TECHNICAL DESIGN NOTE

Project name	Birkbeck Gordon Square		
Design note title	Energy Statement		
Document reference	14299		
Author	Michael Howarth		
Revision	P01		
Date	1 September 2020	Approved	☐

1. INTRODUCTION

1.1 Project Introduction

Hydrock have been appointed by the client to undertake the MEP design of the refurbishment works on the Birkbeck buildings at 39-47 Gordon square. This report details the energy efficiency standards which have been observed in the development of the design of the proposed Mechanical, Electrical and Public Health services.

1.2 Relevant Standards

1.2.1 Part L

As the project covers existing buildings which are not in use as dwellings, it will be governed by approved document L2B. This sets out minimum fabric performance values for any newly constructed or renovated thermal elements, or controlled fittings which work is done upon. All renovated elements shall be specified in line with these requirements. Services installed as part of the works shall meet the minimum efficiency and controllability requirements as set out in the Non-Domestic Building Services Compliance Guide.

1.2.2 Consequential Improvements.

As the floor area of the project is greater than 1,000m^2 and new cooling is required to a number of classrooms, this represents the initial provision of a fixed building service. The building regulations therefore require consequential improvements to be made. As a result of this, 10% of the project cost will need to be spent on energy efficiency improvements, provided these measures achieve a simple payback of 15 years or less. A list of typical improvement measures that should be considered is included below.

No.	Improvement measure
1	Upgrading heating systems more than 15 years old by the provision of new plant or improved controls
2	Upgrading cooling systems more than 15 years old by the provision of new plant or improved controls
3	Upgrading air-handling systems more than 15 years old by the provision of new plant or improved controls
4	Upgrading general lighting systems that have an average lamp efficacy of less than 40 lamp-lumens per circuit-watt and that serve areas greater than 100 m^2 by the provision of new luminaires or improved controls
5	Installing energy metering following the guidance given in CIBSE TM 39
6	Upgrading ***thermal elements*** which have U-values worse than those set out in column (a) of Table 5 following the guidance in paragraphs 5.12 and 5.13
7	Replacing existing windows, roof windows or rooflights (but excluding display windows) or doors (but excluding high-usage entrance doors) which have a U-value worse than 3.3 $W/m^2.K$ following the guidance in paragraphs 4.23 to 4.28
8	Increasing the on-site low and zero carbon (LZC) energy-generating systems if the existing on-site systems provide less than 10% of on-site energy demand, provided the increase would achieve a simple payback of 7 years or less
9	Measures specified in the Recommendations Report produced in parallel with a valid Energy Performance Certificate

Figure 1- Typical measures appropriate for consequential improvements

The existing heating, cooling and ventilation and lighting systems onsite were largely installed as part of the major renovation works in 2006. At the beginning of a works these will be 15 years old, and the replacement of these will be classed as consequential improvements. It is therefore anticipated that the project will achieve compliance with this aspect of the building regulations. If this is not the case, fabric refurbishments may be required to make up any shortfall. Due to the Grade 2 listing of the 39-47 buildings, there may be limited scope to upgrade the building fabric, if this is required, an assessment of opportunities should be conducted in conjunction with the appointed heritage advisors.

1.2.3 Low and Zero Carbon Technologies (LZCTs)

It is proposed that the classrooms are conditioned using floor standing VRF units. These are a form of air source heat pumps (ASHP). Due to their hight efficiency, when used in heating mode these are classed as a renewable technology. This represents a reduction of approximately 2/3 of the carbon emissions compared to the existing gas fired boiler used to heat the spaces.

Additionally, packaged AHUs are proposed to serve the lecture theatre, cinema, and basement areas. These include air source heat pumps, contained within the unit. Heat is rejected into the exhaust air and discharged to atmosphere. As well as the improvement in heating efficiency, this removes the requirement for external condensers associated with the units.

Finally, an ASHP, sized at approximately 25% of peak load is proposed in conjunction with the boilers to meet a proportion of the annual heating and domestic hot water loads for the remainder of the building.

The measures outlined above represent a significant improvement in the efficiency of the project compared to the baseline gas fired heating system currently installed.