
21	**BABY CARE ROOM**	Premium quality Double Charged Designer Vitrified tiles with granite stone borders	Acrylic Emulsion paint upto soffit of the slab
22	**RECORDS & STORE ROOM**	Kota Stone	Acrylic emulsion Paint upto soffit of slab
23	**ELECTRICAL , ELV, AHU , AV , UPS Etc. ROOM**	IPS flooring	Acrylic Emulsion paint upto soffit of the slab
24	**UTILITY SHAFT**	IPS flooring	Plastered wall with white cement wash
	TERRACE	Roof Treatment	-

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	DADO	SKIRTING	CEILING FINISH
		Description	Description	Material
	MOTHER & CHILD HUB BUILDING			
1	**ENTRANCE LOBBY & EMERENCY ENTRANCE LOBBY**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
2	**CORRIDOR & LOBBY**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
3	**LIFT LOBBY**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
4	**OPD CHAMBER, COUNSELING ROOM, PPU, FAMILY WELFARE ROOM, IMMUNIZATION ROOM, PHYSIOTHERAPY ROOM, PROCEDURE & TREATMENT ROOM, DOCTOR'S ROOM, NURSE'S ROOM, SPEECH THERAPY ROOM & OTHER ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
5	**LABORATORY, SAMPLE COLLECTION ROOM**	Digital Ceramic tile dado upto 2100mm high from ffl with highlighter.	-	Acrylic emulsion paint
6	**TOILETS**	Digital Ceramic tile dado upto 2100mm high from ffl with highlighter.	-	Acrylic emulsion paint
7	**SEMINAR ROOM, LIBRARY,TEACHING CORNER, ANTENATAL ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
8	**RECEPTION, WAITING AREA, ENQUIRY COUNTER, NURSES STATION**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
9	**PHARMACY**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
10	**X-RAY ROOM, CITY SCAN SHOULD IN CONFIRMITY WITH AERB REGULATION**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
11	**DARK ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
12	**USG ROOM, MRI ROOM ROOM,STERILE ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
13	**ECO ROOM, EEG ROOM, ECG ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
14	**STAIRCASE WITH SS HAND RAIL**	Acrylic emulsion paint	-	Acrylic emulsion paint
15	**OT AREA,LABOUR ROOM & Other Equivalent Room**	Acrylic emulsion paint	150mm high	Powder Coated Metal False Ceiling

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	DADO	SKIRTING	CEILING FINISH
		Description	Description	Material
16	**HDU,ICU,NICU,SNCU,PICU & Other Equivalent Room**	Digital Ceramic tile dado upto 2100mm high from ffl with highlighter.	-	Combination of seamless Magnesia board and Fiber cement tile. Painted with Acrylic emulsion paint with putty & primer.
17	**RECOVERY ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
18	**AUDIOMETRY ROOM**	Acrylic emulsion paint	150mm high	Acoustic False Ceiling
19	**OFFICE**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
20	**WARD**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
21	**BABY CARE ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
22	**RECORDS & STORE ROOM**	Acrylic emulsion paint	150mm high	Acrylic emulsion paint
23	**ELECTRICAL , ELV, AHU , AV , UPS Etc. ROOM**	Acrylic emulsion paint	300mm cement punning	Acrylic Distemper Paint
24	**UTILITY SHAFT**	-	-	White cement wash
	TERRACE	-	-	-

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	DOOR		
		FRAME	SHUTTER	Height from FFL
	MOTHER & CHILD HUB BUILDING			
1	**ENTRANCE LOBBY & EMERENCY ENTRANCE LOBBY**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
2	**CORRIDOR & LOBBY**	-	-	-
3	**LIFT LOBBY**	-	-	-
4	**OPD CHAMBER, COUNSELING ROOM, PPU, FAMILY WELFARE ROOM, IMMUNIZATION ROOM, PHYSIOTHERAPY ROOM, PROCEDURE & TREATMENT ROOM, DOCTOR'S ROOM, NURSE'S ROOM, SPEECH THERAPY ROOM & OTHER ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Both side enamel painted 35 mm thick solid flush type door shutter	2.40 m
5	**LABORATORY, SAMPLE COLLECTION ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Both side enamel painted 35 mm thick solid flush type door shutter	2.40 m
6	**TOILETS**	For Front door Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm For other door PVC Door Frame of size 50x47 mm with a wall thickness of 5 mm	For Front door Bothside enamel painted 35mm thick solid flush type door shutter For other door Solid panel PVC Door shutter, made out of single piece extruded soild PVC profiles, 5 mm	2.40 m
7	**SEMINAR ROOM, LIBRARY,TEACHING CORNER, ANTENATAL ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
8	**RECEPTION, WAITING AREA, ENQUIRY COUNTER, NURSES STATION**	-	-	
9	**PHARMACY**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
10	**X-RAY ROOM, CITY SCAN SHOULD IN CONFIRMITY WITH AERB REGULATION**	Lead lined FD 120 Fire rated door system including appropriate frame as per satisfaction of employer		2.40 m
11	**DARK ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
12	**USG ROOM, MRI ROOM ROOM,STERILE ROOM**	Lead lined FD 120 Fire rated door system including appropriate frame as per satisfaction of employer		2.40 m
13	**ECO ROOM, EEG ROOM, ECG ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
14	**STAIRCASE WITH SS HAND RAIL**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Steel Metal Fire proof Door Shutter with a fire rating of a minimum of 2hrs.	2.40 m
15	**OT AREA,LABOUR ROOM & Other Equivalent Room**	Harmatically Sealed OT Door shutter with frame of suitable design as per satisfaction of employer		2.40 m

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	DOOR		
		FRAME	SHUTTER	Height from FFL
16	**HDU,ICU,NICU,SNCU,PICU & Other Equivalent Room**	Powder Coated Aluminium Door frame	Aluminium Door thikness 6 mm with Glass as per satisfaction of employer	
17	**RECOVERY ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
18	**AUDIOMETRY ROOM**	Door frame for 65mm thick Accoustic Door Shutter	65mm thick Accoustic Door Shutter	2.40 m
19	**OFFICE**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
20	**WARD**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
21	**BABY CARE ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
22	**RECORDS & STORE ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	Bothside enamel painted 35mm thick solid flush type door shutter	2.40 m
23	**ELECTRICAL , ELV, AHU , AV , UPS Etc. ROOM**	Powder coated MS door frame confirming to IS 4351 letest publication with minimum sheet metal thickness 1.60mm	46mm thick powder coated Steel Metal Door Shutter	2.40 m
24	**UTILITY SHAFT**	Powder Coated Aluminium Door frame	Powder Coated Aluminum door shutter with fire resistant pre-laminated cement bonded particle board	2.40 m
	TERRACE	-	-	-

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	Window		
		Description	Sill height from FFL	Lintel height from FFL
	MOTHER & CHILD HUB BUILDING			
1	**ENTRANCE LOBBY & EMERENCY ENTRANCE LOBBY**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
2	**CORRIDOR & LOBBY**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
3	**LIFT LOBBY**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
4	**OPD CHAMBER, COUNSELING ROOM, PPU, FAMILY WELFARE ROOM, IMMUNIZATION ROOM, PHYSIOTHERAPY ROOM, PROCEDURE & TREATMENT ROOM, DOCTOR'S ROOM, NURSE'S ROOM, SPEECH THERAPY ROOM & OTHER ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
5	**LABORATORY, SAMPLE COLLECTION ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
6	**TOILETS**	Polyester powder coated aluminium Louver window with unbreakable PVC glazing (minimum thickness of polyester powder coating 50 micron) with MS Grill.	1.50 m	2.40 m
7	**SEMINAR ROOM, LIBRARY,TEACHING CORNER, ANTENATAL ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
8	**RECEPTION, WAITING AREA, ENQUIRY COUNTER, NURSES STATION**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
9	**PHARMACY**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
10	**X-RAY ROOM, CITY SCAN SHOULD IN CONFIRMITY WITH AERB REGULATION**	-	-	-
11	**DARK ROOM**	-	-	-
12	**USG ROOM, MRI ROOM ROOM,STERILE ROOM**	-	-	-
13	**ECO ROOM, EEG ROOM, ECG ROOM**	-	-	-
14	**STAIRCASE WITH SS HAND RAIL**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
15	**OT AREA,LABOUR ROOM & Other Equivalent Room**	-	-	-

SECTION 5.3A : SCHEDULE OF FINISHES

SL. No.	TYPE OF ROOM	Window		
		Description	Sill height from FFL	Lintel height from FFL
16	**HDU,ICU,NICU,SNCU,PICU & Other Equivalent Room**	-	-	-
17	**RECOVERY ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
18	**AUDIOMETRY ROOM**	-	-	-
19	**OFFICE**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
20	**WARD**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
21	**BABY CARE ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
22	**RECORDS & STORE ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
23	**ELECTRICAL , ELV, AHU , AV , UPS Etc. ROOM**	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) with MS Grill.	0.90 m	2.40 m
24	**UTILITY SHAFT**	-	-	-
	TERRACE	-	-	-

SECTION 5.3B : SCHEDULE OF FINISHES (Common Items)		
Sl. No	**Particular**	**Description**
1	**Collapsable gate / Rolling Grill**	Collapsable gate / Chain link type Rolling Grill to be provided along with door at all entry & exit point of the Academic building as per approved architectural drawing to the satisfaction of employer.
		Collapsable gate to be provided along with door at all entry & exit point of each department in the Academic building as per approved architectural drawing to the satisfaction of employer.
		Collapsable gate to be provided along with door at main entry & exit point of the Hostel buildings, Residential Quarters building, and other buildings as per approved architectural drawing to the satisfaction of employer.
		Collapsable gate to be provided at entry point along with door of each Residential Quarters as per approved architectural drawing to the satisfaction of employer.
2	**EXTERNAL DEVELOPMENT**	
	a) Parking Area	80 mm thick Paver Block at eaternal parking / Paver tiles at covered parking under stilt floor after getting approval from the employer.
	b) Footpath	60 mm thick Paver Block at footpath.
	c) External / Internal Roads of Medical College Campus	Concrete road (Grade of concrete minimum M40) with maximum gross vehicle weight (GVW) 31 tonnes with maximum axle load 19 tonnes carrying capacity
	d) Kerb Channel & Kerb Stone	PCC M20 Precast Block
	e) Compound Wall all sides	RCC Column, Brick work with MS Grill & other decorative materials as directed & to the satisfaction of the employer.
3	**WINDOW/LouverS**	
a)	All External Windows	Polyester powder coated aluminium glazed sliding window (minimum thickness of polyester powder coating 50 micron) frame as per approved drawing (with section thickness minimum 1.5 mm) with MS Grill. Each shutter width should be more than 600mm. Minimum 5 mm or more Thick Glass as per requirement
b)	Window Sill (External and Internal- 300mm / 150mm Wide respectively)	Moulded Granite cladding inside & outside
c)	Louvers	Polyester powder coated aluminium Louver window with unbreakable PVC glazing (minimum thickness of polyester powder coating 50 micron) with MS Grill. Minimum 5 mm or more Thick Glass as per requirement.

