

7.3 Kilkea National School

Lot KW3

Equipment Schedules

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BDP.

Built Original.

Equipment Schedules

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Equipment Schedules Suppliers/Manufacturers

Explanation of Status:

If the supplier status is listed for an item of equipment it has the following meaning:

1: Suggested Manufacturer: The names are provided to assist the contractor in identifying suppliers that may supply compliant equipment. This does not preclude the use of alternatives that comply fully with the requirements detailed in the schedules. The equipment supplied must comply fully with the requirements listed in the schedule irrespective of the manufacture/supplier used.

2. Required Quality: The supplier/manufacture listed provides an indication of the quality of equipment that must be provided. Equivalent alternatives will be considered but all alternatives offered must comply fully with the requirements of the schedules and must be fully technically and visually equivalent to that provided by the supplier/manufacture listed.

3: Required Product: This item of equipment must be purchased from the supplier/manufacture listed. Any difficulties in obtaining an accurate quotation must be raised during the tender period. Post tender, a deviation from the listed manufactures will only be considered if (in the view of the consultant engineer) the cost is considerably outside the industry norm or the supplier is shown to be unreliable or inappropriate.

	Schedule Name		
	ASHP	1	Mastertherm. Ideal, Keyter
	Boilers	1	Remeha, Viessmann, Hamworthy
	Temperature Stats	1	Danfoss RET MD
	Flues	1	Insulated Chimneys
	Radiators	1	Jaga
	Fire Extinguishers	1	Apex Fire, Britania Fire
	Gas Detection	1	Medem
	Pressurisation Units	1	Wilo, Grundfos
	Pumps	1	Wilo, Grundfos
	Dirt Air Separator	1	Spirax Sarco, Flamco
	Buffer Vessels	1	Flamco
	Trace Heating	1	Raychem
	Calorifier	1	Hamworthy, Flamco

Equipment Schedules : General Notes Applicable To All Schedules

Equipment must be supplied from companies that meet the following Minimum Requirements:

A distributor must have hand an office in the same country as the project, for at least five years.

The supplier must be able to provide on request ten positive references from previous installations of the proposed equipment.

The supplier or distributor must have a minimum of 5 No. support staff in the same country as the project.

Fit for Purpose:

All equipment must be fit for the intended purpose and suitable for the weather conditions found at the site. All equipment must comply with all statutory regulations and requirements.

Technical Support:

All suppliers proposed must be able to provide a technically competent representative who is capable of fully understanding the equipment provided and advising on commissioning and operational information.

Warrantees:

Provide warranties / extended warranties for all equipment for a period of at least 12 months beyond the date of at which the equipment is accepted as handed over to the client, snag free. If equipment is not accepted, the contractor shall provide, at their cost, extended warrantees as required to meet this clause.

Two year warranties shall be provided for any item of equipment that contains moving parts with the exception of the heat pumps.

Warrantees shall cover full replacement cost including parts and labour in the event of an equipment failure For any other purpose other than direct damage by the client.

Provide a minimum warranty period of five (5) years post date of substantial completion for the heat pumps. Refer to Mechanical Specifications Volume Two Section 11.4 for further information on heat pump warranties.

Oversizing:

Equipment supplied shall not be significantly oversized. If equipment is oversized by more than 20% of the specified duty, and the Employer's Representative determines that this is causing a difficulty with the control, efficiency, noise, or physical dimensions of the unit then the item shall be replaced at no cost to the contract.

Certification

All plant shall contain the CE mark All plant and equipment shall comply with the Building Regulations. References above to equipment shall also refer to plant and components.

Equipment shall only be proposed, for which the manufacturer can supply environmental performance declarations in accordance with ISO 14025 and EN 15804+A2

Air Source Heat Pump Schedule

Equipment Property	Units	
Reference:		HP01
Heating Duty (@7degC)	kW	12.00
Number of heat pumps of this type		1
Modes		Heating Only
Refrigerant		R290
To be treated for marine environments		No
Compressors per unit		1
Refrigeration Circuits per unit		1
Width	m	1.385
Length	m	0.413
Height	m	0.865
Weight	kg	135
Must Support Static Pressure of	Bar	6

Heating:		
Entering Temperature	°C	50
Leaving Temperature	°C	55
Design Ambient	°C	7
Water Flow Rate	kg/s	0.6
SCOP W35		4.67
ErP class W35		A++
Max possible temperature at -5 ext	°C	60

