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North Manchester General Hospital
Gallery Restaurant

Outline Services Report

RIBA Stage 2

August 2026

Document Revision Control

Revisions	Date	Reason for Issue	By	Approved
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1.0 Introduction

1.1 Purpose of this Report

Harley Haddow has been appointed to provide Mechanical, Electrical and Public Health (MEP) engineering services in connection with the proposed refurbishment and Reinforced Autoclaved Aerated Concrete (RAAC) remediation works to the Gallery Restaurant and adjacent toilet accommodation at North Manchester General Hospital.

A RIBA Stage 1 MEP review was previously undertaken to consider the engineering implications associated with the refurbishment options developed by Murphy Philipps Architects (MPA). The project has subsequently progressed on the basis of Option 2 – Plus, with further development of the MEP strategy during Stage 2.

This report describes the proposed Stage 2 MEP strategy for the preferred option and identifies the principal requirements, constraints, assumptions and further investigations required to progress the design through RIBA Stage 3.

The report should be read in conjunction with the current architectural and structural information, Harley Haddow Stage 1 MEP review and the project MEP survey brief.

1.2 Basis of Design

The MEP services will be designed in accordance with the relevant current statutory requirements, regulations and recognised industry guidance including, where applicable:

- Building Regulations, including Approved Documents F and L.
- Building Regulations 2nd tier document – Non-Domestic Heating, Cooling, and ventilation compliance guide
- Non-Domestic Building Services Compliance Guide.
- CIBSE Guides A, B, C, F, G, H and L.
- CIBSE TM guidance applicable to thermal comfort and overheating.
- HTM 04-01 - Safe water in healthcare premises & Supp D08 Thermostatic Mixing Valves.
- HTM 05-03 - Operational Provisions Part B Fire Detection & Alarm Systems
- HTM 05-01 - Managing Healthcare Fire Safety
- HTM 05-02 – Firecode - Guidance in support of functional provisions (Fire safety in the design of healthcare premises)
- HTM 06-01 - Electrical services supply and distribution - Part A - Design Considerations
- HTM 08-01: Acoustics
- BS 7671 – Requirements for Electrical Installations.
- BS EN 12056 – Gravity drainage systems inside buildings.
- BS EN 806 – Specifications for installations inside buildings conveying water for human consumption.
- Water Supply (Water Fittings) Regulations.
- HSE Booklet HS(G)70 - The control of Legionellosis including Legionnaire’s Disease
- HSE Document L8 - The control of Legionella Bacteria in Water Systems
- Relevant fire safety legislation and Trust fire strategy requirements.
- Relevant British Standards and Trust Estates engineering requirements.

The Gallery Restaurant comprises non-clinical accommodation. The proposed restaurant air handling system is therefore not required to meet the specialist clinical ventilation provisions of HTM 03-01. A compact commercial-type AHU is proposed, selected to meet the appropriate Building Regulations, energy, acoustic, thermal comfort and indoor air quality requirements for the restaurant use.

Refer to the Derogation Schedule for derogations from the design standards.

2.0 Project Overview

2.1 Project Description

The Gallery Restaurant comprises dining accommodation, kitchen and servery facilities and adjacent toilet accommodation. RAAC roof construction has previously been identified within the Dining Extension and Toilet Block.

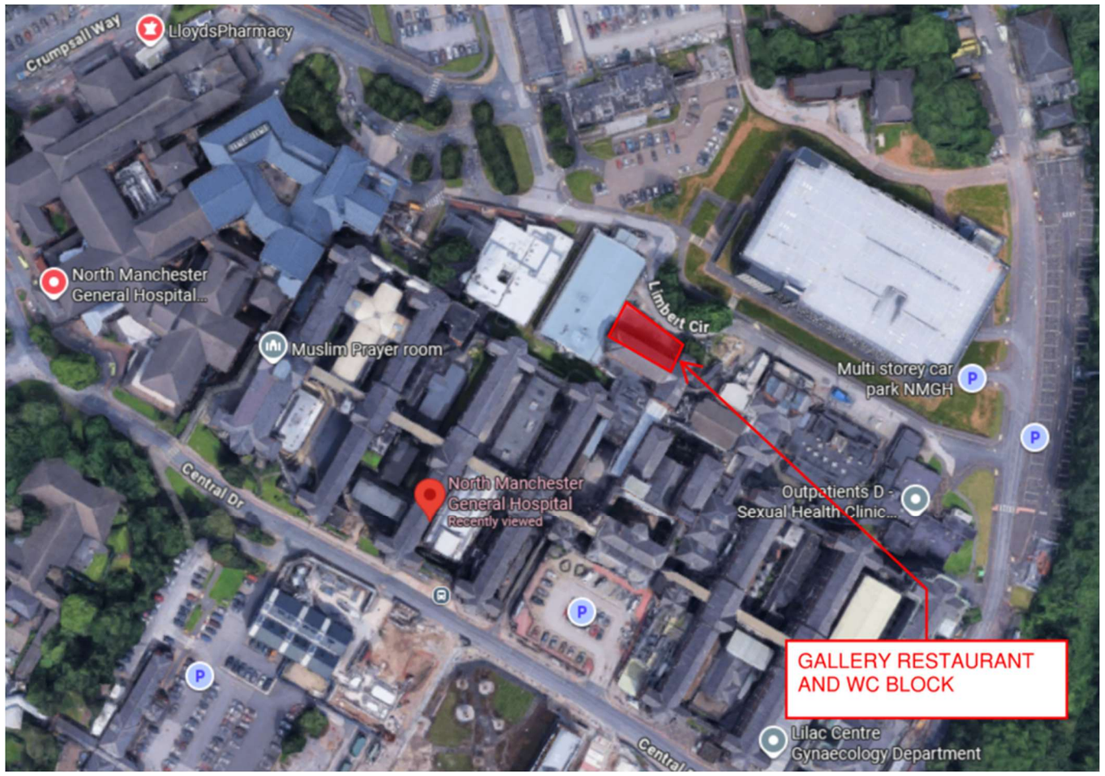
The preferred Option 2 Plus scheme comprises removal and replacement of the affected RAAC roof construction, replacement of the external façade to the Dining Extension, retention of the principal structural beams, columns, ground floor slab and foundations, refurbishment of the toilet accommodation and associated alterations to the Kitchen and Servery.