SECTION 5.3B : SCHEDULE OF FINISHES (Common Items)		
Sl. No	**Particular**	**Description**
4	**EXTERNAL FACADE of Mother & Child Hub building**	a) The following materials may be used for external finishes of the project. Design as per satisfaction of employer. i) Structural Glazing. ii) Glass mosaic tiles. iii) Exterior paint over plastered surface. iv) Exterior textured paint over plastered surface. v) ACP cladding. vi) Stone cladding. vii) Metal louvers. viii) GFRC. ix) Designer Balustrade. x) Exterior high pressure compact laminate.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
1)	**MS Door Frame**	:	Powder coated pressed steel door frames (profile - C) conforming to IS: 4351, manufactured from commercial mild steel sheet of 1.60 mm thickness, including jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25 mm, or base ties of 1.60 mm, pressed mild steel welded or rigidly fixed together by mechanical means, including M.S. pressed butt hinges 2.5 mm thick with mortar guards, lock strikeplate and shock absorbers as specified and as directed by Engineerin-charge:
2)	**Flush Door shutter**	:	Bothside enamel painted 35mm thick solid flush type door shutter of deluxe decorative quality, conforming to I:S 2202 timber frame consisting of top and bottom rail and side styles of well seasoned timber 65mm wide each and the entire frame fitted with 27.5mm wide battens places both ways in order to made the door of solid core and internal lipping with teak, mahogony or rose wood approved lamination sheet using phenol formaldehyde as glue etc.
3)	**Door frame for 65mm thick Accoustic Door Shutter**	:	Supplying fitting & fixing frames for Fire resistant acoustic door shutters 1st class Malaysian Hardwood Frame (densified to 810 kg/cum) and pressure treated with fire retardant chemicals in vacuum impregnation vessel under 160 psi pressure as per IS:401and kiln seasoned to moisture below 15% as per IS:1141 of section 120 mm X 70 mm spray quoted with 2 coats of intumescent paint of minimum 200 micron, with standard double acoustic seal (equivalent to Hafele) placed along two faces of rebate for sound insulation and single row of Brush- Type intumescent strip of size 10 mmx 4 mm affixed in the slit of the Frame for fire and smoke sealing, etc. complete as per direction of Engineer inCharge including a protective coat of painting at the contact surfaces of the frame.
4)	**65mm thick Accoustic Door Shutter**	:	65mm thick asbestos free - fire, heat and smoke resistant composite Accoustic Door Shutter complying with fire performanceFD120 as per IS:3614 (part -II)- comprising of 2x 8 mm Calcium Silicate boards over Chemically treated (with Fire retardant chemicals in pressure impregnation vessels under 160 psi pressure as per IS:401 and kiln seasoned to moisture below 15% as per IS:1141) internal timber (Malaysian Hard Wood,densified to 810kg/cum) frame work of 100 mm x32 mm with 32mm thick infill of ceramic fiber (density 128Kgs/cum), vermaculite mix faced with 6 mm Fire retardant High Density fire board, internally lipped with hardwood beading, and pasted in Hydraulic Press under 25 MPa, spray coated with 2 coats of in-tumescent paint of minimum 200 micron, and with 1 row of Brush- Type intumescent strip of size10mmx 4mm affixed on peripheral slit on all edges of shutter except bottom for fire and smoke sealing and placement of 3 mm thick rubber membrane, at the inside face, sandwiched between calcium silicate board & high density fire retardant board, without any external lipping as per direction of Engineer -in -charge complete in all respect.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
5)	**46mm thick Steel Metal Door Shutter**	:	46mm thick Door shutter of 1.20mm thick slip coated pre-galvanised steel sheet confirming to ASTM A527/ASTM A525, JIS G 3302, IS 277. Zinc coating 80-120 g.sqm. Lock formed panels with internal stiffeners of 3mm thick made of GP 3.00mm thick hinge reinforceing, hardware mounting plates and lock protection. Shutter filled with paper honeycomb thickness of 150 gsm, load bearing capacity 1-1.5 ton/sqm. External finish should be powder coated surface finished with thermosetting polyurethane paint of aliphatic grade, scratch resistance. Polyurethane powder coat thickness 60 - 65 microns
6)	**Metal Fire proof Door**	:	Steel Metal Fire proof Door Shutter with a fire rating of a minimum of 2hrs as per manufacturer specification.
7)	**PVC Door Frame of size 50x47 mm with a wall thickness of 5 mm**	:	PVC Door Frame of size 50x47 mm with a wall thickness of 5 mm (± 0.2 mm), made out of single piece extruded PVC profile, with mitred cut joints and joint with 2 nos of PVC bracket of size 190 mm x 100 mm long arms of cross section size 35 x 15 mm & self driven self taping screws, the vertical door profiles to be reinforced with 40x20 mm M.S. rectangular tube of 0.8 mm , including providing EPDM rubber gasket weather seal throughout the frame, including jointing 5 mm PVC frame strip with PVC solvent cement on the back of the profile. The door frame to be fixed to the wall using 8 x100 mm long anchor fasteners complete, all as per manufacturer's specification and direction of Engineer-in-charge.
8)	**Solid panel PVC Door shutter, made out of single piece extruded soild PVC profiles, 5 mm**	:	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded soild PVC profiles, 5 mm (± 0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinge side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm X 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm X 100 mm of cross section size 35 mm x 17 mm x 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm, out of which 75 mm to be flat and 20 mm to be tapered at both ends, having 15mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge. Decorative finish (wood grained finish)
9)	**Kota stone & Black stone flooring**	:	18 mm. to 22 mm. thick, kota stone & black stone slab set in 20 mm thick (avg) cement mortar (1:4) in floor, stair & lobby including pointing in cement slurry with admixture of pigment matching the stone shade, including grinding & mirror polishing as per direction of Engineer - in - charge. [Slurry for bedding @ 4.4 kg/Sq.m and pointing @2.0 kg/Sq.m]

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
10)	**Granite stone flooring**	:	Granite slab 15mm to 18mm thick in floor, lobby, stair, landing and treads etc. over 20mm (avg) thick base of cement morter (1:2) laid with white cement slurry @ 4.40Kg per Square meter before placing of granite and jointed with white cement slurry @ 2.0 Kg per square meter with necessary pigments and complete as per direction of Engineer-in-charge including
11)	**Granite dado on lift fascia wall**	:	Granite slabs 15mm to 18 mm. thick with uniform texture & without decorative veins in columns, wall, facia, rise etc. with 15 mm thick [avg] cement mortar (1:2) including making suitable arrangements to hold the stones properly by brass / copper hooks including pointing in cement mortar (1:2) (1 white cement : 2 marble dust) with admixture of pigment matching the stone shades all complete as per direction of the Engineer-in-charge including all materials, labours, scaffolding, staging, curing and roughening of concrete surface complete. [Using cement slurry at back side of granite @ 4.4 kg/sq.m & white cement slurry for joint filling @ 1.8 kg/sq.m]
12)	**Premium quality Double Charged Designer Vitrified tiles flooring**	:	600mm x 600mm Premium quality Double Charged Designer Vitrified tiles of approved brand (size not less than 600 mm X 600 mm X 10 mm thick) in floor, skirting etc. set in 20 mm sand cement mortar (1:4) and 2 mm thick cement slurry back side of tiles using cement @ 2.91Kg./sqM or using polymerised adhesive (6 mm thick layer applied directly over finished artificial stone floor/Mosaic etc without any backing course) laid after application slurry using 1.75 Kg of cement per sqM below mortar only, joints grouted with admixture of white cement and colouring pigment to match with colour of tiles / epoxy grout materials of approved make as directed and removal of wax coating of top surface of tiles with warm water and polishing the tiles using soft and dry cloth upto mirror finish complete as per direction of Engineer-in-Charge.
13)	**Full Body Vitrified tiles flooring**	:	600mm x 600mm Full Body vitrified tiles of approved brand (size not less than 600 mm X 600 mm X 10 mm thick) in floor, skirting etc. set in 20 mm sand cement mortar (1:4) and 2 mm thick cement slurry back side of tiles using cement @ 2.91Kg./sqM or using polymerised adhesive (6 mm thick layer applied directly over finished artificial stone floor/Mosaic etc without any backing course) laid after application slurry using 1.75 Kg of cement per sqM below mortar only, joints grouted with admixture of white cement and colouring pigment to match with colour of tiles / epoxy grout materials of approved make as directed and removal of wax coating of top surface of tiles with warm water and polishing the tiles using soft and dry cloth upto mirror finish complete as per direction of Engineer-in-Charge.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
14)	**Wooden flooring**	:	8mm thick Laminated Wooden Flooring Work conforming to EN13329:2006 with plank size not less than 1200mmX 190 mm (with unilin/tongue-groove locking arrangement) having 0.2mm thk top abrasive layer over a decorative layer followed by a High-density fibreboard (HDF) having density > 940 kg/m3 substrate core over a rasin saturated backing layer and installing through unilin or tongue- groove system (having locking strength not less than 1000 kg/m) over a 2 mm thk underlayer polyurethene foam on polythene sheet 250 micron, over a smooth, flat, hard subfloor free from moisture (< 8%), grease etc. complete in all respect with requisite accessories like end profile, transition profile, reducer 'T' profile etc. wherever required and preparation of base including all other incidental works as per direction & satisfaction of Engineer in charge.Category: High Footfall ; Class-23; Abrasion resistance:-AC4 Thk on Swelling:- < 15%; Impact resistance:- IC 2
15)	**IPS flooring**	:	Artificial stone in flooring, dado, staircase etc with cement concrete (1:2:4) with stone chips, laid in panels as directed with topping made with ordinary or white cement (as necessary) and marble dust in proportion (1:2) including smooth finishing and rounding off corners including raking out joints or roughening of concrete surface and application of cement slurry before flooring works using cement @ 1.75 kg/sq.m all complete including all materials and labour. 35 mm. thick with mm. thick topping using grey cement.
16)	**Ceramic tiles flooring**	:	600mm x 600mm 1st quality Ceramic tiles in floors & 4 nos. of key stones (10mm) fixed with araldite at the back of each tile & finishing the joints with white cement mixed with colouring oxide if required to match the colour of tiles including roughening of concrete surface, if necessary or by synthetic adhesive & grout materials etc. Laying with Sand Cement Mortar (1:4) 20 mm thick & 2 mm thick cement slurry at back side of tiles using cement @ 2.91 Kg/Sq.m & joint filling using white cement slurry @ 0.20kg/Sq.m.
17)	**Ceramic tiles on walls**	:	300mm x 450mm for toilets & 300mm x 600mm for rest portion best quality digital printed Ceramic tiles in coloured decorative on walls & 4 nos. key stones (10mm) fixed with adhesive 4.5 mm thick at the back of each tile & finishing the joints with white cement mixed with colouring oxide if required to match the colour of tiles including roughening of concrete surface, if necessary or by synthetic adhesive & grout materials etc. With polymerised adhesive and epoxy grout pointing including spacer - 2mm (When tiles are laid over existing hard ready surface) all complete as per direction of Engineer-in-charge.
18)	**Stone Polymer Composite (SPC) tiles flooring**	:	Stone Polymer Composite (SPC) Luxury Performance Tiles with tile thickness 4.00mm in any shape and size as per approved design fixing in Click-N-Lock Technology over IPS flooring.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
19)	**Acoustic Wall Panelling**	:	a) Above 1.20m to false ceiling Providing, Fitting and fixing of wall panel up by G.I. frame work with 600 x 300mm c/c to be fixed on wall, all the framing materials of GI section made of approved brand. Thereafter Synth PF 50 mm thick having density of 20 Kgs/Cu.M tie up with Galvanized wire mesh and Galvanized wire, to avoid sagging. On top provide Acoustical panel fabric finish of woodfibre core of size 1200 x 600x20 mm with H -Spline of NRC upto 0.95, Fire class 1&P having density of 400 kg/M3. to maintain the functional activities & aesthetic decor of the hall. This kinds of treatment to be provided on both side wall of the Hall. Design of wall to be made for popper sound reproduction. b) Above flooring to 1.20m Wall panelling with Melamine faced 3 layered flat pressed wood particle board of approved make and brand as per direction of Engineer - in - Charge of requisite grade bonded with phenol formaldehyde synthetic resin conforming to IS: 848-1974 (Prelaminated particle board confirming to IS 3087 -1985 and IS 12823 - 1990 one side decorative laminated exterior grade 12mm thick) including the cost of supporting frame work with GI grid. c) For decoration: i) Porviding & Fixing of wall panel by G.I. frame work with 600 x 300mm c/c to be fixed on wall, all the framing materials. There after Synth PF 50 mm thick having density of 20 Kgs/Cu.M. tie up by Galvanized wire mesh and galvanized wire to avoid sagging. On top of GI frame provide wooden slats of 16mm thick 128mm x 2440mm x16mm toungue and groove edges for seamless mounting having density of 750-800 kg/m3. with fleece melamine finish. NRC is upto 0.75 with a pitch of L-16 of 2mm grooves with FR grade, colour to be approved. This run of wall panelling to be provided on both side and back wall of the hall partialy. Design of wall to be made for popper sound reproduction. ii) Providing & Fixing of wall panel by G.I. frame work with 600 x 300mm c/c to be fixed on wall, all the framing materials of ultra section made of Saint Gobain. There after Synth PF 50 mm thick having density of 20 Kgs/Cu.M. tie up by Galvanized wire mesh and galvanized wire to avoid sagging. On top of GI frame provide 12mm thick BWR ply and 4 mm thick teak with freanch polish finish Provide 50 x 20 mm wooden molded bit to be fixed between the edge area. To match aesthetic decor and functional activities. This run of wall panelling to be provided on both side and back wall of the hall partialy. Design of wall to be made for popper sound reproduction.
20)	**Interior grade Acrylic Primer**	:	Solvent based Interior grade Acrylic Primer of approved quality and brand on plastered or cencrete surface old or new surface to receive Distemper/ Acrylic emulsion paint including scraping and preparing the surface throughly, complete as per manufacturer's specification and as per direction of the EIC. Two Coats
21)	**Exterior grade Acrylic primer**	:	Exterior grade Acrylic primer of approved quality and brand on plastered or cencrete surface old or new surface to receive decorative textured (matt finish) or smooth finish acrylic exterior emulsion paint including scraping and preparing the surface throughly, complete as per manufacturer's specification and as per direction of the EIC. Two Coats

