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PASSENGER RAIL AGENCY OF SOUTH AFRICA

J42000 PRASA EPCM
Durban Lifting Shop Depot Upgrade

Wet Services Equipment Schedule
Ref: J42000-B-06-05-WET-SCH-0001-01

Rev 1 – TEDNER

1 May 2024

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ALL EQUIPMENT IS EQUAL OR APPROVED

1 Drainage Equipment

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Requirements and Notes
FD/1	Standard Floor Gully for use in toilets for wash-down drainage and potential overflow drainage		150x150mm 50Ø Outlet		With integral removable seal trap. Gully must allow rodding access to drain below once trap is removed. Cast into screed/slab with waterproofing lapped into floor drain if present. Square flange with “Slots” removable cover stainless steel
FD/2	Heavy Duty Floor Gully for use in refuse areas and other external heavy use areas		110Ø Outlet 400 X 400 inlet		Drain to have removable (bolted down) heavy duty grate to allow access to the trap for cleaning. Removable sieve Double water seal trap to be removable for rodding Large Sludge Box Perorated outlet cap Cast into screed/slab 110ø vertical connection to below Stainless Steel 2500kg Load capacity
FD/3	Medium Duty Floor gulley for kitchen use		110Ø Outlet 240x240mm flange		With integral removable double seal trap. Gully must allow rodding access to drain below once trap is removed. Cast into screed/slab with waterproofing lapped into floor drain if present. Side inlets if required to accept flow from basins. Square flange with “Slots” removable cover Stainless steel
FD/4	Heavy Duty gully For Pit Drainage		110Ø Outlet 400 X 400 inlet		Drain to have removable heavy duty grate to allow access to the trap for cleaning. Double water seal trap to be removable for rodding Sludge Box Perorated outlet cap Cast into screed/slab 110ø vertical connection to below Stainless Steel
GU/1	Standard Concrete Overflow Gully		400x400x120mm		Standard concrete gully for external use. To be supplied with steel grate To supplied with 110Ø connection to below To be supplied with 110Ø P trap and rodding eye connection and rodding eye installed after trap to allowing pipe after trap to be rodded.
GT/1	Kitchen Under counter Grease Trap		1.5/s 500 x 400 x 300		Installed below kitchen counter Stainless steel Large solid strainer Easy to remove cover and basket 50 inlet and 50 outlet

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Requirements and Notes
GOS/1	Oil/Water Separator		Gravity based in-line 3 stage oil separator		In ground oil/grease separator Installed In line with drain Installed with sample and inspection box after 3no. separate chambers to maximise collection and ease of cleaning each chamber has an easy access manhole manhole lids can be filled with local surface finish to blend in
SP/1	Small Submersible Sump Pump Base of existing pit sumps Base of Lift shaft	Grundfos / DW.50.07.1	3.4l/s @ 7.3m 395x210Ø 50Ø connection	1Ø 1.0kW 4.0A – Running	c/w integral level sensor and controller. Fault and high level warnings to be outputs. c/w all required support/footings and inlet To be supplied with standalone control system and control panel. Electrical Contractor to provide isolator. Plumber to connect to isolator. All Power for controls/sensors and pump to be taken off the control panel. To be supplied with LC108 controller To be supplied with Float switch for monitoring and activating of pump
MH/1	Concrete Manhole		1000mm diam concrete ring manhole Depth as per layout / BOQ		Per Civil Engineers Spec. c/w cover and metal lid for high traffic and general areas c/w cover and inlay lid for sensitive areas where surface finish will be installed in inlay lid. c/w rungs to climb out installed on concrete bas Benching at the bottom to ensure smooth and easy flow round bends.

