STORI BRYMBO

MECHANICAL SERVICES
SCOPE OF WORKS

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Ref: P1915-CDP-XX-XX-SP-M-0001

C4	Construction	NS	CR	LA	IC	10/12/25
C3	Construction	NS	CR	LA	IC	08/10/25
C2	Construction	NS	CR	LA	IC	18/08/25
C1	Construction	NS	CR	LA	IC	03/09/24
T3	For Tender	NS	CR	LA	IC	26/02/24
T2	For Tender	NS	CR	LA	IC	15/01/24
T1	For Tender	NS	CR	LA	IC	08/01/24
P2	For comment	NS	CR	LA	IC	02/01/24
P1	For comment	NS	CR	LA	IC	18/12/23
Revision	**Description**	**Originated**	**Checked**	**Reviewed**	**Authorised**	**Date**

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SECTION 1.0
SCOPE OF WORKS

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1.01 INTRODUCTION

This specification and the associated drawings detail the requirements for the mechanical services associated with the renovation of Stori Brymbo located at the former steel works site in Brymbo.

It is a requirement of this Contract that the Mechanical Services Installer provides fully detailed working drawings. These shall be submitted for approval a minimum of two weeks prior to commencement on site. It is also the Mechanical Services Installer's responsibility to fully co-ordinate the mechanical installation with other services including electrical services and building structure. Any services which need to be altered due to full co-ordination not being undertaken shall be carried out at the Mechanical Services Installer's expense.

1.02 STANDARDS AND REGULATIONS

a) All materials, equipment and workmanship shall be in accordance with the specification and drawings.

b) Unless otherwise specified all materials shall be new and these, together with equipment or work supplied or executed, shall comply with current Codes of Practice and with British Standards where available. Where particular Codes of Practice or British Standards are cited, such shall be deemed to refer to the current editions.

c) Any instrument, rule or order made under any Act of Parliament or any regulations of any Local Authority or of any statutory undertaking which has any jurisdiction with regard to the Works or with whose systems the same are or will be connected, shall be complied with, and it will be ascertained that any necessary notices have been given to the Authority concerned.

d) All electrical apparatus and work in connection therewith shall comply with the current edition of the Regulations for Electrical Installations produced by the Institution of Electrical Engineers.

e) All works and materials shall also comply with the requirements of the following:-

i. Local Authority Regulations, Recommendations, Requirements and Bylaws;

ii. Water, Gas, Electricity, Fire Officer, British Telecom and all Public Authority and Statutory Regulations and Recommendations;

iii. Health and Safety at Work Act, including all current regulations and statutory instructions issued by the Health and Safety Executive;

iv. Chartered Institution of Building Services Engineers current recommendations as described within this Specification;

v. CLAW Standard Engineering Specification, current edition.

1.03 PROTECTION OF THE WORKS

a) All new equipment, materials and components shall be in perfect condition, when handed over. Adequate protection shall be provided against rough treatment, dust, grit, frost, etc, and immediate action taken if any such protection is removed or displaced by following trades or other unauthorised persons.

b) Uncompleted sections of the Works shall be left in a safe condition and any temporary works necessary to give protection from unauthorised interference shall be provided.

1.04 BUILDER'S WORK AND DRAWINGS

a) In all cases the necessary information to define requirements for builder's work, either by the provision of drawings and/or schedules, or by setting out requirements on site shall be provided by the Mechanical Services Installer.

b) The methods to be adopted shall be agreed with all interested parties but in general will be as follows:-

i. Where builder's work is to be defined, drawings shall be provided;

ii. Where builder's work is to be cut it shall be marked on site.

c) The submission of, and subsequent approval to, drawings shall in no way relieve the responsibility for the accuracy of the information provided which shall remain at the sole risk of those preparing the data.

1.05 PRACTICAL COMPLETION OF THE WORKS

a) The date of Practical Completion of the Works shall be the date of practical completion agreed for the Main Contract provided that, unless otherwise stated on a Certificate prior to that date:

i. practical completion of the Works has been achieved.

ii. the tests, specified or reasonably required, have been made and accepted.

1.06 DEFECTS LIABILITY PERIOD

a) The Defects Liability Period shall be 12 months and shall operate from the date of Practical Completion of the Works or part thereof as certified. A Certificate of Final Completion shall not be granted until all defects or faults have been made good.

b) The Employer shall be indemnified against any damage caused to the building and/or contents and occupants caused by such defects or faults.

c) If remedial work is not undertaken within a reasonable time, other arrangements to proceed to do the work may be made, subject to proper notice being given. Without prejudice to such rights as exist under the Contract, the cost may be deducted from the final payment.

d) Should the Defects Liability Period extend beyond the date of termination of the liability period of any Contract principal to it then the responsibilities with respect of this clause shall be discharged directly to the Employer for the balance of the Defects Liability Period, including the continuation of the appropriate insurances.

1.07 EXTENT OF WORK

a) The work shall comprise the whole of the labour and, unless otherwise indicated, all the materials necessary to form a complete installation and such tests, adjustments and commissioning as are prescribed in subsequent clauses and as may otherwise be required to give an effective working installation to the satisfaction of the Engineer.

b) The words 'complete installation' in the previous paragraph shall mean not only the major items of plant and equipment covered by the tender documents, but all the incidental sundry components necessary for the complete execution of the works and of the proper operation of the installation, with their labour charges, whether or not these sundry components are mentioned in detail in these tender documents.