Property Relevant to all Instances

Compliance	CE marked	
Compressor Type	Inverter driven, variable speed with a turndown ration of no larger than 20%	
Max water side pressure drop	kPa	10
Pump Control	To be suitable for variable speed primary pumping.	
Pump control	Primary pumps to run at minimum speed in frost conditions	

Electrics:		
Include	Soft start to be provided	
Note	Unit must be capable of operating with grid voltage tolerances (+-10%)	
Include:	The unit shall be capable of restarting within 30 seconds on loss of power	
Include:	They shall continue to control with previous set points on restoration of power	

Accessories:		
Include	Anti-Vibration mounts	
Include	Sump heater and any other components required to safely operate in glycol free mode	
Include	Crank case heater	
Include	Flow swtiches	

Sound Levels:		
Maximum sound power	dB(A)	65
Maximum sound pressure at 1m	dB(A)	51

Air Source Heat Pump Schedule

Warrantee	Include five year manufacturers warrantee covering all parts and labour
Fan type	Fans shall be variable speed with ECDC motors
Pump duty	Refer to the pump schedule
Integration	If integrated into ASHP, ensure BMS can control pumps for frost control and sequencing requirements

Controls:								
BMS Interface	BACnet							
Inputs	Enable	Flow temperature	Frost mode	Mode (H/C)				
Outputs	Fault	% Output						
Outputs For Evaporator and Condenser	Flow temperature	Return temperature						
Sequencing	Integrated sequencer to sequence for most efficient operation and to ensure defrost of one unit at a time							
Soft Start	Ensure soft start and ensure no more then one unit starts at a time							
Frost conditions	Ensure primary pumps only run at minimum speed on idle units in frost conditions							

Based off Ideal HP290 Heat Pump

Boiler Schedule

Equipment Property	Units	
Reference		B01
Output	kW	55.3
Flow rate	kg/s	0.7

Property Relevant to all Instances			
Design Flow Temperature	°C		80
Design Return Temperature	°C		60
Fuel	LPG		
Boiler Type	Forced Draught, Condensing, Pre-Mix, Fully Modulating		
Heat Exchanger Material	Stainless Steel		
Casing:	Steel		
Insulation	50mm Rockwool		
Max water side pressure differential	kPa	50	
Rated pressure	Bar	6	
Efficiency	91% Seasonal Efficiency		
NOx Emissions	Below 60 mg/kWh at 0% excess O2		
NOx Emissions	Below 60 mg/kWh at 0% excess O2		
Accessories	Safety valve, Pressure Gauge, Temperature Gauge, Drain cock		
Compliance	CE Certified, HSE INDG436, BG01, BS 7671 , BS 6644,EN 12952		
Note	Boiler must be capable of receiving a temperature set point signal from the control system		
Note	Provide trapped condensate drain to gulley, protect with steel cover, where exposed to damage		
Note	Provide gas pressure regulator upstream of boiler connection		
Note	Boiler shall be complete with pressure switch to cut out boiler safely in the event of high or low pressure		
Note	Boiler must be capable of operating permanently at a flow temperature as low as 45°C		

Controls/Indication:	Self Contained	BMS Outputs	BMS Inputs
Burner Enable:	Yes	Yes	
Flow Temperature set point:	Yes	Yes	
High Limit Cut Out:	Yes		Yes
Lock Out:	Yes		
Flame Rectification:	Yes		
Flow Temperature:	Yes	Yes	

Flue Schedule

Equipment Property	
Reference	F01
Application	Boiler
Heating type	LPG
Length	Refer to drawings
Diameter	As recommended by heating equipment supplier

Property Relevant to all Instances	
External lining	304 stainless steel
Insulation	25mm mineral wool
Internal lining	316 stainless steel
Fire rating	2 hr to EN 13501
Structure	The detailed design, structural stability including all anchoring of the flue arrangement shall be the sole responsibility of the Contractor.
Drawings	Submit fabrication drawings of flue and supports for approval prior to ordering.
Symport material	Corrosion proof, treated supports
Flue dimensions	Confirm with combustion equipment supplier prior to ordering
Flue detailing	All Changes of direction in flues must be limited to a maximum angle of 45°
Weathering	Include for all weathering require for wall or roof penetrations
Condensate drain	Provide a trapped condensate drain at base of flue and plumb to waste
Fire stopping	Include all fire stop spacers required where flue transfers through floors
Boxing out	Where flue is boxed in, include appropriate vents to box outs on each floor
Clearance	Where not enclosed, a distance of 50mm shall be maintained from any combustible materials

LPG Tanks Schedule

Equipment Property	Units	
Reference		LPG 01
Capacity	kg	600
Diameter	m	1
Length	m	2
Quantity		1
Gas Type		LPG
Purchase or rent tanks		Supplier

