

Project UCL Bloomsbury Campus District Heating Extension
Subject Design and Access Statement: Building Services Description
Project no 042994
Date 22 November 2022

1 Overview

University College of London (UCL) have a design proposal for the extension of the Gower Street district heating network (DHN) at its Bloomsbury Campus. The main undertaking will allow for the existing MRC Laboratory for Molecular Cell Biology (MRC) building and 17 – 25 Gordon Square buildings to be connected. The properties currently stand alone with independent gas fired heating systems.

Currently the DHN operates by pumping medium temperature hot water to various buildings around the campus via four main energy centres. It is distributed via flow and return pipework arrangements. This pipework reticulates around the site, primarily through a combination of dedicated buried utility tunnels, through the buildings themselves and elements of direct buried pipes.

The proposed connections are illustrated clearly within the accompanying drawings of the submission, with drawing UCL-BHE-00-00-DR-AM-850 giving a clear overview.

2 Buildings

2.1 MRC Building

The MRC building is a six storey, brick faced period building, situated in the heart of the Bloomsbury campus as depicted in Figure 1. The primary heating plant is contained within a single boiler room located in the basement to Northwest side of the building (frontage). The main plant within the MRC was renewed 2017. A part of the renewal strategy at the time was to leave a set of pipework flanges for future connection to the DHN. These are ready installed within the heating plantroom. This tie-in point is made up of a set of Ø125mm isolated flanges positioned 650mm from the below ground service entry point at the building perimeter basement wall. An image of the DHN tie-in connections are depicted in Figure 2.

The design philosophy of the heating plant renewal was that the MRC boilers would become a net exporter of heat into the DHN when conditions require.



Figure 1: MRC Building



Figure 2: Existing DHN tapping point

2.2 Gordon Square Buildings

The Gordon Square properties consists of a single, six storey Georgian tenement, straddling the Northwest side of Gordon Square. The building generally consist of offices, teaching spaces, and meeting rooms. The portion of the tenement attributed to this project is split into three separate heating zones. The existing heating plant room locations are indicated in the accompanying drawings at address numbers 17, 20 & 25. These are all basement level rooms.

17 Gordon Square: Heating Plantroom B91, Area: $\sim 6\text{m}^2$. This plantroom consists of a single Potterton Derwent Series 182kW Gas fired boiler. The boilers are proposed to be replaced with two plate heat exchangers arranged in a duty & standby arrangement in line with UCL district heating connection guidelines. The heat exchanger contains two sides, the primary district heating side designated at medium temperature hot water, and the secondary building side designated as low temperature hot water.

20 Gordon Square: Heating Plantroom B12, Area: $\sim 5.3\text{m}^2$. This plant room contains two, wall hung, modular Broag, Remeha Quinta 115 series Gas Boilers. Thermal output is 214kW at full operating temperature. The boilers are proposed to be replaced with two plate heat exchangers arranged in a duty & standby arrangement in line with UCL district heating connection guidelines. It should be noted that the heating plant room is located to the front of the building on Gordon Square.

A pair of flanged DN65mm insulated steel pipes have already been installed in anticipation of a DHN connection. This work was undertaken pre-2019. An image of the pipes can be seen within Figures 3 - 6. The pipes have been insulated and colour matched with the interior decoration.



Figure 3, 20 Gordon Square photo perspectives



Figure 4; Pre-installed pipework flanges



Figure 5: Pipework building entry point



Figure 6: Existing pipework routings

25 Gordon Square: Heating Plantroom B27, Area: ~13m². This plant room contains two, wall hung, modular Broag, Remeha Quinta 115 series Gas Boilers. The boilers have a combined thermal output is 214kW. The boilers are proposed to be replaced with two plate heat exchangers arranged in a duty & standby arrangement in line with UCL district heating connection guidelines.

2.2.1 Apartments

There are two apartments located within the general demise of 17 Gordon Square heating zone (16 and 18 Gordon Square) at the 5th floor. These are owned by UCL and rented to university employees. They both contain wall hung gas fired boilers with separate domestic hot water tanks. The flues of each of the apartment’s boilers can be seen in Appendix 1 of this statement. It has been established through RFIs that both properties gas supplies are fed downstream of the main fiscal meter to UCL, and thus the private tenant gas supply is sub-metered by UCL, and tenant billed accordingly.

17 Gordon Square recently had an apartment converted to an office with the past 10years (est.) This apartment also had a boiler which was removed and replaced with a pair of DN40mm heating flow and return pipes from the current heating plantroom B91 at 17 Gordon Square. These are clearly depicted rising up the rear elevation within the annotated sketch of Appendix 1. There are no drawings available for the upper floors of 16 – 18 Gordon Square, however appendix one illustrates the basis for the routing of the pipes by overlaying the apartment footprints on the available ground floor drawing. It’s proposed to reuse the existing route and retain

the current pipeline such that there is no external changes to the current situation. Modifications are internal at the fifth floor by way of adding two additional branches at 17 Gordon Square in order to supply the apartments at 16 and 18. This is also illustrated in Appendix 1. This heating pipework will be supplied from the low temperature hot water side of the newly proposed plate heat exchanger. All internal pipework will be concealed wherever possible.