1.08 DEFINITIONS

The following terms are used within this specification and shall be construed accordingly:

i. **Architect** – Architect and Contract Administrator for the works;
ii. **Contractor** - person or persons appointed to carry out the Contract works;

iii. **Employer** - person or persons employing the Contractor to carry out the Contract works;
iv. **Engineer** - person or persons appointed by the Employer to represent him in connection with the installation of works described in this Specification;
v. **Mechanical Services Installer** - For the purposes of the Tender, the Mechanical Services Installer shall be the person or persons invited to prepare a Tender for the works described within this Specification, including all ancillary work and information requirements. Where the successful Tenderer is appointed to carry out the works as a Sub-Contractor the instructions to the extent of the work shall be agreed with the Contractor, who shall ensure that the installation is complete and in accordance with this Specification.

1.09 SERVICES TO BE PROVIDED

The Mechanical Services Installer shall undertake the supply, delivery, off-loading, positioning, installation, setting to work, testing and commissioning of the Engineering Services Systems as set out below:

1.09.1 General

The undertaking of the work in this section shall infer responsibility for:

a) Providing necessary drawings, diagrams and schedules;

b) Executing the works in a competent, informed and diligent manner;

c) Co-operating fully with other trades, to ensure that there are no impediments to the progress and completion of the works as a whole;

d) Demonstrating satisfactory performance and installation in accordance with the design intent and the accessibility of plant and services to facilitate maintenance work;

e) Ensuring that, up to the date of taking over, all parts of the works are maintained in good condition;

f) Appraising the specified duties of all plant and equipment related to the works (taking into account any additions and/or variations which may be made during the progress of the works) and informing the Engineer of any matter which is at variance;

g) Drawing attention to any discrepancies in documents, drawings or instructions issued immediately upon receipt of same and prior to the commencement of any part of the works affected thereby;

h) Making good any damage to building fabric and systems caused by their installation.

1.09.2 Brief Description of Services

a) Disconnection and Removal of Existing Services
b) Incoming Water Services
c) Heating Services
d) Hot and Cold Water Services
e) Rainwater harvesting services
f) Ventilation Services
g) Above ground drainage services
h) Controls and Electrical Wiring
i) Testing, Commissioning and Twelve Months Maintenance
j) Working Drawings
k) Record Drawings and Operating and Maintenance Manuals

1.09.3 Detailed Description of Services

a) Disconnection and Removal of Existing Services

The Mechanical Services Installer shall be responsible for isolating, draining down and removing all existing mechanical services within the building.

The existing building fabric shall be made good where necessary.

All redundant equipment shall be removed from site and properly disposed of. Where appropriate, waste transfer certificates for disposal of materials shall be obtained and copies shall be submitted to the Contract Administrator.

b) Incoming Water Services

An order shall be placed by the Contractor (not the Mechanical Services Installer) with the Water Authority to provide a dedicated metered water supply for the site. It is assumed that the meter will be located as shown on the drawings, in the pavement of the main road.

The Mechanical Services Installer shall extend from the Welsh Water isolating valve to the buildings as indicated on the drawings. The Contractor shall provide a slow bend ducts for the incoming water mains into the Machine Shop building. A line size stop cock shall be provided on mains water entry. A large traffolite label shall be provided next to the valve. A pressure reducing valve shall be provided after the stop cock to regulate the mains pressure from 10Bar to 3Bar (adjustable).

The trenches shall be cut not less than 300mm wider than the outside diameter of the main, and the bottom level to give an even bed for the pipe. Where rock is encountered, the trench shall be dug at least 150 mm deeper than required and made up with well rammed soft fill. If conditions preclude this then the whole pipe shall be laid on a thin bed of concrete.

In no circumstances shall the pipes be laid on an uneven hard bed. A small additional excavation shall be made in the trench bottom to suit the socket contour at each pipe joint to facilitate even bedding of the pipe.

Marker tape shall be laid by the Mechanical Services Installer above the main. A precise record shall be kept of the routing of the pipe.

All internal pipework shall be run in copper to BS EN 12449:1999 and clearly labelled. External pipework shall be run in blue MDPE unless ground conditions dictate that barrier pipe must be used (reference should be made to the soil report).

c) Heating Services

The Mechanical Services Installer shall be responsible for the supply, installation, testing and commissioning of the entire heating services for the building in accordance with:

- Building Regulations and all associated Approved Documents
- CIBSE guidance documents, including all main Guides, Technical Memoranda and Applications guidance as required by this development

A stand-alone heating system shall be provided comprising of 1 No. air source heat pump, located externally within a fenced compound with associated buffer vessel located within the Plant Room. The heat pump shall provide heat to underfloor heating circuit and hot water cylinder. Details of the heat pump are listed within the Schedules section of this Specification.

The heat pump shall be configured and controlled as agreed with the specialist manufacturer, to ensure maximum possible efficiency of operation. whilst ensuring that, under heating, a minimum temperature of 55degC is provided.