The architectural proposals also include a new enclosure adjacent to the restaurant to accommodate the new air handling unit.

The principal Stage 2 MEP works comprise:

- New mechanical supply and extract ventilation to the Dining Extension.
- New VRF heating and comfort cooling to the Dining Extension.
- New cassette-type fan coil units within the restaurant ceiling.
- New dedicated AHU within the proposed AHU plantroom.
- External roof-level ductwork distribution where required due to the restricted ceiling void.
- Replacement kitchen extract fans and improvements to steam extraction.
- Replacement / improvement of WC extract ventilation.
- Alterations to domestic water and drainage services associated with the refurbished toilets.
- New general and emergency lighting within affected areas.
- New and altered small power supplies.
- Electrical supplies and controls for new mechanical plant.
- Fire alarm interfaces associated with new plant, fire shutters and fire suppression systems.
- Associated containment, controls, builderswork and service penetrations.

The existing kitchen equipment and extract hood are currently understood to be retained.



Site plan location of existing Gallery Restaurant

2.2 Principal MEP Risks and Constraints

A project risk register should identify the overall project design risks. However, the below provides some further narrative on some key considerations for the MEP systems and approach.

The principal MEP risks identified at Stage 2 are:

- The retained structural beam arrangement significantly restricts the depth and continuity of the ceiling void available for ventilation ductwork distribution.
- Existing concealed service routes and levels have not yet been fully established.
- New service penetrations will require close coordination with the retained structural frame and the new roof construction.
- Available electrical capacity for the proposed VRF system, AHU, kitchen extract plant and associated equipment remains to be confirmed.
- Existing kitchen ventilation quantities and the existing air balance between Kitchen, Servery and dining areas require verification.
- Final kitchen extract duty will depend upon measured existing performance and confirmation of the retained catering equipment and extract hood.
- External plant and ductwork will require coordination with acoustic, planning and architectural requirements.

- The final route and location of external ductwork must maintain roof access, drainage routes and maintainability.
- Existing foul drainage connection points are to be confirmed.
- The Kitchen / Servery ventilation may be impacted by the Fire Strategy requirements for this areq which are to be confirmed
- Works will interface with operational hospital accommodation and require appropriate phasing, isolations and permits.

The Stage 1 review identified concealed services, electrical capacity and kitchen ventilation performance as key uncertainties requiring further investigation.

2.3 Surveys and Further Investigation

A dedicated MEP survey brief has been prepared to obtain the information required to develop the Stage 3 design.

The intrusive services survey will establish the mechanical, electrical and public health services within and immediately serving the works area, including service routes, sizes, levels, isolation points, plant and equipment and existing service penetrations.

Particular emphasis will be placed on intrusive investigation of the ceiling and service voids to establish the available distribution space and interfaces with the retained structural construction. Service heights and levels will be recorded against a common survey datum, together with accessible drainage invert levels and existing penetrations.

A separate ventilation survey will establish the existing arrangements serving the Kitchen, Servery and dining accommodation. This will include:

- Existing kitchen extract system.
- General supply and extract ventilation.
- Any existing or concealed kitchen supply / make-up air arrangement.
- Existing ductwork routes, sizes, plant and controls.
- Airflow measurements at accessible supply and extract terminals.
- Airflow measurement at the kitchen extract hood / terminals.
- Assessment of the overall air balance between Kitchen, Servery and dining areas.

The survey is intended to provide a measured baseline from which the new ventilation and kitchen extract duties can be developed.

Survey information will be recorded on coordinated CAD drawings with PDF outputs, supported by photographs and a concise schedule / report identifying significant findings and limitations.

A CCTV below-ground drainage survey is included within the Civil and Structural investigation works. The results will be reviewed by the MEP Engineer to confirm interfaces with the proposed above-ground drainage alterations.