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
22)	**Synthetic oil bound primer for steel or other metal surface**	:	Priming one coat on steel or other metal surface with synthetic oil bound primer of approved quality including smoothening surfaces by sand papering etc.
23)	**Synthetic oil bound primer on timber or plastered surface**	:	Priming one coat on timber or plastered surface with synthetic oil bound primer of approved quality including smoothening surfaces by sand papering etc.
24)	**Acrylic Emulsion Paint**	:	Applying Acrylic Emulsion Paint of approved make and brand on walls and ceiling including sand papering in intermediate coats including putty: (Two coats Luxury Quality)
25)	**Acrylic Distemper Paint**	:	Acrylic Distemper to interior wall, ceiling with a coat of solvent based interior grade acrylic primer (as per manufacturer's specification) including cleaning and smoothning of surface. Two Coats
26)	**Acrylic exterior emulsion paint**	:	Protective and Decorative Acrylic exterior emulsion paint of approved quality, as per manufacturer's specification and as per direction of Engineer-in-Charge to be applied over acrylic primer as required. (Super Protective 100% Acrylic Emulsion Two Coat) with 10 years of manufacturer's waranty
27)	**Textured exterior high class matt finish paint**	:	Protective and Decorative Textured exterior high class matt finish paint of approved quality, composed of special Tharmoplastic Resin containing fine crystalline additives derive from Granite as per manufacturer's specification and as per direction of EIC to be applied over acrylic primer as required. (Two Coat) with 10 years of manufacturer's waranty
28)	**Cement based paint**	:	Applying decorative cement based paint of approved quality after preparing the surface including scraping the same thoroughly (plastered or concrete surface) as per manufacturer's specification. (Two Coat)
29)	**Synthetic enamel paint**	:	Best quality synthetic enamel paint of approved make and brand including smoothening surface by sand papering etc. including using of approved putty etc. on the surface, if necessary : On timber or plastered surface & On steel or other metal surface
30)	**White Wash**	:	White washing including cleaning and smoothening surface thoroughly. Three coats The white washing is to be done with 5 parts of stone lime and one part of shell lime with necessary gum (2 Kg. per Cu.M. of lime) using indigo as necessary and to be mixed as per standard practice. The operation for each coat shall consist of four consecutive strokes of the brush, one horizontally from right to left and the next from left to right and the third stroke bottom to upward and the fourth from top to down ward before the previous stroke dries. Each coat shall be allowed to dry before the next coat applied. No portion of the surface shall be left out initially to be patched up later on. The brush shall be dipped in white wash, pressed lightly against the wall of the container and then applied by lightly pressing against the surface with full swing of hand. The white wash on ceiling should be done prior to that on walls.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
31)	**Polyurethane (PU) Polishing**	:	Polyurethane Polishing to woodwork with required colour as approved by Engineer-in-Charge with preparing surface including scaffolding and hire charges of compressor machine including cost of filler and hardener material such as P. U. Sealing, P. U. Top coat (Matt/Glossy), Thinner, Spirit etc. and inclusive of all operation, material and labour complete as per direction of Engineer-in- Charge
33)	**Fiber cement tile false ceiling**	:	False ceiling with powder coated exposed G.I. grid suspension system (E-Grid T 2430 or equivalent load carrying capacity with mid span deflection not exceeding 1/360 span with hanger spacing of 1200mm c/c) consisting of Main Runner 3600 mm long, Cross Tee 1200 mm / 600 mm long and Wall Angle. The Wall Angle shall be fixed on PVC Dash Fasteners on the perimeter of the wall by steel screws with distance 300mm c/c. The Main Runners to be placed @ 1200 mm. The Cross Tee 1200mm will be inserted in the pre-cut slots of Main Runner at regular interval of 600 mm to form a modular grid of 1200mm X 600mm. Additional Cross Tees of 600 mm shall be placed perpendicular to the Cross Tee 1200 mm long to finally form a grid of 600 mm X 600 mm. Grid of module size 600 mm X 600 mm shall be supported by 6 mm dia G.I. wire from purlins / soffit. 6 mm thick High Pressure Steam Cured Non Asbestos Fibre Cement Standard Ceiling tile (Density > 1300 Kg/m3) of size 595 mm X 595 mm, conforming IS 14862 & Type B Category III of ISO 8336, tested as per AS-1530 part 3 & BS-476 Part 4,5,6,7 & 8, should be placed in the Grid module to form a False Ceiling. All complete as per the drawing & directions of Engineer-in-charge. (with 6mm thick Fibre Cement Standard Ceiling Board and E-Grid-2430).
34)	**Magnesia False ceiling**	:	Concealed False ceiling Framework with G.I. Section (perimeter channels having one flange of 20 mm. and another flange of 30 mm. with thickness of 0.55 mm. and web of length 27 mm., along the perimeter of the ceiling, screws fixed to the wall with help of nylon sleeves or PVC dash fastners @ 610 mm c/c. then suspend G.I. intermidiate 'C' section with web 90 mm. and flanges of 15 mm. each from soffit @ 1200 mm c/c with ceiling angle of size 25 mm. X 10 mm. X 0.55 mm. fixed to soffit G.I. Cleat and Steel expansion fasteners. Ceiling section of 0.55 mm. thickness having web of 51.5 mm. and two flanges of 26 mm. each with lips of 10.55 mm., are then fixed on to the intermediate channel with the help of connecting clips in the direction perpendicular to the intermidiate channel @ 610 mm c/c) with fully threaded fiber cement screws @ 300 mm c/c. all complete as per the drawing and direction of Engineer-in-Charge. Section specification :- Perimeter Channel :- 30 mm X 20 mm X 27 mm, thickness 0.55 mm (min), Intermidiate Channel :- 15 mm X 90 mm, thickness 0.90 mm (min), Ceiling Section :- 51.5 mm X 26 mm X 10.55 mm, thickness 0.55 mm (min), Ceiling Angle :- 25 mm X 10 mm, thickness 0.55 mm (min). Eco-friendly, Water Resistance and Incombustable 8mm thick Magnesia board/tiles (Density >900 Kg per Cu.m.) of approved design and brand finished with calcium silicate jointing compound to form a joint less false ceiling all complete as per drawing & direction of Engineer - in- Charge.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
35)	**Acoustic false ceiling**	:	False ceiling with powder coated exposed G.I. grid suspension system (E-Grid U-1520 or equivalent load carrying capacity with mid span deflection not exceeding 1/360 span with hanger spacing of 1200mm c/c) consisting of Main Runner 3600 mm long, Cross Tee 1200 mm / 600 mm long and Wall Angle. The Wall Angle shall be fixed on PVC Dash Fasteners on the perimeter of the wall by steel screws with distance 300mm c/c. The Main Runners to be placed @ 1200 mm. The Cross Tee 1200mm will be inserted in the pre-cut slots of Main Runner at a regular interval of 600 mm to form a modular grid of 1200mm X 600mm. Additional Cross Tees of 600 mm shall be placed perpendicular to the Cross Tee 1200 mm long to finally form a grid of 600 mm X 600 mm. Grid of module size 600 mm X 600 mm shall be supported by 6 mm dia G.I. wire from purlins / soffit. Acoustic Board (NCR>0.90) of approved patern and size 595mm X 595mm should be placed in the Grid module to form a False Ceiling. All complete as per the drawing & directions of Engineer-in-charge.
36)	**Metal false ceiling**	:	False ceiling with powder coated exposed G.I. grid suspension system (E-Grid T 2430 or equivalent load carrying capacity with mid span deflection not exceeding 1/360 span with hanger spacing of 1200mm c/c) consisting of Main Runner 3600 mm long, Cross Tee 1200 mm / 600 mm long and Wall Angle. The Wall Angle shall be fixed on PVC Dash Fasteners on the perimeter of the wall by steel screws with distance 300mm c/c. The Main Runners to be placed @ 1200 mm. The Cross Tee 1200mm will be inserted in the pre-cut slots of Main Runner at regular interval of 600 mm to form a modular grid of 1200mm X 600mm. Additional Cross Tees of 600 mm shall be placed perpendicular to the Cross Tee 1200 mm long to finally form a grid of 600 mm X 600 mm. Grid of module size 600 mm X 600 mm shall be supported by 6 mm dia G.I. wire from purlins / soffit. 0.6mm thick powder coated metal tile of size 595 mm X 595 mm, should be placed in the Grid module to form a False Ceiling. All complete as per the drawing & directions of Engineer-in-charge. (with 6mm thick Fibre Cement Standard Ceiling Board and E-Grid-2430).
37)	**Polyester powder coated aluminium Sections for glazed sliding window Louvers, Glazed Partitions, Fixed glazing etc. as per drawing.**	:	Aluminium frames section made of Aluminium Alloy Extrusions conforming to IS: 732-1983 and IS: 1285- 1975; Polyester powder coated (minimum thickness of polyester powder coating 50 micron) for sliding & casement windows, Louvered window, partitions, formed of basic sections of ISI embossed / certified make and brand as per direction of Engineer - In- Charge as per approved drawing (with section thickness minimum 1.5 mm). Filling the gap in between aluminium frame & adjacent RCC/ Brick/ Stone work by providing weather silicon sealant over backer rod of approved quality as per architectural drawings and direction of Engineer-in-charge complete. Upto 5mm depth and 5 mm width.
38)	**Glass**	:	Coloured (any colour) / tinted / frosted toughened glass, miminum 5mm thick or as per design with U shaped & T Shaped EPDM gusket of approved make and brand as per direction of Engineer in charge.

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
39)	**MS Grill**	:	M.S.or W.I. Ornamental grill of approved design joints continuously welded with M.S, W.I. Flats and bars of windows, railing etc. fitted and fixed with necessary screws and lugs. Grill weighing above 10 Kg./sq.mtr and up to 16 Kg./sq. mtr.
40)	**SS functional hinge for casement window**	:	Supplying stainless steel functional hinge for casement window as per approved brand as directed by Engineer- in -charge. (Natural White) 300 mm long.
41)	**Collapsible gate**	:	Collapsible gate with 40mm x 40mm x 6mm Tee as top and bottom guide rail, 20mm x 10mm x 2mm vertical channels 100mm apart in fully stretched position 20mm x 5mm M.S. flats as collapsible bracings properly rivetted and washered including 38mm steel rollers including locking arrangements, fitted and fixed in position with lugs set in cement concrete
42)	**Steel rolling grill**	:	Fixing grilled rolling shutters manufactured out of 8 mm dia M.S. bar instead of laths as per design approved by Engineer-in- charge of approved make, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters with 1.25 mm thick top cover.
43)	**Steel rolling shutter for substation**	:	Fixing partly perforated rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters. 80x1.25 mm M.S. laths with 1.25 mm thick top cover.
44)	**Wall Guards and Corner Guards**	:	High Impact Vinyl 150 mm high Wall Guards with aluminium retainer, bumper, vinyl cover, end cap & suitable corner guard etc.
45)	**UPVC pipes (B Type) & fittings for sewerage system internal including roof water drainage system.**	:	UPVC pipes (B Type) & fittings conforming to IS-13592-1992 including fitting and fixing U.P.V.C. pipes for above ground work including cost of jointing materials etc. fitting and fixing all necessary specials, cutting pipes, cutting holes in walls or R.C. floor where necessary and mending good all damages excluding the cost of masonry or concrete work, if necessary, but including the cost and fitting and fixing holder bat clamps (any floor) complete as per direction of the Engineer-in-charge. Minimum dia of soil pipe is 110mm, waste pipe is 75mm & Rain water pipe is 160mm

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
46)	**UPVC pipes SDR41 SN4 & fittings for sewerage system external.**	:	UPVC pipes (B Type) & fittings conforming to IS-15328-2003 (reaffirmed 2008) including fitting and fixing as per approved drawing of U.P.V.C. pipes for underground work Minimum dia 250mm or as per design which ever is higher including cutting trenches upto design depth and refilling the same complete as per direction of the Engineer-in-charge.
47)	**CPVC pipes**	:	Fitting and fixing CPVC (Chlorinated Polyvinyl Chloride) pipes of approved make conforming to IS-15778: 2007 . with all necessary accessories, specials viz. socket, bend, tee, union, cross, elbo, nipple, longscrew, reducing socket, reducing tee, short piece etc. fitted with holder bats clamps at 1.00 m spacing, including cutting pipes, fitting, fixing etc. complete in all respect including cost of all necessary fittings as required,jointing materials in any position above ground. (Payment will be made on the centre line measurements of total pipe line including all specials. CPVC Pipes Class-I,SDR-11
48)	**UPVC pipes (Schedule 80)**	:	UPVC pipes (Schedule 80) & fittings conforming to ASTM D 1784, ASTM D-1785 shall be used for external water supply distribution.
49)	**Mirror for single user toilet**	:	Fitting and fixing bevelled edged mirror 5.5 mm thick silver red as per I.S. 3438 / 1965 together with complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete. Size 600 mm X 450 mm
50)	**Mirror for common toilet**	:	Fixing mirror of superior glass (of approved quality) and of required shape and size with plastic moulded frame of approved make and shade with 6 mm thick hard board backing, rectangular shape size 1500mm x 450 mm or as per design requirement.
51)	**Wash Basin for single user toilets and staff quarters**	:	Fitting and fixing white vitreous china best quality approved make wash basin with C.I. brackets on 75 mm X 75 mm wooden blocks, C.P. waste fittings of 32 mm dia., one approved quality brass C.P. pillar cock of 15 mm dia., C.P. chain with rubber plug of 30 mm dia., approved quality P.V.C. waste pipe with C.P. nut 32 mm dia., 900 mm long approved quality P.V.C. connection pipe with heavy brass C.P. nut including mending good all damages and painting the brackets with two coats of approved paint. Size 630 mm X 450 mm.
52)	**Wash Basin for Common Toilets**	:	Fitting and fixing white vitreous china best quality approved make wash basin with C.I. brackets on 75 mm X 75 mm wooden blocks, C.P. waste fittings of 32 mm dia., one approved quality PTMT pillar cock of 15 mm dia., C.P. chain with rubber plug of 30 mm dia., approved quality P.V.C. waste pipe with C.P. nut 32 mm dia., 900 mm long approved quality P.V.C. connection pipe with heavy brass C.P. nut including mending good all damages and painting the brackets with two coats of approved paint. Size 550 mm X 400 mm.
53)	**Pedestal of wash basin (white) for Principal's Toilet & all HOD's Toilet**	:	Fitting and fixing pedestal of approved make for wash basin (white)

SECTION 5.3C : ITEM WISE SPECIFICATION.			
Sl. No.	**Items**		**Detail Specification**
54)	**Stainless steel sink**	:	Fitting and fixing stainless steel sink complete with waste fittings and two coats of painting of C.I. brackets. 630 mm X 550 mm X 180 mm
55)	**Flat back urinal**	:	Fitting and fixing Flat back urinal (590 mm X 390 mm X 380 mm) (half stall urinal) in white vitreous chinaware of approved make in position with brass screws on 75 mm X 75 mm X 75 mm wooden blocks complete including urinal flush pipe fittings of approved brand.
56)	**Urinal Partition for common toilets**	:	Fitting and fixing 12mm high pressure compact bothside prelaminated panel for urinal partition wall of approved make of size 1000 mm X 600 mm with SS hardwere complete in all respect.
57)	**CP flushing valve**	:	Concealed type CP flush valve for flushing purpose minimum 32mm dia push type (Single/double flush) should be used in all toilet including commom toilets.

