



Issue No. 2 | MEP SERVICES REPLACEMENT SCOPING NOTE

P2389 | KNELLER HALL

Document Revision Sheet

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1.0 INTRODUCTION

1.0 INTRODUCTION

This document has been prepared by WB Shiels to support the Listed Building consent application in connection with the proposed refurbishment works at Kneller Hall. The school is intended to be opened in September 2023.

This document is intended to set out our approach to the proposed mechanical, electrical and public health replacement works within the buildings and outline the strategy for minimising any impact on the heritage building fabric.

It should be noted that installations within the areas discussed in this document will also be selected to maximise energy efficiency, provide good operation, and meet appropriate Building Regulations.

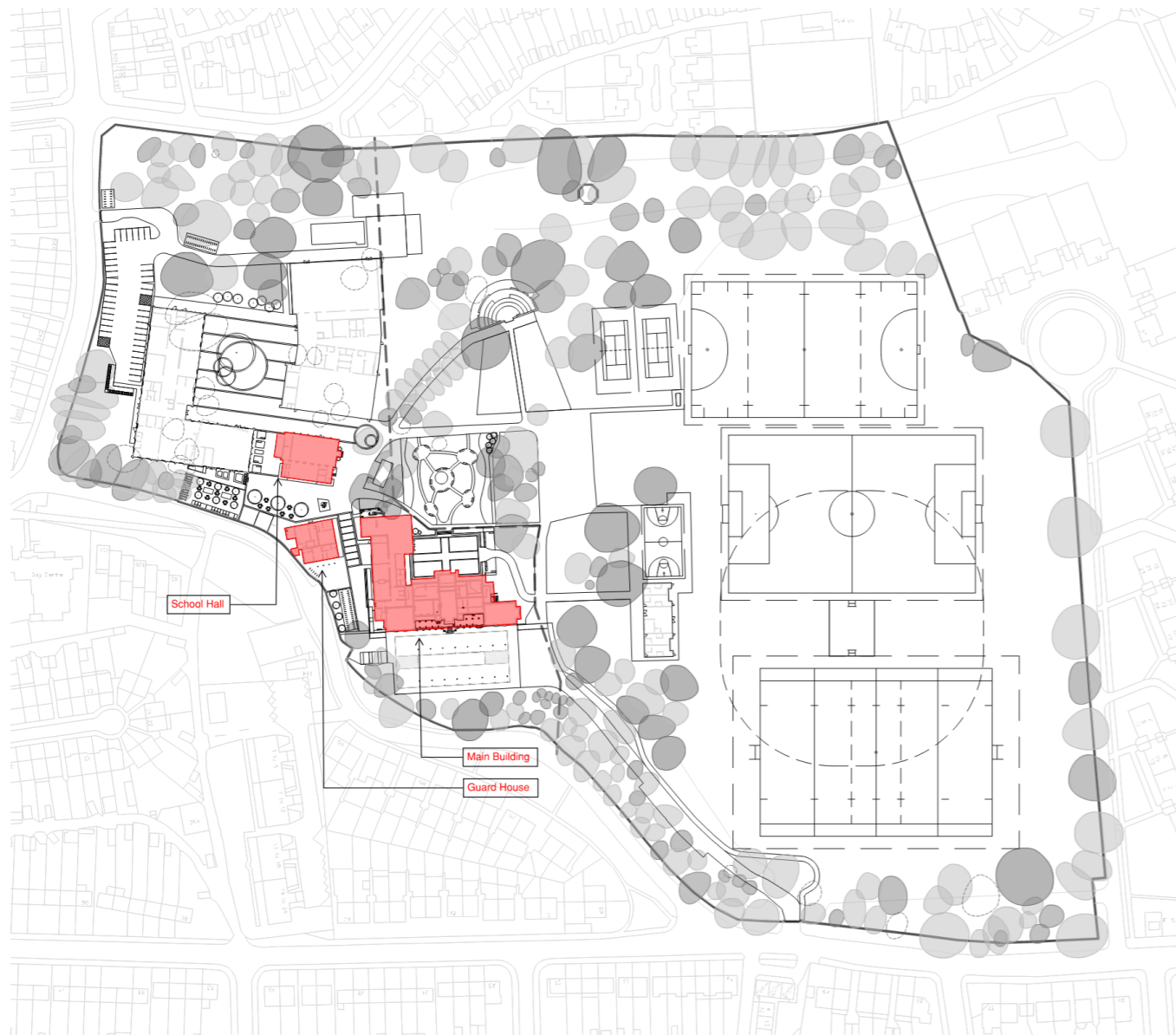


Fig 1. Site Plan; Building location

2.0 MECHANICAL - MAIN BUILDING, SCHOOL HALL & GUARD HOUSE

2.0 MAIN BUILDING

2.1 CURRENT MECHANICAL AND PUBLIC HEALTH PROVISION

The current space heating installation in the Main Building is via wall mounted radiators supplied via visible, surface mounted pipework. The heating system has been retrofitted into the existing building using modern panel radiators with no effort made to conceal services. The domestic services pipework has also been retrofitted into the building, surface mounted and visible throughout. In many instances, the existing services have been routed with no consideration of the existing historic building fabric. Services have been routed through existing floors, skirtings, and ceiling cornicing. Examples of the existing services arrangement can be seen in the figures below.



Fig 2. Existing services have been installed surface mounted with no consideration for the historic building fabric

The ventilation has also been retrofitted into the building on an ad-hoc basis with no consideration of planning restrictions or respect to existing, historic building fabric. Where required, local extract fans were installed at façade. There is also natural ventilation via openable windows on crank drives and pivot hinges.



Fig 3. Existing ventilation services and manually openable windows

The existing pipework, radiators, and local extract fans are all quite dated visually, and are nearing the end, or already surpassed, their useful operating life span. The existing heating pipework system is not insulated which results in wasteful energy losses. In addition, the existing heating system does not provide any means of control resulting in inefficient operation and wasteful use of energy. The existing installation would not meet current building regulation requirements for energy efficiency and carbon reduction targets.

2.2 PROPOSED MECHANICAL AND PUBLIC HEALTH REFURBISHMENT WORKS