3.0 Plant Strategy

A Request for Information schedule has been issued to the Trust however no existing record information has yet been received for review. From review of the project brief and site walkaround, a plant strategy proposal has been developed as below (refer to specific services sections for further system details):

The Stage 2 plant strategy has been developed to provide substantially improved environmental conditions within the Dining Extension while minimising dependence upon the existing hospital heating and ventilation infrastructure.

The following principal new plant is proposed:

- New packaged supply and extract AHU serving the Dining Extension.
- New VRF heat-pump system providing heating and comfort cooling.
- Ceiling cassette fan coil units within the Dining Extension.
- Associated external VRF condenser unit(s).
- New twin kitchen extract fan arrangement.
- New local extract fans serving the WC accommodation.
- Associated electrical supplies, controls and BMS interfaces.

4.0 Design Conditions

The design of the engineering services shall be based on the parameters as detailed in the appropriate industry standards where applicable. Occupancy densities / figures shall be taken from the room data sheets and architectural information.

External Design Conditions

For the design of all thermal loads and selection of equipment the following ambient conditions shall apply:

	Dry Bulb (˚C)	Wet Bulb (˚C)
Winter	-6	-6
Summer	32	23.6

Internal Design Conditions

The following table states the average internal summer and winter design conditions for the spaces.

Unless there is no means of automatically re-setting the internal temperature from the summer to winter conditions or vice versa and during the mid-season, the average space temperature will vary between the two temperature limits.

As there is no humidity control provided, the internal humidity will vary considerably depending on external conditions and internal latent gains.

Area/Space	Winter Design Condition		Summer Design Condition	
	°C	RH %	°C	RH %
Kitchen / Servery – As Existing				
Restaurant Seating Area	21°C ± 2	N/A	24°C ± 2	N/A
WC	18°C ± 2	N/A	Uncontrolled	N/A

Ventilation Rates
The ventilation strategy has been designed using criteria below.

Area/Space	Ventilation	Min Ventilation Rate	Pressure Regime	Reference
Kitchen / Servery	Extract with make-up air via adjacent	To match / improve on existing	-VE	DW172
Restaurant Seating Area	Supply & Extract	10 (l/s)/p Based on occupancy of 1 person / 2m^2	Balanced	
WC	Extract	6 ACH	-VE	

Noise Criteria

The building services shall be designed and installed such that the following noise ratings are not exceeded in the occupied spaces in accordance with the acoustic recommendations:

Area/Space	Overall Room Noise Level (dB(A))	Ventilation Design Value (dB(A))
Kitchen / Servery	50	45 (50 below extract hoods)
Restaurant Seating Area	45	40
WC	45	40

Internal noise levels shall be measured at 1.5 m above the finished floor level.

Achieving background noise levels will require not only the quiet delivery of ventilation, but also the attenuation of any plant equipment noise that propagates down the duct paths. Sound attenuators and strategic use of internal acoustically lined ductwork shall be specified to ensure noise criteria are not exceeded.

Specialty detailing of building services will be required where services cross through the boundary construction of other sound-sensitive spaces. Vibration isolation detailing shall be provided to all building services that cross structural separations that are intended for acoustic purposes.

Cross talk attenuation shall be provided in noise sensitive spaces as appropriate to limit speech intelligibility.

Filtration Standards

All filters shall be integral to the air handling units unless stated otherwise.

System	Primary filter	Secondary filter
Air handling units	ISO ePM10 >50%	ISO ePM1 >60%

Specific Fan Power

The new ventilation plant is proposed to achieve the below in line with Part L for existing buildings:

System	Specific fan power W/litre/second
Kitchen Extract fan (remote from zone with grease filter)	1.0
AHU with heating only	2.2
WC Extract (wall / window fan)	0.4

Duct

Calculation and selection of duct sizes shall be based on current CIBSE calculation methods. Air velocities shall be in accordance with limiting velocities to suit Preferred Noise Criteria (PNC) and Noise Rating (NR) systems. The following maximum velocity criteria (subject to noise criteria as stated earlier):

Ductwork location	Maximum velocity m/s	Maximum Pa per metre run	Ductwork classification
Plantrooms	5.0	1.0	A
Main risers	5.0	1.0	A
General distribution	4.0	1.0	A
Final distribution to terminal units	To suit terminal device / room noise requirements		A

Ductwork classifications shall be as defined in HVCA DW/144

Pipework Sizing

Calculation and selection of pipe sizes shall be based on current CIBSE calculation methods.

LTHW and chilled water pipe sizes shall be based on 240 Pa/m (max) and velocities of 1.5 m/s (max).

Domestic Water Services Design Criteria

Calculation and selection of pipe sizes will be based on I.O.P high frequency loading units and the HTMs.

Domestic water pipe sizes will be based on velocities of 1.5 m/s (max) in mains within plantrooms and risers and velocities of 1.0 m/s (max) for general distribution.

Internal Lighting

The levels of maintained horizontal illumination shall be:

Area	Average Lux Level (measured on floor plane unless noted otherwise)	Comments
Gallery Restaurant	300	
Male WC	200	
Female WC	200	
Circulation	150	
Kitchen / Servery	500	

Lighting controls to utilise SmartSCAN system, or other approved NCA Electrical Authorising Engineer.