SECTION – 5.8

SCOPE OF WORK OF MEDICAL GAS PIPELINE SYSTEM

(MGPS)

SECTION – 5.8

SCOPE OF WORK OF MEDICAL GAS PIPELINE SYSTEM (MGPS)

Scope of Works, Standards, Safety, System, Installation, Operation and Maintenance at Mother and Child Hub, Diamond Harbour Medical College and Hospital

(Total 250 beds MGPS includes 150 critical care unit beds and 100 general beds)

Survey, Inspection of the site, Plan, Design, Supply, Installation, Testing and Commissioning, Operation & Maintenance of Medical Gases Manifold & Plant room and Pipeline Distribution System as a turnkey work and providing of free spare parts, consumables and service during 1 year operation and comprehensive maintenance from the date of commissioning and handing over.

1. The system should comprise of

1.1 Source Equipments:

a. Fully Automatic Oxygen Control panel, Oxygen Manifold and Emergency Manifold

b. Fully Automatic Nitrous oxide Control Panel, Nitrous Oxide Manifold and Emergency manifold.

c. Vacuum (suction) supply system complete with Filters and Silencers including bacteria filters.

d. Compressed air system with air Filtration system and pressure reducing station for Medical Air-4 bar and Surgical Air-7 bar.

e. Combined Electrical Control Panel for Air Compressors & Vacuum Pumps.

1.2 Distribution piping complete with accessories

1.3 Outlets

1.4 Alarm Systems

1.5 Area Valve Service System

1.6 Ceiling Pendants for Operation Theatres (OT)

1.7 Horizontal Bed Head Panels (provision only)

1.8 High pressure tube for O_2, N_2O, Compressed Air, Vacuum

1.9 Oxygen flow meter with humidifier complete with accessories

1.10 Ward vacuum units complete with accessories

1.11 Theatre Suction units complete with accessories

1.12 Unit wise Service Required:

Sl. No.	Name of the Unit	Medical Gas Services Required	Remarks
1	Operation Theatre	Oxygen (2 nos.), Nitrous Oxide, Medical Air 4 bar, Surgical Air 7 bar and Vacuum	Pendent (Surgeon Pendant and Anesthetist Pendant)
2	ICU/HDU/ICCU/ITU /Pre OP./Post OP./ Recovery/SNCU/PICU /NICU (All Critical Care Unit)	Oxygen (2 nos.), Medical Air 4 bar, and Vacuum	Bed Head Panel
3	Wards/OPD area	Oxygen and Vacuum	On Wall Outlet

1.13 Specification of the Plant cum Manifold Room :

a. Plant cum Manifold room size should be 13 Meter Width x 15 Meter Length with toilet facility.
b. Approach road should be present in front of Plant cum Manifold room for direct cylinder loading and unloading from Trucks at the platform of the Manifold room.
c. 2 meter width cylinder loading unloading platform should be provided in front of Manifold room.
d. Beside the Plant cum Manifold rooms a 9 Meter x 16.5 Meter space with proper road access for future provision of Liquid Medical Oxygen tank installation.
e. All inside wall will be flush type without any projection
f. All ventilators (louver) should be above 3500 mm from the floor level of manifold & plant room. Ventilator Size should be 1.2 Meter X 0.6 Meter
g. Thickness of the wall should be 250 mm minimum
h. Each room should have sufficient number of 450 mm exhaust fans (4 nos. for each room) above 3000 mm centre height from floor level
i. Flooring of Manifold and plant room including loading unloading platform should have Kota stone finish.

j. Electric power requirement for plant room : 90 KW 3 phase and Manifold Room: 5 KW Single phase
k. Fan Light as required to be provided
l. Rolling shutter having (WxH) 2000 mm X 2100mm (perforated in the middle 1200mm to 1800mm) should be provided for the doors
m. Ceiling height of the building would be 4.5 meter and plinth height +1 meter from road level
n. All the pipeline run through surface of ceiling or surface of walls

2. Standards:

The Contractor should execute the installation work complying with the standards like HTM02-01/ NFPA99C; should use equipments and materials having any of the standards like CE/ISO/BIS unless specified otherwise in the specifications of the equipments and copper pipes should have third party inspection certification by Lloyds'. Compliance with standards like HTM02-01 / NFPA99C would be verified during checks prior to commissioning.

3. Scope of work:

3.1 The bidders are required to survey the site before submitting the quotes. Drawing of pipe routing should be submitted for approval of WBMSCL before starting of execution work.

3.2 Electrical Control Panel for Vacuum and Air plant system to be supplied by the Contractor. All required electrical connection for installation of entire system including alarm panel/ bed head panel/ pendant/ control panel should be tapped from the nearest available points and remains in the Scope of Work of the Contractor. Further distribution and wiring is to be carried out by the Contractor to make the system functional. Technical Specifications will be as per the bidding documents. Prior approval of electrical panel drawings shall be taken from the Corporation before manufacture.

3.3 All the required consumables, gases, cylinders etc. for installation, testing, calibration, quality control tests, commissioning etc. remains in the Scope of Work of the Contractor.

3.4 The Contractor shall be responsible for the complete works including the submission of working drawings, detailed work schedule and materials. The Contractor will have to take prior approval from the Corporation for the materials to be delivered at the site for taking up the installation work of MGPS.

3.5 The Contractor shall be responsible for coordination with Liquid Medical Gas system supplier for maintenance and day to day operation and Reporting to hospital authority. Training of the staff will be arranged by WBMSCL with the LMO vendor.

3.6 The hospital authority / Corporation will arrange for D type Oxygen/ Nitrous cylinders for the Manifold Room for the regular supply of Gases for the patient use at a later stage. Bidders need not have to consider prices of D type Cylinder in their Bid for operation of the installed system. However cylinders required for installation, testing and commissioning of the pipeline system will have to be arranged by the Contractor.

3.7 Electricity required for commissioning the system will be provided by the hospital free of Cost, if available. Otherwise, commissioning of the installed MGPS followed by operation of the system should be carried out by the emergency DG set to be installed at each hospital by the selected bidder.

3.8 The Contractor should submit technical data sheets, Product catalogs, Drawings, samples etc for approval. The Corporation or its appointed consultant will provide approval as per the specification in the Bidding Documents.

3.9 The Contractor should supply complete set of part manuals, service manuals and user manuals for all the systems and subsystems to be supplied.

3.10 The Contractor should demonstrate pressure and flow rate at each outlet point at the time of commissioning. The Contractor is required to demonstrate and Document all safety features incorporated in the system as per HTM 02-01 / NFPA 99C Standards.

3.11 All material used for Installation, Testing and Commissioning the system should have required quality certification.

3.12 All supporting material like saddles, cable tray, channels, joints/ connectors, trenches/ bridges for pipe laying as required from manifold room to hospital building, minor civil works including foundation & modification of manifold/plant room as required, making holes in the wall & repairing after installation of copper piping, electrical works, etc. are a part of MGPS work.

3.13 The Contractor should display maintenance Log, Normal values etc in the manifold room as prescribed by Corporation or its consultant. Daily/Periodical maintenance chart/log should be maintained. This maintenance chart will be provided by the Corporation.

3.14 Final electrical safety test, system test and calibration should be done by the bidder by authorized persons using calibrated test equipment as per standards. For operation and maintenance of the installed system, the Contractor should post necessary trained experienced technicians / helpers in shifts (at least 1 technician and 1 helper in each shift) that should be available at site 24hrs. X 365 days.

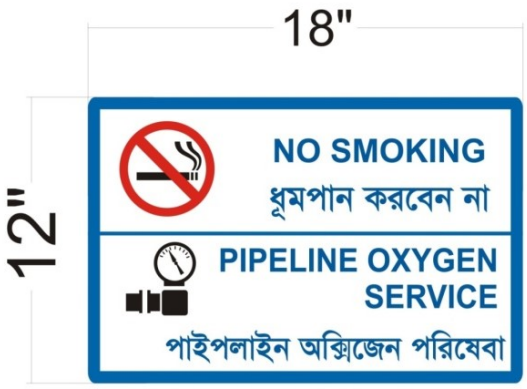
3.15 Earthing arrangements for all the equipment shall be completed by the bidder as per standard practice.

3.16 The Contractor is required to put up signages, as are applicable inside and outside of the manifold/ plant room and at the places specified by the Corporation, in the manner as given herein below:

List of signage along with technical specifications:

A. List of signage :

1. To be installed in wards and corridors:



2. To be installed inside plant and manifold room :

3. To be installed inside plant room and manifold room :

4. To be installed outside plant and manifold room :

5. To be installed inside manifold room :

6. To be installed inside manifold room :

30"

47"

GUIDELINES OF MEDICAL GAS CYLINDERS HANDLING AND STORAGE
মেডিক্যাল গ্যাস সিলিন্ডার ব্যবহার এবং মজুত করার নির্দেশিকা

DO

- Read the label to see what gas you are dealing with and double check the cylinder/gas is right for the intended use.
- No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name.
- If the labeling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked "contents unknown" and returned directly to the manufacturer/supplier.
- Never rely on the color of the cylinder for identification. Color coding is not reliable because cylinder colors may vary with the supplier. Additionally, labels on caps have little value because caps are inter changeable
- The cylinder's contents should be identified at all times as well as the cylinder Status(full, empty or in service)
- Maintenance of cylinders and their valves or relief devices shall be performed only by trained personnel.
- An emergency response plan shall be developed and implemented wherever compressed gas cylinders are used, handled or stored.
- Valve protection caps must remain in place at all times except when cylinders are secured and connected to dispensing equipment. Only wrenches or tools provided by the cylinder supplier should be used to open or close a valve. At no time should pliers be used to open a cylinder valve.
- Securely restrain cylinders with chains connected to a wall bracket to prevent them falling over
- Close the cylinder valve when cylinder not in use
- Before connecting a gas cylinder to equipment or pipe work make sure regulator and pipe work are suitable for the gas,chemical properties & pressure being used
- Store gas cylinders in the open/well ventilated area and on concrete in a fenced compound with some weather protection
- Maintain in storage area, oxygen cylinders must be store at least 3 metres away/separated by a fire wall from fuel gases such as acetylene, propane, methane etc.
- Store full cylinders separately from empty cylinders and should be secured with straps or chains connected to a wall bracket or other fixed surface, or by use of a cylinder stand
- Maintain good housekeeping and adequate warning signs with fire fighting equipment as necessary

কি করবেন।

- আপনি কোন গ্যাস নিয়ে কাজ করছেন তা লেবেলে দেখে নিন। ব্যবহার করার আগে আরও একবার পরীক্ষা করে নিন।
- যে কমপ্রেসড গ্যাসের সিলিন্ডারে নিয়মমাফিক গ্যাসের নাম লেখা নেই তা ব্যবহার করা উচিত নয়।
- যদি সিলিন্ডারের লেবেল অস্পষ্ট হয় অথবা সংযুক্ত ট্যাগ এমনভাবে নষ্ট হয় যে ভিতরে কী গ্যাস আছে বোঝা যা"ছ না, তাহলে "কনটেন্টস আননোন" লিখে প্রস্তুতকারী/সরবরাহকারীর কাছে ফেরত পাঠাতে হবে।
- শনাক্তকরনের জন্য কখনও সিলিন্ডারের রঙের ওপর নির্ভর করবেন না। বিভিন্ন সরবরাহকারীর ক্ষেত্রে সিলিন্ডারের রঙ আলাদা আলাদা হয়। তাই কালার কোডের ওপর নির্ভর করবেন না। ক্যাপের লেবেলের উপরেও নির্ভর করা উচিত নয়। কারণ ক্যাপ পরিবর্তন করা যায়।
- সিলিন্ডারের ভিতরে কী আছে তা সবসময় শনাক্ত করা উচিত। সিলিন্ডার কি অবস্থায় আছে (ভর্তি, খালি অথবা ব্যবহার করা হচ্ছে) তাও দেখে নেওয়া উচিত।
- সিলিন্ডার এবং তার ভালভ অথবা রিলিফ ডিভাইসেসের মেরামতি কেবলমাত্র প্রশিক্ষিত ব্যক্তিরই করা উচিত।
- যে জায়গায় কমপ্রেসড গ্যাস সিলিন্ডার ব্যবহার করা হবে বা মুজুত করা হবে,সেখানে আপদকালীন পরিস্থিতি মোকাবিলার উপযুক্ত ব্যবস্থা রাখতে হবে।
- সিলিন্ডার সুরক্ষিত এবং ডিসপেনসিং ইকুইপমেন্টের সঙ্গে যুক্ত না থাকলে ভালভ প্রোটেকশন ক্যাপ যথাস্থানে রাখা উচিত।
- ভালভ খোলা বা বন্ধ করার জন্য কেবলমাত্র সিলিন্ডার সরবরাহকারীর দেওয়া রেঞ্জ বা টুল ব্যবহার করবেন। কখনও প্লায়ার দিয়ে সিলিন্ডারের ভালভ খুলবেন না।
- সিলিন্ডারকে চেনের সাহায্যে দেওয়ালের ব্র্যাকেটের সঙ্গে আটকে রাখুন, যাতে পড়ে না যায়।
- যখন ব্যবহার হবে না তখন সিলিন্ডারের ভালভ বন্ধ রাখুন।
- যন্ত্র বা পাইপে গ্যাস সিলিন্ডার লাগানোর আগে নিশ্চিত হোন যে রেগুলেটর এবং পাইপ ফিটিংস্ গ্যাস, রাসায়নিক পদার্থ এবং চাপ সহ্য করার উপযুক্ত।
- গ্যাস সিলিন্ডার এমন জায়গায় মজুত করুন যেখানে খোলা/বায়ু চলাচল করে। জায়গাটি যেন বেড়া দেওয়া এবং কংক্রিট করা হয় এবং আবহাওয়া থেকে সুরক্ষিত থাকে।
- মজুত করার জায়গায় অক্সিজেন সিলিন্ডারগুলিকে যেন একটি অগ্নি প্রতিরোধক পাঁচিলের দ্বারা অ্যাসিটিলিন, প্রপেন, মিথেনের মতো জ্বালানি গ্যাসের থেকে অন্তত ৩মিটার দূরে রাখা হয়।
- ভর্তি সিলিন্ডারগুলিকে খালি সিলিন্ডারের থেকে আলাদা রাখুন। স্ট্র্যাপ বা চেনের সাহায্যে দেওয়াল প্রভৃতির সঙ্গে অথবা সিলিন্ডার স্ট্যান্ডের সাহায্যে সুরক্ষিত রাখুন।
- **ভালোভাবে দেখভাল করুন এবং নিরাপত্তার চিহ্ন সহ আগুন নেভানোর যন্ত্র রাখুন।**