Two new heat meters will be installed in accessible positions on the branches to each apartment within the 5th floor prior to the new pipework entering the apartments. This will facilitate tenant billing. The meters will be suitable for billing purposes, compliant with the Measuring Instruments Directive Class 2 for accuracy.

Both of the apartments domestic hot water cylinders will be replaced by an electric hot water heater with the same storage volume.

All new internal partition penetrations will be appropriately fire sealed.

2.3 Andrew Huxley Building

As shown on drawing UCL-BHE-00-00-DR-AM-810, the district heating pipeline serving the Andrew Huxley building will be required to be upgraded to a larger size as the same buried pipeline route is proposed to be reused for the extension of the network from the current DHN tunnel. The current pipeline will be completely replaced. A new tee piece and valve set will be installed to serve Andrew Huxley building as the pipeline continues on towards MRC and Gordon Square.

2.4 District Heating

The Gower Street DHN containing combined heating and power (CHP) plant, there is an inherent energy efficiency benefit in supplying the campus buildings with medium temperature hot water which contains a substantial portion of recovered waste heat from the electricity generators. Furthermore removing gas appliances removes the requirement for the Gordon Street buildings having standing gas charges, annual statutory maintenance checks a general reduction in maintenance and costs for gas fired equipment and their appurtenances.

Therefore this report shall also include the desire to also convert any gas heating systems in the tenement out with the three existing boiler rooms, currently described.

3 Schedule of Works

Zones			
Andrew Huxley / Printroom café outdoor seating area	MRC	Gordon Square Plantrooms (17 / 20 / 25)	17 Gordon Square Apartments
Remove current buried district heating and dispose of accordingly	Break into current basement plantroom wall below ground. Install /pass through new pipeline, waterproof and make good	Remove: Gas Boilers, flues, control panels, gas pipelines up to the meters, secondary pipework up to the existing distribution pumps, power to boilers and control panels, heat detectors. Dispose of materials	Remove: existing boilers, flues, water supply dead leg, drain Remove domestic water cylinder Dispose of materials
Drain district heating system from Egyptology to Christopher Wilkin Building Replace current Andrew Huxley branch connection point with an enlarged Tee piece. Dispose of old pipe tee accordingly		Bring in new pipelines as indicated in drawings UCL-BHE-00-00-DR-AM-2001 & UCL-BHE-00-00-DR-AM-2002. Install plate heat exchangers, pipework, control panels, maintenance and control valves, minor power modifications,	Install a new branch at the current 5 th floor riser head complete with new control heating balance valves. Install a new electric water heater in both apartments and provide a new power supply from the existing consumer unit. Install two new heat meters for tenant billing
Trench remaining pipeline routes, install new pre-insulated steel pipeline as indicated in drawing UCL-BHE-00-00-DR-AM-850 Re-waterproof the DHN tunnel			Photograph local internal areas prior to works and redecorate. Make good the existing flue penetration with reclaimed like for like brickwork of a similar age and type

4 Appendices

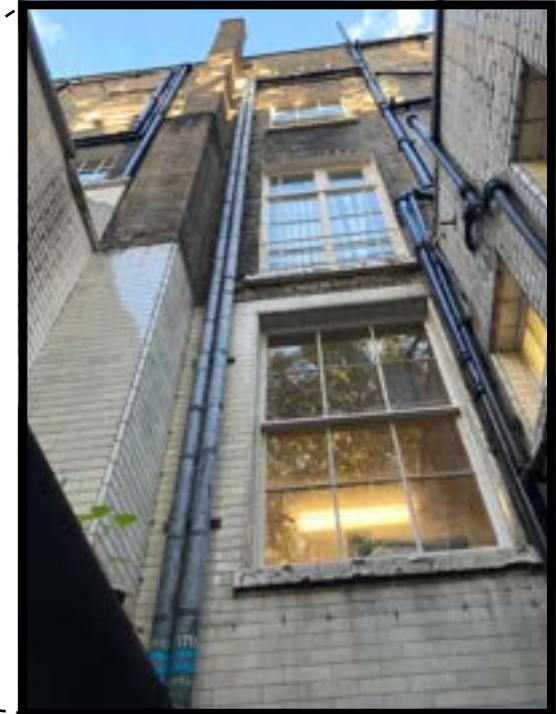
Appendix 1: 17 Gordon Square Annotations (Overleaf)