Emergency Lighting

Emergency lighting installations shall comply with the requirements of BS 5266 and BS EN 1838. Subject to confirmation from the risk assessment in accordance with the requirement of BS 5266-1 the levels of illumination for a period of 3 hours shall be as follows:

Area/space	Illumination level (lux)	Uniformity (Minimum/Maximum)
Escape Routes	1.0	1:40
Open Areas	0.5	1:40
High Risk Task Area	15	1:40
Manual Call Points	TBC in Stage 3	
Disabled Refuge Areas	TBC in Stage 3	
Disabled WC's	TBC in Stage 3	
Other High Risk areas	TBC in Stage 3	

5.0 Energy and Sustainability

The proposed design will seek to reduce operational energy consumption while improving internal environmental conditions.

The principal measures proposed include:

- High-efficiency heat-pump VRF heating and cooling rather than extending the existing LTHW heating installation.
- Heat recovery within the new supply and extract AHU.
- Low specific fan power selection.
- Variable-speed fan control where appropriate.
- Demand-based or time-scheduled ventilation control where operationally appropriate.
- High-efficiency LED lighting.
- Automatic lighting controls appropriate to room use.
- Appropriate sub-metering of significant new mechanical plant.
- Connection of new systems to the Trust BMS where practicable.

The new systems will be developed to satisfy the applicable requirements of Part L.

6.0 Mechanical and Public Health Services

6.1 Foul Drainage - Above Ground

Existing above-ground drainage connections will be reused wherever practicable to minimise intervention into the existing structure and below-ground drainage system.

Local waste and soil pipe modifications will be provided to suit the replacement sanitaryware.

Existing routes, connection points and accessible invert levels will be confirmed through the MEP survey. The separate CCTV survey undertaken as part of the Civil and Structural investigation package will be reviewed to confirm the suitability and location of below-ground connections.

It is understood that the Kitchen / Servery above ground foul drainage is to be retained and no modifications are required as part of the scope. Also, that no new sanitaryware is to be provided within the Restaurant area.

6.2 Domestic Hot & Cold Water System

Domestic hot and cold-water installations will be in accordance with HTM04-01.

The WC refurbishment includes replacement sanitaryware.

Existing domestic hot and cold-water distribution will be retained where practicable, with local modifications undertaken to suit the new sanitaryware and final layouts.

Existing pipework routes, sizes, isolation points and condition will be confirmed through the intrusive MEP survey before the Stage 3 design is finalised.

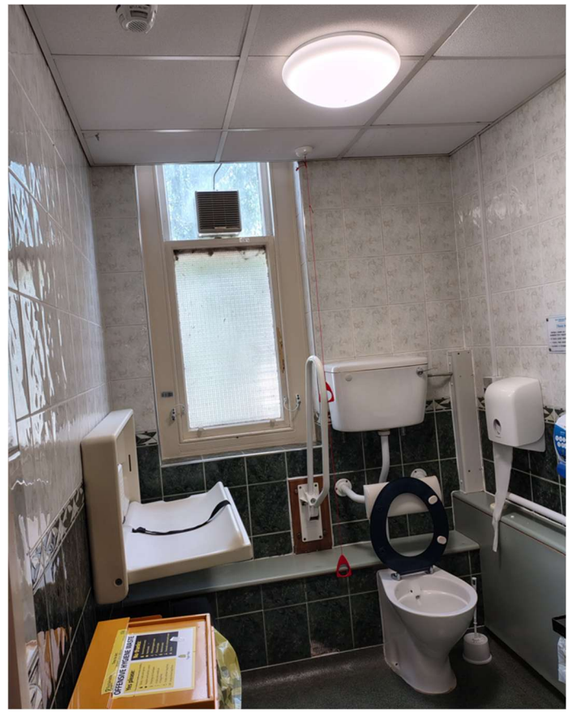
Domestic water services to the Kitchen / Servery areas are to be retained and protected during the works, no modifications are currently anticipated.

Hot water return pipework will be extended down to connect into the flow approximately 300mm from the associated outlet.

Cold water distribution will be arranged to terminate at an agreed high use fitting.

Dead-legs are to be removed, and temperature sensors linked to the BMS are to be provided for monitoring.

Thermal insulation on domestic water services will be mineral wool.



Existing WC area

6.3 Heating & Cooling Systems

The existing Dining Extension is currently heated using LTHW fan-assisted emitters positioned around the external façade. These services will be directly affected by the proposed façade replacement.

The Stage 2 proposal is therefore to remove the existing local heating installation serving the Dining Extension and provide a new dedicated VRF heat-pump heating and cooling system.

The system will be sized taking account of:

- Occupancy.
- Solar gains through the proposed glazing.
- Lighting and equipment gains.
- Fresh-air ventilation load.
- Building fabric performance.
- Relevant summer and winter external design conditions.

No active humidity control is proposed.

Ceiling-mounted cassette fan coil units are proposed within the restaurant seating area. These will provide local temperature control and allow the system to respond to varying occupancy and solar gains.

The arrangement provides cooling that is independent of the existing hospital chilled-water infrastructure and responds to the Stage 1 observation that the highly glazed Dining Extension currently has no mechanical cooling.

Condensate drainage will be routed from the cassette units to suitable drainage connection points.