All heating pumpsets shall be duty/standby configured. Details of the pumps are listed within the Schedules section of this Specification.

Automatic air vents shall not be used. The facility for manual bleeding shall be provided at all high points in the system.

The heating system shall be commissioned by the manufacturer and full MCS certification provided by the Mechanical Services Installer, including the provision of heat and electric sub-meters. The full manufacturer's warranty shall be provided (7 years).

- **Underfloor Heating**

The Mechanical Services Installer shall supply, install, test, commission and set to work a complete LTHW underfloor heating system as indicated on the drawings.

The Mechanical Services Installer shall appoint an underfloor heating specialist to develop the detailed design of the underfloor heating system in accordance with the design intent indicated on the drawings and described below.

The manifold shall be provided with LTHW heating with flow and return temperature of 55°C/45°C with water temperatures blended at the manifold to ensure no over-temperature provided to the underfloor heating coils.

All underfloor heating pipework shall be installed at 200mm centres and shall be provided to supply 100W/m^2.

Each heating zone shall be controlled via its own dedicated temper-proof room thermostat or controller.

Each manifold shall have provided with the following elements:

- Multizone Controller
- Wiring Centre
- Actuators
- Floor Sensors
- BMS Connection (Enable / Disable Function)
- Fill & Drain Valves
- Flow Meters
- Air Vent (Automatic)
- Gauges (Pressure & Temperature)
- Mixing Pump
- Thermostatic Mixing Head
- Isolation Valves (Flow and Return)

Each zone shall have a tamperproof thermostat located within the zone.

The manifold shall be operated by its own controller, based on setpoints provided by the thermostat.

All pipework shall be plastic (PERT tube) and shall be installed by the underfloor heating specialist on top of all structure and insulation and below screed.

It shall be the responsibility of the underfloor heating specialist to ensure that the underfloor heating pipework is fully coordinated with all other services installed within the floor prior to commencement on site.

The underfloor heating shall be commissioned by the underfloor heating specialist.

The underfloor heating specialist shall be appointed by the Mechanical Services Installer.

- **Combined Dearator and Dirt Separator**

A combined deaerator and dirt separator shall be supplied and installed in the primary heating circuit, as indicated on the drawings, to remove air and dirt from the LPHW system.

- **Pressurisation Unit**

A pressurisation unit and expansion vessel shall be provided for the heating system, all as detailed in the Schedules section of this Specification. This shall also include a quick-fill and a means for dosing and sampling for the system.

- **Pipework and Fittings**

The whole of the heating pipework shall be run in copper to BS EN 12449:1999, with the exception of the pipework from the heat pumps to the main pumps within the Plant Room which shall be medium weight mild steel to BS1387.

The route of the distribution mains and take-off points of the radiator connections must be carefully arranged to allow for natural expansion and contraction of the pipes. Expansion facility shall be provided as necessary on all straight pipework lengths, comprising proprietary expansion devices (not loops). These are indicated on the drawings, however the number and configuration are dependent on the precise arrangement of the installed pipework.

- **Insulation**

The entire heating services shall be insulated, including drops and low level pipework, with 30mm Class O foil-faced phenolic foam. Aluminium cladding shall be provided on all pipework services externally and within the Plant Room.

d) Hot and Cold Water Services

The Mechanical Services Installer shall be responsible for the supply, installation, testing and commissioning of the entire hot and cold water services for the building in accordance with:

- Building Regulations and all associated Approved Documents
- CIBSE guidance documents, including all main Guides, Technical Memoranda and Applications guidance as required by this development
- Water Supply (Water Fittings) Regulations
- BS6700 – Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages
- Institute of Plumbing Design Guide
- HVCA TR/20 – Installation and testing of pipework systems
- HSC Approved Code of Practice – Legionnaires Disease, The control of Legionella bacteria in water systems

- **Kitchen Extension**

Mains cold water shall be extended from the incoming mains position to the twin compartment sectional cold water storage tank.

The water services within the building shall be boosted, derived from the packaged cold water storage tank and booster set located within the external Tank Room as indicated on the drawings and listed in the schedules section of this specification.

Hot water provision to the Commercial Kitchen shall be provided via 1N° hot water unvented indirect calorifier, located as shown on the drawings, which shall feed all hot water outlets within the Kitchen. The

pipework configuration to the calorifier shall be carried out in accordance with the manufacturer's recommendations.

- **Toilet Block Extension**

No tank shall be provided, with all hot and cold water outlets at mains pressure, with the exception of the rainwater harvesting services.

Mains water shall be extended from the incoming position to each outlet, pressurisation unit, hot water hot water heaters, and rain water harvesting tank.

One-quarter turn isolating ball valves shall be provided on connection to all appliances/outlets.

Hot water shall be generated by local unvented electric hot water heaters as detailed within the schedules section of this specification and as indicated on the drawings.

- **General**

The entire water services shall be insulated, including drops and low level pipework, with 25mm Class O foil-faced phenolic foam. Aluminium cladding shall be provided on all pipework services within the Boiler Room. Insulated valve bags shall be provided on all valves within the Boiler Room.