Property Relevant to all Instances	
Testing and handover	Provide adequate gas for testing and leave at least 25% of the total capacity at handover
Prior to ordering	Arrange for confirmation of suppliers conditions prior to ordering
Include	Pressure regulators, labelling and all equipment recommended by supplier
Compliance	IS 3216:2010, Code of Practice – Part 1 and Part 7: Bulk LPG Storage at Fixed Installations
Builders works	Detail plinth and lockable cage requirements for main contractor

Radiator Schedule

Equipment Property	Units	
Plant Reference Number		R01
Location		Boiler Room
Output	W	1000
Quantity		1
Energy Source		Electric
Length	m	1000
Height	m	500
Include brackets for mounting on		Wall

Property Relevant to all Instances	
Control	Radiator to turn on at 5degC and switch off at 14degC

Portable Fire Extinguishers Schedule

Property Relevant to all Instances	
Locations	Refer to drawings
Supplier	An extinguisher supplier shall be used that offers full after sales support and maintenance for the system including annual inspection, refilling and parts.
Supplier	The contractor shall supply and install portable fire extinguishers in accordance with the drawings
Location and Fixing	Exact locations and mounting heights shall be agreed with clients representative prior to mounting extinguishers. Extinguishers shall be placed on the floor adjacent to the proposed installation locations and the supplier shall walk the building with the project architect agreeing the exact location of each extinguisher prior to mounting.
Locations and Fixing	Provide wall brackets for all extinguishers and allow for mounting all extinguishers. Include any grounds required to mount extinguishers robustly on the wall types provided.
Standards	All portable fire extinguishers to be CE approved and marked.
Standards	The supplier shall install the fire extinguishers and labels to BS 5306 and provide a signed certificate for the installation Fire extinguishers to conform to BS EN 3-7:2004 #and I.S. 291.
Signage	Provide and install wall mounted signage above all fire extinguishes identifying fire point, and extinguisher usage.
Signage	Provide a fire assembly point sign and mount externally in the location indicated by the clients representative
Guarantee	All portable fire extinguishers shall have a minimum 5 years guarantee

Gas Detection Schedule

Equipment Property	
Locations	Required in Both Boiler Rooms

Panel	
Conformity	CE Rated, IEC 61779-1
Protection	IP44
Inputs	Fire alarm, and sensors as per below
Warning	Led indication and audible detection/fault alarm
Include	Manual Reset
Include	Emergency shut off button, provide remote if the panel is not beside the exit

Valve	
Auto reset	Valve to auto reset on loss of power and restoration and on fire alarm reset
Energy	Maximum consumption of 2W during normal usage
Compliance	CE rated, EN161 and DIN Class A.
Size	To suit line size

Detectors	
Gas	Provide quantities as recommended by the system manufacturer for the room that the system is in
Heat	Resettable heat detectors shall be mounted over each combustion device
Carbon Monoxide	Provide in the same room as the main panel and in each space the flues pass through

Meter Schedule

Equipment Property	Units					
Reference		HM1	HM2	HM3	GM1	WM1
Location		Heat Pumps	Boiler	Calorifier	Gas	Water
Monitoring		Heat	Heat	Heat	Gas Use	Water Use
Flow Rate (Max)	kg/s	0.6	0.36	0.18	2.3 m3/h	0.5
Load (Max)	kW	12	30	15	N/A	N/A
Typical Temperature	°C	55	80	80	N/A	N/A

Gas Meters	
Accuracy	Shall be accurate within 0.2m ³ /hr up to the maximum value above.
Control Interface	Pulse, minimum 1 pulse per kWh
Power	Operate from mains power, not battery
Utility Meter	In addition to above, provide utility meters to utility requirements,
Utility Meter	Shall be 2m from any window or opening, shall be provided in locked cage

Water Meters	
Accuracy	Shall be accurate within 0.05l/s up to the maximum value above.
Control Interface	Modbus, pass stored totals not pulses.
Power	Operate from mains power, not battery
Battery Backup	Meter to retain value for at least 72 hrs with a battery life of 16 yrs
Pressure drop	Maximum pressure drop through the meter shall be 5 kPa
Monitoring method	Ultrasonic
Utility Meter	In addition to above, provide utility meters to utility requirements,
Pressure Rating	16 BAR

