

HEATING REPORT

at

**ST. MARY'S CENTRE,
CHURCH STREET,
CLITHEROE,
LANCASHIRE.
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SECTION 1

PURPOSE OF REPORT

The purpose of this report is to act on the instruction given by the Manager of the St. Mary's Centre, Clitheroe – John Wilkinson, as per the e-mail confirmation dated 23rd June 2025 for this report to provide the following Consultancy advice in relation to the Heating Services serving & within that Hall.

Services to be provided:-

Mechanical Services;

- (i) Assess the heating & energy characteristics of the building
- (ii) Examine the condition, performance & capability of the present heating system in relation to the heating requirements of the building.
- (iii) Make appropriate recommendations in relation to improvements to the building thermal efficiency & other heating / energy consideration.

SECTION 2

BASIS OF REPORT

The basis of this report is as follows:

- (i) Issue of drawings from John Wilkinson at the Centre
- (ii) Survey of the building and heating services by John Book on 18/06/2025

SECTION 3

HEATING SERVICES

The Centre is currently heated by 3No. low pressure hot water heating systems from gas fired heating plants, with the boilers serving the various areas being indicated as follows;

The Main Centre area heating – Ideal Evomax 2 – 80kW

The front end of the Centre heating & hot water – Vaillant Eco-Tec plus 838 – 38kW

The rear end of the Centre heating & hot water – Vaillant Eco-Tec plus 838 – 38kW

Heat is distributed from the boilers via circulation pump systems. The pipework distribution system has been installed on the design basis of what is known as a two-pipe flow & return system.

Whilst individual radiators have been provided within each of the separate small room areas, the 2 main areas of the Centre can be identified as being provided with the following radiators;

The Main Upper Hall – 6No. 600mm high x type K2 x 2000mm long, plus 2No. vertical 6 column vertical radiators 450mm wide x 1800mm high. A further radiator is installed on the Stage (although served from the rear areas boiler – 600mm high x P+ x 1400mm long

The Lower Hall - 6No. 600mm high x type K2 x 2000mm long

The whole of the boiler-plants and heating systems are all relatively new and appear to be in good working order. The boiler plants are flued via a conventional concentric flue system which exit the building through the wall with external wall flue terminals. Control of the Centre heating systems is made by a conventional Drayton Lifestyle time controller with internal temperatures being controlled by thermostatic radiator valves.

Energy characteristics of the existing systems:-

Centre Heating system to Upper Hall;

The heat loss from the Upper Hall of the Centre building is currently assessed as being 56kW.

The heat emission from the various types of heat emitter systems within the Upper Hall is calculated as being able to produce 25kW.

Centre Heating system to Lower Hall;

The heat loss from the Lower Hall of the Centre building is currently assessed as being 23kW.

The heat emission from the various types of heat emitter systems within the Lower Hall is calculated as being able to produce 21kW.

It can therefore be seen that in both cases the existing boiler that serves these area, which has a total rated output of 80kW is over-sized for maintaining the full heat output required from the installed heat emitters within the Centre, but is correctly matched to the calculated heat loss from the building.

Whilst it can be seen that the output from the existing heating system serving the Upper Hall of the Centre itself is only 45% of the calculated heat loss it should be pointed out that the calculated heat loss is based on a room temperature of 20°C (68°F) at an external ambient of 0°C (32°F).

The basis of the assessment for the Lower Hall shows that the installed heating whilst appearing to be only 90% of the heat loss at 20degC, it may well be that this temperature is higher than what would normally be required within this space, and hence, it is likely that the heating system within this area at that level does prove to be satisfactory

A further consideration of the above outputs is that these are based on the normal operating temperature from a low pressure hot water heating system, ie. 82°C (180°F) flow and 71°C (160°F) return, and hence it should be pointed out that in order to obtain the required heat outputs from the installed heating systems, that this higher level of flow & return temperatures must remain in place.

Condition of the existing system;

The condition of the existing heating system is considered to be very good for the age of the system, bearing in mind that this is considered as being only quite recent.

Requirements for a Centre / Hall heating system;

A Centre / Hall heating system must be capable of not only providing 'warmth' to the occupants for the various types of usage, but must also be able to be used to assist in the condition maintenance of the building fabric & fitments. The assistance towards condition maintenance of the building fabric & fitments is made by trying to ensure that the internal surface temperature of the structure is slightly higher than the external surface temperature. This helps to prevent interstitial condensation within the fabric construction and hence damp and stale/moisture laden air within the space. It is thought that the use of the existing controllers will adequately provide for good control of the heating system by ensuring that the Centre is currently not allowed to become too cold by maintaining the internal space at a temperature not less than 10 / 12degC.