2 Hot and Cold Water Equipment

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Controls	Requirements and Notes
WST/01	Cold Water Storage tank	JoJo Tank	20 000 litre		Units to have visible clear pipe to show level of tank.	UV resistant 50Ø Inlet and 65Ø Outlet • Overflow • High level indicator pipe. • Drain valve and manual level indicator • Test Tap • Temperature indicator at high level • Temperature indicator at low level • Inlet float valve and isolation valve • Outlet with anti-vortex end piece
WST/02	Cold Water Storage tank		10 000 litre		Units to have visible clear pipe to show level of tank.	UV resistant 40Ø Inlet and 50Ø Outlet • Overflow • High level indicator pipe. • Drain valve and manual level indicator • Test Tap • Temperature indicator at high level • Temperature indicator at low level • Inlet float valve and isolation valve • Outlet with anti-vortex end piece
BS/01	Cold Water Supply Booster Pump		2 l/s 5 Bar	3ø /400V 1.5 kW 8.7 A	Two pump set with 1 duty and 1 standby pump. Pumps will have full inverter control to provide continuously variable speed pumping. Pump to be supplied with all control elements required to ensure constant pressure is achieved. This may include line Pressure Sensors, etc. System is to be plug and play once the desired pressure and flow have been set.	Liquid Temperature 0 °C to +60 °C Inlet pressure not exceed 16 Bar Motor Protection against overload and stalled condition To be supplied c/w: base and frame with ant-vibration mounts Accumulator / expansion vessel Pumps will be supplied with all the valves, sensors and gauges required; including isolation at each end, non-return, strainer, drain, PRV, flexible connectors and pressure gauge on outlet.

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Controls	Requirements and Notes
BS/02	Window Washer Booster Pump		4l/s 6 bar	3ø /400V 4 kW 7.37 A	Pump will have full inverter control to provide continuously variable speed pumping. Pump to be supplied with all control elements required to ensure constant pressure is achieved. This may include line Pressure Sensors, etc. System is to be plug and play once the desired pressure and flow have been set. Pumps will be controlled from washer control panel. (See below)	Single pump booster to supply flow and pressure to window washer nozzles. Liquid Temperature 0 °C to +60 °C Inlet pressure not exceed 10 Bar Motor Protection against overload and stalled condition To be supplied c/w: base and frame with ant-vibration mounts Pumps will be supplied with all the valves, sensors and gauges required; including isolation at each end, non-return, strainer, drain, PRV, flexible connectors and pressure gauge on outlet.
WT/01	Standard Bib tap		20mm			Standard water tap with connector to be located in plant areas for wash down. Tap to be 900AFFL.
WT/02	Standard Bib tap		20mm			Standard water tap with connector to be located in public areas for wash down. Tap to be 900AFFL. Tap to be supplied with lockable cover to ensure tap cannot be used without removing the cover.
CP/01	Hot Water Recirculation Pump		0.26l/s 35 kPa	1ø /230V 0.56 kW 0.46 A	Pump will have on board controls. The pump will be controlled to ensure that the return temperature is within 2°C of the flow temperature. Pump to be supplied with all control elements required to ensure temperature control is achieved. This may include line Temperature Sensors to feed back to the pump. All control wiring will be completed by the Wet Services / specialist Installer	Temperature on the return line will be monitored and maintained. Pumps will be supplied with all the valves, sensors and gauges as indicated on the schematics and layouts. This will include flexible connectors, vibration mounts, plinth connections, isolation valves, strainers and non-return valves as required in the relevant layouts.
HP/01	External Hot Water Heat Pump		7kw	3Ø / 380V 1.85kW 8.6A	Micro-computer controlled with timer function, the heat pump automatically starts up and stops according to the water temperature and the set temperature setting. The heat pump will be linked to the geyser elements. The elements will kick in should the heat pump fail to het the water.	Specialist to provide installation of all equipment, pumps, pipes, valves, etc as required. Approximately 885x360x600 and 58kg To be installed on vibration mounts on the wall