All internal pipework shall be run in copper to BS EN 12449:1999 and clearly labelled. External pipework (eg to external taps and rainwater harvesting tank) shall be run in blue MDPE unless ground conditions dictate that barrier pipe has to be used (reference should be made to the soil report).

All internal pipework and above ground pipework feeding the rainwater harvesting tank shall be insulated with 25mm Class O phenolic foam applied in a thorough and professional manner. Aluzinc cladding shall be used on the above ground pipework feeding the rainwater harvesting tank.

It shall be assumed that a blending valve shall be provided on every hot water outlet, excluding the sink in the Cleaners Room and all hot water outlets within the Kitchen.

e) Rainwater Harvesting Services

A rainwater harvesting system shall be installed as indicated on the drawings and listed in the Schedules section of this Specification. The system shall comprise an external underground storage tank with top access, submersible pump, filtration, backflow prevention valve and internal control panel assembly.

The rainwater harvesting system shall provide water supplies to the WCs as indicated on the drawings.

Installation of the tank and connection to the rainwater system (on inlet and outlet) shall be by the Contractor. The Electrical Services Installer shall carry out all electrical and controls works associated with the installation of the system.

All remaining works shall be by the Mechanical services Installer, whose responsibility it shall be to contact the specified equipment supplier as listed in the schedules section of this specification and determine the full extent of these works, including commissioning at completion.

f) Ventilation Services

- **Mechanical Heat Recovery Ventilation**

Ducted MVHR shall be provided as indicated on the drawings. All fresh air intake ductwork and the plenums of all louvres (fresh air intake and exhaust) shall be insulated with 25mm Class O phenolic foam. There is no requirement for any other ductwork to be insulated.

The Mechanical Services Installer shall provide wiring details for all controllers to the Electrical Services Installer to allow the wiring to be carried out within the electrical services contract.

- **Extract Ventilation**

Extract ventilation shall be provided as indicated on the drawings. For tender purposes, fans shall be costed as listed in the Schedules section of this Specification, with exact types agreed with the Engineer prior to order.

The Mechanical Services Installer shall provide wiring details for all fans and controllers to the Electrical Services Installer to allow the wiring to be carried out within the electrical services Contract.

- **Destratification Fans**

Destratification fans shall be provided to the visitor area as indicated on the drawings and detailed within the schedules section of this specification. The fans shall be controlled via integral thermostats set to a temperature to be agreed with the Engineer and Manufacturer's speed controller located at low level behind the reception counter.

The Mechanical Services Installer shall provide wiring details for all fans and controllers to the Electrical Services Installer to allow the wiring to be carried out within the electrical services Contract.

- **Commercial Kitchen**

The new ventilation system shall comprise a stainless-steel induction canopy (by others), filtered and heated fresh air supply and extract ventilation.

A stainless-steel induction canopy shall be located within the Kitchen in the position indicated on the drawings.

Supply and extract ventilation shall enter the building from external and run to connect to the canopy. The fans, filter and electric heater battery shall be located at high level internally.

Suitable access shall be provided for all equipment, including good-sized access panels to allow cleaning of the heater battery, inspection of filters.

Ductwork shall be provided as indicated on the drawings. Access panels shall be provided to ensure that the entire extract ventilation ductwork can be routinely cleaned with minimal disruption, in full compliance with DW142 and DW172.

The filter, electric heater battery and fans shall be as detailed in the Schedules section of the Specification.

Substantial galvanised steel gantry support framework shall be provided to support the external ductwork with no deflection.

Kitchen supply ductwork and fresh air intake ductwork shall be insulated with 50mm Class O foil-faced mineral fibre.

g) Above Ground Drainage Services

The Mechanical Services Installer shall allow for all necessary tools, labour, materials, and equipment to design, supply, install, test, commission and put into operation the above ground drainage including all necessary pipework, fittings, supports, rodding eyes, thermal insulation, identification labels, flushing, testing, etc.

The above ground drainage systems shall be designed and installed to meet:

- BS EN 12056
- Building Regulations approved document H
- Local byelaws

The Mechanical Services Installer shall install all sanitaryware (provided by others) and make all final connections (to be agreed with the Mechanical Services Installer and Contractor).

Soil and waste water shall be collected from sanitary and waste water appliances.

A UPVC pipework system shall convey the soil and waste water, by gravity, down through the building, via soil vent pipes, to points of discharge to the underground drainage system.

All new pipework shall be provided with suitable falls and rodding access. Provide all rodding access points in accessible locations.

All soil pipes to have horizontal 45 degree swept tee connections.

The Mechanical Services Installer shall provide rodding access facilities within the above ground system immediately prior to connection to the below ground system.

Rodding access shall be provided to give access to any length of discharge pipe which cannot be reached by removing traps or appliances with internal traps.

Rodding points shall be provided in discharge stacks above the flood level of all appliances. In kitchens all SVPs shall be provided with rodding access above the worktop level.

All connections to sanitary fittings, floor gullies etc. shall be the responsibility of the Mechanical Services Installer.