Wall mounted temperature sensors and controllers are to be provided with set points and lockable temperature range override dictated by the BMS.

Final refrigerant pipework routing, zoning, refrigerant concentration assessment and external condenser selection will be developed during Stage 3.

Noise assessments will be required for the proposed external plant locations.

The WC spaces are currently served by low temperature hot water radiators in low surface temperature casings. Subject to the extent of Architectural changes these may be retained in place, or new LST radiators provided with thermostatic regulating valves to suit the new room layout. In this instance local modification of the heating pipework will be required.



Existing Restaurant heating and natural ventilation system

System operating parameters taken as follows:

- External Winter design condition -6ºC
- External Summer design condition 32ºC WB / 23.6ºC DB
- External ambient design condition for cooling plant 35ºC



Indicative external variable refrigerant flow condensing unit

6.4 Medical Gases

There are no requirements for the refurbishment to be served by medical gases. Should it be found through further survey work that any medical gas pipework distributes via the ceiling void to and from areas outside the scope of works, a design solution may be formulated in line with HTM-02-01.

6.5 Ventilation Systems

Fresh-air quantities will be developed based upon the anticipated restaurant occupancy and the requirements of Approved Document F and relevant CIBSE guidance.

Supply and extract air quantities will be balanced to provide appropriate air movement through the Dining Extension while maintaining the required relationship with the adjoining Servery and Kitchen.

Final air quantities will be coordinated following completion of the existing ventilation survey.

Restaurant Ventilation

The Dining Extension will be provided with new mechanical supply and extract ventilation from a new dedicated AHU.

Tempered fresh air will be supplied independently from the VRF heating and cooling system. The AHU will therefore principally address fresh-air and ventilation loads, while the VRF system provides the majority of the sensible space heating and cooling.

The new AHU will be located within the purpose-designed AHU enclosure adjacent to the Dining Extension. The architectural proposals currently identify an approximately 15 m² enclosure for this purpose.

As the restaurant is non-clinical accommodation, the unit is not proposed to comply with the specialist dimensional, construction and access provisions associated with an HTM 03-01 clinical AHU. This enables a more compact commercial AHU arrangement to be adopted within the restricted plantroom footprint.

The unit will nevertheless incorporate appropriate filtration, heat recovery, low-energy fans, frost protection, access for maintenance and controls appropriate to the building use.

Allowances have been made at Stage 2 for unit dimensions, maintenance zones and component arrangement, these will be developed during Stage 3.

The outdoor air intake and exhaust discharge will be positioned to minimise the potential for recirculation, with a minimum separation of 4 m proposed between intake and exhaust locations.

The ventilation system will be designed to:

- Provide fresh air appropriate to the restaurant occupancy.
- Provide effective distribution throughout the seating area.
- Recover heat from the exhaust air.
- Coordinate with the adjoining Kitchen and Servery air balance.
- Avoid draughts within occupied areas.
- Meet appropriate internal noise criteria.

The existing structural beams are to be retained as part of the architectural and structural strategy. The retained beams result in limited continuous ceiling-void depth through which the new supply and extract ductwork can be distributed.

To avoid significant structural intervention and excessive reduction of the internal ceiling height, the current Stage 2 proposal is therefore to route sections of the main ventilation ductwork externally at roof level.

Ductwork will penetrate the new roof locally within suitable zones between retained structural beams, with smaller distribution ductwork then routed internally to ceiling diffusers / grilles.

External ductwork will be:

- Weatherproof and externally insulated as appropriate.
- Coordinated with roof falls and rainwater drainage.
- Located to retain suitable maintenance access.
- Supported independently from the roof construction as required by the structural design.
- Coordinated with acoustic requirements and the architectural appearance of the building.

The strategy will be developed through Stage 3 following completion of the intrusive MEP and structural surveys.

Existing Main Dining / Seating Area

The section of existing restaurant seating accommodation located within the original building is currently outside the principal architectural refurbishment scope.

However, following discussion with MPA, there is an opportunity to extend the new mechanical services into this retained seating area.

An allowance is therefore being maintained within the Stage 2 design for:

- Extension of mechanical supply and extract ventilation from the new AHU; and
- Extension of the VRF heating and cooling installation to serve the retained restaurant seating area.

Providing both areas from the new systems could improve environmental conditions across the complete restaurant and provide a more consistent ventilation and thermal comfort strategy.

This remains outside the currently defined base scope and is subject to further discussion and agreement with the Trust and design team during Stage 3. Suitable spare capacity and connection provisions will therefore be considered within the Stage 2 plant and distribution strategy where practicable.

Kitchen and Servery Ventilation

The existing catering equipment and kitchen extract hood are understood to be retained.

The existing roof-mounted kitchen extract fans will be replaced with a new twin-fan extract arrangement, reconnecting to the retained kitchen extract ductwork where confirmed suitable.

The existing kitchen has reported problems associated with steam capture and removal. Additional extract capacity is therefore proposed as part of the new installation to improve steam extraction performance.

Final extract quantities will be determined following:

- Measurement of the existing kitchen extract airflow.
- Confirmation of the retained hood and catering equipment arrangement.
- Assessment of the condition and size of the existing ductwork.
- Identification of any existing kitchen make-up air system.
- Assessment of the overall air balance between Kitchen, Servery and dining areas.

