Honourable Society of Lincoln's Inn

Great Hall, East Terrace and Library Extension
MEP Planning Statement

July 2015

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1. Introduction

The Honourable Society of Lincoln's Inn seek to refurbish and improve existing kitchen and catering facilities which are currently inadequate for the needs of the Inn. There is also a need to provide expansion space for the existing library alongside new advocacy training and educational facilities to enhance the function of the Inn. In providing these new facilities, the existing Under Treasurer's residence will need be relocated to another part of the Inn.

To achieve the above proposals, planning and listed building consent are sought for five separate applications proposed at Lincoln's Inn:

- Application 1 – Old Hall Kitchen Refurbishment (Submitted to LB Camden Ref 2015/2413/P & 2015/2517/L)
- Application 2 – Great Hall Refurbishment Works (including Old Hall Temporary Kitchen Works)
- Application 3 – East Terrace Development (Excavation to create a two storey basement containing a lecture theatre, advocacy rooms and study areas)
- Application 4 – Library Extension (including demolition of Under Treasurer's House)
- Application 5 – 15 New Square (Change of use from Office B1 to Residential C3)

This Mechanical, Electrical and Public Health Statement has been prepared as part of applications 2, 3 and 4.

The strategy for the design of the building engineering services is to provide a safe and comfortable environment for the occupants, using energy efficient design principles in both new and refurbished buildings to provide sustainable, effective and flexible areas for the Honourable Society of Lincoln's Inn. This will be carried out in a sensitive manner appropriate to preserve the historic fabric and the Inn's grounds.

The design parameters and conceptual design solutions have been developed in consultation with the client, the architect, and design team.

2. Ventilation

East Terrace Ventilation

The east terrace will be mechanically ventilated using a low energy displacement system to supply fresh air to the advocacy rooms, central circulation space and the lecture theatre.

Two variable volume air handling units (AHU) incorporating energy recovery will be sized to provide fresh air to meet the required volumes based on occupancy as well as to meet peak cooling loads.

The AHUs will be located in the plant room to the north of the lecture theatre. Air intake and exhaust for the AHU's are via a new plenum located within a planter on top of the east terrace and new louvres under the new escape stairs of the east terrace.

Full control of the AHUs, including timelock, temperature set points, etc will be made on the head end BMS, complete with graphical display, adjustable operation settings and fault signals. Energy consumption from the AHU will be monitored on the BMS.

Library Extension Ventilation

Whilst it was not feasible to naturally ventilate the east terrace being a subterranean space, it is proposed to naturally ventilate the Library extension.

The offices will be naturally ventilated by openable windows/louvres on the façade allowing cool fresh air to enter through the windows and warm stale air to exit.

The principle is manual openable doors behind the louvred panels and openable windows on the façade with high level manual openable windows to allow ventilation in winter without uncomfortable cold draughts.

Consideration will be given to provide automated actuators to the high level windows to provide automated control for night time ventilation.

At the basement level, the reading areas will achieve natural ventilation by manual controlled opening roof lights. An automatic override to close the rooflights will be provided to close after a set period of time or

during the occurrence of rain to prevent them being left open. The current basement library storage is not ventilated.

Where there are any beverage making areas or photo copying areas these services will be ventilated with an individual local extract fan to meet Approved Document Part F of the building regulations.

The extract fans will be operated locally with a time clock to prevent the system operating outside of occupancy hours

As part of the library extension works the existing mechanical ventilation to the server room and the strong rooms will require relocating to exit to the west façade at basement level through an existing lightwell.

Kitchen Ventilation

As part of the works, the existing kitchens within the great hall will be refurbished. These include the great hall kitchen itself including all preparation areas and wash-up facilities, the great hall servery, and member's common room servery.

The refurbished kitchens will require new ventilation systems to meet the requirements of the equipment and current standards and regulations.

The great hall kitchen supply and extract ventilation plant will utilise the existing brick enclosures in the western service yard. The member's kitchen will share the same extract system as the great hall kitchen with the intake through the existing open windows of the kitchen as the current installed system. The great hall servery will have the intake through the western façade of the south western tower with the exhaust to discharge at the top of the tower both as the existing system.

Given the sensitive location with regard to noise levels the extract ventilation will be treated with attenuation or noise reducing encasement where necessary to ensure the overall noise is limited as per the acoustic report by Sandy Brown Associates.

The cooking processes within each of the kitchens will generate molecules of cooking odours, caused by the combustion of animal and vegetable matter which results in a particulate and gaseous mixture. The particulate phase comprises small food deposits and hydrocarbons

or smoke, the concentration level of which will vary with the type of cooking.

Whilst odour will be reduced by removing the particulate using filtration within the cooking hoods, it is the gaseous or vapour phase which contains the majority of the odour and will also be treated. This will be achieved by ultra violet lights being installed in the extract air stream which generate trace quantities of ozone. In the presence of ultra violet light, the ozone reacts with the organic compounds in the fat by photolysis and by ozonolysis to leave an end product of only carbon dioxide and water.

WC Ventilation

The East Terrace WC's, library extension WC and Great Hall WC's and changing areas will each have an extract fan system capable of providing 8 air changes per hour.

Each system will extract air from the WCs and will operate upon a signal from a passive infra-red (PIR) sensor or the light switching from respective local lighting circuits in each room and will be set to with adjustable 10 minute overrun following last presence detection. The East Terrace WC's will be combined.

3. Heating and Cooling

Heating and cooling for the East Terrace development will be provided from a ground source heat pump system consisting of a closed loop vertical borehole arrangement beneath the east terrace. The heat pump system will be designed to provide simultaneous heating and cooling. As well as meeting the heating and cooling with a renewable energy solution this proposal also negates any visual or noise concerns with additional external condensers.