Ventilating pipe open to outside air shall finish at least 900mm above any opening into the building within 3m and shall be finished with a wire cage or other perforated cover. Vent stacks can be shared to minimise roof penetrations but compliant with British Standards and Building Regulations. The Mechanical Services Installer shall ensure that the following items are checked and allowed for within the design and costs:

Spatial requirements
Co-ordination with other mechanical and electrical services
Co-ordination with the structural engineers below ground drainage design
The design of the soil and waste shall be installed in accordance with Building Regulations requirements
Air test commissioning shall be in accordance with BS EN 12056
Fire stopping shall be provided where required
The pipework shall be designed to the recommendations of Building Regulations and BS EN 12056 and shall be routed to minimise the risk and effect of any consequential damage due to leakage.

h) Controls and Electrical Wiring

The Mechanical Services Installer shall appoint a Controls Specialist to carry out the following works.

The heating services shall be controlled utilising an EasyIO controls systems.

The control panel shall be Form 2, with run and fault indication for all pumps, air source heat pump, pressurisation unit and door curtain heaters. The panel fascia shall be provided with a current EasyIO display. The control panel shall be provided with an ethernet facility to allow full remote control and monitoring by access to dedicated IP address.

Internal and external sensors shall be provided to control the heating. Temperature sensors shall be provided on the heating flow and return.

A remote monitoring panel and adjustable plant extension timer for the heating shall be located within the Welcome Area.

50% spare points shall be provided on all analogue and digital outstations.

All graphics shall be prepared on the front-end pc to be provided by others.

There is no requirement for any sub-metering.

The facility for fire alarm interface shall be provided to the control panel.

All power and controls wiring from the control panel and associated containment shall be carried out by the Controls Specialist.

A control panel shall be provided within the Kitchen to give fault indication and speed control (pre-set prep and cook settings) and on/off operation of the new supply fan and existing extract fan, control and fault of the ventilation heating and filter dirty indication.

The panel shall be linked back to the main panel within the Plantroom.

An internal room sensor shall be provided to control the ventilation heating, located within the Kitchen.

All power and controls wiring from the panel and associated containment shall be carried out by the Controls Specialist.

The Controls Specialist shall be appointed by the Mechanical Services Installer.

Electrical Works

All new mains voltage wiring shall be carried out utilising single core LSF cables enclosed in galvanised steel trunking and conduits. Controls cabling shall be screened/twisted pair cables, enclosed in trunking and conduit.

All power and controls cabling, including containment, shall be by the Controls Specialist, excluding the feeds to the control panel, extract fans, electric water heaters, underfloor heating manifolds and heat recovery unit which shall be by the Electrical Services Installer.

Earthing and bonding of all pipework shall be carried out in accordance with the 18th Edition of the IEE Wiring Regulations.

All electrical and controls wiring shall be carried out in compliance with 18th Edition IEE Wiring Regulations. All cabling shall be installed on galvanised cable tray or within galvanised trunking and conduit.

i) Testing, Commissioning and Twelve Months Maintenance

The entire mechanical services installation forming this contract shall be tested and commissioned in accordance with this Specification, including chlorination of the domestic water services.

Commissioning shall be carried out in line with current Building Regulations and BSRIA and CIBSE guidance, where applicable. This shall include testing of room temperatures to ensure correct operation of the heating systems.

The Mechanical Services Installer shall provide complete demonstrations of all systems to the Engineer and Employer prior to handover.

The Mechanical Services Installer shall include for the following service visits during the defects period:

- 2 No. controls service visits to ensure correct operation of all systems

- 1 No. visit by the underfloor heating specialist to ensure correct operation of the existing underfloor heating

The above visits are in addition to any visits associated with defects during the 12 month defect period.

j) Working Drawings

Fully coordinated working drawings shall be provided for approval before any works commence.

k) Record Drawings and Operating and Maintenance Manuals

3 N° sets of record drawings and operating and maintenance manuals, as follows, shall be provided as a prerequisite of award of practical completion.

- Record drawings shall be provided. If required ACAD files can be made available to the Contractor to assist this process.

- Operating and maintenance manuals shall be provided. The manuals shall incorporate full manufacturer's details of all equipment utilised together with copies of all Test and Completion Certificates and shall be bound in heavy duty plastic ring binders.

- 1 N^{o} electronic copy of the manual (including record drawings) shall be provided on CD and shall be a prerequisite of practical completion. The electronic version shall mimic the hard copy version in such a way that the manual can be printed in sections or in its entirety to exactly match the hard copy version.

1.10 SERVICES SUPPORTS

The Mechanical Services Installer shall include for the design and installation of all services bracketry. Pipe sleeves shall be used on all wall penetrations. Escutcheon plates shall be used where the pipework penetrations through walls are visible.

All bracketry shall be load bearing (ie substantial with no deflection).

Insulated inserts shall be provided on all pipework brackets.

1.11 FIRE COMPARTMENTATION

The Mechanical Services Installer shall provide fire dampers and access doors where ductwork passes through any fire compartment in the building.

SECTION 2
SCHEDULES

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SCHEDULE 2.01

TENDER DRAWINGS

The schedules contained herein list the mechanical services drawings, which shall form part of the tender documentation. The tenderer is advised to carefully study the drawings listed, in order to fully appreciate the density of services in the various areas and make due cost allowance within the Tender for the proper execution of the works.