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Controls	Requirements and Notes
HP/02	External Hot Water Heat Pump		3.5kw	1 / 3Ø / 380V 1.5kW 5.0A	Micro-computer controlled with timer function, the heat pump automatically starts up and stops according to the water temperature and the set temperature setting. The heat pump will be linked to the geyser elements. The elements will kick in should the heat pump fail to het the water.	Specialist to provide installation of all equipment, pumps, pipes, valves, etc as required. Approximately 885x360x600 and 45kg To be installed on vibration mounts on the wall
GEY/01	Geyser		250 litres	1-Phase 230V 15A Isolator	Fail safe thermostat graduated between 30 °C and 70 °C. 4kW element To be controlled and supplied by the heat pump with the electric element as backup.	The geyser will be installed in compliance with SANS 10254 Electric Hot Water Storage Heaters c/w Temperature & Pressure Valve (Safety Valve), Drain Cock, Pressure Control Valve, Drip Tray, Vacuum Breakers. See Manufacturers Details for installation requirements. See Schematics for any additional installation requirements 65kg empty Up to 600Kpa 538mmØ x 1645mm long To be supplied with all valves and safety equipment. PRV to be installed on the geyser inlet – set to 6 bar Geyser to have an additional 50mm thick thermal blanket.
GEY/02	Geyser		150 litres	1-Phase 230V 15A Isolator	Fail safe thermostat graduated between 30 °C and 70 °C. 2kW element To be controlled and supplied by the heat pump with the electric element as backup.	The geyser will be installed in compliance with SANS 10254 Electric Hot Water Storage Heaters c/w Temperature & Pressure Valve (Safety Valve), Drain Cock, Pressure Control Valve, Drip Tray, Vacuum Breakers. See Manufacturers Details for installation requirements. See Schematics for any additional installation requirements 21kg empty Up to 600Kpa 480mmØ x 610mm long To be supplied with all valves and safety equipment. PRV to be installed on the geyser inlet – set to 6 bat

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Controls	Requirements and Notes
GEY/03	Point of use Geyser		10 litres	1-Phase 230V 15A isolator for a 3 pin plug connection	Fail safe thermostat graduated between 30 °C and 70 °C. 1.5kW element To be controlled by timeclock located in the DB	The geyser will be installed in compliance with SANS 10254 Electric Hot Water Storage Heaters c/w Temperature & Pressure Valve (Safety Valve), Drain Cock, Pressure Control Valve, Drip Tray, Vacuum Breakers. See Manufacturers Details for installation requirements. See Schematics for any additional installation requirements 7.9kg Up to 400Kpa - TBC 340mm x 347mm x 291mm To be supplied with all valves and safety equipment. PRV to be installed on the geyser inlet – set to 6 bat
GEY/04	Point of use Geyser		5 litres	1-Phase 230V 15A isolator for a 3 pin plug connection		5 litre Stainless steel water boiler with stainless steel tank, steam free boiling water, electronic controls, 15mm overflow, connected to 15mm cold water supply including isolating valve
CS/01	Commissioning set. Balancing valve to control flow on recirculation system		Line Size – taken off layouts		To have a lockable set point to allow valve to be fully opened but when screwed closed, the set point is achieved.	Max Operating Temperature 130°C at 10bar Max operation 20 bar at 20° Max differential pressure at closed valve 10 bar
BWM/01	Bulk Water Supply Check Meter		Up to 250m3/h		Pulsed Output connect to BMS for water monitoring	Unit to be supplied with PR7 pulsed output module.
WM/XX	Billing standard water meter		To be line size		Water meters will be standard commercial water meters that are billing approved. Meter to be line size. Meters to be Eltser V110 / M110 or similar and approved. Contractor to provide specification and costing of proposed meters for agreement before purchasing	To be supplied with read switch / interface as well as interface unit for connection to BMS for water readings to be taken remotely at the BMS.
WLM/01	Electronic Water Level Monitoring System				System to monitor and report on water tank levels back to the relevant control panel	System must have the following warnings at a minimum, low level, mid-level, full and overflow warning (high level).
WDU/01	Water Dispensing Unit		Cold water dispensing unit			Standard wall/floor mounted water dispensing unit To provide normal and chilled water To have long spout to fill bottles and short spout to drink directly

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Controls	Requirements and Notes
EW/01	Emergency Combination shower/eye wash		Emergency Combination shower/eye wash		Shower by pullrod or foot treadle Eye wash by paddle or foot treadle	ABS Plastic in Safety colours For outdoor installation Must be able to handle 8 bar Must stand out for easy use.