The Stage 1 review similarly identified improvement of kitchen extract and steam removal together with new high-level-discharge extract fans as a principal requirement.

The new fan discharge will terminate at high level and will be coordinated with the new AHU outdoor-air intake to prevent entrainment of kitchen exhaust air.



Existing Kitchen extract fan

WC Ventilation

The Female and Accessible WCs are currently served by window-mounted extract fans which were observed during Stage 1 to be aged.

These fans will be replaced with new local extract units, either wall or window mounted subject to development of the architectural façade design.

New mechanical extract ventilation will also be provided to the Male WC.

Final fan arrangements, external louvres and controls will be coordinated with the Architect during Stage 3.

For all areas penetration locations are to be co-ordinated with existing structural records and existing services.

Ductwork penetrations through compartment and sub-compartment walls will be motorised fire dampers. The ductwork design though will seek to minimise the provision of dampers and access requirements from ceiling voids by routing methods and use of fire rated ductwork where appropriate.

The fire damper strategy is to be reviewed for approval by the Trust Fire Officer.

6.6 Controls and Building Management System

New mechanical plant will be provided with local packaged controls where appropriate and interfaced with the existing Trust BMS where practicable.

The proposed control strategy will include:

- AHU enable / disable, operating status and common fault.
- Supply-air temperature control.
- Fan enable / disable, status and fault indication.
- Filter differential-pressure indication.
- Frost protection.
- VRF enable / disable, operating status and common fault.
- Fan coil unit temperature control
- Kitchen extract fan enable / disable, status and fault.
- Appropriate alarms from mechanical plant.
- Energy metering where required.
- Time scheduling

The BMS interface and further requirements will be agreed with the Trust Estates team during Stage 3.

6.7 Kitchen Fire Suppression System

From discussion with the Trust, it is understood that the kitchen has been refurbished relatively recently, and that the equipment has been relocated however the existing K-15 fire suppression system was not upgraded to take into account of these changes. It was also discussed on site that it is not feasible to modify the system and therefore this will need to be replaced.

1.0 Electrical Services

This section of the report will give guidance on achieving a fully compliant design for the electrical distribution and systems for the proposed fit out of the Gallery Restaurant. The electrical distribution strategy proposed in this outline services report will cover all relevant electrical systems.

1.1 Electrical Standards

- BS 7671: - Requirements for Electrical installations. IET Wiring Regulations.
- BS IEC 60287 2012 - Current Capacity of Cables.
- BS EN 60947:2015 - Low Voltage Switchgear and Control gear with Amendment 2.
- BS EN 12464-1:2011 - Light and Lighting- Lighting of Workplaces, Indoor Workplaces.
- BS EN 12464-2:2014 - Lighting of Workplaces, Outdoor Workplaces.
- BS 5266-1:2016 - Emergency Lighting. Parts 1 to 10. Code of Practice for Emergency Lighting
- BS EN 50172:2004 - Emergency escape lighting systems.
- IEC 60158 - Specification for Low Voltage Control Gear.
- BS EN 61439:2015 - Low-voltage switchgear and control gear assemblies.
- BS 7430:2011+A1:2015 - Code of Practice for Protective Earthing of Electrical Installations
- BS 5839-1 - Fire Detection and Fire Alarm and PA/VA
- BS 8519 – Life Safety and Fire Fighting, classified as Category 1 Control cable
- BS EN 62305: Protection against Lightning
- BS EN 61643:2013 - Low voltage surge protection devices
- BS EN 50200:2015 - Method of test for resistance to fire of unprotected small cables for use in emergency circuits
- BS 7629-1:2015 - Electric cables. Specification for 300/500 V fire resistant multicore cables
- BS 8519:2000 – Fire Resistant Power and Control Cable Systems for Life Safety and Fire Fighting Applications
- CIBSE Lighting Guide 02 Lighting for Health Care Premises.
- HTM 06-01 - Electrical services supply and distribution - Part A - Design Considerations

1.2 Electric Mains and Sub-mains Distribution

The Gallery Restaurant is currently served from the wider North Manchester General Hospital low voltage distribution network. It is understood that the area is fed via a sub-main derived from local LV switch room, terminating at local distribution equipment within the restaurant and kitchen areas. The origin, rating, route and condition of the existing sub-main have not been confirmed at the time of writing.

Record information for the existing electrical installation is limited. The Stage 1 ground-level visual inspection did not include access above the suspended ceiling within the Dining Extension, and no intrusive investigation of the existing distribution equipment has been undertaken. It was noted during the Stage 1 site visit that spare capacity within the local electrical distribution may be limited.

The existing installation is understood to comprise general and emergency lighting, small power, heating controls, fire alarm devices and kitchen equipment supplies, with distribution equipment locations to be established by survey. The earthing arrangement is assumed to be TN-S at the point of supply to the works area, to be confirmed.

1.3 Low Voltage Distribution:

This section describes the local low voltage distribution downstream of the sub-main termination, comprising distribution boards, final circuit distribution, containment, isolation and interfaces with mechanical and life safety systems.