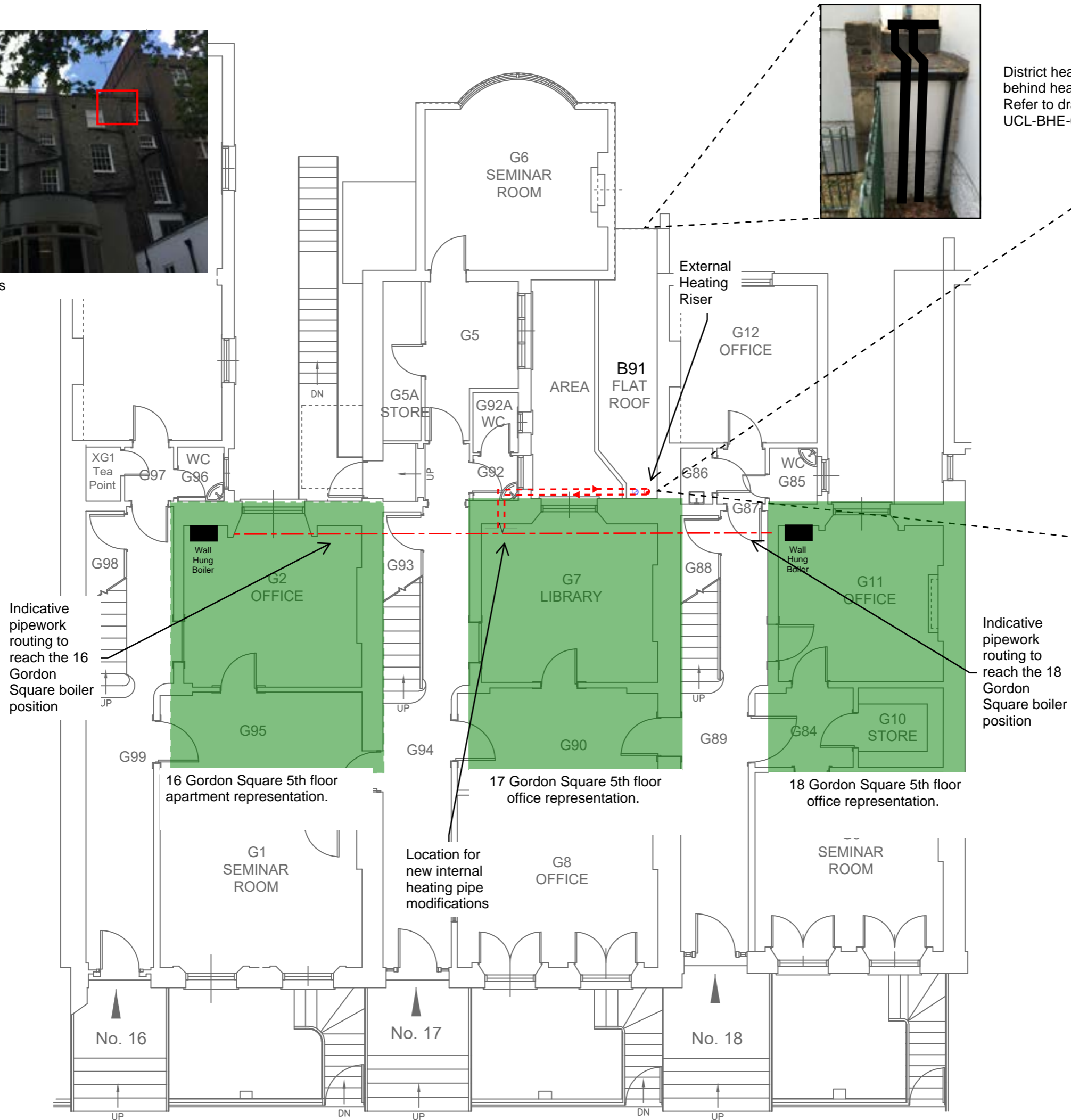
Existing Gas Boiler Flues



District heating pipework rise behind heating plant room B91. Refer to drawing UCL-BHE-00-00-DR-AM-2002



Existing LTHW rises to 5th floor void level, sets access the external electaion enters the building above mid level WC located in the building stairwell. This currently serves 17 Gordon Square office.



Indicative pipework routing to reach the 16 Gordon Square boiler position

Indicative pipework routing to reach the 18 Gordon Square boiler position

Location for new internal heating pipe modifications

16 Gordon Square 5th floor apartment representation.

17 Gordon Square 5th floor office representation.

18 Gordon Square 5th floor office representation.

BURO HAPPOLD		
Project: UCL Bloomsbury Campus District Heating Extension		
Project Number: 042994		
Sketch Title: 16 - 18 Gordon Square Heating Pipework		
Sketch Number: SK001		
Status: Planning		
Date: 22/11/22	Initials: SC	Revision: 00