Any additional costs that may be involved as a result of the tenderer not fully appreciating the density of services and/or building details will be rejected.

Drawings No.	**Title**
P1809 CDP-XX-00-DR-M-1101	Machine Shop Lower Ground Floor Heating Services
P1809 CDP-XX-00-DR-M-1102	Machine Shop Ground Floor Heating Services
P1809 CDP-PS-02-DR-M-1103	Pattern Shop Second Floor Mechanical Services
P1809 CDP-XX-00-DR-M-1201	Machine Shop Lower Ground Floor Water Services
P1809 CDP-XX-00-DR-M-1202	Machine Shop Ground Floor Water Services
P1809 CDP-XX-00-DR-M-1301	Machine Shop Lower Ground Floor Ventilation Services
P1809 CDP-XX-00-DR-M-1302	Machine Shop Ground Floor Ventilation Services
P1809 CDP-XX-00-DR-M-1303	Agents House Ground & First Floor Ventilation Services
P1809 CDP-XX-00-DR-M-1501	Machine Shop Ground Floor plant Room Services Schematic

SCHEDULE 2.02

FANS (EXCLUDING KITCHEN EXTRACT)

Location	Type	Controls
~~Machine Shop – Comms Room~~	~~Vectaire Elix~~	~~Intermittent, boost on thermostat~~
Machine Shop - Changing Area	ACM 150	Trickle/Boost interfaced with lighting in WCs, complete with adjustable run-on
Machine Shop – Servery	ACM 200	Trickle/Boost interfaced with switch above countertop
Machine Shop – Kitchen WC	Vectaire Elix	Trickle/Boost interfaced with lighting in WCs, complete with adjustable run-on
Pattern Shop	Vectaire Elix	Trickle/Boost interfaced with lighting in WCs, complete with adjustable run-on

SCHEDULE 2.03

GRILLES & LOUVRES

GRILLES

Room Reference	Grille Reference	Grille Type	Connection Size (ø)	Size (mm)	Flow Rates (L/s)	
KITCHEN	EG1	Gilberts DG 4-Way	250	600x600	90	
~~SERVERY~~	~~EG2~~	~~Gilberts DG 4-Way~~	~~250~~	~~600x600~~	~~90~~	
~~SERVERY~~	~~EG3~~	~~Gilberts DG 4-Way~~	~~250~~	Construction	NS	CR
WC AREA	EG3	Series GX100	100		6	
WC AREA	EG4	Series GX100	100		6	
WC AREA	EG5	Series GX100	100		6	
WC AREA	EG6	Series GX100	100		6	
WC AREA	EG7	Series GX100	100		6	
WC AREA	EG8	Series GX100	100		6	
WC AREA	EG6	Series GX100	100		14	

LOUVRES

Louvres to be sized as indicated on the drawings with plenum on rear. 70mm Pitch. RAL colour to be agreed with Architect. Complete with insect screen.

SCHEDULE 2.04

BLENDING VALVES

All blending valves shall be Maynell Safemix TMV3 or equivalent

SCHEDULE 2.05

ATTENUATORS (EXCLUDING KITCHEN EXTRACT)

2No. 600mm long, 200mm diameter for Servery ACM200 Fan.

2No. 600mm long, 150mm diameter for WC ACM200 Fan.

4No. 600mm long, 200mm diameter for Meeting Room MVHR.

SCHEDULE 2.06

ELECTRIC WATER HEATERS

WC Area

Hyco PowerFlow Smart PF50S complete with unvented kit.

Pattern Shop

Hyco PowerFlow Smart PF30S complete with unvented kit.

SCHEDULE 2.07

HEAT RECOVERY VENTILATION

~~Mitsubishi Lossnay LGH35 complete with controller – Machine Shop Meeting Room~~

TBC – Agents House Study Room

SCHEDULE 2.08

PRESSURISATION UNIT AND EXPANSION VESSEL

A pressurisation set and expansion vessel shall be provided for the heating system to the following Specification:

The system fill and expansion set shall be a purpose-designed package comprising accumulator vessel, break tank and duplicate duty/standby pressurisation pumps, interconnecting pipework, valves and controls, all mounted in a sheet steel casing. A 80 litre remote expansion vessel shall be provided.

The break tank shall be fabricated of rigid plastic and supplied with float operated inlet valve. The pump shall draw water from the tank to fill the system and pressurise a polyester-lined diaphragm vessel to cater for small leakages. The unit shall be furnished with pre-wired pressure control switch and high and low cut-out switches for connection to the boiler control circuitry within the plant room control panel.

In the event of either of these switches cutting out, the heat pumps supply shall be locked out and a red warning lamp shall illuminate on the control panel indicating the appropriate condition.

Re-setting of the switches shall be by manual operation.

The fill section shall comprise switchfuse starter, non-return valve, pressure reducing valve, system isolating valve and pressure gauge.

Pressure/safety valve shall be installed in the system feed line.

The expansion vessels shall be of steel construction with flexible rubber diaphragm top BS4814 and BS7074. The vessel shall be charged to the static head of the installation before despatch.

All interconnecting pipework within the casing shall be undertaken by the manufacturer, leaving only the system expansion connection and cold fill connection requirements.