Distribution Boards

New distribution equipment is proposed as follows:

A new three phase and neutral distribution board serving the Dining Extension, Servery and Toilet Block, located within location to be confirmed a dedicated, accessible position outside public circulation is required.

A new three phase and neutral distribution board or motor control centre within the new plant extension, serving the air handling unit, kitchen extract plant, WC extract, condensing units and associated controls. Retention and modification of the existing catering distribution board where survey confirms it to be of suitable age, condition and capacity; otherwise replacement to suit the revised equipment layout.

Distribution boards are to comply with BS EN 61439-3, with panelboards to BS EN 61439-2. Boards are to be fitted with lockable doors, be provided with a minimum of 25% spare ways and 25% spare capacity for future adaptation and be labelled and scheduled in accordance with HTM 06-01. Type 2 surge protective devices are to be provided in accordance with BS 7671 Section 443 and Regulation 534.

Final Circuit Distribution

Final circuits are to be distributed as follows:

Separate final circuits for general lighting, emergency lighting, small power, catering equipment, mechanical plant and controls, and specialist services.

Cables generally LSZH insulated and sheathed single core in containment, or LSZH sheathed SWA where run externally, within the plant extension or where mechanical protection is required. Cable sizing is to satisfy volt drop, thermal constraint and disconnection time requirements in accordance with BS 7671, with volt drop from the origin of the installation limited to 3% for lighting and 5% for other uses.

Socket outlet circuits rated at 32 A or less and intended for general use are to be provided with 30 mA additional protection in accordance with Regulation 411.3.3. RCBOs are to be used in preference to grouped RCD protection in order to limit the consequences of a single circuit fault, and are to be Type A as a minimum.

New small power accessories and outlets are to be provided throughout the Toilet Block and Dining Extension, replacing existing accessories disturbed by the refurbishment.

Accessories within the kitchen, servery and wash-up areas are to be of a wipe-clean, corrosion resistant pattern with IP ratings appropriate to the local environment, generally IP65 within wash-down zones, and are to be positioned clear of splash zones and heat sources.

Distribution boards will if possible:

- Be metal-clad, fully rated, and compliant with BS EN 61439.
- Include 25% spare ways minimum.
- Incorporate RCBO protection where required to minimise nuisance tripping.

Be positioned within dedicated rooms wherever practicable to support maintenance access.

The installation of the low voltage systems is to be phased as per the project phasing plan, and shall be installed in such a way to minimise distribution to ensure that the area remains operational during fit out.

New electrical supplies will be provided for the proposed mechanical plant including:

- AHU.
- VRF outdoor unit(s).
- VRF cassette units and controls.
- Kitchen extract fans.
- WC extract fans.
- Associated controls and BMS panels.

Final connection points will be determined following confirmation of the existing distribution and available capacity.

1.4 Metering

To align with NHS Net Zero and energy management objectives:

- Sub-metering will be provided at SMDB level.
- Metering will integrate with the existing Building Management System (BMS) and energy monitoring platform.

Final metering strategy will be developed at Stage 3 in consultation with the Trust estates team.
Generally, the electrical metering strategy will ensure the main incoming supply plus the following items/equipment are monitored:

Metered Electrical Systems	
Plant Item	**Rated Input Power (kW)**
Hot Water & Heating generating installations supplied direct from the building main panel	>10
Motor control centres providing power to fans and pumps	>10
Final electrical distribution boards	>5

Meters with pulse outputs or other communication protocols with the ability to be interfaced with the BMS system for monitoring and data logging usage will be utilised and installed as per the schematics, drawings and this specification. All meters within switchboards will be grouped and communicate with the BMS system via IP addressed gateway. Meters on general lighting and power distribution boards around the building will be connected direct to the BMS.

All electrical energy monitoring meters will be multifunction digital meters measuring V, A, kW, kVA, kVAr, PF, kWh etc.

1.5 Power Installations

Generally, each circuit will be wired on the ring main principle protected by miniature circuit breakers incorporating overcurrent protection. Socket outlets will be provided with RCD protective devices.

The general power will be wired using 4mm²LSF singles in trunking and conduit.

Socket outlets will be colour coded to established which power source they are supplied from e.g.,

All final circuits supplying general purpose socket outlets will be provided with high integrity earthing.

Smoke Damper Control Panel/Supplies shall also be included.

New small-power accessories will be provided within the refurbished WC accommodation and other areas directly affected by the works.

Existing power installations within the Kitchen and Servery will generally be retained unless alterations are required by the proposed works.

1.6 Containment Systems

A new containment system shall be provided throughout the new Gallery Restaurant refurbishment.

The electrical containment system will comprise the following: -

Primary Routes

- Sub main cable tray
- Low voltage final circuit wiring trunking
- Communications tray
- Extra low voltage tray
- Fire alarm tray

All tray & trunking will be galvanised steel.

Secondary Routes

- LV final CCT wiring galvanised conduit.
- Communications final CCT wiring galvanised conduit.
- ELV CCT wiring galvanised conduit.
- Fire Alarm CCT wiring galvanised conduit.
- Primary electrical containment will run within ceiling void.