General

All services shall be renewed throughout the building in order to bring the building up to current building regulations, to improve general system energy efficiencies and achieve environmental targets, and to replace services which are nearing or have already surpassed the end of their useful life span.

In addition, it is clearly apparent that the existing services were installed in such a manner that did not consider or respect the listed nature of the building, or the historic decorative elements. Therefore, as services are renewed, every service routing has been carefully considered to minimise disruption to existing building fabric, and to also improve the overall building aesthetic and ensure the decorative and listed building elements are showcased.

Corridors were identified as main services distribution routes on each floor, as they do not contain aspects of decorative or historic value. Therefore, there is an opportunity to create a dropped ceiling with a service void above which enables services to distribute throughout the floor plate yet remain concealed from view, thereby achieving the aesthetic design intent.

Each room was examined on an individual basis to determine the optimum servicing strategy on a case-by-case basis. Please refer to the design drawings for full details of service routings. In instances where a room does not have historically significant or decorative features such as cornicing, skirting, ornate ceilings, etc, then services can be installed within ceiling voids. In order to minimise disruption to existing building fabric wherever possible, a new false ceiling can be installed under the existing where adequate heights are available. In instances where there may not be adequate heights (such as in the west wing), existing ceilings can be locally chased to enable services installations, and then fully made good. Chasing works will be kept to an absolute minimum to install services (as opposed to a full strip out and take down of ceilings) in order to minimise the disruption to the building fabric disruptions.

In the instances where rooms contain highly decorative historic elements (ie: Headmaster's Office, GF Meeting Room, Main Hall, etc), service routings within that specific room have been minimised as much as possible. In specific instances where it has been determined that cornices and skirtings should be left undisturbed, pipework shall be surface mounted at low level to avoid disrupting the building fabric.

Heating

Heating to the building is provided via heating pipework feeding radiators. Please refer to the schedule in the appendix of this document for images of the proposed design intent for radiators.

In typical rooms such as classrooms, corridors, and study areas, a flat panel radiator is proposed which can be sprayed to any RAL colour.

