



Proair Consultants

Mechanical and Electrical Services Engineers



Technical Note: Justification for Increased Extent of Mechanical Services Roof Plant Area

At

Royal Berkshire Archives Extension, Reading

For

**West Berkshire Council
Property Services**

**7896
April 2026**

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Background

The building and building services for the extension to the Royal Berkshire Archive building have been designed to meet the requirements of the licensee, The National Archives and the Royal Berkshire Archives as the Berkshire archive repository which require the close control and monitoring of temperature and humidity to ensure the conditions required to store and protect ancient documents are met.

The building and building services for the extension are designed to be standalone and do not rely upon the existing mechanical and electrical services in the main building for a number of reasons:

- Age of the existing plant and equipment;
- To maintain the resilience of the plant and;
- To avoid disturbance of the existing archive stores and their current services.

The new mechanical services have been designed to meet a number of current standards including:

- Reading Borough Council Sustainability Appraisal & Scoping report;
- Reading Borough Council Policy CC2;
- West Berkshire Council Sustainability & Energy Efficiency policy CS15;
- Building Regulations 2022 Part L, which are exceeded.

Justification of the Increased Plant Space Requirements

The mechanical services design upon which the original Planning Application was made approved is dated February 2020 and based upon Building Regulations 2010.

The mechanical services design was based upon chilled water air conditioning which is no longer considered sustainable nor energy efficient and would not be compliant with any of the above standards.

The current design for the mechanical services for the project are based upon air source heat pumps which operate at lower temperatures, are more energy efficient, compliant with the above standards but require larger plant and air handling capabilities.

Demonstration of Compliance

We have completed a full BRE certified design stage thermal model with output in the form of a BRUKL document to demonstrate what is required to meet these standards and provide the energy efficiencies required on modern buildings.

To achieve the energy targets on the BRUKL requires that the building services be efficient and utilize renewable energy systems for providing the heating cooling and humidity control in the new building extension. These services include individual condensers providing heating and cooling for each air handling unit along with two air handling units which are highly efficient requiring much lower heating temperatures to temper the air coming into the spaces.



The design of the roof plant area has taken all the above items into account along with acoustics, aesthetics, and maintainability of the plant and with residential buildings at the rear of the site and potential development of the old Yeomanry house into a residential.

Benefits

The overall result of the design is that the Royal Berkshire Archives and thus the local authorities, including Reading Borough Council, which fund it, will have long term benefits with low energy costs, safe and easy access for maintenance and provide the resilience required for this type of building.

BRUKL

For reference we have included a copy of the design stage BRUKL below for your information, this shall be superseded at the end of the project with "As Built" BRUKL. This shall confirm that the design aspirations have been met.



BRUKL Output Document

Compliance with England Building Regulations Part L 2021



Project name

Berkshire Record Office extension

As designed

Date: Tue Feb 25 14:27:19 2025

Administrative information

Building Details

Address: 9 Coley Ave, Reading, RG1 6AF

Certifier details

Name: Alexandros Grigoropoulos
Telephone number: 07837047051
Address: . .

Certification tool

Calculation engine: Apache
Calculation engine version: 7.0.27
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.27
BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 205.27

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	4.72
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	4.49
Target primary energy rate (TPER), kWh _{eq} /m ² .annum	51.16
Building primary energy rate (BPER), kWh _{eq} /m ² .annum	48.47
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U _u -Limit	U _u -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.15	0.15	ROOM_61_:Surf[2]
Floors	0.18	0.18	0.18	ROOM_61_:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.14	0.14	ROOM_68_:Surf[3]
Windows** and roof windows	1.6	-	-	No windows, glazed doors, or roof windows in building
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors ^A	1.6	1.6	1.6	ROOM_61_:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building
U_u-Limit = Limiting area-weighted average U-values [W/(m²K)] U_u-Calc = Calculated area-weighted average U-values [W/(m²K)] U_i-Calc = Calculated maximum individual element U-values [W/(m²K)] * Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. ** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position. ^A For fire doors, limiting U-value is 1.8 W/(m²K) NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	0.5

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