Heat Meters	
Accuracy	Shall be accurate within 1% of rated output
Control Interface	Pulse, minimum 1 pulse per kWh
Power	Operate from mains power, not battery
Battery Backup	Meter to retain value for at least 72 hrs with a battery life of 16 yrs
Pressure drop	Maximum pressure drop through the meter shall be 5 kPa
Monitoring method	Ultrasonic
Installation	Inline meters with multi-position installation capability
IP rating	54
Ambient range	Operate from -5 to 40°C
Include	Include pockets for all probes required
Compliance	EN 1434 Class 2
Pressure Rating	16 BAR

All meters	
Isolation	Provide isolation valves both sides of the meter
Sizing	Size for load, reduce pipe size if required to achieve required accuracy
Testing	Load test all meters and provide schedule of test provided, confirm readings on BMS during test.
Cabling	Pulse output cables from each heat meter shall be installed and routed back to a designated
Pulse Testing	The Contractor shall test and demonstrate that the pulse output generated by each heat/gas

Pressurisation Unit Schedule

Equipment Property	Units	
Plant Reference Number		PU 01
System		Heating
Fluid		Water
Fluid Temp	°C	80-60
Energy Input	kW	55.3
Minimum Expansion Vessel Size	L	49
Maximum Fill Pressure	bar (g)	6
System Height	m	8
Tank Size	L	4
Fil Rate	L/m	12
No. of Pumps (with auto changeover if multiple)	per unit	2

Property Relevant to all Instances		
Maximum Ambient	°C	20
Pump Casing Material		Gun Metal
Pump Shaft Material		Stainless Steel
High Pressure Cut Out		Yes
Low Pressure Cut Out		Yes
High pressure cut out		Yes
Low pressure cut out		Yes
BMS BACnet connection		Yes
BMS outputs for fault and high and low pressure		Yes
BMS outputs for pump run indication		Yes
Feed tank low level protection		Yes
Frost protection (only to be activated in frost conditions)		Yes
Include controls with "pump kick" feature to prevent seizing		Yes

Conformity, Must be	CE marked, ErP Compliant, IEE rating to be marked on pumps, BS 7074, EN ISO 4126
Conformity, Must be	Regional wiring regulations
Include :	All brackets and supports required
Include :	Isolating valve on the inlet and lock shield valve on the outlet
Include :	Non return valve (with expansion vessel on system side)
Include :	Strainers on all pumps
Include :	Pressure gauge to indicate system pressure
Include :	Air relief valve and pressure relief valve
Note	Type "AA" air gap shall be included within the system
Note	Noise produced shall be less than 60 dB(A) at 1m
Commissioning	The contractor shall measure the actual system content and confirm pressure vessel size is appropriate with the manufacturer prior to order

Pump Schedule

Equipment Property	Units				
Plant Reference Number		PHP01	PB01	P01	P02
Serving		Primary Heat Pump	Primary Boiler	Secondary	DHW Recirc
Flow rate	kg/s	0.6	0.66	0.72	0.111
External Pressure Drop	kPa	120	50	50	120
Temperature	°C	55	80	80	60
System Temperature Difference	K	5	20	10	
Glycol Content	%	0	0	0	0
Integrated Variable Speed Drive		Yes	No	Yes	No
Variable Speed Control		Auto Adapt	N/A	Auto Adapt	N/A
Pump Housing Material		Cast Iron	Cast Iron	Cast Iron	Cast Iron
Pump Impeller Material		Plastic	Plastic	Plastic	Plastic
Electrical Phases		1	1	1	1
Provide Control Interface		BACnet	BACnet	BACnet	BACnet
Integrated Energy Meter		N/A	N/A	N/A	N/A
Pump Heads		2	1	2	1
Pump Mounting		Wall	Wall	Wall	Wall
Include Flexible Connections		No	No	No	No

Property Relevant to all Instances			
Pump Efficiency Must be at least	EEI < 0.23 , with rating clearly displayed on the pump		
Conformity, Must be	CE marked, ErP Compliant		
Provide Control Input Per head	Enable		
Provide Control Outputs Per head	Fault	Active flowrate	Energy Consumed
All Pumps shall have active displays showing	Pressure	Flow rate	Active control mode
Pumps to be rated for a static head of	10 Bar		
Include	All brackets and supports required		
Include	Anti vibration mounts on all pumps with a flow rate over 8g/s		
Selection	Select pumps at the centre of the pump curve		
Handover	Demonstrate correct commissioning of the VSD's		
Handover	Pumps to be commissioned within 10% of design conditions		

Dirt Air Separator Schedule

BDP.