7. To be installed inside manifold room:

(Dimension as same as Sl. no.6)

GUIDELINES OF MEDICAL GAS CYLINDERS HANDLING AND STORAGE
মেডিক্যাল গ্যাস সিলিন্ডার ব্যবহার এবং মজুত করার নির্দেশিকা

DON'T

- Never drop a gas cylinder
- Never tamper with cylinders or subject them to abnormal mechanical shocks which could damage the valve or safety device
- Never re-paint, change markings or identification or interfere with threads
- Never attempt to repair a cylinder
- Never subject cylinders to abnormally high or low temperatures
- Never try to refill a cylinder through any unauthorized agency
- Never transport cylinders by rolling on the ground or use them as rollers or supports
-
- Never subject to abnormal mechanical shocks which could damage the valve or safety device of cylinder
- Never apply PTFE tape, jointing compounds or any other sealing material to the cylinder valve in an attempt to achieve a tight seal, if a gas tight seal cannot be achieved metal to metal, replace the regulator or change the cylinder
- Never smoke around compressed gas cylinders.
- Never use oil or grease on the regulator of a cylinder valve.
- Don't keep cylinders in horizontal position/on the ground
- Don't keep cylinders in contact with electrical cords
- Don't keep cylinders unprotected from falling
- Don't store cylinders in an area where could be subject to impact such as near operating fork lift
- Don't store cylinders near combustibles
- Don't store Oxygen and acetylene cylinders stored together
- Don't keep cylinders without valve caps
- Don't store other products along with gas cylinders, especially not oil or corrosive liquids, sources of ignition or flammable materials

কি করবেন না ।

- কখনও গ্যাস সিলিন্ডার ফেলে দেবেন না ।
- সিলিন্ডারের ক্ষতি করবেন না বা এমন কিছু করবেন না যাতে ভালভ বা সেফটি ডিভাইসের ক্ষতি হতে পারে । সিলিন্ডার রং করবে না, মার্কিং বা শনাক্তকরণ চিহ্ন পরিবর্তন করবেন না, সিলিন্ডার থ্রেড নষ্ট করবেন না, সিলিন্ডার মেরামতির চেষ্টা করবেন না ।
- সিলিন্ডারকে অস্বাভাবিক বেশি বা কম তাপমাত্রায় রাখবেন না ।
- অনুমোদনহীন সংস্থাকে দিয়ে সিলিন্ডার পুনরায় ভর্তি করবেন না ।
- সিলিন্ডার মাটিতে গড়িয়ে নিয়ে যাবেন না । তাদের রোলার বা ঠেকনা হিসাবে ব্যবহার করবেন না ।
-
- সিলিন্ডারের ভালভ বা সেফটি ডিভাইসের ক্ষতি হতে পারে এমন কোন অস্বাভাবিক কাজ করবেন না ।
- সিল টাইট করার জন্য সিলিন্ডারের ভালভে কখনও পি টি এফ ই টেপ, জয়েন্টিং কমপাউন্ড অথবা অন্য কোনও সিলিং মেটিরিয়াল লাগাবেন না । যদি গ্যাস টাইট সিল ঠিকভাবে না আটকায় রেগুলেটার বদলান বা সিলিন্ডার পালটান ।
- কমপ্রেসড গ্যাস সিলিন্ডারের আশেপাশে ধূমপান করবেন না ।
- রেগুলেটার বা সিলিন্ডার ভালভে কখনও তেল বা গ্রিজ দেবেন না ।
- সিলিন্ডারকে কখনও মাটিতে শুইয়ে রাখবেন না ।
- বৈদ্যুতিক তারের সঙ্গে সিলিন্ডার লাগিয়ে রাখবেন না ।
- সিলিন্ডার পড়ে যেতে পারে এমনভাবে রাখবেন না ।
- এমন কোনও জায়গায় সিলিন্ডার মজুত করবেন না যেখানে আঘাত লাগতে পারে, যেমন চলমান ফর্ক লিফ্টের কাছে ।
- দাহ্য পদার্থের কাছে সিলিন্ডার রাখবেন না ।
- অক্সিজেন এবং অ্যাসিটিলিন সিলিন্ডার এক সঙ্গে মজুত করবেন না ।
- সিলিন্ডারের ভালভ ক্যাপ খুলে রাখবেন না ।
- গ্যাস সিলিন্ডারের সঙ্গে অন্য পদার্থ যেমন তেল বা ক্ষয়কর তরল, আগুন সৃষ্টি করতে পারে বা দাহ্য পদার্থ মজুত করবেন না ।
- সিলিন্ডার ফিটিংয়ে কখনো যেন তেল বা গ্যাস স্পর্শ না কওের ।
- সিলিন্ডার ম্যানিফোল্ড ও প্লান্ট রুমে ধূমপান করবেন না ।

NEVER LET OIL OR TOUCH YOUR CYLINDER FITTINGS

NO SMOKING

B. Technical Specifications :

Sl.no.	Description of work	Unit
1	**Caution Signage-1 (18″ X 12″)**	Each
	i) CNC cut ACP- 3mm indoor quality	
	ii) Electro Cut Vinyl	
	iii) VHP Tape/Stud	
2	**Caution Signage-2 (24″ X 18″)**	Each
	i) CNC cut ACP- 3mm indoor quality	
	ii) Electro Cut Vinyl	
	iii) VHP Tape/Stud	
3	**Do/Don't's Signage (30'' x47″)**	Each
	i) CNC cut ACP- 3mm indoor quality	
	ii) Digital Print on self adhesive vinyl with matt lamination	
	iii) VHP Tape/Stud	

Note :

The signage quantity will depend on actual site conditions.

3.17 In case any inspected or tested equipment fail to conform to the specifications, the Corporation may reject them and the Contractor shall either replace the rejected equipment or make all alterations necessary to meet specification requirements free of cost to the Corporation.

3.18 Leaflets, as-built drawings, equipment operating and maintenance manuals (hard copy, Compact Disk, DVD etc.) and literature should be attached for ready references along with complete documentation of all the measurements conducted during installation period which shall be submitted by the Contractor for future reference.

3.19 Acceptance Test at site shall be conducted of individual equipment and complete system to ensure that individual equipment and complete system meets the technical specifications and other operational and technical requirements as contained in the Bidding Documents.

3.20 The Corporation shall have the right to reject any individual equipment or complete system, if in its opinion the same does not meet technical specifications, operational or technical requirements. The decision of the Corporation in this regard shall be final.

3.21 The delivery, installation or commissioning shall not be deemed to have been completed unless all the equipment and systems are accepted by the Corporation.

3.22 If it is found that to meet the performance criteria, any extra equipment as have been specified in the Price Schedule is required, the same will be provided free of cost by the Contractor.

3.23 Accessories from gas/vacuum outlets to patients including high pressure and low pressure tubing with connectors, face mask/canula, catheter, etc. will be under the scope of supply of the Contractor. However, the Contractor shall be required to make one time supply of consumables like face mask/ canula, catheter, connector and low pressure tubing, for all oxygen flow meters, ward vacuum units and theatre vacuum units.

3.24 Before the starting of installation work, pipe routing drawing should be prepared and submitted by the Contractor to the Corporation for approval.

3.25 Exposed riser pipelines, if any should be installed vertically upward along the wall, for which protective ACP cover over MS angle frame should be provided by the Contractor to safeguard the pipelines from any damage/theft.

3.26 Bidder should arrange from a licensed Third party, the quality certification for the entire MGPS System that the system meets the Design, quality and safety standard. For this purpose bidders should propose three licensed parties with their credentials. WBMSCL will approve the party based on their credentials and work experience.

Part A

TECHNICAL SPECIFICATIONS OF MGPS FOR PURULIA SSH

1.0 OXYGEN SYSTEM

1.1 Oxygen Manifold: Main with Middle Frames — Indigenous

Oxygen Manifold: Emergency with Middle Frames — Indigenous

The Oxygen Manifold will be configured as 2 x 20 Cylinder Manifold is suitable to withstand a pressure of 145 Kg/cm2, along with high-pressure copper annealed tail pipes with end Brass adapter suitable for Oxygen Cylinders and manifold.

Top frame comprising of high pressure copper pipes of size 1/2" NB x 15swg with high pressure brass fittings made of high tensile brass and connections through non- return valves; high pressure copper tail pipes, made of high pressure copper pipe of size 1/4" NB x 15 swg. The design of middle and bottom frames should be provided to fit both round and flat bottom cylinders safely. The manifold should be tested (hydraulically) at 3500 psig and necessary test certificates should be submitted along with the supply.

The Emergency Oxygen Manifold will be configured as 2 x 10 Cylinder Manifold is suitable to withstand a pressure of 145 Kg/cm2, along with high-pressure copper annealed tail pipes with end Brass adapter suitable for Oxygen Cylinders and manifold.

To reduce the risk of medical oxygen system from contamination due to ignition of fluorinated polymer materials, only Non Halogenated Polymer materials should be used in the Non Return Valves and high pressure side of the Pressure Regulators of the manifold system.

In case of supply pressure failure from the main manifold system, there should be arrangement of automatic switchover of supply of oxygen from main to emergency manifold with audio-visual alarm. Again with the restoration of pressure of the main manifold, supply of oxygen should change automatically from emergency to main manifold. **A scope of bypass pipeline of 28 mm should be installed from the main line with an isolation valve for connection of Liquid Medical Oxygen System.**

1.2 Fully Automatic Oxygen Control Panel with audio visual indicator Imported

The Oxygen Control Panel should fully comply and meets latest NFPA-99/HTM 02-01 standards and UL Listed. Country of origin certificate must be submitted.

The Manifold Control Panel is Digital, fully automatic type and switches from "Bank in Use" to "Reserve" bank without fluctuation in delivery supply line pressure and without the need for external power. After the switch-over, the "Reserve" bank then becomes the "Bank in Use" and

the "Bank in Use" becomes the "Reserve" bank. The manifold control panel should have a microprocessor based digital display panel.

The control panel should have incorporated with three large, red, illuminated LED displays for the Left Bank, the Right Bank and for the Supply Pressure. The control panel should also have six LED's, two Green for "Bank in Use", two Amber for "Bank Ready" and two Red for "Bank Empty".

Features:

- Fully automatic self-contained shuttle-valve with no electrical power required for switching
- Input power 240 VAC, 50 HZ
- Microprocessor based control panel incorporates six LED's and illuminated LED display readable even in poor lighting conditions
- Audio-visual alarm indicating changeover from one bank to other bank
- Units of measure switchable (psi/kPa/BAR)
- Two limit switches for positive indication of bank in use
- Dual line pressure regulators
- Delivery flow capacity : 2000 L/min or above at 4.2 bar pressure

2.0 NITROUS OXIDE SYSTEM

2.1 Nitrous Oxide Manifold: Main with Middle Frames Indigenous

Nitrous Manifold: Emergency with Middle Frames Indigenous

The Nitrous Oxide Manifold will be configured as 2 x 4 Cylinder Manifold is suitable to withstand a pressure of 145 Kg/cm2, along with high-pressure copper annealed tail pipes with end Brass adapter suitable for Nitrous Oxide Cylinders and manifold

Top frame comprising of high pressure copper pipes of size 1/2" NB x 15swg with high pressure brass fittings made of high tensile brass and connections through non- return valves; high pressure copper tail pipes, made of high pressure copper pipe of size 1/4" NB x 15 swg. The design of middle frames should be provided to fit both round and flat bottom cylinders safely. The manifold should be tested (hydraulically) at 3500 psig and necessary test certificates is accompany along with the supply.

A High Pressure Double Stage Regulator with gauges indicating cylinder pressure and delivery line pressure should be mounted on the 2-cylinder Emergency Manifold System suitable to withstand a pressure of 145 Kg/cm2, along with high-pressure copper annealed tail pipes with end Brass adapter suitable for Nitrous Oxide Cylinders and manifold.

2.2 Fully Automatic Nitrous Oxide Control Panel with audio visual indicator Imported

The Nitrous Oxide Control Panel should fully comply and meets latest NFPA-99/HTM 02-01 standards and UL Listed. Country of origin certificate must be submitted.

The Manifold Control Panel is digital, fully automatic type and switches from "Bank in Use" to "Reserve" bank without fluctuation in delivery supply line pressure and without the need for external power. After the switch-over, the "Reserve" bank then becomes the "Bank in Use" and the "Bank in Use" becomes the "Reserve" bank. The manifold control panel should have a microprocessor based digital display panel.