In high priority areas which are either main reception areas, feature rooms, or rooms with existing highly decorative and historic features, a more aesthetic, historic, cast-iron type radiator has been proposed which is well suited to reflect the history of the building.

Ventilation

A natural ventilation strategy utilising existing openable windows has been adopted throughout in order to respect the significantly listed nature of the building. By utilising natural ventilation, the requirement to install large ventilation equipment in every room can be negated, along with the relatively large and bulky ductwork services and external louvres which accompany these types of units.

This has helped keep service voids to an absolute minimum, and achieve one of the overall project goals of respecting the listed nature of the building, preserving the history of the site, and minimising disruption to existing building fabric wherever possible.

New ventilation will be installed to serve toilet blocks and the new café as per British standard and building regulation requirements. However, ventilation ductwork will be contained to the local areas which it is required, and distribution of ductwork across the floorplates is not required.

3.0 SCHOOL HALL

3.1 CURRENT MECHANICAL AND PUBLIC HEALTH PROVISION

The current mechanical services installation in the School Hall follows the same strategy as the Main Building. Existing heating and domestic services pipework has been retrofitted into the building, with services installed surface mounted and visible. An example of the current service provision can be seen in the figures below.



Fig 4. Existing services have been installed surface mounted with no consideration for the historic building fabric

There is currently no ventilation service provision to the School Hall building. Ventilation is provided by opening windows only.

3.2 PROPOSED MECHANICAL AND PUBLIC HEALTH REFURBISHMENT WORKS

With the change of use of the building to a 300-occupancy theatre, it is necessary to provide new mechanical ventilation to ensure adequate amounts of fresh air is provided to meet building regulations. The new mechanical ventilation infrastructure also provides the heating and cooling to the space. Air is supplied and extracted from the building via a new Air Handling Unit (AHU).

The primary objective in designing the new ventilation services was to minimise disruption to the existing building fabric wherever possible, and to retain the historic façade.

Therefore, it was determined that in designing the new ventilation services, the existing windows would not be modified and no new external louvres would be installed which would alter the historic appearance of the building. In order to minimise the disruption to the building fabric, the AHU was located externally and concealed within a decorative external enclosure. This ensures the very least disruption to the existing fabric, as only 2no new openings are required for ductwork in the façade, and no louvres must be added to the facade. The AHU and external ductwork will be concealed from view behind the enclosure.

Please refer to the architect's package for details on the aesthetic elements of the external enclosure.

Multiple options were examined in locating the new AHU equipment. It was investigated to locate the AHU within the existing basement plantroom however the AHU is too large to fit in the demise. It was also investigated to locate the AHU within the internal structure of the School Hall building, however due to the size of the AHU, this would require completely removing existing partitions and potentially having to take down parts of the external façade to enable suitable access and installation of the AHU. The extensive disruption to the existing building fabric was determined to be contrary to the original goals of preserving the existing building fabric as much as possible.

4.0 GUARD'S HOUSE

4.1 CURRENT MECHANICAL AND PUBLIC HEALTH PROVISION

The current space heating installation in the Guard House is via wall mounted radiators. There has been upgrades to the radiators over the years, as a result, there is a combination of relatively modern panel radiators and older cast iron rads. The LTHW pipework network throughout is also a combination of surface mounted and in-wall routing.

Where possible, and following condition surveys and testing, retained services will be used to minimise the extent of re-piping works. However, considerable intrusive works are needed to

get a clear and accurate understanding of the existing installation and the installation is of considerable age.

The figures below give an indication of the current arrangement.



Fig 5. Site Plan; Building location



Fig 6. Existing building services elements

The ventilation is mixed across the building. In-window, local extract fans are located in some spaces, there is also natural ventilation via openable windows on pivot hinges.

Insulated domestic service pipework can be found routed throughout the building to sanitary points such as sinks and WCs.

4.2 PROPOSED MECHANICAL AND PUBLIC HEALTH REFURBISHMENT WORKS

The aim of the MEP services installation is to provide suitable building functionality without compromising the historical context of the building. A successful outcome will ensure a sensitive and understanding approach, while meeting the operational requirements of the services.