Equipment Property	Units	
Reference		DA1
Flow rate	kg/s	0.72
Maximum temperature	°C	110
Pipe connections	mm	40 flanged
Test Pressure	Bar	10
Max pressure drop acceptable at flow above	kPa	3.7

Property Relevant to all Instances	
Location in system	Adhere to manufacturers advices
Efficiency	Separator to be capable of separating out particles with a size of 5 µm and larger
Materials	Stainless steel
Insulation	To same standard as containing pipe
Accessories	Include air vent and drain
Include Magnetic filter integrated into unit	Yes

Buffer Vessel Schedule

Equipment Property	Units	
Reference		CB1
Volume	m ³	0.3
Max Diameter	m	0.55
Max Height	m	1.5
Connections		4
Storage Temperature	°C	50

Property Relevant to all Instances	
Insulation	Vessels to be insulated to achieve a U-Value of 0.3 W/m2K or better
	Provide second layer of insulation where factory insulation does not achieve this value
	Protect insulation with ridged polyisobutylene wrapping
	Insulate to all surfaces including surface in contact with the ground
	All connections, valves, access hatches etc. shall be securely insulated
	Do not provide cylinders that do not have manufacturer standard solutions for insulating all components
Efficiency	ERP efficiency rating of B or better
Materials	Stainless steel
Pressure rating	Factory tested to 10 Bar, marked on nameplate
Compliance	CE labelled, construct to BS 1566 Part 2
Sensors	Provide pockets for sensors as shown in the controls specifications
Lifting mounts	Provide lifting eyes
Provide sparge pipes on	Inlets and outlet
Provide internal baffles	Yes

Trace Heating Schedule

Equipment Property	
Locations	All external pipework, all basement car park pipes, cold feed to pressurisation unit in plant room
Control panels	Provide as required to serve trace heating
Protection	Maintain water temperatures above 3°C when external temperatures are -15°C
Controls	Include thermostats and pipe safety cut out thermostats
BMS outputs	Include BMS outputs of fault from each control panel
Compliance	CE rates, BS 7671 and IS EN 62395

Calorifier Schedule

Equipment Property	Units	
Reference:		HW01
Volume	L	250
Coil Capacity	kW	10
Flow Temperature	°C	80
Temperature Difference	K	20
LPHW flow rate	kg/s	0.1
Electric Immersion	kW	10

Property Relevant to all Instances	
Insulation:	Vessels to be insulated to achieve a U-value of 0.25 W/m ² K or better
	Provide second layer of insulation where factory insulation does not achieve this value
	Protect insulation with ridged polyisobutylene wrapping
	Insulate to all surfaces including surface in contact with the ground
	All connections, valves, access hatches etc shall be securely insulated
	Do not provide cylinders that do not have manufacturer standard solution for insulation
Materials	Cylinders shall be manufactured from stainless steel
Efficiency	ErP rating of B or better under current rating system
Compliance	BS 1566, BS 5615, CE Marked, WRAS approved
Test Pressure	6 Bar for cylinder and 10 Bar for coil
Corrosion Protection	A magnesium electrolytic protection anode, wired to manufacturers instructions
Coil Maintenance	All coils shall be fully removable through flanged, insulated connections
Connections	Cold inlet at base of unit and hot water outlet at top, hwsr 1/3 from top.
Electric Immersion Maintenance	Immersion shall be fully removable through flanged, insulated connections
Electric Immersion protection	immersion shall include run dry protection and over temperature.
Electric Immersion Trip	Immersion shall include over temperature protection requiring manual reset
Include:	Packaged expansion kit inclusive on non return valve
Include:	Pressure relief valve
Include:	Outlet temperature gauge
Include:	Cylinder temperature sensor pocket

Peroxide Polyethylene Cross-Linked (PE-Xa) Pre-Insulated Pipework for Below Ground

BDP.

Property Relevant to all Instances	Units	
Thermal conductivity	W/mK	0.35
Softening Point	°C	133
Linear Coefficient of Expansion @ 200C	m/mK	1.4 x 10 ⁻⁴
Application Temperature	0C	-50 to +95
Water absorption (24 days)	%	< 1.0
Volumetric Weight	kg/m ³	30
Tear Strength	N/mm ²	1.38
Tensile Strength	N/mm ²	24
Flamability Rating		B2
Bendin Radius	m	0.25 to 1.2

Material and Composition		
Jacket Material - High Density Polyethylene (HDPE)		
Insulating Foam Material - Cross-linked Polyethylene (PE-X)		
Pipe Material - Peroxide Cross-linked Polyethylene (PE-Xa)		
Core insulation to have colour coding for flow & return		
Complete with ethylene vinyl-alcohol (EVOH) oxygen barrier		
Single insulated pipe for each of the flow and return.	mm	100