S2.1 Cold Water Transfer Pumps

Equipment Designation	
Location	
Flow Rate (1/s) each	
Approx. Pump Head (m)	
Type of Drive	Constant/Variable Speed Type

S2.2 Water Tanks

Equipment Designation	Domestic Water Transfer Tank	Domestic Water Storage Tank
Tanks Location		
Min. Effective Capacity (m^3)		
Dimension (LxWxH)		
Tank Material	FRP/SS304/Mild Steel	FRP/SS304/Mild Steel

S2.3 Sump Pumps

Equipment Designation	
Location	
Flow Rate (1/s) each	
Approx. Pump Head (m)	

……..
Official Stamp & Authorised Signature of Tenderer

S2.4 Pressure Booster Pump

Equipment Designation	
Location	
Flow Rate (1/s) each	
Approx. Pump Head (m)	
Min. Eff. Vol. of Pressure Vessel Tank (l)	
Type of Drive	Constant/Variable Speed Type

S2.5 Ejector System

Location	
Ejector Tank Designation	
Min Tank Effective Volume (l)	
Ejector Pump Designation	
Pump Flow Rate (l/s) each	
Approx. Pump Head (m)	
Sump Pump Designation	
Pump Flow Rate (l/s) each	
Approx. Pump Head (m)	

……..
Official Stamp & Authorised Signature of Tenderer

S2.6 Vibration Isolation Requirements

All vibration isolation equipment shall be selected in accordance with this Schedule.

Item	Equipment	Vibration Isolation Requirements
1	Domestic water transfer pumps	Unhoused type steel springs in series with 2 layers of 8mm thick, 40 durometer neoprene waffle pads with 1mm thick steel shim, of 38mm minimum total static deflection. Inertia block/equipment mass ratio minimum 2:1 required. Thickness of the inertia block shall be 150mm minimum and need not exceed 300mm. The inertia blocks shall support the pipework up to and including the first elbows. For floor supported elbows, isolate with similar type support of similar static deflection as for pumps. There shall be no rigid ties to the structure, all connections shall be looped or flexible. The 1st three pipe hangers from the pump shall be of minimum 20mm static deflection steel springs in series with min. 5mm deflection neoprene in shear hangers or supports.
2	Booster pumps with motor below 5kW	Unhoused type steel springs in series with 2 layers of 8mm thick, 40 durometer neoprene waffle pads with 1mm thick steel shim, of 25mm minimum total static deflection. Inertia block/equipment mass ratio minimum 2:1 required. Thickness of the inertia block shall be 150mm minimum and need not exceed 300mm. The inertia blocks shall support the pipework up to and including the first elbows. For floor supported elbows, isolate with similar type support of similar static deflection as for pumps. There shall be no rigid ties to the structure, all connections shall be looped or flexible. The 1st three pipe hangers from the pump shall be of minimum 20mm static deflection steel springs in series with min. 5mm deflection neoprene in shear hangers or supports.
3	Submersible/sump /sewerage pumps	Double deflection neoprene in shear isolator supports load to minimum 6mm static deflection.
4	All horizontal pipework beyond the 1st three spring hangers and within up to 100 pipe diameter length from the pumps or equipment	Double deflection neoprene in shear hangers or supports of minimum 6mm total static deflection. All isolator metal springs and fittings located outdoors are to be galvanised or epoxy coated.
5	All vertical riser and dropper pipework	Resilient pipe guides or mounts with neoprene in shear mounts in angle or channel steel frames of minimum 5mm static deflection.

……..
Official Stamp & Authorised Signature of Tenderer

Item	Equipment	Vibration Isolation Requirements
6	All pipework unless otherwise specified	One layer 8mm thick neoprene waffle pad sleeve between pipe and clamp or supports.
7	All pipework chased into or attached to brickwalls	One layer 6mm thick industrial felt or heavy density neoprene foam (Armaflex or equivalent) to isolate pipes from masonry.
8	Penetrations of all pipework and ducts	One layer 25mm thick 120 kg/cu.m firbreglass in 0.8mm sheet steel sleeve with nom. 25mm clearance and caulked from both sides with a non-setting resilient caulking compound e.g. Bostik Fireban or equivalent. Pipes shall be supported on both sides of penetration to maintain min. 25mm clearance between pipe/duct and structure.
9	All water tanks, reservoirs and pressure tanks	One layer neoprene impregnated duck pads min. 12mm thick, loaded to max. 5,000 kPa. For loads between 200 to 400 kPa, use 50 durometer neoprene ribbed or waffle pad.