Ref	Description	Manufacturer / Ref [1]	Spec	Electrical	Controls	Requirements and Notes
RWH/01	Rainwater Harvesting system		Standalone rainwater harvesting system for watering the gardens		Rainwater Harvesting system to be controlled by booster pump control panel. Control Panel will be standalone	Complete small scale rainwater harvesting System that will include: Small booster pump, piping, 10 000l tank, tank protection, valves, strainers and all fittings, fixtures and equipment required for a complete installation. The system will be installed to accept water off a roof and will be used to supply water to a hosepipe to water the garden around the facility.

2.1 Control Panels

Ref	Description	Manufacturer / Ref [1]	Spec	Notes
WCP/01	Control Panel for washer area		The control panel will comprise an IP65 mild steel enclosure with orange powder coated finish.	The control panel will have the following indication and control equipment for; • Power on switch • Power ON Indicator • System Fault Indicator • Supply pressure and flow indicator The control panel will be fitted with manual selector switches. The manual selector shall be used to switch the system on and off. The system will have a timeclock that will time the system out after a programmed time. This is to prevent the system running over should the controller leave. The system will have a low water shutoff that will shut the system down should the water level in the tank fall below a preset level. The control panel will be supplied with all the necessary sensors required to the achieve its control and sensor functions.

Item Specification for all of the above as required

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2.1 Pipework

Ref	Description	Manufacturer / Ref [1]	Spec	Requirements and Notes
WPIP/01	Water Reticulation Pipework		Multi-layered water pipework	**MEPLA or equivalent will be used** These pipes comprise multiple layers of HDPE, Aluminium and PEX-Xb. These pipes and fittings shall be manufactured in accordance with SANS and EN ISO 21003. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by agreed and manufacturers recommended connection to suit the pipework material and/or the fitting being connected to.
WPIP/02	Water Reticulation Pipework		Galvanised Steel	Galvanised steel pipework will be used for potable water and fire water where stated. Galvanised Steel pipes and fittings shall be manufactured in accordance with SANS. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by screw fit or flanged connection to suit the pipework material and/or the fitting being connected to. Generally connections will be flanged for all pipes 50mm in diameter or greater with screwed connections for smaller pipes.
WPIP/03	Water Reticulation Pipework		HDPE Pressure Pipe	HDPE water pipes will be used for all water pipework installed below ground. Pipes 50Ø or smaller must run in the ground inside a smooth bore sleeve of appropriate size to ensure pipe can be replaced. HDPE pipes and fittings shall be manufactured in accordance with SANS. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by screw fit or flanged connection to suit the pipework material and/or the fitting being connected to.
WPIP/04	Water Reticulation Pipework		UPVC Pressure Pipe	uPVC water pipes will be used for all water pipework installed below ground. Pipes 50Ø or smaller must run in the ground inside a smooth bore sleeve of appropriate size to ensure pipe can be replaced. Pipes and fittings shall be manufactured in accordance with SANS. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by screw fit or flanged connection to suit the pipework material and/or the fitting being connected to.
WPIP/05	Water Reticulation Pipework		Copper	Copper pipes and fittings shall be manufactured in accordance with SANS 6059. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by welding, soldering or by a compression type mechanical coupling to suit the pipework material and/or the fitting being connected to.
PIPR/01	Refrigerant Pipework	Copper	Class as required by manufacturer	All refrigerant pipework will be copper

2.2 Ductwork

Ref	Description	Manufacturer / Ref	Spec	Notes
DUCT/01	Galvanised Steel ductwork for normal operation		Rectangular and Circular ductwork	Low pressure galvanised steel ductwork All Ductwork will be insulated as per DINS/01 All ductwork (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule.
DUCT/02	Flexible Ductwork			Flexible duct insulation shall be 25 mm nominal thickness fibreglass of 24 kg/m^3 density. The insulation shall encase the flexible duct and shall be sheathed with a moisture barrier having a permeability of not over 0.02 perm. Flexible circular ductwork will be used for the final 1m only (to the valve/grille) of the installation and this distance should be reduced where possible. All ductwork (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule.