Heating & Cooling

The new space heating will generally be via panel radiators positioned under windows. LTHW pipework will be surface mounted, where in-wall distribution doesn't allow. Where pipework is to be hidden, it is to be boxed in as outlined by the Architect's detail.

Please refer to schedule in the appendix of this document for images of radiators

Rooms considered to have high provision of IT equipment (i.e. computers, servers, recording studios and the like) will be served with wall mounted fan coil units, as generally shown in the accompanying drawings to this short report.

Joinery areas to conceal fan coil units will be provided. Pipework to and for the unit will be positioned in locations accessible for maintenance and access but also in line with manufacturers requirements.

Wall mounted fan coil unit controls will be signed off by the client and the architect.

Ventilation

In general, the spaces and rooms will be naturally ventilated via openable windows. There are WCs, and classrooms that require mechanical ventilation; supply and extract with heat recovery for instance. These space will have fans and ductwork mounted at ceiling level unless otherwise indicated in drawings. Louvres will be provided in newly installed windows for duct work to connect to for fresh air intake and exhaust.

Openable windows will be provided to allow for purge ventilation and summertime overheating. Please refer to Architects' information for details on window arrangement.

Intake and exhaust louvres for fresh air intake and exhaust will be integrated to new window arrangements, so as to not puncture existing wall elements.

Domestic Services

Cold water will be piped across the building from the plantroom to serve the various sinks, wash hand basins an instantaneous water heater. The cold-water pipework will be installed in walls where possible and hidden from wall surfaces.

Instantaneous hot water heaters will be located under sinks in kitchen floor standing cabinets or below wash hand basins. Where units are boxed in, suitable access must be provided.

Where pipework is required to be surface mounted it will be boxed out behind architects' details.

Drainage

Where necessary sanitary drainage pipework will be boxed outed in line with Architect's details. Where pipework is boxed in, suitable access must be provided.

Lengthy and exposed drainage runs can be avoided by room layout and sanitary wear fitout considerations.

3.0 ELECTRICAL - MAIN BUILDING, SCHOOL HALL & GUARD HOUSE

4.3 CURRENT PROVISION

The current provision of the building consist of suspended battens fittings on threaded rods. The corridor consist of a mixture of 600x600 recessed light fittings and surface battens in false ceiling. The light controls are manually operated switched. The wireways are a mixture of recessed, surface mounted conduit and surface wiring.

The energy consumption of the existing system is predicted to be significantly higher than a modern installation due to the use of high energy consumption lamps and the absence of any automatic lighting controls.

4.4 PROPOSED REFURBISH WORKS

The building is being re-purpose to an Education Institution. The lighting design intent is to design for the lighting levels to meet with the requirements set out in LG 05 – Lighting for Education, together with BS EN 12464-1:2021 Lighting for Workplaces- Indoor Workplaces. The Lighting design has to meet up with the requirements of Building Regulation Part L2 and the BREEAM certification Levels targets.

The proposed refurbishment design will be done using LED lighting fittings throughout the whole building. Passive Infra-Red (PIR) occupancy detection, Occupancy Sensors and Daylighting Control will be part of the lighting control strategy to have an Energy Efficient Building during operation.

Whilst the choice of the light fittings was made to fit the purpose, the intention was also to blend with the surrounding environment and the Grade II building.

Where wall mounted fittings & switch plates are proposed in a special interest area, the plaster will be locally chased out to provide a cabling route from the ceiling to the luminaire or switch plate. Cabling and mechanical protection will then be installed. The wall surface will be carefully made good replacing like-for-like plaster. Works will avoid interference with architectural details.





Where ceiling suspended fittings and PIR occupancy detectors are proposed in special interest area, new cabling will be pulled through the existing wireways as far as is practicable. If this is not possible, small localised temporary access openings will be formed within the ceiling to provide access for feeding cables through the ceiling void. The small opening will then be closed and made good with like-for-like materials following completion of the cabling works.