The existing LTHW system to the great hall, kitchens and library is supplied from the boilers located in the boiler plantroom beneath the existing library. These LTHW services will be reconfigured as part of the refurbishment works to provide zoned control in particular areas to reduce energy and prevent the current overheating problems.

Depending upon the final heat emitter selection and BREEAM requirements, the boiler LTHW system may be extended to provide the heating to the library extension which will negate the need for additional

pipe distribution. Alternatively it will be heated using the new GSHP system.

Timelock control, flow temperature set points, etc will be made on the head end BMS, complete with graphical display, adjustable operation settings and fault signals. Energy consumption from the ground source heat pumps will be monitored on the BMS.

To facilitate the East Terrace Development, a number of (17) external condensers will require relocation to the western service yard. These serve various areas at the mezzanine level and in the kitchen basement including kitchen refrigerant equipment. All of these will be replaced as part of the overall kitchen and great hall refurbishment.

4. Domestic Water Services

The hot and cold water to the WC's in the new build areas will be extended for the existing systems that provide the great Hall and library.

The existing domestic hot water system has two pumped return systems supplied from a LTHW supplied calorifier and an electric hot water calorifier located in the existing basement heating plantroom.

The modified hot and cold water to the kitchens and new build areas will be served by the existing water tanks on the roof of the east and west towers and hot heaters as presently installed.

Low flush WC's and automatic sensor or percussion spray taps will be utilised in the new and refurbished WC's.

The cold water branches serving the WCs and basins within the library extension and east terrace will have solenoid isolating valves. The solenoid will operate from the room PIR controller to open the valve upon occupancy detection with a 20 minute (adjustable) time delay to remain open. This is to prevent accidental flooding in accordance with the BREEAM requirements.

Local sub water meters will be provided for the cold water services to the following:

- Each Kitchen/Servery
- Education Suite
- Library Extension

5. Drainage

An above ground drainage system will be provided to the education suite WC's and the new WC's in the Great Hall and Southern Vestibule. It is envisaged this will require a pumped external chamber as part of the below ground drainage system due to the depth of the facilities relative to the existing external drainage system.

Within the kitchens, grease traps shall be provided on cooking equipment, wash up equipment and sinks to prevent grease entering the below ground drainage system.

6. Low voltage supply

The existing low voltage electrical supply to the Great Hall derives from an existing 1000kVA UKPN transformer which is located within UKPN's substation in the basement of the Great Hall.

This current electrical supply is insufficient to serve the great hall, the new East Terrace extension, the new Library Extension as well as the refurbishment of the kitchens. To meet this additional demand a new 800kVA transformer within new enclosure will be located in western service yard.

The main switchpanel adjacent to the existing transformer will be replaced with a new MCCB switchpanel to serve the requirements of the new East Terrace extension, the new Library Extension as well as the refurbishment of the kitchen and associated serveries..

Metering

Metering will be provided in accordance with the requirements of the Building Regulations Part L2 and additional requirements of BREEAM. Metering will be included to 90% of all mechanical plant and electrical distribution board supplies. Metering will be linked to a central monitoring system to allow remote monitoring.

7. General Lighting

A complete internal lighting system will be provided throughout the new developments and refurbished spaces to meet the task and amenity requirements of the occupied spaces.

Lighting will be controlled both manually and automatically using 'daylight linking', 'occupancy detection', and 'corridor linking' to maximise potential energy savings throughout the building and reduce running costs. Lighting controls in corridors will also be linked to the adjacent rooms so that whenever an adjacent room is in use and artificial lighting is required the corridor lighting will be switched on to avoid isolating lit rooms in areas of darkness. In the Kitchen area the controls will be manual for safety purposes.

The lighting will be carefully chosen to allow for low maintenance for cleaning and replacing luminaires.

Generally the lighting throughout the development will utilise a combination of LED and linear fluorescent T5 energy efficient lamp sources. Generally lamps will be high efficacy types with a target to achieve an overall average energy usage of 10 Watts/m² or better measured over all interior lighting within the building areas.

8. External Lighting

It is envisaged that the Camden Borough Planning Authority will classify the area as category E4, an area typically Town/City centre with high levels of night time activity. Therefore the lighting installation will be designed to comply with the following:

- Sky glow upward light ratio, i.e. the maximum permitted percentage of luminous flux for the total installation that goes directly into the sky, not to exceed 15%
- Lighting trespass into windows pre curfew 25 Lux and after curfew 5 Lux
- Source intensity pre curfew 30 Candelas; post curfew 2.5 Candela
- Building luminance pre curfew 25 Lux

Curfew is anticipated to be after 23.00. Where the pre curfew conditions exceed those permitted for post curfew conditions controls will be provided to reduce the lighting installation output to the post curfew condition. In addition lighting controls will be provided to allow the lighting to be turned on during the hours of daylight for maintenance inspections and isolated for maintenance

Astronomical time switches will be incorporated into the control switches to inhibit the operation of the external lighting when natural light is available.

Luminaires will be selected to minimise light output to avoid sky glow, light trespass and limit spill lighting to concentrate the lamp output to the required area.

External lighting will be designed to provide a maintained average illumination level of 10 Lux to the external walkways and terrace.

From the bat inspection report it is noted in section 3.1.1 that there are no features suitable for bats in the Great Hall. Also mentioned is that most of the roof west is well lit externally with halogen lighting which reduces the potential for bats. The tower to the North West was very bright internally with no potential for bats. The new external lighting will have no further impact above that of the existing conditions.