The control panel should be incorporated with three large, red, illuminated LED displays for the Left Bank, the Right Bank and for the Supply Pressure. The control panel should also have six LED's, two Green for "Bank in Use", two Amber for "Bank Ready" and two Red for "Bank Empty".

Features:

- Fully automatic self-contained shuttle-valve with no electrical power required for switching
- Input power 240 VAC, 50 HZ
- Microprocessor based control panel incorporates six LED's and illuminated LED display readable even in poor lighting conditions
- Audio-visual alarm indicating changeover from one bank to other bank
- Units of measure switchable (psi/kPa/BAR)
- Two limit switches for positive indication of bank in use
- Dual line pressure regulators
- Delivery flow capacity : 1000 L/min or above at 4.2 bar pressure

3.0 COMPRESSED AIR SYSTEM

3.1 Compressed Air System Indigenous

Medical compressed air system comprising of **triplex** System Air Compressors, base mounted, each having required capacity with suitable Motor and Filter, Non-Return Valve, Isolation Valves along with 2 (two) nos. of Receiver Tanks of 1500 litres, 2 nos. of Air Dryers and 2 Pressure Reducing Station along with interconnecting piping to take care of the requirement of desired no. of air outlets.

Type of Compressor :

Air Cooled, totally Oil Free Reciprocating Compressors along with TEFC squirrel cage induction motors (V-belt driven). The Compressed Air System will have **3 nos. of identical Air Compressors.**

Sequence of Operation: The compressors shall run in cascading phenomenon.

Initially 1st and 2nd will run according to the demand, the 3rd will remain as standby; simultaneously, the 2nd and 3rd will run according to the demand, whereas the 1st will remain as standby. In case, if two compressors are not capable of achieving the required pressure, the other one shall start automatically after 3 minutes). The compressors shall run on rotational basis during auto mode. In manual mode, every compressor shall run maintaining the required higher (8.5 kg/cm^2) and lower cut-off pressure (7.5 kg/cm^2).

Specifications of each Air Compressor:

Make	: Anest Iwata /FS Curtis/ Ingersoll Rand India
Type of Compressor	: Base mounted Air Cooled, **100% Oil Free** Reciprocating Air Compressor
Type of Motor	: 15 HP, 3-phase, T.E.F.C, foot mounted
` Piston Displacement	: 50 CFM or above at 8.5 Kg/Cm2
Pressure Switch Cut in Pressure	: 7.5 Kg /Cm2
Pressure Switch Cut out Pressure	: 8.5 Kg /Cm2
Type of Starter	: Star Delta
Type of Suction Filter	: Dry Type Filter (Polyester)
Type of drive	: V-belt

Air Receivers: 2 nos., each of 1500 litres capacity should comply with IS 2825/ BS EN 286 for maximum working pressure of 200 PSI. Each air receiver shall be equipped with a suitable pressure gauge, safety relief valve, 3-way by pass and automatic electronic tank drain with manual override.

Air Dryer Type: Heatless Desiccant Type – 2 nos., each dryer should be suitable for above compressor system (i.e. each dryer should be suitable to take the total load of 4 compressors). Each Dryer should be supplied with suitable inlet filter.

Duplex Air Dryer, desiccant type, each having full capacity of plant flow with a minimum accuracy of ±3°C in a range from -20°C to 60°C atmospheric dew- point, with a set point of -46°C. It should be equipped with moisture separator, auto drain valve.

Pressure Reducing System:

For Medical Air : The System will have **2 sets** of Pressure Regulators (one in working & one stand-by) with isolation valves to reduce air pressure to required 4.2 Kg./ cm2 for Medical Air pipeline.

For Surgical Air : The System will have **2 sets** of Pressure Regulators (one in working & one stand-by) with isolation valves to reduce air pressure to required 7 Kg./ cm2 for Surgical Air pipeline.

Automatic drainage traps:

Electrically operated automatic drainage traps should be provided at the bottom of the receivers along with manual drainage facility with isolation valves. The discharge from these drainage traps should be piped outside the room at a suitable place.

4-Stage Breathing Air Filters:

The breathing air filters should have maximum contaminant removal efficiency with minimum pressure drop. The filtration system should conform to breathing air filtration as per ISO 8573, Ch – I Standard. Two sets of 4-stage filters will be provided; while one set will be working, the other set will remain as standby.

Stage-1 & 2: Coalescing filters (Water separator & Oil filter) upstream of the desiccant dryer for general purpose protection, removing liquid water and oil aerosol to 0.1mg, cum (0.1 ppm) and particles down to 1 micron.

Stage-3: Active carbon filter after the desiccant dryer for removal of oil vapors and hydrocarbon odors with maximum remaining oil content of 0.003 mg/cum.(0.003 ppm) will be installed after stage 3 filter.

Stage-4: Bacteria filter for particle removal.

4.0 VACUUM SYSTEM

4.1 Vacuum System Indigenous

To design, fabricate, test & install medical vacuum system comprising of **Triplex** System of Lubricated, Air-cooled, Reciprocating vacuum pump /Rotary vane Lubricated vacuum pump may also be offered. Vacuum Pumps each having desired capacity with suitable Motor and interconnecting piping with Filter, Silencer, Non-Return Valve, Isolation Valves, etc. along with 2 nos. Receiver Tanks, 2 nos. of Bacteria Filters, Auto Switch Gear to set minimum & maximum operating vacuum to 450 mm Hg and 650 mmHg respectively to take care of the requirements of desired no. of vacuum outlets.

Sequence of Operation: The vacuum pumps shall run in cascading phenomenon.

Initially 1st and 2nd will run according to the demand, the 3rd & 4th will remain as standby; simultaneously, the 3rd and 4th will run according to the demand, whereas the 1st and 2nd will remain as standby. In case, if two pumps are not capable of achieving the required pressure, the other two shall start automatically after 3 minutes). The vacuum pumps shall run on rotational basis during auto mode. In manual mode, every compressor shall run maintaining the required higher (-650 mm Hg) and lower cut-off pressure (-450 mmHg).

Each Vacuum Pump will be complete with Base Plate, Belt Guard, V-Belts, Motor and Starter. The system will be of Automatic Start and Stop Type. The Pumps will be connected to 1 nos. vertical receiver of 3000 litres capacity. Receiver will have a drain valve at the bottom.

Specifications of each Vacuum Pump:

Vacuum pump	**: 3 nos.**
Make	**: Ingersoll Rand India/Anest Iwata/Busch**
Piston displacement	: 4235 LPM (149.6 CFM at 29")
Cooling	: Air cooled
Starting	: Unloaded
Drive Data	**: 3 nos. –**
Type	: TEFC Induction Motor
Drive	: Belt drive
Electric supply	: 440 V, 50 Hz, 3Ph.
Vacuum Receiver	**: Two nos.**
Capacity	: 2000 Ltrs.
Design Pressure	: 7 Kg/cm2 (+ve) Pressure
Type	: Vertical type and vacuum receiver shall comply with IS: 2825/ BS EN: 286 for a vacuum pressure of 760mm of mercury, made of steel plate as per IS: 2062 and fitted with suitable fittings and accessories. The Pumps should be connected to common receiver. The receiver shall have a drain valve and vacuum gauge. The inside of the tank should be coated for rust protection with a double component coating which should provide a hard, durable lining.

Vacuum plant exhaust:

The position of the termination point should be carefully chosen outside the plant room to be clear of windows, ventilation intakes and the intake of air compressors and other equipment.

To reduce noise from the exhaust, a silencer should be fitted in the exhaust pipe of each pump.

The termination point should be turned down and provided with wire mesh protection to reduce the effect of wind pressure and prevent the ingress of rain, snow, insects or animals.

Bacteria Filters:

The Duplex bacteria filters should be designed for critical applications involving the removal of liquid, solid and bacterial contamination from the suction side of vacuum pump systems, each filter is designed and sized to carry the full plant design flow and pressure. Bacteria filters shall have efficiency at least 99.999% when tested by the sodium flame method in accordance with BS

3928:1969 utilizing particles in the 0.02 to 2 micron size range. Bacteria filters shall be marked with the legend 'Bio-Hazard'. Bacteria filter shall be provided with a transparent sterilisable collection jar to collect condensate. It should be internally and externally epoxy coated, easily removable.

5.0 COPPER PIPE **Indigenous**

Solid drawn, seamless, de-oxidized, non-arsenical, half-hard, tempered and de-greased copper pipe conforming to BS EN 13348: 2008 shall be used for the installation of pipelines. All copper pipes should be de-greased & to be delivered capped at both ends. The pipes should be accompanied with manufacturers test certificate for the physical properties & chemical composition. Copper pipes should have reputed third party inspection certificate from **Lloyds' Register of Services.**

The Pipe Sizes to be used as mentioned below:

Pipe OD (in mm)	**Thickness (in mm)**	**Maximum interval between supports (Horizontal and Vertical) (in Meters)**
12	0.7	1.5
15	0.9	1.5
22	0.9	2
28	0.9	2
42	1.2	2.5
54	1.2	2.5
76	1.5	3.0
108	1.5	3.0

Copper fittings has been made of copper and suitable for a steam working Pressure of 17 bars and especially made for brazed socket type connections. All copper fittings should comply with EN 1254-1:1998 and factory degreased. Each size of fittings should be individually packed for medical use.

Pipe preparation

Pipe ends should be cut with the pipe axis, using sharp wheel cutters whenever possible, and be cleaned to get rid of any cuttings or burrs.

When brazing copper-to-copper joints:

a. The brazed joints should be made using a silver copper- phosphorus brazing alloy and no flux should be used;
b. Brazing should be carried out using oxygen-free dry nitrogen as an internal inert gas shield to prevent the formation of oxides inside the surface of the pipes and fittings.

c. Ensure adequate protection of adjacent pipe runs and other services.

Capping

Sections of pipeline should be capped as soon as they are completed so as to prevent the ingress of debris and other impurities.

Pipe supports

The pipeline should be adequately supported at sufficient intervals to prevent sagging or distortion. Supports for surface mounted pipe work should provide clearance to permit painting of the surface. Where it is essential for pipes to cross electric cables or conduit, they should be supported at intervals on either side of the crossing to prevent them from touching the cables or conduit. Supports should be of suitable material or suitably treated to minimize corrosion.

The spacing of supports shall be as per the latest HTM standard. Suitable sleeves shall be provided wherever pipes cross through walls / slabs. All pipe clamps shall be non-reactive to copper. Metallic pipe clamps must be separated from copper pipes by insulating materials.

INSTALLATION & TESTING

Installation of piping is carried out with utmost cleanliness. Only pipes, fittings and valves which has been degreased and brought in polythene sealed bags should be used at site. Pipe fixing clamps of non ferrous or non-deteriorating plastic suitable for the lower diameter of the pipe (max. up to 42mm OD). For pipe size of over 42mm, metallic clamps may be used by separating the copper pipe by insulating materials.

All pipe joints should be made using flux less brazing method. All joints of copper to copper should be brazed by silver brazing filler material without flux.

After erection, the pipes should be flushed with dry nitrogen gas and then pressure tested with dry nitrogen/ Medical Air at a pressure equal to twice the working pressure (or 10.5 kg/cm2 whichever is higher) for a period of not less than 24 hours. All leaks and joints revealed during testing should be rectified and re-tested till the pressure in pipes stands for at least 24 hours.

Finally, before use of the system, each pipeline should be flushed with working gas.

All the piping system shall be finally tested in the presence of the authorized representative of WBMSCL for final approval and Certification.

PAINTING

All exposed pipes should be painted with two coats of synthetic enamel paint and colour codification should be as per IS: 2379 of 1990.

Besides pipelines, colour band identification should be applied near to valves, junctions, walls etc. A label applied every 3 mtr. bearing 6mm size letters should identify each gas. Self-adhesive plastic labels with direction of flow should be used for this purpose. A band 150 mm wide is usually adequate.

6.0 ISOLATION VALVES

The **isolation valves** should be Non Lubricated Ball type, **suitable for oxygen service**. Necessary certificate should be provided from the manufacturer on this matter. All valves should be pneumatically tested for twice the working pressure and **factory de-greased** for medical gas service before supply.

7.0 Alarm Valve Service Unit

7.1 Valve Box Assembly: Indigenous

Valve Box is made of Powder Coated M.S. Material.

Valve Box Assembly consists of the following:

- Lever operated quarter turn valve (i.e. 90 degree shut off ball valve, factory degreased and suitable for oxygen service) with brass body and chrome plated brass ball.
- Brass fittings (Nut, Nipples and extruded brass Adapter) KE Type Seat Brass Block for pressure gauge.
- 2" Dial gauges (0 - 10 kg/cm2, 0 - 760mm Hg)
- Nylon Bush for copper pipes holding with the valve box
- Beading for box lead
- Lockable cover with breakable glass so that during normal operation access has been by key. But during emergency operation, access by breaking the glass panel.

8.0 AREA ALARM SYSTEM

8.1 Line Pressure Alarm (DIGITAL) Indigenous

The area line pressure alarm is micro-processor based which monitor the pressures of medical gases like oxygen and vacuum levels at a specific area of piped gas system in any hospital. The electronic circuitry has been such that if the pressure/ vacuum in the gas pipeline drops below the present limit, the equipment is give an audio-visual alarm. Visual alarm remains active even after pressing of “Mute” button. But it comes to normal condition when gas pressure/ vacuum return to normal level.

The equipment should have following features:

- Digital Display of Line Pressure for all the services (both for Pneumatic & Vacuum Services) with factory calibrated pressure sensors.
- Color coded LED Display of Line pressure status (High – Caution – Normal – Caution– Low)
- Audible Alarm for High & Low pressure condition.
- Test and Alarm Acknowledge (Mute) facility.
- Should be of light weight and with small and compact design.
- Highly sensitive gas pressure sensors of reputed make should be used.
- Mounted on a powder coated MS box.