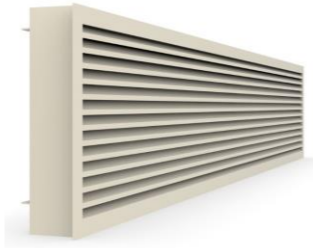

The emergency lighting will be updated throughout in compliance with BS 5266 and BS 1838. Generally emergency lighting will be through use of the proposed recessed downlighters or wall lights with integrated NM3 emergency packs, although in some locations dedicated replacement recessed emergency luminaires will be provided where there is no fittings available with integral battery pack.

4.0 VISIUAL SCHEDULE OF PROPOSED ELEMENTS







The schedules below set out the mechanical, electrical and public health aesthetics aspirations for the various elements throughout the buildings.

These can be read in conjunction with the layout drawings accompanying this report; for the planning submission.

WB SHIELS		Mechanical Equipment Reference Table	
Item	Description	Typical Location	
	Decorative LTHW radiator; floor standing	Located in high spec/ highly decorative / feature spaces where it is desired to maintain the existing historic aesthetic of the room.	
	Flat panel LTHW radiator; wall mounted	Located throughout as typical, unless noted otherwise for high spec / highly decorative / feature spaces	
	Fan Coil Unit; Vertical concealed	Control room; Music Tech. Classroom	
	Swirl diffuser; ceiling mounted supply grille from FCU/MVHR	Music tech classroom, security mess	

	Linear diffuser; ceiling mounted or wall mounted supply grille from FCU/MVHR	Music tech classroom, security mess
	Controller/Thermostat; wall mounted fan coil unit controller	Music tech classroom, security mess

			Typical Locations		
Reference Fitting	Reference Type	Description	Main Building	Guard House	School Hall
	A1 & A1/E	Surface or Suspended Luminaire	Library, Classrooms, Offices, Common Room, Staff rooms	Classroom, Recording Studio, Control Room, Music Practice Room, Office, Security Mess Room, Nurse Room	Dressing Room, Green Room
	A2 & A2/E	Surface or Suspended Luminaire	Lecture Space	Not used	Not used
	B1 & B1/E	Ceiling Recessed Downlight Luminaire	Corridors, Stair Core, Video Conferencing Booth, Lobby and WCs	Corridors, Stair Core, Lobby, Sick Bay	Corridors
	B2 & B2/E	IP65 Ceiling Recessed Downlight Luminaire	WCs (Corridors and Stalls), Risers, Lobby, Cleaning Cupboard	WCs (Corridors and Stalls)	WCs (Corridors and Stalls), Showers
	B3	Wall Mounted Luminaire	Stair Core, Lecture Space, Headteacher's Room Seminar Room, Meeting Room, Staff Office	Stair Core	Auditorium

Reference Fitting	Reference Type	Description	Main Building	Guard House	School Hall
	B4	Surface Mounted Ceiling Luminaire	Lecture Space	Not used	Auditorium
	B5	Ceiling Mounted Luminaire	Hall	Not used	Not used
	B6	Wall Mounted Luminaire	Café	Not used	Not used
	C & C/E	Ceiling Mounted Luminaire	Switch Room, Video Conferencing Booth	Plant Area, Services, Music Store	Plant Room
	D1/E	Wall Mounted Luminaire	Exterior to emergency exit routes – ground floor	Exterior to emergency exit routes – ground floor	Exterior to emergency exit routes – ground floor
	P1 & P1/E	Suspended Halo Luminaire	Hall/ Headteacher /Pupil Support/ Office/ Seminar Support	Not used	Not used

Reference Fitting	Reference Type	Description	Main Building	Guard House	School Hall
	P2	Suspended Luminaire	Café	Not used	Not used
	F1	Suspended Ball Pendant Luminaire	Café	Not used	Spare Foyer, Break Out Space, Lobby
	F2 & F2/E	High Bay Suspended Luminaire	Lecture Space	Not used	Auditorium
	G1	Track Light Luminaire	Lecture Space	Not used	Auditorium
	L1	LED Strip	Library	Not used	Not used
	-	Emergency Exit sign	All emergency exit routes as required by fire strategy	All emergency exit routes as required by fire strategy	All emergency exit routes as required by fire strategy

Notes: E – denotes a light fitting with integrated emergency battery pack