2.3 Insulation

Ref	Description	Manufacturer / Ref [1]	Requirements and Notes
PINS/01	Hot and cold water pipework Insulation	Foil Faced Rockwool/ Mineral Wool	Various Pipe sizes Thickness 25-50mm Limit operation Temp 850°C ODP of zero required Thickness to be selected to achieve a Thermal Conductivity that will be less than 0.034W/mK To be installed snugly onto the pipework. To be wrapped in aluminium foil tape to protect the insulation To be installed as per manufacturers best practice requirements. All Valves, fittings and other equipment to be insulated as well using insulation boxes or insulation specifically designed fdor that unit, application. All Joints, Bends, offset, etc to be insulated, including the entire of a flange should that be a connection type. Installation installed on pipework in exposed/external/high risk area will require galvanised steel sheet cladding over all insulation.

Ref	Description	Manufacturer / Ref [1]	Requirements and Notes
DINS/02	Ductwork Insulation	Foil Faced Rockwool/ Mineral Wool 24 kg/m^3 density mineral wool insulation ODP 0 Thickness 25-50mm Limit operation Temp 850°C	Thickness to be selected to achieve a Thermal Conductivity that will be less than 0.034W/mK The insulation shall be glued to the ducting and sealed along all longitudinal and transverse overlapping joints with approved adhesive to provide a vapour seal. The overlapping joints shall be approximately 75 mm wide. The edges of overlaps are to be taped down with self-adhesive aluminium tape no less than 50 mm wide. The insulation shall be strapped with nylon straps at intervals of more than one metre apart. Where necessary, especially at bends, transformation pieces, branches, etc. insulation is to be glued, taped and strapped to ensure that the joints are vapour sealed. All insulation installed externally and in Plant Rooms shall be protected with 0.4 mm thick galvanised steel sheet metal cladding, which shall be applied directly over the insulation vapour barrier. The cladding shall be secured by means of removable and re-usable stainless steel bands every 330 mm. Self-tapping screws will not be accepted. No dents or damage to the sheet metal cladding will be accepted. All insulation (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule.
ACINS/03	Refrigerant Pipework Insulation	Nitrile Rubber insulation Class O, dust-free, fibre-free and CFC free ODP of zero	Thickness 12mm to 25mm Preformed Pipe Section to suit pipework diameter. DO NOT COMPRESS THE INSULATION WHEN FIXING TO PIPEWORK DO NOT USE CABLE TIES TO FIX INSULATION. Use recommended vapour barrier tape (50mm wide minimum) and ensure tape overlaps joints sufficiently for a good seal. Use good quality tools—in particular, fresh adhesive, good adhesive brushes, and sharp knives. Apply insulation only when the pipes are clean, dry, and unheated or uncooled. The surface to be insulated must be free of rust. Never stretch insulation when sealing the joints. It is better to compress it slightly. Use pieces of insulation that are at least as long as the section of pipe to be insulated. Always use the insulation that is properly sized for the pipe it is to cover. Do not stretch it over the pipe and don’t install oversized insulation. Do not crowd insulation-covered pipes. Space pipes far enough apart to allow for the free circulation of air. Ensure all piping insulation is properly sealed to minimize heat loss and control condensation. When installed outdoors, paint with a recommended finish. Follow the manufacturer's instructions regarding the type of finish, the number of coats required, etc. Allow proper drying times between coats. In double layer work, apply insulation with the side and end joints staggered. Do not compress piping insulation at joists, studs, columns, ducts, hangers, etc. This is important because the insulation will lose thermal efficiency where it is compressed. All insulation (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule. The finish must not flake or be prone to being easily removed.