Existing System Considerations;

From the survey & report perspective the following points should be worth noting:-

- (i) It should be recognised that the heating system within the main Centre spaces, whilst being capable of providing the correct conditions within the Lower Hall and all other ancillary spaces, that the heating within the Upper hall is only capable of providing the 'warmth' conditions being indicated. However it is felt that due to the age and construction of the building it is felt that as the system is controlled to maintain a low-level of background heat at all times that it can be seen that these lower temperatures do provide some benefit to the maintenance of the Centre in terms of fabric condition
- (ii) System operating efficiency & conditions provided within the Centre are paramount for consideration and perhaps it would be worthwhile to again point out that in addition to the current boilers being correctly sized, the heating system within the Upper Hall is clearly deficient.
- (iii) It should be noted that the existing incoming electrical supply is a 3-phase supply with this being fused at 100amps per phase.

- (iv) For reference purposes, please see the apportionment of the heat loss from the various elements of the building as follows;

Upper Hall space:-

Air heat loss	-	34% - 19kW
Heat loss through windows	-	16% - 9kW
Heat loss through walls	-	19% - 11kW
Heat loss through roof	-	31% - 17kW

Lower Hall space:-

Air heat loss	-	38% - 9kW
Heat loss through windows	-	23% - 5kW
Heat loss through walls	-	18% - 4kW
Heat loss through floor	-	21% - 5kW

Current fuel cost assessments;

The boiler which is gas fired currently uses a fuel which costs 12.442p/kW, with a 196.72p/day standing charge.

The current three phase electrical supply to the Church costs 23.12p/kW at the day rate, and 17.67p/kWh at evenings, with a daily standing charge of 72.43p/day.

SECTION 4

RECOMMENDATIONS;

It is clear that the heating within the Upper Hall space is the matter which requires further consideration, bearing in mind that it would not really make sense to increase the radiators / heat emitters within this space to meet the heat loss from the building, as this would simply increase running costs, which obviously the Centre would not like to progress down that line on. It is therefore recommended that a fabric first approach is made to improving the thermal efficiency of this building and to try and reduce the carbon footprint initially.

It would therefore seem to make sense to consider improving the thermal efficiency of this space, by replacing the existing windows with high efficiency double glazed sealed units, whilst at the same time under lining the roof with high efficiency insulation boarding. Both of these elements would also act to reduce the natural air loss from the space.

Whilst it can be seen from the following that taking the above steps would drastically reduce the heat loss from the Upper Hall down to a figure of 29kW, this would only show that the existing installed radiators, that are only sized at 25kW, could still only achieve 18degC, whilst obviously being more than what can be currently achieved, may still be more than adequate for the space usage requirements, and therefore whilst improved comfort levels would be provided from the existing system, this may only lead to a small reduction in running costs and carbon generation in the order of some 10% for both of these.

An indication of the new building performance would be as follows:-

Upper Hall space:-

Air heat loss	-	38% - 10kW
Heat loss through windows	-	23% - 4kW
Heat loss through walls	-	18% - 11kW
Heat loss through roof	-	21% - 4kW

Clearly if the same consideration was going to be made to the Lower Hall, then I think that it would only be necessary to upgrade the windows to high-efficiency double glazed sealed unit, and as an indication of the new building performance in this area, this would be as follows:-

Lower Hall space:-

Air heat loss	-	28% - 4.5kW
Heat loss through windows	-	16% - 2.5kW
Heat loss through walls	-	27% - 4kW
Heat loss through floor	-	31% - 5kW

Based on the above improved heat loss it can be seen that the current heating within this space would be oversized in meeting the 20degC design level and therefore reductions in running costs and carbon generation would be made in this space due to these improvements which would indicate a possible 30% reduction in both.

Whilst the initial fabric approach improvements are recommended to be considered first, then possibly after the details for the replacement double glazed windows has been agreed, that a consideration towards the ventilation of certainly the Upper Hall may then need to be considered, certainly for when the space may be full to capacity for certain performances being staged. Whilst a natural ventilation principle may be best to follow, it is unlikely that this alone would fully satisfy the requirements of a 'full-house', and that the provisions for a mechanical heat recovery ventilation system may be necessary, The cost of this type of system within this space could cost as much as £35,000, but I would advise not to progress with this consideration until the window details have been finalised and so a full ventilation assessment can be carried out.

It should be pointed out that in order to meet the requirements of approaching someone for grant funding that it would be necessary to agree which works you were going to run with, and then you would need to make an appointment for the Architectural Services to carryout the design & specification of the works which could then be sent out to tender to a minimum of 3 approved Contractors. Both of these stages would have to be completed to allow the Stage 2 grant application process to take place.

I am able to advise you that in terms of possible grant funding, that after carrying out a postcode check for St. Mary's Centre, that you do not fall within the boundary for consideration by the Community Waste Management Funds. However in addition to this type of funding there are other bodies such as the Lancashire Environmental Fund or the Benefact Trust who support these types of work in order to improve the carbon footprint of a building, but also you may also obtain further advice on this from the Blackburn Diocese.