SCHEDULE 2.09

ELECTRIC SHOWER

Mira Advanced 8.7kW electric shower with thermostatic control and manufacturers riser rail.

SCHEDULE 2.10

AIR SOURCE HEAT PUMP

1 No. Mitsubishi CAHV-P500YB-HPB 43kW 3-phase air source heat pumps, supplied, installed and commissioned to ensure full 7-year manufacturer's warranty, complete with Mitsubishi approved in-line pumps (suitable for external mounting).

Mitsubishi controllers to be provided.

SCHEDULE 2.11

BUFFER VESSEL

800 litre pre-insulated (100mm minimum thickness), mains pressure rated with 2 No. flow, 2 No. return connections and 4 No. temperature immersion sensor pockets, positions to be agreed.

SCHEDULE 2.12

DAMPERS

All fire and control dampers to be manufactured by:

Actionair Equipment Ltd.
South Street
Whitstable
Kent
CT5 3DU

or

Advanced Air (UK) Ltd.
3/4 Cavendish Road
Bury St Edmunds
Suffolk
IP3 3TE

or equal and approved.

SCHEDULE 2.13

DESTRATIFICATION FANS

2.No Bn Thermic DSU3-50 destratification fans to be installed at high level within the Machine Shop as indicated on drawings.

SCHEDULE 2.14

ELECTRIC DOOR CURTAIN HEATERS

1.No Visible Horizontal SPC Airdor 1000E (electric heated unit) complete with on/off and 2 speed switch

2No. Visible Horizontal SPC Airdor 2000 LPHW (enhanced coil) complete with on/off and 3 speed switch and SPC delta controller.

SCHEDULE 2.15

PUMPS

Each pump shall be suitable for pipeline mounting and must be supported to eliminate pipe vibration and ensure proper support of its weight.

On the suction and delivery sides of the pump, 100mm diameter brass-cased pressure gauges with setting pointers and complete with gunmetal shut-off cocks shall be fitted.

P1
Primary Side of Buffer Vessel 2.1/s at 40kPa

Inverter controlled to allow operation at constant pressure differential and complete with Grundfos hand-held remote controller, duty/standby configured.

P2
CT Heating to underfloor hating manifolds & door curtains 1.1l/s at 80kPa

Inverter controlled to allow operation at constant pressure differential and complete with Grundfos hand-held remote controller, duty/standby configured.

P3
CT Heating to hot water calorifier 0.42l/s at 60kPa

Inverter controlled to allow operation at constant pressure differential and complete with Grundfos hand-held remote controller, duty/standby configured.

Pumps to be as manufactured by:

Grundfos Pumps
Gawsworth Court
Risley
Warrington
WA3 6NJU

or equal and approved.

SCHEDULE 2.16

HOT WATER CALORIFIER

Reference	CAL 001	
Location	Plant	
System	DHWS	
Total Required Capacity	250	
Quantity	1	
Manufacturer	Gledhill	
Model	PLUHP250	
Energy Efficiency		
Heat Loss	kWh/day	1.78
Standing Loss	W	74
Dimensions and Weight		
Diameter	mm	550
Height	mm	1744
Weight (empty)	kg	43
Weight (full)	kg	291
Heat up time from 15°C to 50°C	min	22.01
Coil Data		
Coil Rating	kW	27.34
Coil Surface Area	m^2	3

Calorifier to be provided with electric immersion heater and unvented kit.

SCHEDULES 2.17

KITCHEN VENTILATION

Supply Fan

Vent Axia EMF50014, inverter controlled (inverter to be provided to allow automatic speed control from kitchen vent panel), selected at 80% duty.
Fan to provide 0.44m³/s @ 300Pa

2No. 900longx400Ø attenuators.

Kitchen Canopy Extract Fan

Vent Axia EKF400E1, inverter controlled (inverter to be provided to allow automatic speed control from kitchen vent panel), selected at 80% duty.
Fan to provide 0.524m³/s @ 200Pa

Fan to be complete with external weather kit
2No. 900longx400Ø attenuators.

Filter

The in-duct kitchen supply filter shall be to the following duty:

Air volume 0.524m3/s.

Grade EU3.

Size 500x400 (or equivalent) sized to ensure a face velocity no greater than 2.5m/s.

The filter shall be removable for cleaning/replacement.

Heater Battery

Air volume 0.524m3/s
Size 500x400 (or equivalent) sized to ensure a face velocity no greater than 2.5m/s.

Duty -5degC to 10degC (9.5kW), against 15Pa (air), 3 phase, thyristor controlled.

SCHEDULE 2.18

COLD WATER PACKAGED TANK AND BOOSTER

Supply and install in the position shown on the drawings 1 No WRAS approved ScubaTANK® integrated pump and tank booster system by

Dutypoint Ltd
Unit A, Quedgeley West Business Park
Gloucester
GL2 4PA
United Kingdom

Tel: 01452 300592
Email: sales@dutypoint.com

Water shall be boosted to provide a minimum of 1.1 litres per second at 3 bar pressure. The capacity of the storage cistern shall be 2250 litres.

The unit is to be provided with twin pumps arranged on a duty/assist basis.