All steel containment used in external applications will be hot dipped galvanised.

1.7 Lighting Installations

General lighting will be provided to suit the application area served and to achieve the recommended lighting levels as published in BS EN 12464 and CIBSE LG2.

Method of lighting control for each space will be provided with a combination of manual and presence detection in line with the operational requirements required.

Emergency Lighting will be provided in accordance with BS 5266. Emergency luminaires will be LED self-contained dedicated and integral luminaires in addition to the general lighting.

Emergency lighting will be tested by means of manual key switches located adjacent to the distribution boards.

The general lighting and emergency lighting will be wired using 1.5mm² LSF singles in trunking and conduit.

New general lighting will be provided within areas affected by the refurbishment and RAAC replacement works.

High-efficiency LED luminaires will be selected and coordinated with the architectural ceiling arrangement.

Existing lighting within retained areas will remain where outside the project scope unless specifically identified for alteration.

Automatic controls will be provided where appropriate to reduce unnecessary energy consumption.

Lighting Performance Criteria

The lighting conditions shall be in accordance with the Lighting Design Criteria as shown on the following tables.

The general illuminance for the building areas will be taken from CIBSE/SLL Code for Lighting and BS EN 12464 as per the lighting levels table in the design conditions section above.

Lighting criteria from CIBSE LG2 shall also be consider as well as HTM 06-01 and BS EN 12464-1.

Emergency Lighting:

Emergency Lighting will be provided in accordance with BS 5266. Emergency luminaires will be LED self-contained dedicated and integral luminaires in addition to the general lighting.

Emergency lighting will be tested by means of self test system only

The proposed emergency luminaires are to be self-contained with 3 hours of battery backup. Battery packs shall be Lithium-Ion complying with the requirements of ICEL 1001 and will be provided in the primary lighting in common areas together will illuminated exit signs. Emergency lighting key test switches will be provided adjacent to the suppling distribution boards.

Illuminated exit signs shall be provided at final exits to the building doors to stairwells and intermediate changes of direction within the building on escape routes, in accordance with the Fire Consultants escape plans.

In case of power failure, the emergency lighting system will provide a minimum level of illumination as per BS 5266 indicated in the following emergency lighting requirements table.

Emergency lighting affected by the works will be replaced or modified to suit the revised layouts and escape routes.

The installation will be designed in accordance with BS 5266 and BS EN 1838 and coordinated with the project fire strategy.

1.8 Fire Detection Systems

The existing sitewide fire alarm and detection system shall be extended into the fit out area, providing total coverage throughout the building communal area to comply with BS 5839-1, BS EN 54 and HTM 05-02.

A category L1 fire detection system in accordance with BS 5839 Part 1 should be installed thought out. This system will equate to smoke detection in each area with manual call points at final exit doors.

Generally, all ceiling mounting devices shall be fed from cable contained on dedicated containment systems within the ceiling void or floor void above. For all wall mounted devices such as break glass units, cabling shall rise up the wall from the device recessed in metal conduit into the ceiling void connecting to the respective device.

The existing hospital fire alarm system will be extended and modified as required to suit the refurbished areas.

New interfaces are anticipated for:

- New mechanical ventilation plant.
- Kitchen extract plant where required.
- Replacement kitchen fire suppression system.
- New fire shutter between Kitchen and Servery.
- Fire / smoke dampers where required by the fire strategy.

The final cause-and-effect requirements will be coordinated with the Trust and Fire Engineer.

1.9 Communication Systems

Data systems shall be served from the current data cabinet located on off the main hospital street. Switches shall be retained but new cabling shall be provided as part of the fit out.

The cable containment will be provided in ceiling void and cable risers for distribution. Proposed WiFi points and data outlets have been indicated on the drawings within the next design phase.

1.10 Earthing

An earthing system will be provided to comply with BS.7430: 1998, and BS.7671 IET Wiring Regulations 18th Edition and relevant HTM's.

The principle elements of the earthing system comprise the following: -

- LV System Earthing - The LV system earth will ensure that a protective conductor connects all exposed conductive parts to one of the main earth bars. The main earth bars will be located adjacent to the main LV switch panels. Each distribution board will have its own integral earth bar and a dedicated separate wall mounted earth bar.
- Sub main cables will have separate circuit protective conductors.
- Equipotential Bonding - Main equipotential bonding will ensure that extraneous conductive parts are bonded to the main earth bars. This will generally consist of bonds to the main water pipes, air ductwork, pipework, exposed metallic parts of the building structure, metallic cable sheaths of all cables (except Telecoms) and the lightning protection systems. All will be bonded to earth.
- Supplementary Bonding - Supplementary equipotential bonds will be made to interconnect all simultaneous accessible conductive parts to the protective conductor system. This will generally be undertaken in bathrooms, shower rooms, and wet and damp process areas such as kitchens.
- Voice & Data Systems Functional Earth – Functional earth cables will also be installed from the main earth bar to the main IT equipment rooms around the building.
- Connection to the Lightning Protection Installation
- Final Circuit Earthing - All final circuit lighting and individual power circuits will be provided with separate protective conductors. All general-purpose socket outlet circuits will be provided with high integrity earthing.