- Nut & Nipples to be provided for connection with Pneumatic supply line.
- Low voltage internal operation with input power supply of 220V AC.
- Wall mounting facility.
- Gas/vacuum inlet of alarm should be equipped with isolation valves considering ease of maintenance.

9.0 Bed Head Panels (Horizontal / Vertical)

- Efficient, Safe & Robust design in extruded aluminum section.
- Smooth curved surfaces, and choice of base colour and fascia plates.
- The headwall system should be constructed of aluminum extrusions joined together to form a carcass to suit the particular application. Unit should be factory assembled for electrical and mechanical components.
- Front fascia plate should be removable individually to access for respective service.
- Length of horizontal/ vertical Bed Head Panel shall be 900 mm.
- Bed head should have provision for Facility per unit as under:
  - Oxygen – 2
  - Medical Air- 2
  - Vacuum – 2

10.0 Combined Electrical Control Panel for Compressor & Vacuum System

Common Electrical Control Panel for Air-Compressors and Vacuum Pumps, cubicle type, complete with Mains Incomer, Bus Bar arrangement, Voltmeter with VSS, Phase indicating lights, Phase loss or Phase Reversal indicating light, individual MCBs for all starters, individual Ammeters for all motors, Single Phasing Preventer, Contactors, Overload Relays, Control Circuit MCB, Start/ Stop Push buttons, Auto/ Manual switches, Pump "ON" & Pump "TRIP" indicating lights, sequencing Relays (Separate for Air Compressors and Vacuum pumps) with overriding feature. The Control Panel should facilitate synchronize operation of Vacuum Pump and Compressor. Electrical control panel is made of MS Sheet having thickness 16 SWG and should be epoxy powder coated. The electrical control panel would be equipped with auto manual selector, Star-Delta starters 55 each compatible to motors for compressors and DOL starter's compatible to each electric motor for Vacuum pumps. The electrical control panel would be further equipped for triplex/quadruplex and cascade system for vacuum pumps & Air Compressors and also be equipped with safety equipment for the air compressors. Safety equipment for air compressors would include temperature controller temperature indicator. All terminals, switches and lights must be duly marked. Internal wiring must be duly ferruled. Incomer shall be of adequate size so that it is suitable for the total load of the system

The panel shall be provided with am-meter, power control for Star-Delta (for compressor system) and DOL (for vacuum pump system) Starter, Indication Lamp indicating all three

phases, indication lamp indicating compressor 1 on, compressor 1 off, compressor 2 on, compressor 2 off, compressor 3 on, compressor 3 off, vacuum Pump 1 on, vacuum pump 1off, vacuum pump 2 on, vacuum pump 2 off, vacuum pump 3 on, vacuum pump 3 off.

The panel shall also be provided with Hour meter, stop, start and test, switch for control supply on and off, duty selecting switch (auto / manual), indicators for overload.

The panel is designed to trip off the system in case of overload by giving an audio and visual alarm. If the first compressor/Vacuum Pump fails due to any fault, the second compressor/vacuum pump will automatically start without giving any drop in pressure at the outlet point.

Duty selector switch can be used in auto or manual.

Electrical Control Panel will have following features:

- Incoming - MCCB with aluminum Bus Bar and complete metering (i.e. Ammeter & Volt meter) with R-Y-B selector switches
- R-Y-B phase indicating lamps (LED type).
- Individual MCCB and Ammeter for Air compressors with Connector & over Load having Single Phase Preventer.
- Individual MCB for vacuum pumps with Connector & over Load having Single Phase Preventer.
- Individual start & stop push buttons with ON/OFF indicating lamps.
- Appropriate relay and programming for changing and running Air compressors & Vacuum pumps according to the mentioned sequence of operation.
- The panel should be provided with prominent engraved identification plates.
- In case of electrical power failure, both compressor and vacuum system should be re-started automatically with restoration of power.
- Individual Auto-Manual switches for Vacuum Pumps & Compressors.
- Tripping for abnormal operating conditions like earth fault, over current etc.
- Panel earthing of 2 nos. 50mm GI pipe electrode to be provided.
- Spare feeder of each type of feeder to be provided.
- The panel should be IEC 61439/1&2 and type test certificate should be in the name of the OEM.
- The vendor should submit drawings and approval to be taken for the same from WBMSCL before manufacturing of panel.
- Approved Spares of Electrical Control Panel

Sl. No.	Item	Manufacture's Name
1	Motor Protection Circuit Breaker (MPCB)	L&T/ Siemens/ Schneider/ ABB/ Legrand
2	Power Contactor (AC3 duty)	L&T/ Siemens/ Schneider/ ABB/ Legrand
3	Overlay Relay with Single Phase Preventer	L&T/ Siemens/ ABB/ Legrand
4	Change Over Switch	L&T/ Havells/ ABB/ Legrand
5	HRC Fuse & Switch Disconnector Fuse	L&T/ Siemens/ ABB/ Legrand
6	Digital Ammeter/ Voltmeter/ Multifunctional meter/ tri-vector meter	Secure/ L&T/ Conzerve/ AE
7	LT XLPE Cable	Gloster/ Havells/ Polycab/ Crystal
8	Protection Relays	Alstom/ L&T/ Siemens/ Schneider
9	Timer	L&T/ Siemens/ Havells/ ABB/ Legrand
10	Indicator Lamp (LED Cluster type), Actuator, Push Button	L&T/ Kaycee/ BCH/ Siemens
11	Terminal Block	Elemex/ Wego
12	Lugs	Dowells/ Commet
13	Brass Cable Glands	Commet/ Beliga
14	Current Transformer	AE/Kappa/ L&T/ Schneider
15	PT	AE/Kappa/ L&T/ Schneider
16	Cable/ Wire (Copper, flexible, 1.1 kV PVC insulated FRLS up to 10 sq. mm.)	Havells/ Crystal/ Polycab/ KEI/ RR Cable
17	MCB/RCCB/RCBO/Isolators	L&T/ Siemens/ Havells/ ABB/ Legrand/Schneider
18	Distribution Board (should be design verified as per IEC61439/4)	L&T/ Siemens/Schneider/ Legrand
19	Rechargeable Batteries	Exide/ Amaron/ Quanta

Special feature- If running compressor trips by any cause of trips mentioned, the other compressor should start immediately, by-passing timer switch.

11.0 Double Lock Gas / Vacuum Outlet Points with Adapter (B S type)

Indigenous

Outlets should be manufactured with a 165 mm long Copper inlet pipe stub which is silver brazed to the outlet body. Body should be of one piece brass construction. For positive pressure gas services, the outlet should be equipped with a primary and secondary check valve and the secondary check valve should be rated at minimum 200 psi in the event the primary check valve is removed for maintenance.

The outlet assembly must have separate colour coding for each service and should accept only corresponding gas specific adapters.

All outlets must be cleaned and de-greased for medical gas service, factory assembled and tested.

The medical gas outlets should be of quick connecting and wall mounted modular type.

13.0 Single Arm Ceiling Pendants

Indigenous

The heavy-duty pendant will be mounted on ceiling and the column length to be fabricated for the specified ceiling height. Each pendant head will have following features:

Number of Gas/Vacuum Outlets-

Oxygen (O_2)	-	2 nos.
Nitrous Oxide (N_2O)	-	1 no.
Compressed Air (4 bar)	-	1 no.
Compressed Air (7 bar)	-	1 no.
Vacuum	-	2 no.
Arm length (horizontal)	-	800 mm (horizontal - centre to centre).
Rotation of Arm	-	330 degree
Material of construction	-	Gas box - Aluminum PU coated Vertical & horizontal arm, bearing housing - MS.
PU coated Fasteners	-	SS.
Equipment Carrier	-	Equipment carrier is mounted at the base of the gas box fitted with **two nos.** stainless steel tray each of size 700 mm x 400 mm. The position of the tray can

be continuously adjusted on the vertical SS rails.

Load bearing capacity	-	150 kg.
IV hook	-	2 nos.

Interface Plate for gas connection.

14.0 ACCESSORIES FOR PIPELINE SYSTEM Indigenous

14.1 BPC Flow meter with Humidifier (including accessories up to patient's bed):

Back Pressure Compensated flow meter is of accurate gas flow measurement with following features:

- Control within a range of 0 – 15 lpm, out of which 0-5 lpm should be with expanded scale.
- It meets strict precision and durability standard.
- The flow meter body is made of brass chrome plated materials.
- The flow tube and shroud components are made of clear, impact resistant polycarbonate.
- Flow Tube has large and expanded 0 – 5 lpm range for improved readability at low flows.
- Inlet filter of stainless steel wire mesh to prevent entry of foreign particles.
- The humidifier bottle is made of unbreakable polycarbonate material and autoclavable at 121°C temperature.

14.2 Ward Vacuum Unit (including accessories up to patient):

Ward Vacuum Unit will be light weight and compact.

The unit will consist of-

- A regulator,
- A 600 ml. reusable collection jar, made of unbreakable poly carbonate material and fully autoclavable at 121°C temperature.
- A wall bracket for mounting the jar assembly on the wall.
- The vacuum regulator with instant ON / OFF switch should be infinitely adjustable and the vacuum gauge will indicate suction supplied by the regulator. Safety trap should be provided inside the jar to safeguard the regulator from overflowing.

14.3 Theater Vacuum Units (including accessories up to patient):

The unit will be consisting of two reusable 2000 ml shatter resistant bottle, each made up of poly carbonate material and fully autoclavable at 121°C temperature.

The vacuum regulator with instant ON / OFF switch will be infinitely adjustable and the vacuum gauge will indicate suction supplied by the regulator. Safety trap should be provided inside the jar to safeguard the regulator from overflowing. There should be a three way selector switch with an option to operate either - Left, Right or Both.

All the above items should be mounted on an Aluminum Trolley having free moving castor wheels.

14.4 High pressure tube for O_2, N_2O, Compressed Air & Vacuum

It should be color coded for individual services i.e. white for Oxygen, Blue for Nitrous Oxide, Yellow for Vacuum, and Black for air. Antistatic rubber tube should be as per ISO standards.

15. Warranty and CMC

The Contractor is to assure uninterrupted Operation and Maintenance service for 3 (three) year from the date of commissioning of the complete pipeline system.

Complete system should have comprehensive onsite warranty (including labour & spares) for 3(three) year commencing from the date of issue of installation & commissioning certificate by the Hospital/ Corporation.

- If the performance of any individual equipment or system is not satisfactory, the same shall be replaced by the Contractor free of cost.
- If it is found that to meet the performance criteria of MGPS, any extra equipment is required the same will be provided free of cost by the Contractor.
- All faults appearing and their rectification shall be periodically advised to the hospital, the period being not more than a month.
- No conditional warranty and CMC will be acceptable.

a) Warranty as well as Comprehensive Maintenance contract will be inclusive of all accessories and consumables for the total turnkey MGPS work and it will also cover the following wherever applicable:-

- Any kind of motor.
- Oil for the vacuum pumps
- Molecular sieves for the air dryers
- Filter cartridges
- Plastic & Glass Parts against any manufacturing defects.
- All kind of sensors, electrical/electronic parts
- All kind of coils, probes and transducers.

b) Replacement and repair will be under taken for the defective goods. Proper marking has to be made for all spares for identification like printing of installation and repair dates.

18. Upon receipt of such notice, the Contractor shall, within 8 hours on a 24(hrs) X 365 (days) basis respond to take action to repair or replace the defective goods or parts thereof, free of cost, at the ultimate destination. The Contractor shall take over the replaced parts / goods after providing their replacements and no claim, whatsoever shall lie on the Corporation for such replaced parts/goods thereafter. The penalty clause for non-rectification will be applicable as per the GCC.

19. In the event of any rectification of a defect or replacement of any defective goods during the warranty period, the warranty for the rectified/ replaced goods shall be extended till the completion of the original warranty period of the main equipment.

If the Contractor, having been notified, fails to respond to take action to repair or replace the defect(s) within 8 hours on a 24(hrs) X 365 (days) basis, the Corporation may proceed to take such remedial action(s) as deemed fit by the Corporation, at the risk and expense of the Contractor and without prejudice to other contractual rights and remedies, which the Corporation may have against the Contractor.

During Warranty & CMC, the supplier of Compressor, Air Dryer, Vacuum Pump and Manifold Control Panel is required to visit at consignee's site at least once in 6 months or earlier as required, commencing from the date of the installation for preventive maintenance of the equipment.