S2.7 Sanitary Ware and Fixture

The following schedules indicate the sanitary wares and fixtures which will be supplied by others.

The Sub-Contractor shall be responsible for the installation and connection of the following items:

(a) Long bath/bath tub and associated mixer, tap and shower head

(b) Shower and shower tray including associated stop valve, mixer and tap

(c) Basin and associated mixer and tap

(d) Bidet and associated fixture

(e) Urinal and associated flush valve and sensor

(f) Water Closet and associated flush valve and sensor

(g) Kitchen sink & mop sink including associated mixer and tap

……..
Official Stamp & Authorised Signature of Tenderer

S2.8 Computer-Based Control System - Point Schedule

The remote indications and controls points called for in the following schedule shall be monitored and controlled on a Computer-based Control System. The Computer-based Control System shall be supplied and installed by the Air Conditioning & Ventilation Sub-Contractor who shall be responsible for the supply, installation and termination of all signal cables from the Computer-based Control System to the respective control panels/switchboards/distribution boards/contractor panels of the equipment to be provided under the various Sub-Contracts/ Contract. However, the Sub-Contractor/Contractor concerned shall supply and install all necessary relays, auxiliary switches/contacts, terminal boards, wirings, etc. connected to a central terminal point (or board) suitably located in a separate compartment of the respective control panels/switchboards whereupon connections will be by the Air Conditioning & Ventilation Sub-Contractor from this central terminal point to the Computer-based Control System.

The notations on functional points are as follows:

	Notation	Description
(a)	DI	Digital input from field device into computer based controller
(b)	DO	Digital output from computer based controlled to field device
(c)	AI	Analogue input from field device into computer based controller
(d)	AO	Analogue output from computer based controller to field device
(e)	PI	Pulse input from field device into computer based controller
(f)	HL	High level interface between field device/equipment/system with computer based controller

……..
Official Stamp & Authorised Signature of Tenderer

SUB-CONTROL PANEL

S/N	INPUT/OUTPUT VARIABLES (FOR EACH PANEL)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	Incoming Power Supply Status	3					
2	Power Meter						X
	- Current for all 3 phases			3			
	- Voltage between all 3 phases			3			
	- kVA			1			
	- kW			1			
	- kWH			1			
	- kW Average Demand			1			
	- kW Maximum Demand			1			
	- Power Factor			1			

DOMESTIC WATER BOOSTER PUMP

S/N	INPUT/OUTPUT VARIABLES (FOR EACH PUMP)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	On/Off Status	1					
2	Trip Alarm	1					
3	Auto Mode Status	1					

DOMESTIC WATER/NEWATER TRANSFER PUMP

S/N	INPUT/OUTPUT VARIABLES (FOR EACH PUMP)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	Start/Stop Control		1				
2	On/Off Status	1					
3	Trip Alarm	1					
4	Auto Mode Status	1					

DOMESTIC WATER TANK

S/N	INPUT/OUTPUT VARIABLES (FOR EACH TANK COMPARTMENT)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	Low Water Level Alarm	1					
2	High Water Level Alarm	1					
3	Overflow Alarm	1					

……..
Official Stamp & Authorised Signature of Tenderer

SUMP PUMP & PIT

S/N	INPUT/OUTPUT VARIABLES (FOR EACH PUMP)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	On/Off Status	1					
2	Trip Alarm	1					
3	Auto Mode Status	1					
4	Sump High Water Level	1					

EJECTOR PUMP & TANK

S/N	INPUT/OUTPUT VARIABLES (FOR EACH PUMP)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	On/Off Status	1					
2	Trip Alarm	1					
3	Auto Mode Status	1					
4	Tank High Water Level	1					

PRIVATE WATER SUB-METER

S/N	INPUT/OUTPUT VARIABLES (FOR EACH METER)	TYPE AND NUMBER OF POINTS					
		DI	DO	AI	AO	PI	HL
1	Cooling Tower Make-up Water Tank Incoming					1	
2	Domestic Water Tank Incoming					1	
3	Domestic Water Pump Feed					1	
4	Domestic Water Gravity Feed					1	
5	Domestic Water Direct Feed					1	
6	Garden/Landscape Tap Branch					1	
7	Swimming Pool Balancing Tank Incoming					1	
8	Refer to schematic drawing for ___ no.					?	

……..
Official Stamp & Authorised Signature of Tenderer