The ScubaTANK® tank will be a GRP pre-insulated type with reinforced base, screened vent, overflow and warning pipe, all in accordance with the Water Regulations Advisory Scheme (WRAS).

The unit will incorporate the following:
WRAS Approved stainless steel submersible pumps controlled via variable speed inverter drives
High flow 1" Inlet - Motorised ball valve controlled by level sensor
12/24 litre WRAS Approved pump control vessel with isolation and drain valve
Low water level protection and tank fill controlled via level sensor system
Adjustable tank level control
Common fault alarm volt-free contact
High level alarm volt-free contacts
Digital system status display
Integrated Control Centre for power and controls wiring and distribution
WRAS Approval for the complete system
Horizontal Split Tank Options for Access

The unit shall be commissioned by the manufacturer and covered by the Dutypoint Titanium Warranty and breakdown cover. The commissioning report is to be included in the maintenance manual.

SCHEDULE 2.19

RAINWATER HARVESTING SYSTEM

Refer to separate quote.

SECTION 3
TENDER SUMMARY

INDEX

3.01 TENDER SUMMARY BREAKDOWN

3.02 DAYWORK RATES

3.03 CERTIFICATE OF BONA FIDE TENDER

3.04 SUB-LETTING

3.05 MANUFACTURERS LIST

3.01 TENDER SUMMARY BREAKDOWN

The tenderer shall complete the tender cost breakdown as detailed below. Any tender received which does not separately detail each and every item listed shall be rejected.

The Employer reserves the right to omit any items from the contract. Should this occur, the full amount indicated against the relative item/s shall be deducted from the account and no additional costs will be payable due to reduced extent of the works.

Item	Description	Cost (£)
a	Disconnection and Removal of Existing Services	
b	Incoming Water Services	
c	Heating Services	
d	Hot and Cold Water Services	
e	Rainwater harvesting services	
f	Ventilation Services	
g	Above Ground Drainage Services	
h	Controls and Electrical Wiring	
i	Testing, commissioning	
j	Working Drawings	
k	Record drawings and operating and maintenance manuals	
Sub-total		
Provisional Sums		
a	Repair to existing services	**3,000**
b	Heating and ventilation services to Agent's House	**5,000**
TOTAL		

3.02 DAYWORK RATES

Engineering Services

The Mechanical services Installer shall insert below the rates of pay of labour and his percentage addition for carrying out works on a Dayworks basis (these shall include overheads).

a) Normal Working Hours

b) Authorised Non-Productive Overtime

c) Materials

Labour

a) Normal Working Hours

Grade	**Basic Rate**	**Percentage Addition**	**Total Hourly Rate**
Working Foreman	----------	----------%	----------
Chargehand	----------	----------%	----------
Leadinghand	----------	----------%	----------
Fitter	----------	----------%	----------
Tradesman	----------	----------%	----------
Mate	----------	----------%	----------
Apprentice	----------	----------%	----------
Labourer	----------	----------%	----------
Insulation Operative	----------	----------%	----------
Plumber	----------	----------%	----------

b) Authorised Non-Productive Overtime

The rate for non-productive overtime inserted below shall be for the non-productive time only and shall include for all payments with the exception of those items only applicable to normal time rates.

Grade	Basic Rate	Percentage Addition	Total Hourly Rate
Working Foreman	----------	----------%	----------
Chargehand	----------	----------%	----------
Leadinghand	----------	----------%	----------
Fitter	----------	----------%	----------
Tradesman	----------	----------%	----------
Mate	----------	----------%	----------
Apprentice	----------	----------%	----------
Labourer	----------	----------%	----------
Insulation Operative	----------	----------%	----------
Plumber	----------	----------%	----------

c) Materials

Percentage Addition to materials for overhead and profit	----------%	----------
Percentage Addition to subcontracts overhead and profit	----------%	----------

3.03 CERTIFICATE OF BONA FIDE TENDER

Mechanical Engineering Services

The essence of selective tendering is that the Client shall receive bona fide competitive tenders from all firms tendering.

In recognition of this principle, we certify that this is a bona fide tender, intended to be competitive, and that we have not fixed or adjusted the amount of the tender by or under in accordance with any agreement with any other person.

We also certify that we have not done and we undertake that we will not do at any time before the returnable date for this tender any of the following acts:

a) Communicating to a person, other than the person calling for these tenders, the amount or approximate amount of the proposed tender.

b) Entering into any agreement or arrangements with any other person that he shall refrain from tendering or as to the amount of any tender to be submitted.

c) Offering or paying or giving or agreeing to pay or give any sum of money or valuable consideration directly or indirectly to any person for doing or having done or causing to be done in relation to any other tender or proposed tender for the said work any act or thing of the sort described above.

In this certificate, the word “person” includes any persons and any body or association, corporate or unincorporate; and “any agreement or arrangement” includes any such transaction, formal or informal, and whether legally binding or not.

Signed ……..

on behalf of ……

Date ……

3.04 SUB-LETTING

Sub-letting of any installation works or the use of Agency staff shall not be permitted

3.05 MANUFACTURERS LIST

The Contractor shall complete at the time of tendering, the following list of manufacturers' names and catalogue references of equipment he proposes to use in the Services Installation.

Equipment	Manufacturer	Catalogue N°