Part B

Description of Work	Approved Name of the agency for this installation
Medical Gas Pipeline System of Diamond Harbour Mother & Child Hub	Linde India Linited /Sytco Inc./B S Medical International/MDD Medical System (India) Pvt. Ltd./ Ellenbarrie Industrial Gases Limited

Approved makes or Equivalent Components

Equipment description	**Approved makes**
Manifold	Activ/ MR Engineering/ MDD/ BS Medical International /IPS
Automatic Oxygen / Nitrous Control panel	Beacon Meades/ Amico/ Allied Medical/ Ohio Medical
Vacuum Pumps	Ingersoll Rand India/Anest Iwata India/ Busch
Air Compressors	Anest Iwata India/ FS Curtis / Ingersoll Rand India

Breathing Air Filter	Dominick hunter (Perker) / Trident / Summit
Isolation Valve	RB - 5940 or RB – 6674/ (equivalent Medical Grade)
Copper pipes	Lloyds' Certified Medical Grade Copper Pipes Manufacturers in India
Copper Fittings / Joints	IBP Connex/Mex flow Mehta Tubes
Flow meter	Activ / Aneer engineers/ MR engineering/ MDD/ BS Medical
Ward Vacuum Unit	Active / Aneer engineers/ MR engineering/ BS Medical / MDD/ IPS
Suction unit	Active/Aneer engineers/ MR engineering/ BS Medical / MDD/ IPS
Theatre Vacuum Unit	Active / Aneer engineers/ MR engineering/ BS Medical / MDD/ IPS
Valve Box & Alarm Panel	Activ/MR Engineering / MDD/ IPS/ BS Medical International
Gas Outlets (B S Type)	Activ/ MR Engineering/ MPS/ PES/ MDD/ IPS/ BS Medical International
Combined Electrical Panel	Smith/ Jog Electric
Air Drier	Trident/ Summits
Air Receiver Tank	UD Marketing / Hydro Pneumatic/ Premier

Selected bidder will have to arrange for demonstration of the components at WBMSCL office, if felt necessary by the tender committee for approval. All "equivalent" items must be used, subject to prior approval from WBMSCL. Wherever necessary the approved make should have CE / ISO / BIS Certification. QA / QC Test / Electrical safety test certification should be provided.

PRICE SCHEDULE

Sl. No.	Description of Work	Unit	Quantity	
1	**OXYGEN SYSTEM**			
1.1	**2 x 20 size Main manifold** complete with middle frame with chain for individual cylinder along with Tail Pipe and Non Return Valve for every cylinder and Isolation Valve, Safety Valve, etc. as required for the complete manifold system as per standards	Set	1	
1.2	**2 x 10 size emergency manifold complete** with middle frame with chain for individual cylinder along with Tail Pipe and Non Return Valve for every cylinder and Isolation Valve, Safety Valve, etc. as required for the complete manifold system as per standards	Set	1	
1.3	**Fully Automatic control panel Imported** for Oxygen Having a constant delivery flow capacity of 2000 lpm or above at 4.2 bar pressure as per Standards	Set	2	
1.4	**Surface/panel/pendant mounted front loading double lock Oxygen outlets** with matching Adapters (BS type) as per standards	Nos.	As required	
1.5	**Oxygen Flowmeter & Humidifier Bottle:** Back Pressure Compensated Flow meter within a range of 0-15 LPM where 0-5 LPM should be with expanded scale. Humidifier bottle should be made of unbreakable polycarbonate materials and autoclavable at 121 degree Centigrade (to be supplied along with required low pressure tubing and face mask) as per standards	Nos.	As required	
1.6	**H.P. tubing** having anti static core white color 5mtrs with kit conversion for Oxygen	Set	As required	
2	**NITROUS OXIDE SYSTEM**			
2.1	**2 x 4 size manifold** (Primary & Secondary supply) complete with middle frame with chain for individual cylinder along with Non Return Valves for every cylinder, Safety Valve, etc. as required for the complete manifold system as per standards.	Set	1	

2.2	**Fully Automatic control panel Imported** for Nitrous Oxide Having a constant delivery flow capacity of 1000 lpm or above at 4.2 bar pressure as per Standards	Set	1	
2.3	2 cylinder Emergency Nitrous oxide arrangement using a high flow double stage Regulator with gauges complete with middle frame with chain for individual cylinder along with Non Return Valves for every cylinder as per standards	Set	1	
2.4	**Surface/panel/pendant mounted front loading double lock Nitrous Oxide** outlets with matching Adapters (BS type) as per standards	Nos.	As required	
2.5	**H.P. tubing** having antistatic core Blue color 5 mtrs. with Kit conversion for Nitrous Oxide as per ISO Standards	Set	As required	
3	**MEDICAL AIR SYSTEM**			
3.1	Compressed Air System complete with 3 **nos.** of non-lubricated, Reciprocating each of 15 HP Motor with 57 cfm capacity at 8.5Kg/cm2 pressure with Isolation Valve for each compressor, 2 nos. Air dryer with by-pass valve arrangement, Duplex Pressure Reducing Unit each for Air 4 bar and Air-7 bar valve arrangement Flexible High pressure SS Hose for each compressor NRV for each compressor, 2 nos. Air Receiver of 1500 litre capacity with Safety Valve and interconnecting pipelines, Pressure Gauge with Valve Arrangement in the Air Receiver Valve – Upstream of Air Receiver Automatic Drain Arrangement for air receivers Air Compressor By pass line Pressure Gauge with Valve arrangement in Main line Isolation Valve in the main line	Set	1	
3.2	Supply, Installation, Testing and commissioning of **4-stage air filtration system (suitable for 15 HP Compressor) as per ISO 8573**.1.	Set	2	
3.3	**Surface/panel/pendant mounted front loading double lock Medical Air-4 bar Outlets** with matching Adapters (BS type)	Nos.	As required	

3.4	**Surface/panel/pendant mounted front loading double lock Surgical Air-7 bar Outlets** with matching Adapters (BS type) as per standards	Nos.	As required	
3.5	**HP colour** coded black Tubing having anti static core as per ISO Standards	Mtr	As required	
4	**VACUUM SYSTEM**			
4.1	**Vacuum Central System** Complete with 3 **nos.** Vacuum Pumps each having 149 cfm PD with 10 HP motor Filter, interconnecting pipes, NRV, auto switch gear assy., exhaust silencer And Receiver – 2 No. 2000 liters, 2 nos. Bactria Filters, oil trap filter, etc. NRV for each Vacuum Pump Isolation Valve for each Vacuum Pump Valve - Upstream of Vacuum Receiver Vacuum Drain valve with flask arrangement Filters for each vacuum pump Silencer for each vacuum pump.	Set	1	
4.2	**Surface/panel/pendant mounted front loading double lock Vacuum Outlets** with matching Adapters	Nos.	As required	
4.3	**Ward vacuum Unit :** It shall include vacuum regulator along with 0-760 mm of Hg vacuum gauge,600 ml capacity reusable poly carbonate collection bottle with overflow safety trap and autoclavable at 121 degree Centigrade with plastic slide wall mounted type (to be supplied along with required low pressure tubing with catheter).	Nos.	As required	
4.4	**Theatre Vacuum Unit:** It shall be trolley mounted. The unit shall include one regulator along with 0-760 mm of Hg vacuum gauge mounted on the trolley stand, having two reusable collection bottles each of 2000 ml capacity and made of unbreakable polycarbonate materials, autoclavable at 121° Centigrade, having over flow safety trap, mounted on the base of trolley unit made of aluminium along with castor wheels and connected with regulator & low pressure tube inter-connections (along with required low pressure tubing with catheter).	Nos.	As required	

4.5	**High Pressure** color coded yellow Tubing having anti static core as per ISO Standards	Mtr	As required	
4.6	**Low Pressure** Tubing having anti static core as per ISO Standards	Mtr	As required	
5	**ELECTRICAL CONTROL PANEL FOR COMPRESSOR & VACUUM SYSTEM**			
5.1	Supply, Installation, Testing and commissioning of Combined Electrical Control Panel for Vacuum System (10HP each) & Compressed Air system (15HP each) with Duplex/ Cascading/ Sequencing facilities and complete with plant Room wiring .	Set	1	
6	**PIPELINE DISTRIBUTION SYSTEM**			
6.1	Supply, Installation, Testing and commissioning of **copper piping with Lloyds' Certified Copper Pipes as** per BS EN 13348: 2008. Pipe sizes will be as follows:			
6.1.1	12 mm OD x 0.7 mm thick	Mtr	As required	
6.1.2	15 mm OD x 0.9 mm thick	Mtr	As required	
6.1.3	22 mm OD x 0.9 mm thick	Mtr	As required	
6.1.4	28 mm OD x 0.9 mm thick	Mtr	As required	
6.1.5	42 mm OD x 1.2 mm thick	Mtr	As required	
6.1.6	54 mm OD x 1.2 mm thick	Mtr	As required	
6.1.7	76 mm OD x 1.5 mm thick	Mtr	As required	
6.2	**Isolation Valve (factory-degreased) with brass adapters**			
6.2.1	15 mm	Nos.	As required	
6.2.2	22 mm	Nos.	As required	
6.2.3	28 mm	Nos.	As required	
6.2.4	42 mm	Nos.	As required	
6.2.5	54 mm	Nos.	As required	
6.2.6	76 mm	Nos.	As required	

6.3	**VALVE BOX with** NIST connectors for oxygen with lockable arrangement and breakable glass cover.			
6.3.1	2 valve configuration with size 15 O2, 22 VAC	Nos.	As required	
6.3.2	3 valve configuration with size 15 O2, 15 MA4, 22 VAC	Nos.	As required	
6.3.3	4 valve configuration with size 15 O2, 15 N2O, 15 MA4, 22 VAC	Nos.	As required	
6.3.4	5 valve configuration with size 15 O2, 15 N2O, 15 MA4, 15 SA7, 22 VAC	Nos.	As required	
6.4	**ALARM SYSTEM** : Providing and fixing digital alarm system for Medical gas system complete consisting of pressure sensors, panel and the control cabling, all wiring shall be within 1mm sq multi core data cable, PVC pipe for data cable. Panel shall be self contained low voltage (less than 24 V)			
6.4.1	2 service alarm configuration for O2 and VAC	Nos.	As required	
6.4.2	3 service alarm configuration for O2, MA4, VAC	Nos.	As required	
6.4.3	4 service alarm configuration for O2, N2O, MA4, VAC	Nos.	As required	
6.4.4	5 service alarm configuration for O2, N2O, MA4, SA7, VAC	Nos.	As required	
7	**CEILING PENDANTS**			
7.1	**Ceiling Anesthetist Pendants for OT :** Supply, Installation, Testing and commissioning of Rigid Ceiling Pendant with 7 nos. of Gas & Vacuum Outlets (2-Oxygen, 1-N2O, 1-Air 4 bar, 2-Vac)	Nos.	As required	
7.2	**Ceiling Surgeon Pendants for OT :** Supply, Installation, Testing and commissioning of Rigid Ceiling Pendant with 7 nos. of Gas & Vacuum Outlets (2-Oxygen, 1-N2O, 1-Air 4 bar, 1 Air 7 bar & 2-Vac)	Nos.	As required	
8	**BED HEAD PANELS**			
8.1	**Bed Head Panels** having a length of 900 mm (provision for 2 oxygen, 2 med air and 2 suction outlets)	Nos.	As required	
Total for Design, Supply, Installation and Commissioning of MGPS				
Operation & Comprehensive Maintenance charges for the 1st Year				

Part C

OPERATION AND MAINTENANCE OF MEDICAL GAS SYSTEM

Scope of Work

The primary objective of the bidder is to ensure safe and reliable MGPS and their efficient operation and use as per **HTM - 2022/NFPA 99 C standards**. The Contractor will be responsible for operational management and maintenance of

- Medical Oxygen System - Manifold and Control panels
- Nitrous Oxide System - Manifold and Control Panel
- Medical Air System - Compressor systems, Control panel, Dryers, Reservoir, Filters, etc.
- Medical Vacuum System - Vacuum pumps, Control panel, Reservoir, Filters etc.
- Copper pipelines
- Area Valve Service Units
- Isolation Valves
- Area Alarm panels and Master/ Main alarm panels
- Gas Outlets with Adapters and Accessories
- Ceiling Pendants/ Bed Head Panels

Staff responsible for plant operation should be aware of the activities necessary to ensure the continued safe operation of the system and what action should be taken in an emergency. The authorized person (MGPS) in particular should take a lead in explaining to users the function of the system and will have to be adequately trained and informed about the system. The Contractor will be responsible for safe cylinder handling including loading, unloading and storage. Any work involving alterations, extensions or maintenance work on the system should be subject to the permit-to-work procedure as per HTM standards.

Operation of Medical Gas

The Contractor should provide skilled manpower to operate the plant and manifold system throughout 24 hrs x 365 days in a year.

The Contractor, during operation should ensure a trouble free supply at the outlets at the required pressure and flow. It shall monitor the consumption of O_2 & N_2O on hourly basis and submit a consolidated report weekly. Timely intimation of gas cylinders refill due date, and other service maintenance has to be done by the Contractor. The Contractor shall place indent upon the hospital authority for supply of cylinders. Hospital authority will be responsible to

take back the empty cylinders and supply the filled cylinders. It shall be the duty of the Contractor to assist in the loading and/ or unloading of empty/ filled cylinders to and from the trucks.

The Contractor, while undertaking operation, shall be fully aware of the safety regulations applicable for Medical Gas System. It is the mandatory responsibility of the Contractor to conduct training sessions of adequate level to the workforce to keep them fit for handling the plants and associated systems. All tests to be conducted by authorized persons, competent persons, quality controller etc have to be arranged by the contractor additionally as required. The Contractor may refer to relevant part of HTM for details like responsibilities.

Operational Policy

Refer Section: 5, HTM - 2022 Part B (Operational Management)

Routine Activity

1) **Manifold (Oxygen and Nitrous Oxide)**
    - Inspection of Liquid Medical Oxygen level in the LMO tank
    - Working and reserved cylinder pressure
    - Checking for leakage
    - Checking inlet and outlet pressure
    - Checking the change over
    - Loading the cylinder as required
    - Replacement of defective parts
    - Notifying breakdown logging details

2) **Compressed Air**
    - Checking the operation of compressors (sound, vibration, etc.)
    - Checking change over
    - Checking delivery pressure
    - Checking the dryer and change over
    - Checking the receiver
    - Checking the filter
    - Functioning of auto drain of receiver

3) **Medical Vacuum system**
    - Checking vacuum pump operation
    - Checking delivery vacuum level
    - Checking vacuum controls in receiver

- Checking change over
- Checking for drop in vacuum level